United States Department of the Interior

FISH AND WILDLIFE SERVICE

New England Field Office
70 Commercial Street, Suite 300
Concord, New Hampshire 03301-5087

004975

February 24, 2005

Colonel Thomas L. Koning
District Engineer
U.S. Army Corps of Engineers
696 Virginia Road
Concord, MA 01742

Dear Colonel Koning:

This is in response to Public Notice 2004-388-1, an application by Cape Wind Associates for a Section 10 permit to install and maintain 130 wind turbine generators and associated infrastructure in Nantucket Sound, Massachusetts.

The proposed offshore wind farm would entail a form of exclusionary occupation in 24 square miles of public waters, lands and airspace, as described on Plan Sheet 2 and Sheet 2 of 18 in the Public Notice. Turbine support structures would physically occupy approximately 0.68 acre of bottom lands. Additional lands would be affected by 1) the large-scale jack up barges needed to provide stable work platforms during construction, 2) the installation of electrical cables from each turbine to the electrical service platform and from the platform to onshore transmission facilities, and 3) the construction of scour protection measures around the base of each turbine monopole. Approximately 1,381 acres of benthic habitat would be affected in the construction footprint of the proposed project (DEIS, Table 5.3-3). Wind turbines with a capacity of 3.6 mw and rotor tip height of 417 feet above sea level would be used in the wind energy project.

Aquatic resources of national importance in Nantucket Sound include 1) migratory birds, shellfish, fish and other benthic and pelagic species utilized by fish, birds and mammals, including man; and 2) physical attributes such as a semi-enclosed shallow sea with a complex of macro- and micro-scale habitat features. These resources are more fully described and discussed in the Fish and Wildlife Service reports dated March 25, May 6, and June 29, 2004 to your Regulatory Division, which were based on our review of environmental documents for the proposed project. In addition, we are also incorporating by reference all of the Service correspondence on the proposed Cape Wind Project contained on the Chronology of Service Correspondence attached to this letter.

In view of the above, it is the opinion of the Fish and Wildlife Service, Department of the Interior, that the Cape Wind proposal may represent substantial and unacceptable adverse impacts to the aquatic resources of national importance as defined in paragraph one, Part IV(3)(a) of the Clean Water Act subsection 404(q) Memorandum of Agreement, signed December 21, 1992, between the Department of the Army and the Department of the Interior. We are hereby making this notification to preserve our prerogative to elevate matters associated with the processing of this application at some future time should the need arise.

Questions should be directed to Mr. Vernon Lang or myself at 603-223-2541.

Sincerely yours,

Michael J. Bartlett
Supervisor
New England Field Office

Attachment

Chronology of Service Correspondence

December 31, 2001 – Scoping letter to Robert Durand, Secretary, Massachusetts Executive Office of Environmental Affairs. Discussed migratory birds, fisheries, submerged lands, alternatives, and other scoping issues for the joint EIR/EIS.

January 17, 2002 – Service report on the Section 10 permit application to install a data collection tower on Horseshoe Shoal in Nantucket Sound. The Service recommended that the data tower application be held in abeyance pending completion of the scoping process. This would enable the agencies to identify equipment/technology and study design necessary to fill data gaps for the EIR/EIS. The Service recommended that the data tower be fitted with various remote sensing equipment identified during the scoping process.

February 22, 2002 – The Service agreed to participate as a cooperating agency within the limits of existing staff and funding constraints.

April 1, 2002 – Scoping letter discussing two-step evaluation process for OCS lands similar to process for oil and gas development to create a more efficient NEPA process. Also discussed purpose and need and iterative screening process to identify the range of reasonable alternatives.

May 8, 2002 – Scoping letter identifying need for remote sensing studies for birds; predator-prey investigations involving benthic species, fish, mammals and birds; and avian response to weather events in Nantucket Sound. The Service recommended three (3) years of study using radar and other techniques (Option 1). Letter also addressed consultation process and information needs regarding roseate tern and piping plover.

May 13, 2002 – Memorandum discussing alternative options to the pile-supported data tower. Also recommended two (2) long-range acoustic recording devices be installed on the tower, if it is selected.

May 16, 2002 – Memorandum discussing the draft scope of work for the DEIR/DEIS. We reiterated comments made in prior scoping letters, including the need for three years of radar study for avian resources (Option 1), and interconnections between benthic, fishery and avian resources.

June 7, 2002 – Memorandum discussing the list of Special Conditions for the data tower Section 10 permit. The Service learned that our recommendation for the long-range acoustic monitors were not included, and asked the Corps to confirm if they had been accepted or rejected.

July 19, 2002 – Formal Section 7 consultation letter stating that the data collection tower would have no, or at most discountable, effects on the piping plover and roseate tern.

October 22, 2002 – Memorandum recommending that the recreational intercept study be conducted using face-to-face interviews as a means of gathering more site-specific information than could be obtained by telephone interviews.

November 13, 2002 – Memorandum discussing the screening process for the Cape Wind alternatives analysis. We identified constraints that exert undue control on the identification of reasonable alternatives, including the definition of utility-scale and the requirement for renewable energy with a connection to the New England grid.

December 11, 2002 – Memorandum discussing the alternatives screening process, including a fatal flaw matrix. Raised concerns with the definitions of project purpose and utility-scale, and with the criteria in the fatal flaw matrix.

May 1, 2003 – Memorandum discussing purpose and need statement and preliminary screening criteria for the alternatives analysis. We reiterated the concerns raised in the November 13 and December 11, 2002 memoranda above. In addition, we cited the ISO-NE CELT report and the large number of small-scale generating stations on the grid. The CELT report does not support the notion that utility-scale must be at least 200 mw.

March 25, 2004 – Memorandum discussing the Table of Contents, Project Purpose and Need, and Project Description sections in the Cooperating Agency review draft. We suggested that the project purpose be broadened because it is so narrowly drawn that representative sites must be invented for the alternatives analysis. In addition, we suggest that the same criteria be used to evaluate all alternatives considered in each iteration for process consistency.

May 6, 2004 – Memorandum regarding the alternatives analysis in the agency review draft. This is a page-by-page, line-by-line review. We identified shortcomings with the no-action alternative, and identified data gaps in baseline data for the action alternatives. In particular, we identified conclusory statements and other areas where the document is vulnerable because the data and/or literature do not support the conclusions drawn.

June 29, 2004 – Memorandum discussing the environmental effects of the applicant's preferred alternative in the agency draft. This is a line-by-line, page-by-page critique. In this review, we identified the major shortcomings regarding the lack of temporal and spatial data for the benthic, fishery, and avian sections of the document. This is our first opportunity to review and comment on the avian radar study, and we identified the stark contrast between the number of birds observed in the rotor-swept zone by boat and aerial surveys (365), versus the radar surveillance (127,697).

February 15, 2005 – Memorandum discussing proposed field study consisting of nighttime boat and aerial surveys of winter waterfowl in Nantucket Sound. With respect to the very serious data gaps that exist in the Cape Wind DEIS regarding avian resources, this proposed study represents another failed opportunity to collect the right kind of information for impact assessment purposes.

United States Department of the Interior

OFFICE OF THE SECRETARY
Office of Environmental Policy and Compliance
408 Atlantic Avenue – Room 142
Boston, Massachusetts 02210-3334

TAKE PRIDE IN AMERICA

March 2, 2005

ER 04/897

Colonel Thomas L. Koning, District Engineer
U.S. Army Corps of Engineers
696 Virginia Rd.
Concord, MA 01742

Dear Colonel Koning:

The Department of the Interior (Department) has reviewed the U.S. Army Corps of Engineers' November 2004 Draft Environmental Impact Statement (DEIS)/Draft Environmental Impact Report for the Cape Wind Energy Project. As currently described, the proposed project will include 130 offshore wind turbine generators (WTGs) capable of producing about 3.6 megawatts (MW) of power per WTG. This will result in an average annual output of 170 MW of power, with a maximum capacity of about 454 MW. Our detailed comments on the DEIS are included in the appended matrix, formatted to facilitate responses by the Corps of Engineers.

Over the past three years the Department has participated as a Cooperating Agency in the EIS process for this proposal. Our involvement has included participation by several Bureaus of the Department, including the Minerals Management Service (MMS), U.S. Fish and Wildlife Service (FWS), National Park Service (NPS), and the U.S. Geological Survey, as well as the Office of the Secretary and the Office of Solicitor. We have provided our perspective and expertise during scoping, study design, interagency meetings, in section-by-section review of preliminary drafts, and have attended public meetings and recent hearings on the DEIS.

The Department acknowledges the uniqueness of the Cape Wind proposal, and the enormity of the environmental impact evaluation is reflected in the 4000+ page DEIS. The uniqueness and breadth of the proposal has necessitated a very thorough and careful review of the DEIS, requiring considerable effort of the participating Bureaus and Offices of the Department at all levels. We apologize for the delay in providing our comments, but respectfully request that you accept our input for consideration.

I look forward to our continuing discussions. Please contact me at the above noted address, or by phone at (617) 223-8565. If you or your staff would like to discuss any of the comments included in the appended Comment Matrix, we can provide you with contact information for the respective contributor.

Sincerely,

Andrew L. Raddant /s/
Regional Environmental Officer

FINAL Department of the Interior Comment/Response Matrix

Cape Wind Associates; Army Corps of Engineers, New England District

Draft Environmental Impact Statement

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		General	The 130 monopoles and electrical service platform proposed to be constructed and part of the Horseshoe Shoal environment are likely to become fish attraction devices (FADs). This will result in changes to benthic invertebrates, finfish, essential fish habitat, recreational fishing, commercial fishing, and sport diving. This information should be so emphasized in the DEIS. Accordingly, the DEIS should discuss the degradation to these resources that would result when the monopoles are removed upon decommissioning. The DEIS will benefit by referencing MMS publications and other information that has been developed over the years in its "Rigs to Reefs" that substantiates program to substantiate a conclusion that these monopole foundations are likely to become FADs. The DEIS does not characterize the lubricating fluids and oils used for the wind turbine generators,or t he diesel fuel capacity and routine discharges from service or construction vessels used for the multiple phases of the project. Vessel discharges to the sea, or potential discharges to the sea caused by accidents or improper handling have the ability to affect water quality and other biological resources. Discharges need to be characterized in the DEIS and their impacts assessed.	MMS
		General	It is important to describe the monopole removal method. These will be 16 – 18 ft diameter poles with pilings driven 85 ft into the substrate. There needs to be more discussion than just to state they will be cut 2m below the mud line. Please also see specific recommendations on DEIS section 4.5 , p. 4-20.	MMS
		General	Among the considerations are ice impacts and possible accretion from ice drifting out of the harbor areas to the north of the proposed wind farms (minimal) and ice build up on the pylons during extended cold events. Since tides in the area are approximately 6 to 8 feet, ice buildup over time on the cold pylons could form an ice rim on the pylon,but the ice would not create a large rim and would probably not fall off in large masses that could endanger boat traffic in the area. Icing during storm events could	MMS

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			cause impacts, but since the pylons are not floating, the major concern would be instability caused by ice on the turbine blades or increase wind loads cause by ice buildup on the superstructure of the support structure.	
		General	Overall, the DEIS does not contain a thorough inventory of the bird and bat species present in the preferred site. Some very short-term biological assessment studies have been conducted by the applicant and other organizations but these are not sufficient to adequately determine which species occur in the preferred action area on a year-round basis. This information must first be gathered before any general or specific determinations can be made on how the proposed action will affect the biology and behavior (e.g.,f light and staging patterns) of any of these species, how to place the wind farm to create the least impact and which measures would be best to mitigate impacts. A more appropriate approach would have been for the applicant to conduct a three-year, year-round biological assessment of bird and bat species in the preferred site, as previously recommended by the Department.	MMS
		General	The DEIS does not contain adequate information regarding the cumulative impact of the current proposed action and future offshore wind farms in the action area. Massachusetts continues to be an ideal U.S. east coast location for these offshore wind farms since wind conditions and water depth are more suitable than other locations.	MMS
		General	The DEIS needs to provide further information and data when assessing the potential impact of bird collision mortality. The small amount of information known on bird collisions is from land-based farms. Although this information can be used to interpret effects to marine and shore birds, it cannot fully assess the impact as collisions are likely to have a higher mortality rate in offshore farms (i.e., unconscious birds would likely drown before being able to regain consciousness). The applicant should further incorporate the most recent data on bird collisions from existing offshore wind farms in Northern Europe but in doing so keep in mind that the Cape Wind project is much larger than these farms in Northern Europe.	MMS
		General	The applicant should address any mitigation measures that would be set in	MMS

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			place to reduce the effects of motion smear, especially with the slower rotating turbines proposed for the project. The applicant should also further address mitigation measures for minimizing collisions in bad weather or low visibility and how confusion can occur when visual disturbance is compounded by noise disturbance. This is especially important for over-water migrations of passerines where adverse weather conditions have resulted in high mortality rates (Berthold, 2001). Berthold, P. 2001. Bird Migration: a general survey. H. Bauer & V. Westhead,T rans. Oxford: Oxford University Press.	
		General	Within the DEIS, there are a number of references by the applicant to situations where certain bird species were reported to avoid flying through offshore wind farms. The applicant needs to further assess the negative effects, if any, of avoidance of these areas, especially for species which migrate through the preferred site, capitalize on food sources within the site, or use the site as a staging area. It is not sufficient to say that other areas outside the preferred site could meet these needs (i.e., the birds could go elsewhere). Even if this were to occur, there would certainly be more energy expended to alter behavior patterns and it is not a guarantee that alternate suitable locations would be available.	MMS
		General	The DEIS should explain why red flashing lights are proposed for the turbines rather than white strobe lights as previously recommended by the FWS. The applicant should also consider and include any mitigation measures to alter lighting during peak nocturnal migrations.	MMS
		General	The DEIS lacks specific identification of regulatory and enforcement authority and responsibility for many aspects of the project, such as maintenance and operation of equipment, directional drilling activities, cable systems, electrical service platforms, decommissioning.	MMS
		General	Summary Comments: In many cases "conclusory statements" regarding environmental impacts of the proposed Cape Wind Energy Project (CWEP) cannot be supported by the data collected and analyses done. While some sections appear to have been done reasonably well, others are not and in certain regards the DEIS is at best incomplete, and too often inaccurate	USGS

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			and/or misleading.	
		General/ Chapters 2-3	One of the notable features of this DEIS is the very close relationship between the purpose and need as defined in Chapter 2 and the applicant's proposed project in Chapter 3. In our opinion, the alternatives analysis is dramatically limited in scope by the purpose and need statement. In turn, this has an equally dramatic effect on our ability to identify reasonable alternatives that would have fewer impacts on fish, wildlife, and other environmental resources. A second notable feature of this DEIS is the tendency to make conclusory statements regarding environmental effects of the proposal.A major causal factor driving this tendency appears to be the lack of important site-specific information on natural resources in, on, or in the airspace above Nantucket Sound that would be affected by the proposed project. Chief among these are migratory birds and the benthic and pelagic resources that they depend on. Due to these factors, we believe this DEIS is insufficient to provide the information necessary for the Corps to make a decision in the public interest. Based on our review, significant additional information needs to be developed to assess the impacts of the proposed action on resources under our jurisdiction or expertise, and to identify actions which will adequately address those effects. This may be best accomplished through a Draft Supplemental Environmental Impact Statement (DSEIS) for public review. <u>Alternatives Analysis</u> The following discussion generally reiterates comments that the U.S. Fish and Wildlife Service (FWS) has provided as a cooperating agency in this EIS process. A more complete discussion of these issues is contained in the FWS' cooperating agency correspondence as noted in the attached chronology. The purpose and need statement in the Cape Wind DEIS should be	FWS

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			broadened to reflect the underlying public need for electric energy. Both the capacity requirement (200-1500 mw) and the renewable requirement serve to unnecessarily limit and focus the alternatives analysis on the applicant's purpose and need rather than the broader, underlying public purpose and need. For instance, the DEIS screens out several renewable technologies because they did not meet the capacity requirement. Of 17 potential wind park sites, only four were under active consideration by private developers, and only one -- Nantucket Sound -- met the capacity threshold.	
1-9		exec summary	Move footnote 1 re: 500 m safety radius from page 1-10 to page 1-9, bottom paragraph. This is where the safety radius is first mentioned	MMS
2-1		2.1	The Project Purpose and Need does not adequately represent the project purpose or need. P urpose should include a statement of the goals that the project proponent intends to fulfill by taking a given action. Goals and objectives are not clearly articulated.	NPS
2-1		2.2	Need should be a discussion of existing conditions that need to be changed, decisions that need to be made or policies that need to be implemented in order to meet the objectives proposed. The need should represent why the action is being proposed at this time.	NPS
3-5		3.2.1.1.2,Ai r Emissions	It is stated that air emissions from an oil-fired facility would be greater than those from a natural gas-fired facility. We recommend including estimates of the emissions from a typical oil-fired 454 MW facility in this discussion.	MMS
3-6		3.2.1.1.3,Ai r Emissions	It is stated that air emissions from a coal-fired facility would be greater than those from a natural gas-fired facility. We recommend including estimates of the emissions from a typical coal-fired 454 MW facility.	MMS
3-26		3.3	Under the No Action Alternative, there are numerous references to the proposed alternative (i.e., wind power) and those references are comparative. In this section, the No Action Alternative should be described objectively and not be subjected to a comparison and contrast with other alternatives. For example, in the No Action description, the paragraph states that the Northeast would benefit from the proposed actions by	NPS

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			reducing dependency on foreign oil. This sentence is not describing the No Action Alternative, but is rather describing the proposed alternative. The DEIS would benefit if reference and comparison of the proposed alternative were removed from the independent descriptions of each of the alternatives including the No Action Alternative. The No Action Alternative should define what the current conditions are, such as how many power plants currently exist, how many megawatts are produced by those plants and what is the demand for the area compared to the production. In addition, a table in the Environmental Consequences section should clearly define these parameters based on each alternative.	
3-37		3.4.3.1	Four alternative locations are identified as representative sites for additional environmental review and comparison purposes. The stated purpose of this iterative analysis is to "help provide the calibration for the weighing and balancing of the probable impacts and benefits of the proposed alternative". It is not clear how this iterative analysis, the summary, or Table 3-57 sharply define the issues and provide a clear basis for choice among options,or how they meet other NEPA or Public Interest Review requirements. Where unresolved conflicts exist over resource use, the DEIS does not adequately analyze the practicability of using reasonable alternative locations and methods to accomplish the objectives of the proposed project.	
3-93		3.4.3.2.11	There are no historic properties within Cape Cod National Seashore (Cape Cod NS) that will be affected by the four proposed Wind Park sites located in the Massachusetts Military Reservation (MMR), Nantucket Sound,S outh of Tuckernuck Island, and in Buzzards Bay near New Bedford Harbor. The distances between the historic properties and the wind turbines needs to be clarified. F or the Massachusetts Military Reservation site, a review of the National Register documentation for certain sites is recommended as	NPS

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			described below.	
3-95		3.4.3.2.11	The NPS' review of historic properties looked at resources where the Wind Park may have an impact on the historical integrity (defined as location, design, setting, materials, workmanship, feeling, and association of a historic property), the setting in particular. For the Massachusetts Military Reservation site, most of the National Registered-listed or eligible sites contain expansive settings where the impact would be minimal, such as Bourne Bridge, Sagamore Bridge, and Cape Cod Canal. O ther National Register-listed or eligible sites are in close proximity to the Wind Park (if not surrounded). These sites require review of the National Register documentation or a site visit to determine the impact of the altered setting, such as the Camp Edwards Range Control.	NPS
3-99		3.4.3.2.11	The comparative summary page should address the proximity (since it relates to the integrity of setting as described above) of the National Register-listed or eligible resources rather than just the quantity of sites. For example the MMR site would locate wind turbines in close proximity to two National Register eligible sites, Camp Edwards Range Control and Ammunition Supply Depot. How close will the turbines be, and what is the height of the wind turbines (if different than the offshore model for the preferred site)? Similarly, it appears that the New Bedford Wind Park site is in close proximity to several sites. Again, how close, and what is the height of the wind turbines (if different than proposed for the preferred site), should be described. We also recommend that the term "Architectural Historic Properties" be revised to read "Historic Properties" as the list includes districts, and civil engineering landmarks.	NPS
3-100		3.4.3.2.12	The selected views in the Aesthetic/Landscape/Visual section should include the historic property in the foreground and the simulated wind turbines in the background. The proposed simulations are from the beach, which will not show the view of the historic property <u>with</u> the wind turbines, and as a result are inconclusive. The relationship of the wind turbines to the historic properties is particularly needed for MMR and New	NPS

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			Bedford (see earlier comments on proximity of properties).	
3-153		3.4.3.4.4 Vessel Traffic Impacts	1) The section incorrectly concludes that there is "no evidence of long-term effects to these marine mammals due to the physical disturbance of the motor vessels." However, no longitudinal studies have been done to assess potential long-term effects of vessel disturbance on marine mammals. The short-term studies and anecdotal information cited within this paragraph (and elsewhere in the document) were not fully designed to assess potential long-term effects. Therefore, we suggest changing the language in this paragraph by inserting the following as the start of the second sentence of the paragraph: "*However,no longitudinal studies exist to assess potential long-term effects of vessel disturbance on marine mammals. For short-term impacts, evidence from whale watching and fishing activities in MA waters indicates....to the presence of large or small motor vessels (Watkins, 1986).*" Then, delete "*and that there is no evidence of long-term effects to these marine mammals due to the physical disturbance of motor vessels.*" 2) Although many of the documented collisions have occurred with larger, ocean going vessels, there have been instances of mortality and injury from smaller vessels; e.g., whale watching and recreational boats. We suggest inserting the following phrase at the end of the second sentence: "*although smaller and slower moving vessels such as whale watching boats have also resulted in mortality (Geroge et al., 1994; NMFS, 2002; Kraus, 1990; Laist et al., 2001).*" 3) Each species (and even individual) tends to show a different level of tolerance for vessel traffic. Although gray seals may have been reported to be tolerant of construction activities at a wind farm in Sweden, harbor seals are known to more quickly leave haul out sites when disturbed. Over time, repeated flushing can increase the potential for injury and mortality of pups (especially during pupping season), result in abandonment of preferred haul out sites, and cause an increase in energy costs. We recommend inserting language into this paragraph that recognizes the differing reactions between species and individuals and	MMS

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			reference the mitigation section in Appendix 5 that states NOAA Fisheries viewing guidelines will be followed to minimize disturbance.	
3-235			On page 3-235, the DEIS contains a list of the Nantucket Sound project design-siting criteria. In this set of siting criteria, the capacity criterion is approximately 454 mw of wind-generated energy. In previous sections, it has been 200-1500 mw or 454 mw, but with no consistent application of either capacity figure. There is no mention of a 200-mw-size facility in these criteria or in the subsequent evaluation on pages 3-235 to 3-237. For instance, would Handkerchief or Tuckernuck Shoal accommodate a 200 mw facility? Is a 200 mw facility a reasonable alternative at Horseshoe Shoal? A 100 mw facility? A 50 mw facility? The minimum-sized facility that would be practicable at Horseshoe Shoal in Nantucket Sound should be described. The results of the siting analysis indicate that both Handkerchief Shoal and Tuckernuck Shoal are technically, environmentally, and economically constrained for a variety of reasons listed on page 3-236. Since all three sites are also identified as being generally feasible for a wind park on page 3-235, we believe the Corps should clarify whether Handkerchief and Tuckernuck Shoals are feasible/practicable alternatives in both the NEPA and Section 10 contexts. In addition, the Corps should evaluate how the feasibility of the sites would change if Horseshoe Shoal were to be developed into a commercial wind farm. For instance, would the infrastructure and/or revenue stream at Horseshoe Shoal make Handkerchief, Tuckernuck or other shoal areas in Nantucket Sound feasible (or simply more feasible) to develop into a commercial wind farm? As stated above, the cumulative impacts of such a build-out should be addressed.	FWS
3-236		3.4.4.2	With regard to the Monomoy/Handkerchief sub-site in the Nantucket Sound alternative, we suggest revising this section to include language acknowledging the special protected status of the resources of Monomoy National Wildlife Refuge (NWR)as pert he designation of portions of the refuge as a national wilderness area. As a national wilderness area, the	NPS

FINAL Department of the Interior Comment/Response Matrix *Cape Wind Associates; Army Corps of Engineers, New England District* *Draft Environmental Impact Statement*				
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			NWR is afforded special protections under the 1964 Wilderness Act to preserve the wilderness experience of the area by minimizing or, to the extent practicable, eliminating any human impacts. To date, there has been no acknowledgement of this special status of the refuge or how visual impacts should be considered in the context of this law. In addition, Cape Cod NS's boundary currently overlaps the boundaries of Monomoy NWR due to the southward migration of the southern sand spit in Chatham, MA. Since the park boundary is defined as 1/4 mile offshore from the land mass, park boundaries incorporate an area that might also be impacted by visual impacts. Cape Cod NS's General Management Plan clearly states that the park will "provide access to views that occur naturally in open areas; maintain vistas only to meet cultural landscape objectives, operational/safety needs or interpretative needs that cannot be met elsewhere." This project does not meet those criteria.	
4-5	4th para	4.1.3.3	Foundation System Design: The first sentence states that a wave height and period for various water depths was an input to the foundation analysis. What was is the design basis wave height for end member water depths? To better gauge structural integrity and safety concerns, this section should include the design basis wave height or a range based on water depth.	MMS
4-7		4.1.4	The Electrical Service Platform (ESP) measures 100' x 200' in 28' of water. It will include ventilation and safety systems, living accommodations, communications, and a helideck. This section should provide detailed information on how the responsibility for maintenance, upkeep, and personnel will be handled.	MMS
4-19	3rd para	4.4	Number of Vessel Trips: The DEIS should include a discussion of the type and numbers of service vessel trips needed to provide the amounts of lubricating oils, cooling oils (10,000 gallons), diesel oil, and grease that will be needed during the operation of the WTG as described on pages 4-20-4-21. Crew boats and service vessel trips are reported for "maintenance." Is maintenance equivalent to the number of trips expected for the whole operations phase? The hydrocarbon carrying capacity of	MMS

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			these vessels should also be provided. These data are very amenable for presentation in a table.	
4-20	2nd para	4.5	The MMS requires bottom-founded oil and gas structures to be removed 5 m (15 ft) below mud line. The DEIS proposes to remove monopole foundations at a depth below mud line of 2 m. Is the correct requirement cited for decommissioning and foundation removal for the Project? The MMS's requirement is provided below. MMS Notice to Lessees 2001-G08 "Structure Removal Applications" http://www.gomr.mms.gov/homepg/regulate/regs/ntls/ntl01-g08.html	MMS
4-20		4.5	The method of monopole foundation removal is not specified other than "cut off." Is the removal method of cutting meant in a literal sense as in a saw, or is cutting used more or less as a synonym for severing, in which case the actually method could be among a range of options. If the latter, the potential for explosive severing would need to be addressed, especially with respect to listed species like sea turtles and marine mammals. This section should be revised to clearly specify or describe the manner of foundation removal or cutting.	MMS
		4.6	"Solid and Hazardous Materials." This section needs to include a discussion about solid waste (trash and debris), the regulations that control the handling of these materials at sea, and their proper disposition.	MMS
4-20 4-21		4.6.1 4.6.2	The oil spill handling equipment that will be required on all service vessels and the waste collection system to be installed on board each WTG and the ESP should be fully described by types, quantities, and capabilities in this paragraph.	MMS
4-21	5th para	4.6.2	The oil containment kits to be located near all equipment should be fully described by types, quantities, and capabilities. The location of this equipment should be specified.	MMS
4-21 5-83 9-2	5th para	4.6.2	In Section 4.7,th e first occurrence, it is stated that MMS has jurisdiction over oil spill planning and preparedness for the Project. The references throughout the document, as noted on the following pages, should delete	MMS

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9-5			the reference to an EPA Spill Control and Countermeasures Plan (SPCC), which is not required for facilities covered by MMS Oil Spill Response Plans. The pages where the reference to SPCC plans needs to be revised include: page 4-21, Section 4.6.2; page 4-21, Section 4.7; page 5-83, paragraphs 4-6; page 9-2, Section 9.1; and page 9-5 Section 9.8.	
4-21		4.7	An oil spill response plan (OSRP) must be reviewed and approved by MMS prior to the installation and operation of the proposed facilities, per MMS regulations. An OSRP must be submitted, approved, and on file ***with*** a plan of operation for the Project. The DEIS should indicate that their OSRP will be submitted with the operations plan.	MMS
5-1		5.1	We remain concerned about the protocols used for the sediment and benthic sampling in the alternative wind park sites and cable routes in Nantucket Sound. In particular, we question whether these protocols can provide data that are acceptable for macro– and micro-scale siting decisions and impact evaluations. It appears that the sediments were characterized as being in one of seven major types (Figure 5.1-5) and that the impact analysis for the project was based on these major sediment types. This appears to be a very coarse filter, given the size of the study area in Nantucket Sound. In 2001, a series of 46 sediment and benthic samples were collected to characterize the Horseshoe Shoal study area and the three major alternative cable routes to the mainland, each being 12-15 miles in length. In 2002, an additional 33 sediment/benthic samples were collected from the three alternative sites in Nantucket Sound (12 samples from the 42.5-square-mile Horseshoe Shoal site, 10 samples from 20.1-square-mile Handkerchief Shoal, and 11 samples from the 34.4-square-mile Tuckernuck Shoal site—Appendix 5.3-B.). On average, it appears that one sediment/benthic sample was collected to represent conditions in 1-3 square miles of sea bottom. We believe this is an extremely coarse filter, even for broad-based zoning or master planning evaluations of Nantucket Sound, much less individual wind farm siting and impact evaluations. In Appendix 4.0-A, page 2, sediments on and around Horseshoe Shoal are described as consisting of poorly-graded, fine-to-coarse grained sands with	FWS

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			localized fractions of clay, silt, gravel and/or cobbles. A similar description of the surficial marine sediments is found on page 5-8. On page 5-9, reference is made to an area of scattered boulders, other intermittent glacially-transported boulders, and other side-scan targets that may represent features such as gravel, cobble patches, submerged aquatic vegetation, or cultural resources. On page 5-141, reference is made to two potential areas of submerged aquatic vegetation within the project area. Accordingly, we believe a much more precise description and mapping of the surficial sediment conditions is necessary to identify, count, and describe the size, shape, persistence, and interspersion of micro sediment types within the larger scale macro sediment types. This finer, more precise scale of information is needed to make decisions on siting, impact avoidance, and minimization, and for predicting environmental effects associated with project construction and operation. The overall issue of sediment and benthic sampling is also found in section 5.2, 5.3, 5.4 and 5.8.1 (see below). We recommend that the Corps reengage the FWS in discussions that will lead to the development of a meaningful sampling and characterization protocol.	
5-8		5.1.3.2	The first paragraph of this section correctly states MMS' authority under Public Law 103-426 relative to the conveyance of rights for sand and gravel for public works projects. However, the paragraph goes on to say that these waters have been withdrawn from leasing until 2012. This only applies to oil and gas leasing. If a request were made to use sand and gravel material within this area for a public works project, MMS could indeed enter into a negotiated agreement and finalize a lease to allow for the extraction of the material. This section adequately describes the shallow geology of the area, but does not mention that the sand resources here represent a potential source of material for nearby beach nourishment. MMS has been informed by the State of Massachusetts and a local engineering firm that has designed several local beach projects, that this material might possibly be used in the	MMS

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			future if nearshore resources become depleted. Therefore, the EIS should mention that the placement of the wind farms and associated infrastructure could possibly interfere with the future extraction of sand in Federal waters that might be used to restore beaches in the Cape Cod area.	
5-8	Figure	5.1.3.2	Conditions Outside of Massachusetts Waters. The text in this section attributes a linked .pdf map file as the basis for text reference to a leasing moratorium. The cited map merely shows east coast OCS areas used by MMS. The citation is incorrect because the cited map doesn't establish anything. It is true that an OCS leasing moratorium exists off Massachusetts, but the cited map does not substantiate it. The citation should be changed to a correct reference for the moratorium, or change the text's characterization of the reference.	MMS
5-22		5.2	Sediment resuspension associated with the 78 miles of interarray cable and 12.2 miles of dual circuit 115kv cable embedment using the jet plow depends on sediment grain size, composition and hydraulic jetting forces (pages 5-15, 5-16). However, the analysis on pages 5-15 to 5-19 is based on a single sediment sample near the mouth of Lewis Bay (Core VC01-L2) that was used to model (Appendix 5.2-C) sand-sized sediment described as poorly graded sand with 4-5% fines (Table 5.1-3). The sediment samples in Table 5.1-3 indicate a wide range of fine grain material in these cores ranging from 0-94%. The analysis in Appendix 5.2-C predicts measurable redeposits of sediment on both sides of the trench ranging from 0.9 inches in depth near the trench to 0.2 inches in depth at a distance of 100 feet from the trench.A s discussed more fully below in our comments on benthic resources, the area affected by these redeposits (0.9-0.2 inches) is 2,186 acres. The other areas affected by sedimentation and redeposits remain undefined.S ince the data above identify localized fractions of clay, silt and gravel and Table 5.1-3 identifies a wide range of fines in the sediment cores, the analysis in Appendix 5.2-C cannot be regarded as representative for sediment types other than poorly graded sands with 4-5% fines. Sedimentation effects resulting from jet plow embedment in clay and silt, and sands with more than 5% fines would likely affect a larger area of Nantucket Sound, persist for a longer period of time, and affect more living	FWS

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			resources. We believe additional work is needed to identify surficial and near-surface sediments on a scale meaningful for impact analysis for the jet plow cable embedment technique.O n page 5-168, a statement is made that a small depression may remain in the trench after the jet plow cable embedment is complete. The DEIS presented no discussion on the size, depth, shape or persistence of this "small depression". We believe this impact needs to be thoroughly evaluated in Sections 5.1, 5.2 and 5.3. As an example, would the "small depression" become a trap for certain species or life stages of aquatic life? In addition, the above discussion on sediment types and percentage of fine grain material may be factors affecting depressions in the trench.	
5-31		5.3	Benthic sampling likewise needs to be conducted on a scale and frequency that is capable of accurately identifying the microhabitats within the study area, including their numbers, size, shape,pe rsistence and interspersion within macrohabitats. The limited benthic sampling conducted for this project was done in August 2001 (46 grabs) and June/July 2002 (33 grabs). These consisted of single surface samples, no replicate samples, limited seasonal difference between sampling dates, and a sampling ratio of one 72- or 81-square-inch surface grab per 1-3 square miles of ocean bottom. A major disparity exists here with the applicant's sampling program and the actual environmental conditions,beca use the DEIS acknowledges very clearly that the benthic community in Nantucket Sound is highly variable from season to season and location to location (page 5-37). In addition, the DEIS states that the reason for the high variability is the patchy nature of microhabitats based on parameters such as depth, substrate type, light penetration, food availability, shelter, disturbance, currents and predation (page 5-37). Despite listing and identifying these important factors, no effort was made to devise a benthic sampling protocol that would accurately sample these microhabitats to identify their numbers, size, shape, persistence, interspersion, locations, species composition and use by fish, birds and mammals in the three alternative sites in Nantucket Sound. We believe that this information is necessary in order to adequately evaluate environmental impacts, characterize and portray the relative merits of the alternatives, or to facilitate siting decisions, as identified in the FWS'	FWS

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			scoping letters dated May 8, 2002,an d June 29, 2004. The general lack of site-specific benthic/sediment data has important implications for the impact analysis associated with anchor line sweep effects during cable-laying operations. According to the DEIS, pages 5-40/47 and Table 5.3-3, approximately 1,172 acres of ocean bottom would be affected by anchor line sweep to a depth of six inches which includes the most biologically active zone. However, because the microhabitats are not identified in the project area, the DEIS is not able to describe how the physical and biological effects vary along the cable routes and how alternative siting on a macro- and micro-scale could avoid or minimize effects to the most sensitive and/or biologically important microhabitats. We note that the impacts described in this section and Table 5.3-3 may underestimate the area, duration and intensity of construction impacts relative to the 12.2 miles of 115kv cable from the electrical service platform to mainland. Since this line includes two circuits separated by a minimum 20-foot distance, the jet plow cable-laying activities would need to be done twice. If these additional impacts have not already been fully incorporated into the impact analysis, they should be included. Likewise, Section 5.3 and Table 5.3-3 need to be revised to include the total area, including macrohabitats (e.g., medium-grained sand bottom) and microhabitats (e.g., clay, silt, or boulder patches in sand macrohabitats), and benthic communities, affected by sediment resuspension from the cable laying, monopole installation and other construction activities. Currently, this section and Table 5.3-3 only identify construction footprint impacts which are a subset of total impact area. Impacts outside the footprint of the immediate construction site are not included. For instance, the area affected by suspended sediment that is redeposited during the jet plow cable embedment process is estimated by the FWS to be 2,186 acres using data in Appendix 5.2-C, and 90.2 miles of electrical cable. The area and living resources affected would likely be greater when the occurrence of fine-grained sediment observed in Table 5.1-3 and fractions of clay and silt sediment types are factored in. In addition, Appendix 5.2-C only estimated	

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			sediment redeposits that were greater than 0.2 inches in depth. Redeposits less than 0.2 inches were not considered. Accordingly, the DEIS should evaluate the area or living resources affected by this sediment plume. The anchor line sweep activity could affect approximately 5,757 cubic yards of surficial sediment per mile of cable based on a six-inch depth penetration. Some of this sediment would be moved by the sweeping motion of the anchor line cables and some could be suspended in the water column and fall back as a redeposit in a different location. Neither this section nor Table 5.1-3 account for these potential effects, including impacts on macro- and microhabitats and benthic communities.	
		5.3	Section 5.3 Benthos. Benthos in the Nantucket Sound area is an important component of the habitat in regard to waterfowl using this area. Literature cited indicates a diverse and abundant benthos, which would be expected in this highly dynamic tidal environment. However, there are no studies that show the connection with the availability of food resources with the actual utilization of food (food habits) of waterfowl in the Nantucket Sound area. Seaducks using the area north of Cape Cod are feeding predominantly on the blue mussel and these might be important food resources in the Nantucket Sound area also. Detailed food analyses of seaducks,ot her waterfowl, and other waterbirds should be conducted to better understand the location of birds and their food resources that might be impacted with the siting of wind turbine power generating facilities in the Nantucket Sound..	USGS
5-40 thru 5-46		5.3.4.1 5.3.4.2	These two sections provide detailed estimates for disturbed areas from the WTG array and submarine cable systems. However, justification is needed for reporting these estimates with a precision of two significant digits. We recommend that disturbance estimates be reduced to one significant figure, which has the merit of being intuitively more reasonable.	MMS
5-48		5.4	The analysis of the potential effect of the wind farm on fisheries was based on existing information,p rimarily Massachusetts Department of Marine Fisheries trawl survey data from 1978-present.O n page 5-52, the DEIS identifies some of the limitations of these data.	FWS

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			Despite the lack of site-specific data, the DEIS concludes that the impacts to finfish resources, finfish habitat, and commercial and recreational fisheries are anticipated to be temporary and localized in nature. We do not believe sufficient data exist, as identified in the FWS' May 8, 2002, and June 29,2 004, letters, and none have been collected by the DEIS, to determine where macro- and microhabitats exist for demersal and pelagic species on a weekly, monthly, seasonal, or year-to-year basis in the project area. Such site-specific data is important to be included in the DEIS in order to adequately describe 1) the spatial and temporal uses by fishery resources of each alternative site in Nantucket Sound on a macro- and microhabitat scale; 2) measures to avoid and/or minimize siting decisions and resultant impacts on macro- and micro-scale habitat features; 3) the effects of the project on a species-by-species or life-stage-by-life-stage basis; and, 4) the effects of the project on behavior and predation interactions by and among fish,bi rds, and mammals. Currently, Section 5.4 is predominantly general information,bu t little site-specific information from which an adequate evaluation could be constructed.	
5-60 5-61 5-62 5-84		5.4.5.1 5.4.5.1.1 5.4.5.3 5.5.6.1.2	The discussions within these headings characterize the ability of monopole foundations to act as fish attractants and ecosystem foundations. The impacts from the formation of more hardground ecosystems and the finfish attracted to them for reproduction, shelter, food, etc. are to be expected. However, the text uses conditional phrases such as; "may attract finfish and benthic organisms," "has the potential to," "may concentrate around the WTG's," "may tend to congregate," or "…monopoles, which may act as fish aggregating devices." These statements do not reflect known experience, for example, with oil and gas structures in the Gulf of Mexico. Oil and gas platforms are jacketed and present an open lattice for encrusting invertebrates and finfish compared to a stump-like monopole foundation. The ESP in particular would provide high quality hardground to attract fish. The most conservative appraisal in the face of existing data and experience would be that monopoles are likely to become FADs and	MMS

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			beneficial effects are likely to occur because monopoles introduce hardgrounds where there are none now. Some MMS sources include: http://www.gomr.mms.gov/homepg/regulate/environ/rigs-to-reefs/artificial-reefs.html http://www.gomr.mms.gov/homepg/regulate/environ/rigs-to-reefs/research-rpts.html http://www.gomr.mms.gov/homepg/whatsnew/stories/940318.html Wilson et al. (2003) http://www.gomr.mms.gov/homepg/regulate/environ/studies/2003-009.pdf The conclusions for direct, indirect, and cumulative impacts based on the FAD effects of monopole foundations appear to be understated and discussions are not carried through to decommissioning. The impact of monopole decommissioning and removal of established hardground-based ecosystems would be to degrade finfish populations on Horseshoe Shoal both in species diversity and abundance of individuals in a species. Because monopole structures can become destinations for recreational anglers and divers, just as oil and gas structures have become such in the Gulf of Mexico, the economic benefits of monopole installation on these economic groups should be indicated, as should the negative impact of removal of established ecosystems at the time of decommissioning. The DEIS should include direct, cumulative, and indirect impacts of the monopoles acting as FADs, including possible beneficial impacts on invertebrates and fin fish EFH, as well as on recreational anglers and divers, in terms of installation and decommissioning. Potential safety issues associated with increased recreational demand should also be discussed.	
5-60 5-61 5-62 5-83 5-84		5.4.5.1 5.4.5.1.1 5.5.6.1.2	To the extent that commercial fishing targets invertebrate or finfish faunas that become established around monopoles, these foundations can beneficially impact commercial fisheries that become accustomed them. As stated in the existing text ("Removal of WTG's as Fish Aggregating Devices"), removal of the monopole structures would cause "dispersal of the aggregated fish, thereby reducing fishing pressure on these species in	MMS

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			the Project area." (p. 5-60). While this is a benefit to the species, it is likely to be a negative economic impact to commercial fishers who view them as FADs for desirable species. The conclusion that "…the overall environment and finfish species composition in the Project area and Nantucket Sound is not predicted to substantially change from pre-Project conditions" (top lines on p. 5-62), we judge to be speculative. This conclusion understates the cumulative effect that 130 monopole foundations and the ESP on these sand shoals will have to species abundances and diversity (stated in last lines of next section also). The net effect of adding monopole foundations is likely to increase finfish abundances on the shoal over time as invertebrates become established on foundation hardgrounds and the finfish follow. Whether or not this impact is significantly beneficial for commercial fisheries is probably more equivocal than for recreational fishers; however, the possibility should be held open and acknowledged.	
5-69		5.4.5.3	Cumulative Impacts to Commercial and Recreational Fishing Activity and Interaction with Commercial Fishing Gear. Discussion is too cautious in characterizing the ability of monopole foundations to be FADs. For example, in 1st para regarding commercial fishing, "The Project is not anticipated to have substantial impacts on commercial fishing activities, since there would be no restriction on fishing activities…" There is no recognition that a <u>benefit</u> could occur as a result of commercially targeted fish attracted to monopole foundations that would not be there under no-Project conditions.	MMS
5.92		5.6	We appreciate the Corps' acceptance of the FWS request (March 25, 2004, letter) to include a discussion of the possible effect of the wind farm on bats (p.5- 93). However, the impact evaluation on pages 5-98/99 makes some assumptions and conclusions that we do not believe are supported by data. The first assumption/conclusion is that few bats would be expected in Nantucket Sound because it is not known as a bat flyway. According to the literature, this is not correct (Cryan 2003, Carter 1950). Red bats in particular are known to migrate over coastal waters, and some bats have been observed on the islands near Nantucket Sound (page 5-96). The DEIS	FWS

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			does not include any site-specific information to document bat activity or lack thereof in Nantucket Sound. The DEIS also argues that bats would use their eco-location sensory system to avoid collisions with the wind turbines. This is also not substantiated by the data. Recent studies at the Mountaineer wind farm in West Virginia confirm that large numbers of bats were killed in 2003 and 2004 (Kearns & Kerlinger 2004, Kearns 2004). Merely having an eco-location system clearly does not eliminate collision risk. The reasons why extensive bat mortality occurs at some wind farm sites but not others are imperfectly understood.H owever, the first step in developing an adequate impact evaluation is to collect data using bat detection equipment to document the spatial and temporal use of the airspace over Horseshoe Shoal. These studies should be combined with the traditional boat and aerial surveys and remote-sensing (radar, etc.) studies of birds that are expected to be conducted by the applicant (p. 5-128). The DEIS should include current relevant information on the spatial and temporal use of the airspace over Horseshoe Shoal, that will support an analysis of potential interactions between bats and the proposed wind farm.	
		5.6	Terrestrial Ecology, Wildlife, and Protected Species. The potential risk of the wind power project on bats is dismissed (p. 5-99: "...central Nantucket Sound is not known to be a bat flyway and bats' echolocation systems and other sensory mechanisms allow them to avoid obstacles such as wind turbines.") without further study. The DEIS cites (pp. 5-98 & 99) several papers as claiming few bats strike wind turbines, but fails to mention the heavy bat casualties that occurred at wind turbines in West Virginia in 2003, reported in Kerns and Kerlinger (2004), which is cited elsewhere in Section 5 (pp. 123 & 129). Additional study in Fall 2004 also found mortality rates for bats to be considerably higher than at other operational wind power projects. Three migratory species (Red Bat, Eastern Pipistrelle, Silver-haired Bat) comprised over 75% of the fatalities. Because these species also migrate to and from New England, it is important that surveys be conducted to determine the extent to which they cross Nantucket Sound, and their flight altitudes when migrating over water. Bats should	USGS

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			have been detected by the radars used to survey bird migration, but no effort was made to distinguish bats from birds, and the data collection wasn't adequately timed to cover bat migration periods. Additional radar surveys that span a broader period of the year should be undertaken, coupled with acoustical monitoring, thermal imaging, or visual surveys using night-vision binoculars, to document the passage and flight characteristics of migratory bats over Nantucket Sound.	
			Section 5.7 Avian Resources The Nantucket Sound area is a major wintering area for waterfowl and is an especially important to seaducks, including long-tailed ducks (LTDU), scoters (black, white-winged, and surf), and common eiders. The winter concentration of LTDU might be the largest on the Atlantic coast and land-based Christmas Bird Count (CBC) in 2002 estimated over 500,000 ducks from Nantucket Island alone. However, the CBC typically is not a good representation of seaducks because seaducks are generally distributed over very large areas and distribution of flocks is variable from year to year, based on food resources. Satellite radio telemetry studies with black scoters (BLSC) show that the No Mans Island area of Martha's Vineyard was a very important area used by wintering BLSC, but that many other areas of the Sound, including proposed offshore wind turbine power areas were also used by BLSC. Other BLSC and surf scoters (SUSC) that did not winter in the Nantucket Sound area, were tracked with satellite radio telemetry used the Nantucket Sound area during migration,whi le traveling farther south for the winter or while traveling north in the spring. Telemetry data has the advantage over aerial surveys in being able to assess turnover rates in as population that is obviously not static during the fall to spring period. Unfortunately due to cost, satellite telemetry UHF transmitters ($3000 apiece) deals with a small sample size. Conventional telemetry VHF transmitters ($200 apiece) have a better advantage of measuring turnover rates and therefore the actual duck-use days during the winter. It is recommended that more telemetry research be conducted in regard to the impact of wind turbine power areas so that turnover rates can	USGS

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			be determined and that data on duck populations can be expressed in duck-use days. Although instrumented ducks represent a small proportion of the whole population using this area, researchers believe that the satellite-determined locations do represent important feeding and loafing sites. Therefore, long-term surveys are needed for the whole sound area to better assess the use of the area for loafing and feeding by longed-tailed ducks. The actual location of seaducks during aerial surveys should not preclude other areas as being important to seaducks, as often ducks move at night to other loafing or feeding areas that may not be used during daylight hours when surveys are conducted. Satellite radio telemetry with BLSC and SUSC is being used by scientists of the USGS to better understand the habitat used by this species that typically feed far from shore in areas not easily surveyed by normal land-based sampling techniques. The locations of 197 data points from instrumented BLSC indicated that depth of water in the duck's location ranged from 1 foot to 111 feet and that the mean was 44 feet. The habitat in this depth range represents a large proportion of the Nantucket Sound area that is available to seaducks for feeding. Researchers realize that these locations do not represent areas where ducks are necessarily feeding, but they do represent potential feeding areas and at least are areas used for loafing which are important in regard to winter energetics of waterfowl. When satellite determined locations were separated by day and night there was not a significant difference between the mean depths, although distance from shore was significantly different with ducks averaging 2.2 miles from shore at nighttime and 1.8 miles during the daylight hours. The variability of water depth and distance from shore determined by satellite telemetry during all hours of the day indicate the extreme range of locations used by the ducks and therefore the actual important habitats may be much more than is indicated with small number of surveys. Depth of water where satellite telemetry instrumented ducks were located increased as the winter progressed, which could be related to depletion of food resources during the winter months. As the discussion above suggests, more surveys of waterfowl, especially seaducks will provide additional information on the importance of the	

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			Nantucket Sound area to waterfowl. The USGS, in helping to facilitate these efforts, has recently awarded a grant of $20,000 to Massachusetts Audubon to conduct additional waterbird surveys, and will continue to provide information and expertise to the Corps/applicant.	
5-103	Third para.	5.7.2.2.1	Page 5-103, third paragraph – Although interesting, the applicability of evaluations of onshore wind farms goes only so far, and cannot be relied upon as a predictor of offshore sites. Offshore developments involve different guilds and different environmental conditions.	USGS
5-105		5.7.2.2.3	Page 5-105 – The statement "sample size of 19% is sufficient" sounds overly definitive. There are probably qualifications to that that should be included.	USGS
5-107		5.7.2.2.5	On page 5-108, a conclusory statement is made that the 2002 and 2003 bird surveys were found to be reliable and valid indicators of the abundance of winter waterbird species in Nantucket Sound. This statement is based on the analysis of Christmas bird count and winter waterfowl survey data for the 13-year period 1989-2001 (Appendix 5.7-B). We do not believe the data support such an overly-broad conclusion for the following reasons: 1) the bird studies conducted by the applicant span a several-month period from late fall to early spring,whe reas the Christmas bird count and winter waterfowl survey have narrow time periods for completion; 2) the areas surveyed by the project consultants are different geographic areas of Nantucket Sound, the offshore waters, whereas the Christmas bird count and winter waterfowl surveys primarily include the inshore waters; 3) as stated in Appendix 5.7-G, et al., the inshore areas have a different bird community than offshore areas; and 4) different observation methods are used by these surveys which could affect results and the ability to compare surveys.	FWS
		5.7.2.2.5	Validation of Representative Study Years: Christmas Bird Count (CBC) data are not collected in a formal scientific fashion, and both CBC and the Winter Waterfowl Survey (WWS) data are collected during a short-time frame about birds in habitats (on land and along the coast) distinctly	USGS

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			different from the offshore environment of the proposed project area in central Nantucket Sound. We lack information showing a relationship, much less a strong correlation, between bird populations in the CBC and WWS areas and those in the rest of Nantucket Sound; therefore the inference (p5-108) that numbers of waterfowl and waterbirds found throughout the Cape Wind 2002 and 2003 avian field surveys "reflected abundances that are not significantly different from those found in most years" may be correct, but does not seem warranted based on the analysis done, and should be qualified accordingly.	
		5.7.2.2.5	Validation of Representative Study Years Data from Audubon Christmas Bird Counts and winter waterfowl surveys for the years 1989-2003 are used to 'validate' the 2002-2003 observations in Nantucket Sound and show that these years are typical. Because the species composition in Nantucket Sound is very different from that in inshore waters, the inshore surveys cannot validate offshore populations.	USGS
5-108		5.7.2.3	On pages 5-108 to 5-113 and 5-116/117, the DEIS contains a summary of the waterbirds observed by the project consultants using aerial and boat surveys during the period March 2002 to February 2004. While the summary provides some useful information, the results are presented as average values over the length of each study period. This averaging process can have the effect of obscuring critically important events that were observed on Horseshoe Shoal during the survey periods. In particular, Attachment(s) 3 and/or 4 to Appendices 5.7-D, F, G, K, L, and M reveal time periods representing days, weeks, or months where a concentration of one or more species of waterbirds was identified at macro- or micro-scale locations on Horseshoe Shoal. Further, the numbers of birds during these time intervals were greater on Horseshoe Shoal than for Handkerchief Shoal,or Tuckernuck Shoal, and in some cases, greater than the outside study area. These time periods are listed for each Appendix in attached Table 1.	FWS

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			The importance of breaking the data into smaller time increments is that bird density and distribution on Horseshoe Shoal and elsewhere in Nantucket Sound change in highly variable time increments, ranging from hours, days, weeks, or even months, and vary by species, season, location (macro- and microhabitat scale), and from year to year. Incomplete as these data are, they support the recommendation made by the FWS regarding the need for a minimum of three years of baseline survey data (FWS letter dated May 8, 2002). These data also demonstrate that Horseshoe Shoal has macro- and micro-scale habitat features that are used extensively by waterbirds (Attachments 2, 3, and/or 4 to Appendices 5.7-D, F, G, K, L, and M).	
		5.7.2.3	The totaling and averaging of numbers over the various surveys obscures important seasonal variation: because an individual could have been seen on more than survey, it is invalid to sum the total numbers seen over all surveys and treat the totals as still representing independent individuals as was done throughout the appendices. Due to the sampling scheme used by the applicants (with no aerial surveys made in the first third of September in either 2002 or 2003, only 1 made each May, 1 or 2 surveys made in April and July, and at the most 3 aerial surveys made in June and August of either year), the ability of the results to show some potentially important short-term in patterns in numbers of birds observed at specific sites on a daily or weekly basis is lacking. At least equally important is the fact that the aerial and boat surveys do not provide any information about birds during the circumstances when they are most at risk - when flying at rotor-swept heights in the dark (often just before or after making higher altitude flights) and/or during bad weather. While the new information on the numbers/distribution of birds during daylight hours is of some value, critically needed information about the movements of birds throughout the day and night is lacking.	USGS
		5.7.3.2.1	Section 5.7.3.2.1 - Collision Risk Assessment	USGS

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			Altitude of ducks as they move around in the Sound is unknown and not able to be determined with implantable satellite transmitters. More research is needed with observations and conventional telemetry to determine altitude of flying ducks during the winter and on migration in regard to potential collision with wind turbine towers. Typically seaducks fly at higher altitudes when on migration then when moving from one area to another area to feed. However, ducks that are disturbed by moving boats or other anthropogenic disturbances are known to fly at higher altitudes. With existing data and general knowledge of seaducks and other waterbirds that use the Sound it is not possible to predict the magnitude of collisions with wind turbine towers. The large area used by the rotating blades of the wind turbines is certainly within the altitude commonly used by ducks during their daily flights to and from feeding areas.	
		5.7.2.3.2	**5.7.2.3.2. Landbirds** **Raptors** Falcons, especially Peregrine Falcons and Merlins, regularly migrate over water, can be expected to occur every year at blade height, and may attempt to perch. What provision can be made to keep them from striking the blades? **Other Landbirds** Songbirds, most of which migrate at night, likely are most at risk of collisions with wind turbines on their ascent or descent in migratory flights. Once they achieve flying altitudes, they generally fly well above the maximum sweep height of wind turbine rotors; however, it is unknown if they maintain those altitudes when flying over water or when weather conditions are poor. Additionally, in both spring and fall, many migrating songbirds overshoot land or are blown out to sea; as daylight approaches, these birds are forced to fly back to land, likely at lower altitudes than during migratory flights, making them vulnerable to collisions with wind turbines that stand in their way. The EIS radar surveys collected data that could have helped to clarify	USGS

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			songbird migration patterns through the region.H owever, the data were not synthesized or analyzed to identify the times of day or weather conditions when migrating birds are most at risk of collisions with wind turbines. Data from additional years are also needed to adequately sample the range of weather conditions that migrants are exposed to. The radar surveys should also have been supplemented with acoustical monitoring or visual surveys with night-vision binoculars to provide some information on bird species' relative abundances and to estimate the proportion of targets that were insects or bats. Data were used to calculate birds/km/hr for spring and fall, which was compared with passage rates from other (inland) sites. No information was presented as to whether the rates were calculated from comparable spans of days.	
5-115		5.7.2.3.3	On pages 5-115/117, the DEIS summarizes the results of the radar study conducted by the project consultants. While the summary (page 5-116) mentions the fact that the vertical radar detected 491,306 targets, of which 127,697 (26%) were in the rotor-swept zone elevation, it then attempts to downplay the significance of the data in the following paragraph by suggesting that the radar misses low-flying birds which would change the percentage of targets in the rotor-swept zone.W e think this assertion fails to have merit because the vast majority (>90%) of birds observed during aerial surveys were on the water (p. 5-117, Appendices 5.7-D, F, G, K, L, and M). Second, as Appendix 5.7-J (Figures 3 and 4) demonstrates, the beam of the vertical and horizontal radars was positioned such that it covered the sea surface, except for a small area near the radars, and would detect birds dependent on sea state, contrary to the assertion on page 5-116. The larger issue missed or obscured in this section is that the observers during the aerial surveys were only able to identify 365 birds flying in the rotor-swept zone (p. 5-117).The c ritically important finding that should be stressed in this DEIS is that the aerial survey technique is not a reliable study method for determining the number of birds in the rotor-swept zone. In fact, Appendix 5.7-L (page 3) states that this "methodology was not	FWS

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			precise and is not a validated procedure." The numbers 127,697 versus 365 speak conclusively on this subject. This section of the DEIS should clearly state that no radar data exist for the other 10 months in 2002 and that no radar data exist for any other year in the study period. We conclude that the DEIS has not collected sufficient information on the spatial and temporal use of the airspace above Horseshoe Shoal and other sites in Nantucket Sound to demonstrate bird and/or bat use patterns on a daily, weekly, monthly, seasonal, or year-to-year basis. Given the discussion on page 5-128 concerning the need for additional avian studies, the Corps also appears to have reservations about the adequacy of the data. The absence of spatial and temporal data over at least a three-year period creates uncertainty in knowing the baseline condition and natural variability, and increases risk in terms of the reliability and supportability of the siting decisions and impact assessment. This issue was discussed in the FWS scoping letter to the Corps dated May 8, 2002.	
		5.7.2.3.3	5.7.2.3.3, Radar Study Results: Although it was recommended that radar work be done year-round, it was done for less than 2 months during a single year and none was done during the critically important period of postbreeding dispersal and premigratory staging by young and adult terns when they are most likely to be commuting back-and-forth across Nantucket Sound. The radar study results, however,do demonstrate that the aerial survey technique used by the applicant is not a reliable method for determining the number of birds flying in the rotor-swept zone during daylight hours (even for large birds, and certainly not for small birds, most of which probably went undetected in the aerial surveys), and the radar data indicate that there are great differences in the heights that birds fly at night compared to typical heights used during day-time foraging and migration. "Ground-truthing" the radar data was not adequately done. As a result, the DEIS does not provide sufficient information on the spatial and temporal use of the airspace above Horseshoe Shoal and Nantucket Sound needed to show	USGS

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			species-specific patterns of bird (and bat) use on a daily, weekly, monthly, seasonal, and annual basis.	
		5.7.2.3.3	5.7.2.3.3 Radar Study Results The radar surveys demonstrated the heavy use of the airspace in and adjacent to the Horseshoe Shoal by night and by day during spring and fall. The 24-hour surveillance of the radar demonstrates the inadequacy of surveys by boat and aircraft to estimate the *numbers* of birds in flight or their *altitude.* Unfortunately, radar data were collected only during two one-month periods, so provide no information on species that migrate over or use Nantucket Sound at other times of year. These short periods also cannot adequately sample the variations in migration and weather conditions that likely occur among years. Frequent mention is made in Appendix 5.7-F of the boat surveys that were undertaken to "ground-truth" the radar surveys, but the data collected apparently were not used for this purpose; it appears that no effort was made to cross-walk the results of different surveys to aid in their interpretation. Classifying the targets into three size classes and two flight speed categories was interesting, but not very illuminating. It is unclear why data from Fall 2002 were collected at Cape Poge on Martha's Vineyard, rather than directly at Horseshoe Shoal, as was done in Spring 2002. There is a real concern that both bird traffic and weather conditions around the Vineyard may not be representative of Horseshoe Shoals. In citing the 127,697 targets recorded by VerCat within the rotor-swept altitude, it should be specified that this was a *two-month sample.* Although the fall radar survey provided some coverage of Horseshoe Shoal, much of the project area was not sampled, and many of the radar sightings were outside the project area.	USGS
5-115		5.7.2.3.3	Page 5-115, bottom of third paragraph – The statement "concentrations of night-migrating birds may be lower across Nantucket …" is conjecture because it is not a comparative study.	USGS

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5-118		5.7.3.1	On pages 5-118/119, the DEIS makes the argument that construction impacts would only result in temporary displacement and habitat modification. We do not believe that the data in the DEIS support these overly broad statements. As identified in previous sections on surficial sediments, benthic communities and fisheries, the data assembled in this DEIS, are screened through a very coarse filter. Insufficient data, and in some cases, no data have been collected to identify the macro- and microhabitats that exist on Horseshoe Shoal or other alternative sites in Nantucket Sound. The DEIS provides little site-specific data to substantiate the claim that all benthic habitats will return to pre-project conditions after cable laying and turbine installation activities are complete. Habitat conversion is made more likely because the jet plow cable embedment process will leave a trench or depression in the sea floor (pages 5-168, 170). Given that Nantucket Sound is a sand-dominated system, it seems plausible, if not probable, that microhabitats containing clay, silt, gravel, cobbles, boulders, or submerged aquatic vegetation would be reclaimed as a surficial layer of sand substrate. If these conversions do occur to surficial sediments, it would seem unlikely that the faunal groups associated with the original sediment, e.g., clay or silt, would return. These changes in benthic communities would likely lead to changes in utilization by fish, birds, and mammals. The DEIS does not adequately address these issues. These issues were raised by the FWS early in the NEPA process (Scoping).	FWS
5-122		5.7.3.2.1	We believe the collision risk analysis on pages 5-122/130 inadequately describes the potential collision risk that this project poses to birds. The analysis is not adequate for a number of reasons; principal among them is the lack of data. The DEIS has not conducted sufficient remote-sensing surveys, especially radar and ground truthing surveys, to demonstrate what the spatial and temporal use patterns of birds and bats are in the airspace over Horseshoe Shoal and other alternatives sites in Nantucket Sound. Radar data are only available for May and September 2002, and no radar data are available for any other month in 2002 or for any prior or subsequent year. By letter dated May 8, 2002, the FWS advised the Corps of the need for three years of remote-sensing data (radar) and of some of	FWS

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			the potential risks posed by attempting to proceed with insufficient baseline data. The overall importance of the radar data becomes clear when the number of birds observed in the rotor-swept zone during the 46 aerial surveys (365) is compared to the number of birds observed by radar (127,697). This example demonstrates that the boat and aerial surveys which are the mainstay of the applicant's field studies are incapable of collecting data that would accurately and reliably demonstrate what the spatial and temporal uses of the airspace are by birds and bats. The FWS does not believe that it is biologically or statistically valid to extrapolate the results of the May and September 2002 radar data to other months or into other years as has been done (p. 5-128). The avian section of the DEIS is not supported by the data. The Department concurs with the Corps' statement on p. 5-128 that "data acquisition during winter months is being planned." The collision risk section relies extensively on information from studies on land-based wind power facilities in the United States. In our view, basing conclusions on the offshore Cape Wind Project from this data set is unsupportable for a number of reasons. A recent comprehensive review of wind farms and birds by Birdlife International on behalf of the Bern Convention found that impacts at wind farms are site-, season-, and species-specific (Birdlife International 2003). All of the wind turbines operating in the United States today are shorter and have smaller rotor diameter than those proposed by Cape Wind. The vast majority are much smaller in size. Rigorous scientific studies have not been done at most wind projects where mortality studies have been conducted to establish accurate mortality estimates. Recent studies indicate that daily search efforts using experienced people and trained bird dogs in combination with weekly search efficiency and predator removal tests are necessary to produce reliable mortality data for towers sampled (Kearns 2004). The Erickson et al. 2001 report that is cited extensively in this DEIS contains data from mortality studies that lack the scientific rigor identified above, in addition to many other shortcomings discussed by Evans 2004. On pages 5-125/126, the DEIS provides a risk assessment by bird groups	

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			based in part on the heights of these birds as estimated during aerial survey flights over Nantucket Sound. We believe this analysis is flawed because the radar data discussed above demonstrate that the flight height estimates made during aerial surveys are unreliable for determining the number of birds in the rotor-swept zone. Appendix 5.7-L states that estimating flight height from aerial surveys is an imprecise and unvalidated procedure. In these same paragraphs, the DEIS makes the statement that any resulting bird mortality at these turbines would not be biologically significant. We believe this conclusory statement should be deleted since the DEIS can not demonstrate what the spatial and temporal distribution of any bird species is in the risk zone (rotor-swept zone), nor what the population biology is for the bird species that may be colliding with the wind turbines, including listed species. (Population biology includes, but is not limited to: population size, including means to measure and monitor the population; how the population size varies by season and year-to-year; annual rates of recruitment and survival; sources and rates of mortality; life history parameters of each species; and sampling errors for each measurement or estimate.) The conclusion section for the avian collision analysis, pages 5-129/130, reveals a high degree of confusion, uncertainty, and inconsistency. The DEIS makes the assumption on page 5-127 that bird use of Horseshoe Shoal could be relatively high because of the very high numbers of birds that use Nantucket Sound. However,on page 5-128, the DEIS uses a low, fixed mortality rate of 2.8 birds per turbine per year based on Erickson et al. 2001 to develop what is referred to in the DEIS as a conservative estimate of annual bird mortality of 364 birds per year. This claim is not consistent with data on page 5-127, which cite two recent mortality studies in the eastern United States with mortality estimates of 3-7 birds per turbine per year. As stated in prior correspondence, we believe the DEIS should state the range of potential turbine mortality at 0-125 birds per turbine per year (Everaert et al. 2002, cited in Birdlife International 2003, and Everaert 2004). We do not believe that the DEIS includes sufficient information on the spatial and temporal use of the airspace at Horseshoe Shoal by birds and bats to allow for a legitimate iterative analysis of the potential collision risk	

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			the project would present. In addition, we do not believe that conclusions can be drawn from studies on land-based wind farms as is done repeatedly in this DEIS. The Corps should adopt the finding (Birdlife International 2003) that avian impacts at wind farms are variable and are site-, season-, and species-specific. In other words, the specific effects of a project are not transferable from site to site in the absence of site-specific data demonstrating transferability. On page 5-130, the DEIS includes the assertion that the loss of 364 birds per year would be an unavoidable adverse impact of the project. We cannot agree since the DEIS does not contain sufficient information to support the siting decisions on a macro- or micro-scale. The sequential mitigation process requires that every reasonable effort be made to first avoid the impact altogether, and then take all reasonable actions to minimize impacts. This presupposes that the potentially impacted resources have been identified. Given comments herein on the lack of macro-scale and micro-scale data for Horseshoe Shoal and the other alternative sites in Nantucket Sound, and the limitations of the alternatives and impact analyses, we do not believe that the DEIS demonstrates that all reasonable avoidance and minimizations measures have been taken.	
5-123		5.7.3.2.1	Under Risk Factors; Species; Paragraph claims that "songbirds are the most common species involved with collisions with wind machines at most terrestrial wind power sites, including collisions during nighttime migration and daytime activities." A reference should be provided for this statement.	MMS
		5.7.3.2.1	5.7.3.2.1, Collision Risk Evaluation: This section is inadequate because of the lack of critical data, especially with regard to Common Terns and endangered Roseate Terns. Data on collisions of Common Terns and other birds with turbines in Belgium (Everaert 2004) were not reviewed in this DEIS. Everaert found that collision numbers varied from 0 to 125 birds per wind turbine per year and that in 2002 the mean numbers at his three study	USGS

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			sites were 24, 35, and 18 birds per turbine per year. His Figure 1 showed that the number of collision victims is in relation to the number of passing birds in flight and that the type of wind turbine seemed to be less important. At the "East dam" part of his study site at the port of Zeebrugge in 2001 and 2002, the number of collision victims among terns was calculated to be 28 and 26, respectively, and he noted "a remarkable high collision chance of 1 in 3000 (all heights) and 1 in 600 (rotor height) was found for the Common Tern." Major problems with the evaluation of risks of collisions of PIPLs and ROSTs were identified above in our general comments. While we note that ROSTs were not found at Everaert's study sites, ROSTs are similar to Common Terns in many aspects of their behavior while roosting and commuting to and from foraging areas. Therefore, in the absence of specific data on ROSTs, the use of surrogate data from Common Terns as a first step in evaluating the risk of collisions of ROSTs with turbines seems reasonable.	
		5.7.3.2.1	5.7.3.2.1 Collision Risk Evaluation Although "Fatality resulting from collisions with wind turbine rotors has been studied extensively" (p. 5-122), there is not a single site in the eastern United States for which an annual mortality rate is known even for a single year. Risk studies have shown that large numbers of migrating birds annually pass through wind farms at rotor height, but little information has been obtained on probabilities of mortality under various weather conditions. Whether birds are attracted to or repelled by the sound of wind turbines has not been determined. Searches for dead birds have been few and fragmentary, most lacking scientific rigor. Claims that fatalities "may average 1 to 2 birds per turbine per year" are not based on peer-reviewed studies. There is no basis for comparing turbine mortalities with mortalities from other sources. Nor can bird corpses found on beaches (p. 5-122) be compared with mortality from other sources, because unlike oiled birds, turbine casualties would likely be eaten by gulls or fish before they washed ashore.	USGS

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5-122, and follow-ing		5.7.3.2.1	5-122, section 5.7.3.2.1, bottom of paragraph 1 – Despite the claim based on Gill (1995), Hestbeck et al. (1991, Ecology) concluded declines in Atlantic Flyway Canada Geese in the southern part of the flyway were due more to differential hunting pressure than shortstopping. In the late 1990's the hunting season was closed for this population, and since then they have rebounded enough to open the season again. In addition, declines in band-tailed pigeons, Canvasbacks, and Pintails were attributed to hunting, triggering conservative harvest strategies. Page 5-122,se ction 5.7.3.2.1, bottom of paragraph 2 – This paragraph points out the lack of direct information on the type of development being considered. Studies of terrestrial windfarms in the US are not very applicable, because of the difference in guilds and environment involved. Other offshore developments provide a more direct comparison,but there have been few or none at the scale proposed. In this same paragraph, how many dead birds does the 3% figure amount to? Page 5-123, Height section under Turbine Design Features section – The section states that turbine height is not a factor except at shorter (60-foot) level to raptors, and then states the risk of communication towers above 500 feet is higher to night migrating birds than shorter towers. The turbines being proposed will reach to 417 ft. This section should be revised to clearly state if this height difference is or is not meaningful from the perspective of bird collisions. Page 5-129, second paragraph – The Erickson publication on mortalities at terrestrial sites (1-2 birds per turbine per year) would not be as pertinent as the results of European studies at offshore sites (in the next paragraph) of 15-51 birds/turbine/year. Page 5-130, first full paragraph – The assessment of potential mortality is inconsistent with the previous page. Using European mortality results of up to 51 birds/turbine/year, would result in an annual mortality estimate for the windfarm would be 6,630.	USGS

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5-127-128		**Conclusion**	**Conclusion** (p. 5-127-128). Preliminary studies indicate that bird use is high,b ut from radar data taken during only two months of the year, largely outside of the proposed turbine site, the risk to bird populations cannot be estimated. Nantucket Sound, unlike inland sites where wind power projects are being developed, is used throughout the year by a wide variety of bird species.	USGS
5-130		5.7.3.2.2	On pages 5-130/132, the DEIS discusses potential disturbance/displacement effects on birds during the operation and maintenance phase of the project; e.g., some of the water birds mentioned will show avoidance behavior when within 2000 ft. of structures. With the monopoles located between 630 and 1000 meters apart, some of the water birds may avoid the entire area of the Horseshoe Shoal occupied by the proposal. We believe that the DEIS fails to adequately describe and quantify the habitat fragmentation effects on migratory birds as a consequence of placing 130 large wind turbines on Horseshoe Shoal. Studies on offshore wind farms in Europe and land-based wind farms in the grassland region of the United States have demonstrated avoidance behavior by species such as eiders and prairie grouse (Birdlife International 2003). The Department has discussed habitat fragmentation issues early in the DEIS process, and is willing to continue working with the Corps and the applicant in this regard. For instance, the impact analysis should display the area potentially affected by habitat fragmentation in acres/miles^2 by placing 100, 200, 300, 500m, etc., concentric rings around each turbine. This information might be most useful if it is displayed in tabular and figure forms for each migratory bird or other wildlife species susceptible to habitat fragmentation effects (direct loss of habitat, an increase in edge habitat, increased isolation of remaining habitat, a decrease in abundance and diversity of area-sensitive and/or tall structure-sensitive species, decreased size of remaining patches of suitable habitat,i ncreased human disturbance, increased stress, interruption of travel patterns and activities, displacement, a decrease in habitat suitability for area- or structure-sensitive species with a concurrent increase in habitat suitability for	FWS

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			generalist or structure non-sensitive species, and other behavioral effects). These complicated fragmentation effects vary by species, life stage, and season, and for most waterbirds, are imperfectly understood, creating considerable uncertainty.	
5-131		5.7.3.2.2	Page 5-131, bottom – The statement "appear to have adequate … displaced birds" seems to be conjecture.	USGS
5-132		5.7.3.2.3	The discussion of the effect of lights on page 5-132 does not adequately represent the range of effects that could occur to migratory birds if the project is constructed and operated on Horseshoe Shoal. W e believe that insufficient attention is given to the potential effects of navigation and aircraft warning lights to waterbirds and migrant land birds. The DEIS should have evaluated these potential effects in greater detail by focusing on those species that fly at night, early evening, early morning, or during fog, drizzle, light rain,ot her inclement weather, including windy conditions, or during other periods of impaired visibility and/or flight (Birdlife International 2003). The Department continues its willingness to support the Corps/applicant in completing this work and recommends the following: The analysis should be broken into seasonal periods to help insure that vulnerable species and/or life stages are assessed. The existing analysis in the DEIS is inadequate in that it does not attempt to identify or evaluate, the species/life stage of birds most at risk, seasonality issues, or weather events which singularly or in combination create high risk situations. We would expect winter waterbirds such as eiders and long-tailed ducks to be at risk from both navigation and aircraft lights, and that this risk factor would vary due to the highly variable conditions described above. Each resident species and species group of migrants would need to be evaluated on a case-by-case basis to develop an adequate assessment of the effect of lighting on birds.	FWS
5-132		5.7.3.2.4	We believe the Corps should reassess the potential effects of vessel traffic on those waterbirds (e.g., waterfowl) that are susceptible to disturbance, displacement, or other behavioral effects caused by boats. As identified in prior correspondence (FWS Memorandum, 6/29/04), maintenance trips at	FWS

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			the Horns Rev Project include two regularly scheduled visits and one to three unscheduled visits per turbine per year (ICES 2003). On a 130-turbine project, this would involve about 390 to 650 trips per year and a substantially greater likelihood for disturbance, displacement, or other behavioral effects to birds or other wildlife. The DEIS needs to consider whether birds will react differently to approaching boats when 130 operating wind turbines are located on Horseshoe Shoal in contrast to existing conditions. The DEIS should consider that this could become an issue of greater concern if vessel disturbance is likely to cause waterbirds to take flight that brings them into collision with the wind tower or rotor, or if the combined effect aggravates habitat fragmentation impacts.	
5-134		5.7.3.2.7	The cumulative effects section, page 5-134, does not adequately address the existing cumulative impacts to migratory birds cited elsewhere in this DEIS (pages 5-103,5 -122, Appendix 5.7-A, and Erickson et al. 2001),no r does it address the potential for additional incremental mortality or habitat loss/degradation caused by the proposed project. There is unequal and inconsistent treatment of avian mortality at man-made structures or from regulated hunting as cited above in the DEIS. In this instance, the references cited above describe a significant cumulative mortality of migratory birds at existing man-made structures. By definition, any additional mortality to birds at the proposed project could be considered significant. The DEIS should acknowledge and evaluate cumulative effects within the range of affected species to the extent that they can be quantified. Additionally, we believe the cumulative impact section should address the potential of the Cape Wind Project to impact birds that are most at risk due to their occurrence in the project area and birds that are known to be in a population decline. The cumulative effects analysis should not be limited to offshore and/or land-based wind farms, but all man-made structures or activities that cause bird mortality, eliminate or degrade bird habitat.	FWS
		5.7.3.2.7	5.7.3.2.7, Cumulative Impacts: This section also should consider how the impact of a fatality can vary as a result of when in the annual cycle it occurs. Mortality of adult terns during the period of postbreeding dispersal	USGS

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			is likely to be mainly density-independent (rather than density-dependent) in nature. However, during this period many (if not most) fledgling ROSTs seem to depend on just one parent for food. The death of a single attending parent during this period, be it due to a hurricane or a wind turbine, will almost certainly result in the subsequent death of its fledgling. (This also needs to be taken into consideration in the ROST Population Viability Analysis (PVA) in Appendix 5-7.H.)	
5-135		5.7.3.4	As stated on page 5-135, a formal biological assessment will be prepared and submitted separately from the DEIS to continue the consultation process with the FWS under Section 7 of the Endangered Species Act. <u>Information Standards and Sources</u> In order for the Corps to meet its obligations pursuant to the Endangered Species Act, the best scientific and commercial data available must be utilized in analyzing species presence and effects of the action. Sections of the DEIS that address roseate tern occurrence and potential effects from the wind park do not include 2004 field season data collected by the Massachusetts Audubon Society. These studies are referenced in the DEIS on page 13 of Appendix 5.7-H, but are not included in any of the analyses. Our consultation guidelines indicate that if relevant data are known to be available or will be available as the result of ongoing or imminent studies, formal consultation should be deferred until such data are analyzed.In view of the above, we strongly recommend that the Audubon 2004 field data be included in the Biological Assessment that the Corps is preparing. The DEIS contains models (population viability assessments) using uncertain probabilities of mortality and estimates of key population demographic factors to project whether a range of plover and tern deaths will adversely affect the recovery rates or extinction probabilities for these species. However, much of the discussion in the avian risk assessment (page 5-122 Collision Risk Assessment) and in the roseate tern and piping plover evaluation (Appendix 5.7-H) deals with the difficult problem of	FWS

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			assigning realistic probabilities of risk to mortality from collisions with the towers or rotor blades in the face of considerable data gaps. Relative to threatened or endangered species, where significant data gaps exist, there are two options: defer formal consultation and submittal of a biological opinion until sufficient information is developed for a more complete analysis, or develop a biological opinion with available information giving the benefit of the doubt to the species.	
5-135		5.7.3.4	Specific Comments on the Roseate Tern and Piping Plover Population Viability Analyses (PVAs) The PVA (Attachment 1, Appendix 5.7-H) is included to give a rough estimate of the impacts of potential wind farm mortalities on roseate tern and piping plover population dynamics and extinction probabilities. The results are not intended to be used in precise or absolute terms, due to limitations of the data used to develop the PVA. For example, the roseate tern PVA uses population figures for roseate terns from the six-year period 1998-2003 to arrive at a rate of population increase of 1.02. However, while the northeastern breeding population of the roseate tern did in fact increase from 1998 to 2000, the population has been declining about 4-5% in the four years since 2000. Roseate tern breeding populations have fluctuated during the past 17 years, from a small increase during the period 1987-1991, to a 17% decrease between 1991 and 1992, then generally increasing again until 2000, then declining from 2001-2004. This variability points out the shortcomings of using a six-year data set to formulate population growth projections, and in particular, extinction probabilities, for 100 years into the future. We believe a second example of "limited available data" is the use of a mortality estimate, calculated for the roseate tern in Appendix 5.7-H and described by the authors on page 24 as "a range of collision possibilities in the face of great uncertainty, and not a prediction". However, on page 5-136 of the DEIS,t hese data are presented as a conclusion with no mention or reference to the reservations and uncertainty raised by the authors. The mortality estimate in Appendix 5.7-H and the results presented in this	FWS

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			section of the DEIS are subject to additional uncertainty not evaluated in either section of the document. The tern data collected by the consulting team for this project relied on boat and aerial surveys. As indicated previously, the number of birds observed in the rotor-swept zone during aerial surveys was 365, while the spring and fall radar study identified 127,697 targets in the rotor-swept zone. This indicates that the boat and aerial surveys did not adequately sample the spatial and temporal use of the airspace over Horseshoe Shoal by birds, including possibly roseate terns. Other uncertainties need to be addressed as well, including the use of Horseshoe Shoal by terns in April and May, flight characteristics of terns over Horseshoe Shoal in the early morning and evening periods, and the frequency with which terns ride thermals over Nantucket Sound. Accordingly, the DEIS should be revised, and the PVA should be recalculated with all available colony data and in cooperation with recognized roseate tern researchers,Ian N isbet, and the U.S. Geological Survey's Dr. Jeffrey Spendelow (301-497-5665), and others whom have been conducting a long-term roseate tern meta-population study. The revised model should better account for uncertainty in the number of roseate terns present, tern population growth variability, density dependence, and other demographic factors not heretofore considered by the authors. As stated in the DEIS (page 7, Appendix 5.7-H), approximately half of the Atlantic Coast piping plover breeding population occurs in Massachusetts and north to Newfoundland, Canada, with 28% of the population occurring north of Nantucket Sound. However, the Piping Plover PVA (modified from the 1994 PVA developed for the Piping Plover Recovery Plan) only focused the analysis on the New England subpopulation. The simulations considered that plovers from Connecticut to Maine are equally at risk from the effects of fatalities in the wind farm area (page 21, Appendix 5.7-H, Attachment 1), even though it is unknown if plovers from Rhode Island and Connecticut would pass through the project area, and ignored the potential risk to Atlantic Canada plovers that are more likely to pass through the area. The risk of extinction analysis provided in the DEIS is only applicable to the New England recovery unit, and does not include the Canadian	

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			population. We question the analysis and suggest that a revised PVA be prepared for the New England population, using the Melvin-Gibbs survival rates, a range of productivity rates, and a range of project-induced mortality rates. A new PVA needs to be developed for the Canadian population, using empirical data from Canada that indicate a much lower juvenile survival rate. Both of these PVAs should be developed in cooperation with the 1994 Piping Plover PVA authors, Dr. Scott Melvin and Dr. James Gibbs. The DEIS should clarify the discussion of the potential wind farm impacts to piping plovers (pages 25–26, Appendix 5.7-H).T he discussion on population impacts for piping plovers based the low estimates of collision mortalities on very limited information and concluded under the worst-case scenario (No Growth) that a loss of 0.08 individuals per year (estimated potential fatality rate) would not significantly affect the population. However, following this conclusion, the DEIS states "A take of 10 birds per year (= five females) is unlikely to affect the New England population." What is the relevance of this statement and where does the estimated take of 10 birds per year occur, at the wind farm or generally within the New England recovery unit? We believe that the summary of potential impacts contained in Section 5.7.3.4, "Potential Impacts to Endangered/Threatened/Other Listed Species" (pages 5-135-137), should more objectively acknowledge data gaps, cautionary notes by authors of the PVA, and the many other uncertainties underlying these summary findings.	
5-136		5.7.3.4	Page 5-136,f irst paragraph – Permitting only 5 female deaths a year is not a lot. Two paragraphs later the projected kill of up to 0.5 per year is considered well below the threshold. Although true, there is probably a fair amount of uncertainty about either value. After reviewing the literature and collecting some new information on the use of the proposed project area at Horseshoe Shoal by various species of waterbirds, the authors have predicted (on p[age] 5-136) that the number of	USGS

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			fatalities of the much smaller population of Piping Plovers (which were not seen over Horseshoe Shoal on any surveys and are assumed in most cases to just migrate over this area above rotor-swept height twice a year) to be 0.08 individuals/year, about 400 times higher than the projected mortality of 0.0002 individuals/year of the (seasonally more numerous in this particular area) Roseate Terns, some of which are known to forage in the project area, and many of which probably traverse across parts of Nantucket Sound on almost a daily basis in the late summer. A cursory comparative analysis should have resulted in an assessment that projected collision fatalities will be greater for Roseate Terns (ROSTs) than for Piping Plovers (PIPLs).	
		5.7.3.4	5.7.3.4, Potential Impacts to Endangered/Threatened/Other Listed Species: The DEIS and the PVAs for ROSTs and PIPLs do not consider population data for 2004. In the case of the northeastern U.S. breeding population of ROSTs, after a sharp decline between 1991-1992,t his population went through a period of sustained growth from 1992-2000, but has shown substantial annual variability and a decline of about 20% since then in the estimated number of peak-period pairs from a high of 4310 pairs in 2000 down to an estimated 3457 pairs in 2004. This recent decline highlights the problems of using estimates of various aspects of population dynamics derived mainly from a short-term string of good years "to formulate population growth projections, and in particular, extinction probabilities" for even 10 years, much less 100 years into the future (Fieberg and Ellner 2000). Greater consideration should have been made of the behavior of individuals throughout the period when they are in our area. During spring migration virtually all ROSTs from the Western North Atlantic breeding population congregate in Nantucket Sound before moving to their breeding colony sites to the north and west. More than 90% of these birds travel from Nantucket Sound west to nest in Buzzards Bay, Massachusetts (BBMA) and various sites in New York and Connecticut. These birds have to pass by,o ver, or through the proposed project area to get to these colony sites,	USGS

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			but we do not know what route they take, at what time of day or night these flights are made, or at what height the birds fly. Movements of terns during daylight hours usually seem to be made relatively close to the surface of the water (Kruger and Garthe 2001 and references therein) at heights below the rotor-swept zone of the turbines proposed for the CWEP, but nocturnal migration flights usually are made at much higher altitudes (Keijl 2003). When they first begin arriving at night at their breeding colony sites, terns frequently are heard flying over the nearby waters at heights estimated to be between 15-75 meters a.s.l. (Spendelow, personal obs.), within the rotor-swept zone of the CWEP. Similarly, by mid August ROSTs again congregate around Cape Cod and in the Nantucket Sound area (Trull et al. 1999). In the past, most ROSTs have roosted at night near South Beach, Chatham, but evidence presented in this DEIS suggests that perhaps a growing number may use Fernando's Fetch. We do not know to what extent individuals use the same roost sites and/or feeding areas on a nightly/daily basis, or to what extent they move around among the various roost and foraging sites. The routes taken by birds to get to these places from the breeding colony sites are not known, but probably involve movements past (if not directly through) the CWEP project area. If true, most breeding adults must traverse this area at a minimum of twice a year, and some probably traverse it much more than this. The first few weeks after fledging (while the young are still developing their flying skills) is a critical period about which relatively little is known of their behavior (or that of their attending adults). Again, though, all fledgling ROSTs from breeding colony sites in BBMA, Connecticut, and New York must pass through or around the CWEP area at least once, and perhaps several times if they commute substantial distances (also unknown) from nighttime roosting areas to foraging areas in and around Nantucket Sound during this postbreeding dispersal/premigratory staging period. Fledglings and breeding birds from colony sites in the Gulf of Maine have been sighted as far west as Falkner Island, Connecticut in early August in recent years (Spendelow 2001, 2002, 2003), indicating that during the time	

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			of post-breeding dispersal even birds originating from sites further north also may pass by the CWEP area at least twice. In summary, therefore, without more information on when and at what height these postbreeding dispersal and daily commuting flights are made, we cannot make any sort of reasonably accurate assessment of the risk of collisions of endangered ROSTs with turbines constructed for the CWEP. The Corps was provided with such information by FWS and Dr. Nesbit in a timely manner that would have allowed date collection to begin prior to the applicant's preparation of the DEIS.	
		Appendix 5.7-H	Appendix 5.7-H: The various population dynamics parameter estimates used in the preparation of the PVA for ROSTs were chosen from a period of relatively sustained population growth and as such do not reflect the overall variation in published estimates (Spendelow et al. 1995, 2002; Lebreton et al. 2003) over a longer period, the differences in sex-specific survival rates (Nichols et al. 2004), or the recent decline in the northeastern breeding population (USFWS Northeastern Roseate Tern Recovery Team, unpublished data). The significantly lower local survival rates for males at one site (Nichols et al. 2004), the overall sex-ratio bias in the breeding population (Nisbet and Hatch 1999, Nisbet and Spendelow 1999), and the concern that if male parents are doing most of the extended parental care that occurs after fledging (as has been suggested from the work done by Teets (1998)), then the loss of an adult male parent will have a greater impact on the population than the loss of an adult female. Taken altogether, these factors indicate a strong need to redo the PVA for both sexes and not just for females.	USGS
		Appendix 5.7-H	Appendix 5.7-H The authors acknowledge that there is a lot of uncertainty about their conjectures in this modeling exercise. Attachment 1 confirms that they tried to take a conservative approach. Nevertheless it is difficult to evaluate their estimates of allowable take and expected mortalities without direct estimates of the uncertainty to put around those numbers.	USGS

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5-140		5.8.1	On page 5-140, the DEIS states that no activities subject to Section 401 or 404 jurisdiction are proposed in the cable route because cable installation via the hydraulic jet plow is considered a non-jurisdictional activity since it is not a discharge of dredged or fill material. This statement is accompanied by a reference cited as (MADEP and USACE-NED 2002),but gives no indication of the factors or rationale that supports the conclusion reached. As stated previously, redeposits of sediment from the jet plow are projected to cover a 100-foot swath on either side of the trench to a depth of 0.9 inches near the trench and 0.2 inches at a distance of 100 feet from the trench. The inner array cables are 78 miles in length and the 115kv circuits are 12.2 miles in length which expose about 2,186 acres of Nantucket Sound to these redeposits. The Corps should articulate the reasons why the redeposits from the jet plow are not regulated discharges under Sections 401, 403, and 404 of the Clean Water Act. In addition, the EIS needs to address the sediment movement and redeposit resulting from anchor line cable sweep during the electric cable and monopile installation process. According to page 5-40/7 and Table 5.3-3, about 1,172 acres of benthic habitat would be affected by cable sweep to a depth of six inches. As above, the EIS should explain why this activity does not involve a discharge subject to Clean Water Act jurisdiction.	FWS
5-168		5.9.4	Water Quality, Analysis of Impacts: The description of the SPCC identifies the requirement that a plan will be in place to respond to spills of lubricating fluids or oils that are part of the wind turbine generator (WTG) or electrical service platform (ESP) design and operation. There is no discussion in section 5.9.4 of the characteristics and quantities of these fluids (or range of characteristics and quantities that are among the options for which a choice is to be made) that are aboard each WTG or quantities involved as a total project. There are no discussions in section 5.9.4 of 1) the likelihood for a spill to occur, 2) reference to spill histories of like or similar WTGs, 3) dispersion and weathering characteristics of candidate fluids, 4) aqueous toxicity of spilled fluids, or 5) impacts on biological resources that might contact a slick should a spill occur, such as finfish or	MMS

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			birds that tend to rest or feed on the water surface. These discussions are necessary in this section.	
5-169	2nd para	5.9.4.1	Water Quality: Potential Impacts Outside Massachusetts Waters: Living accommodations would be equipped with storage tanks for "domestic waste" water for transfer to a service vessel and offloading on shore. Does domestic waste refer to grey water only? Is domestic water stored separately or commingled with sewerage (black water)? What is the capacity of the storage tank?	MMS
		5.9.4.1	Any vessel discharge to the sea, or potential discharges to the sea either caused by accidents or improper handling has the ability to affect water quality and therefore must be characterized. They are likely to be largely benign, but a thorough rendering of the impact-producing factors for the Project would need to include them. Overboard discharges from service and construction vessels for construction, operation, and decommissioning phases need quantitative estimates and impacts assessed on water quality and other biological resources that could be affected. Wastes generated on board ship but which are taken to shore for disposal that originate from service and construction vessels during each phase need to be characterized and direct or indirect impacts on onshore water quality discussed.	MMS
		5.9.4.1	This section does not 1) mention if deck drainage, bilge, ballast,or any other liquid discharges from service or construction vessels is to take place, 2) explain how domestic and sewerage waste water is managed aboard these vessels, 3) provide estimates of wastes quantities of grey and black water generated per monopole and as a total Project (requires an estimated crew size for these vessels that should be reported in Section 4.0 or this section), and 4) discuss the regulations and agencies responsible for discharge limitations. We recommend that these data are amenable to a table that could report an estimated quantity per monopole and a cumulative amount for the entire Project for each waste type. MMS has used New England River Basins Commission (1976) for domestic and sewerage discharge rates per person on service vessels. New England River Basins Commission (NERBC). 1976. Factbook. In:	MMS

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			Onshore facilities related to offshore oil and gas development. Boston, MA. This section does not discuss solid waste and trash handling at sea or the regulatory structure designed to restrict it. Provide an estimate for how much solid waste is to be generated per monopole and as a total Project. Also lacking are impacts on biological resources that might contact trash and debris originating from the Project should improper handling occur. Birds or turtles have been known to mistakenly feed on plastic thinking it was prey, and marine mammals or turtles can injured or be killed after becoming tangled up in plastic. This section does not 1) mention the diesel fuel capacity and number of tanks for the designated ship(s) or class of crew boat or service or construction vessel to be deployed during construction, operation,a nd decommissioning, 2) discuss the likelihood for diesel spills to occur and causes for typical spill size classes at sea, 3) the physicochemical characteristics of spilled diesel on sea water, 4) aqueous toxicity of spilled diesel, and 5) impacts on biological resources that might contact a slick should one occur, such as finfish or birds that tend to rest or feed on the water surface. Recent MMS NEPA documentation might assist on all of these points. http://www.gomr.mms.gov/homepg/regulate/environ/nepa/cw2003-2007.html	
5-173		5.10	Several sections of this document and its appendices (the first being on page 3-97) mistakenly state that the Massachusetts Audubon Society has owned the Monomoy Point Light Station since 1977. Actually, the FWS acquired the light station from the Massachusetts Audubon Society in 1977. The current website for the National Park Service Maritime Heritage Program, among many others, correctly describes this light station as FWS property. We concur with the Corps' conclusion on page 5-206 that this project	FWS

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			would have an adverse effect upon the Monomoy Point Light Station, due to visual intrusion upon its setting. As the Monomoy Point Light Station is an historic property listed on the National Register of Historic Places, held in fee by the FWS, and the applicant proposes a determination of adverse effect upon it due to this undertaking, the FWS asks to be included as a consulting party (as provided under the Regulations of the Advisory Council on Historic Preservation: 36 CFR Part 800), in further National Historic Preservation Act consultation for this project.	
5-203	6th para	5.10.4.3.2	View shed impacts. MMS has referenced work by the Alabama Geological Survey (1998) in its assessments of view shed impacts of offshore oil and gas production structures from shore. Visibility is dictated by, structure size and height, distance from shore, curvature of the Earth, and atmospheric conditions such as fog, haze, or smog, factors that the Corps' analysis considers. Visibility is also affected by a viewer's elevation (for example, from a tall boat on the water or from a two story house or taller structure on shore), and by their expectations and perceptions. Perceptions can affect what people expect to see, and what they report that they see. This section should at least acknowledge these two influence on view shed aesthetics. Alabama Geological Survey and Oil and Gas Board. 1998. Governor's report: Options for development of potential natural gas reserves from central Gulf of Mexico, Mobile Area Blocks 826 and 829. Montgomery, AL. January 1998. 357 pp.	MMS
5-254	38-40	5.15.2	It is not clear what units were used in the emission rates, e.g., tons/yr. Particulate matter is also an important pollutant and the emission rates for those should be presented if available.	MMS
5-264	5th para Last sent	5.16.3.6	Paragraph states that scuba diving is limited in the area because the soft sediment habitat is generally uninteresting. If 130 monopoles are sited and act as FADs for encrusting and attached invertebrates and the finfish that are attracted to these enriched ecosystems, we expect that these locations	MMS

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			would become popular scuba diving destinations. The monopoles are highly likely to stimulate the tour boat and party boat industry that ferries divers to places where there is something to see underwater. Dive boats use oil and gas platforms in the Gulf of Mexico as destinations for scuba diving and spear fishing. The DEIS fails to note a beneficial socioeconomic effect likely to result from the Project. The following quote is taken from Section 4.2.1.12 "Impacts on Recreational Fishing" on p.4- 97 of the MMS's latest EIS from the Outer Continental Shelf (OCS) leasing program in the Gulf of Mexico. *"The type of development activities most likely to affect fish and recreational fishing within a proposed lease sale area most frequented by offshore fishermen is the introduction of high-profile structures, specifically drilling rigs and platforms. Rigs and platforms function as very large de facto artificial reefs. They attract and concentrate sport fish and stimulate the growth of marine life, which, in turn, attract fishermen and divers (Bull et al., 1997). Many studies (Ditton and Auyong, 1984; Roberts and Thompson, 1983; Ditton and Graefe, 1978; Dugas et al., 1979) have demonstrated that, when GOM petroleum structures are accessible to marine recreational fishermen and scuba divers, the structures are a major attraction throughout their entire lifetime for marine recreational fishing and are a positive influence on tourism and coastal economics."* U.S.D ept. of the Interior. Minerals Management Service. 2002. G ulf of Mexico OCS Oil and Gas Leasing Program: 2003-2007, Central and Western Planning Areas - final environmental impact statement,N ovember 2002. 2 vols. U.S.D ept. of the Interior, Minerals Management Service, Gulf of Mexico OCS Region, New Orleans, LA. OCS EIS/EA MMS 2002-052. http://www.gomr.mms.gov/homepg/regulate/environ/nepa/cw2003-2007.html	
5-264		5.16.3.7	There is a simple way to get a picture of the total number of pleasure boats that could represent the total environmental loading. We recommend checking with the State to see how many boat licenses are registered to	MMS

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			residents in the region of interest as an upper bound.	
5-271	4th para	5.16.4.4.1	Total Economic Impacts. Paragraph states that IMPLAN I/O economic model was used for measuring the temporary total economic activity for the manufacturing and construction phases. The MMS also uses IMPLAN to evaluate economic impacts on the Gulf Of Mexico from OCS oil and gas activity. IMPLAN can't be realistically applied unless the operator designates the results spatially using some convention, such as Census Bureau major statistical area, county, or some other geographic convention. We see no such impact analysis by area presented in the DEIS. Recent MMS NEPA documentation might assist on this point. http://www.gomr.mms.gov/homepg/regulate/environ/nepa/cw2003-2007.html	MMS
5-283		5.16.5	Tourism and Recreation. The Corps might wish to reconsider whether or not the monopole foundations provide a benefit. We submit that they will act as an attractant for finfish drawn to the hardground ecologies around foundations, which in turn could beneficially impact recreational angling and scuba diving, and possibly commercial fishing.	MMS
		5.17	We see no summary of Project impacts in Section 5.0. A summary of Project impacts should be provided before the summary of cumulative impacts. Section 1.6 in the Executive Summary reports the summary of impacts for each examined resource in Section 5.9. The DEIS need not repeat this summary, however, please provide a Section 5.17 that points to Section 1.6 as the location where one would find a summary of Project impacts. A new section 5.18 would then be needed for cumulative impacts.	MMS
6-4		6.3	On page 6-4, the DEIS makes contradictory statements about the scoping process for post-construction monitoring. In Section 6.3, the DEIS states that details related to post-construction monitoring will be determined in consultation with reviewing agencies. However, in Section 6.3.3, under biological monitoring, the DEIS states that the specifications for monitoring will be developed, as appropriate, based on comments to the DEIR/DEIS. We believe the Corps should adopt the broader approach articulated in	FWS

FINAL Department of the Interior Comment/Response Matrix
Cape Wind Associates; Army Corps of Engineers, New England District
Draft Environmental Impact Statement

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			Section 6.3. The cooperating agencies and other review agencies will need to scope the elements of post-construction monitoring and these will also be necessary elements of state and federal permits for the ultimate project, should a Section 10 permit be issued. Last, we think the elements of post-construction monitoring will need to be multi-year in scope and duration, given the nature and magnitude of the Cape Wind Project.	

Attachment

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Table 1

Appendix	Species	Time Period	Page
5.7-D	Longtailed duck	March 2002	24
5.7-D	Eiders	Mid-March 2002	24
5.7-F	Terns	Mid-late August 2002	37
5.7-G	Grebes	Mid-December 2002	38
5.7-G	Eiders	November 2002-February 2003	40
5.7-K	Loons	Mid-late April 2003	38
5.7-K	Gannets	Late April 2003	39
5.7-K	Eiders	Late March 2003	41
5.7-K	Gulls	Early June 2003	41
5.7-K	Razorbills	Mid-April 2003	42
5.7-K	Terns	Early-mid May 2003	43
5.7-L	Loons	Late August 2003	28
5.7-L	Terns	Early July 2003	30
5.7-M	Mergansers	Mid-November 2003	43
5.7-M	Longtailed ducks	February 2004	42
5.7-M	Grebes	November-December 2003	40
5.7-M	Eiders	November-February 2004	42

Chronology of U.S. Fish and Wildlife Service Correspondence

December 31, 2001 – Scoping letter to Robert Durand, Secretary, Massachusetts Executive Office of Environmental Affairs. Discussed migratory birds, fisheries, submerged lands, alternatives, and other scoping issues for the joint EIR/EIS.

January 17, 2002 – Service report on the Section 10 permit application to install a data collection tower on Horseshoe Shoal in Nantucket Sound. The Service recommended that the data tower application be held in abeyance pending completion of the scoping process. This would enable the agencies to identify equipment/technology and study design necessary to fill data gaps for the EIR/EIS. The Service recommended that the data tower be fitted with various remote sensing equipment identified during the scoping process.

February 22, 2002 – The Service agreed to participate as a cooperating agency within the limits of existing staff and funding constraints.

April 1, 2002 – Scoping letter discussing two-step evaluation process for OCS lands similar to process for oil and gas development to create a more efficient NEPA process. Also discussed purpose and need and iterative screening process to identify the range of reasonable alternatives.

May 8, 2002 – Scoping letter identifying need for remote sensing studies for birds; predator-prey investigations involving benthic species, fish, mammals and birds; and avian response to weather events in Nantucket Sound. The Service recommended three (3) years of study using radar and other techniques (Option 1). Letter also addressed consultation process and information needs regarding roseate tern and piping plover.

May 13, 2002 – Memorandum discussing alternative options to the pile-supported data tower. Also recommended two (2) long-range acoustic recording devices be installed on the tower, if it is selected.

May 16, 2002 – Memorandum discussing the draft scope of work for the DEIR/DEIS. We reiterated comments made in prior scoping letters, including the need for three years of radar study for avian resources (Option 1), and interconnections between benthic, fishery and avian resources.

June 7, 2002 – Memorandum discussing the list of Special Conditions for the data tower Section 10 permit. The Service learned that our recommendation for the long-range acoustic monitors were not included, and asked the Corps to confirm if they had been accepted or rejected.

July 19, 2002 – Formal Section 7 consultation letter stating that the data collection tower would have no, or at most discountable, effects on the piping plover and roseate tern.

October 22, 2002 – Memorandum recommending that the recreational intercept study be conducted using face-to-face interviews as a means of gathering more site-specific information than could be obtained by telephone interviews.

November 13, 2002 – Memorandum discussing the screening process for the Cape Wind alternatives analysis. We identified constraints that exert undue control on the identification of reasonable alternatives, including the definition of utility-scale and the requirement for renewable energy with a connection to the New England grid.

December 11, 2002 – Memorandum discussing the alternatives screening process, including a fatal flaw matrix. Raised concerns with the definitions of project purpose and utility-scale, and with the criteria in the fatal flaw matrix.

May 1, 2003 – Memorandum discussing purpose and need statement and preliminary screening criteria for the alternatives analysis. We reiterated the concerns raised in the November 13 and December 11, 2002 memoranda above. In addition, we cited the ISO-NE CELT report and the large number of small-scale generating stations on the grid. The CELT report does not support the notion that utility-scale must be at least 200 mw.

March 25, 2004 – Memorandum discussing the Table of Contents, Project Purpose and Need, and Project Description sections in the Cooperating Agency review draft. We suggested that the project purpose be broadened because it is so narrowly drawn that representative sites must be invented for the alternatives analysis. In addition, we suggest that the same criteria be used to evaluate all alternatives considered in each iteration for process consistency.

May 6, 2004 – Memorandum regarding the alternatives analysis in the agency review draft. This is a page-by-page, line-by-line review. We identified shortcomings with the no-action alternative, and identified data gaps in baseline data for the action alternatives. In particular, we identified conclusory statements and other areas where the document is vulnerable because the data and/or literature do not support the conclusions drawn.

June 29, 2004 – Memorandum discussing the environmental effects of the applicant's preferred alternative in the agency draft. This is a line-by-line, page-by-page critique. In this review, we identified the major shortcomings regarding the lack of temporal and spatial data for the benthic, fishery, and avian sections of the document. This is our first opportunity to review and comment on the avian radar study, and we identified the stark contrast between the number of birds observed in the rotor-swept zone by boat and aerial surveys (365), versus the radar surveillance (127,697).

David E. Weber
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February 18, 2005

004976

Colonel Thomas Koning
U.S. Army Corps of Engineers
696 Virginia Road
Concord, MA 01742

Subject: Proposed Nantucket Sound Windmills

Dear Colonel Koning:

I read in the Boston Globe that the First District Circuit Court of Appeals upheld a lower court's finding that federal authorities – the Army Corps of Engineers – properly granted a permit for an offshore test data tower (i.e., a windmill to generate power) in Nantucket Sound.

As a resident of Cape Cod for 38 years, I have followed the rape of the Cape by land developers. In part, this was curtailed by the creation of the Cape Cod Commission and more stringent zoning. Now I will see the further degradation of another delightful place to live on the northeast coast by offshore developers of power-generating windmills.

Apparently, the finding of the courts may also provide you the wherewithal to deny future permits for 130 ugly and hazardous windmills, as well as a huge and environmentally unsafe transformer station. I don't know whether power would be transmitted from the station to shore with a pipe-type cable using oil for cooling the cable. If it does, it is another source for oil pollution if this line fails. Construction of these facilities results in problems that cannot be resolved.

As only one example of many, Craigville Beach has always been a place to enjoy the seashore, both physically and visually, whether day or night. And further, our summer travelers to the Cape enjoy this seashore and view, as well. These travelers are part of our tourist economy who will be cheated of half the value of this beach – the view – if the windmills are built, especially along with their night warning lights. And they'll be cheated of the other half if an oil spill occurs. These tourists may never return and, therefore, compound the adverse affect on the well being of Cape residents and businesses.

In part, it appears to me that the windmill power developers have chosen this site because, if allowed to build here, it would be difficult for governmental agencies to deny any other coastal region such permits. Therefore, all of the seacoasts are endangered.

This is government by corporations and not the people. In addition, federal government subsidization exacerbates the situation even though Massachusetts Representatives, Senators, and the Governor protest the construction of this project.

I fully understand the pragmatic benefit of the windmills. However, it would probably fail any cost-benefit study (if one could even be generated), especially since it is being subsidized. Further, there has been no honest attempts by the entrepreneurs to consider alternate sites that are unobtrusive. Finally, Cape Codders will not purchase the power generated by these windmills. The Cape Light Compact buys its power from ConEdison.

Many years ago, the Army Corps made a good example of unobtrusive engineering with the Cape Cod Canal and its bridges. Today, make another good choice, which is unlike the siting of the Canal's power plant. Consider all the reasons that would deny a permit for 130 windmills, a transformer station, and an underwater transmission line in Nantucket Sound. I am sure that these reasons will outweigh those for granting a permit.

Very truly yours,

David E. Weber, P.E.

Massachusetts Climate Action Network

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February 20, 2005

004977

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Comments on the draft Environmental Impact Statement for the Cape Wind Project

As is commonly the case with environmental impact statements , the DEIS/DEIR/DRI for the Cape Wind Project concentrates on potential environmental damage from the proposed wind farm. There is only a minimal discussion of the potential environmental benefits from Cape Wind, as given in Section 5.15, on Air and Climate.

However, this project is an unusual one, in that the primary gains are not economic, but rather environmental. In fact, both the federal and state governments provide subsidies for wind power development, primarily because of its environmental benefits in comparison to fossil fuels and other means of generating electricity.

Chapter two of the DEIS, "Project Scope and Need," states that "All factors which may be relevant to the proposal must be considered, including the cumulative effects thereof: among those are conservation, economics, aesthetics, general environmental concerns... and, in general, the needs and welfare of the people." (page 2-2)

In order to appropriately determine whether the public interest lies in going forward with Cape Wind, or denying it a permit, the final EIS written by the Army Corps should contain a vastly expanded analysis of the probable environmental benefits from the project, so that these (along with other benefits, such as less costly and more secure electricity) can be fairly weighed against any potential costs from the project.

Section 5.15 discusses quite briefly the environmental benefits from wind power, consisting primarily of reducing the need to generate electricity from fossil-fuel power plants, which causes a large proportion of the air pollution in the United States. This includes criteria air pollutants such as sulfur dioxide and nitrous oxides, particulates, and toxics including mercury.

Of equal or greater importance is the potential reduction due to Cape Wind of approximately one million tons per year in carbon dioxide emissions, the primary cause of global warming (otherwise known as climate change). Although climate change is widely viewed as the most serious environmental threat facing the planet, the DEIS contains only a paragraph or two concerning the issue, in Section 5.15 (pages 254-256)

In considering whether to award a permit for this project, the final EIS by the Army Corps should analyze in much greater depth the benefits from reducing criteria air pollutants and greenhouse gas emissions that would result from Cape Wind.

Of course, Cape Wind will not by itself solve the global problem of climate change. Scientists and policymakers recognize that greenhouse gas emissions must eventually be cut by four-fifths if the world's climate is to be stabilized. This was stated, for example, by the Conference of new England Governors and Eastern Canadian Premiers in its 2001 Climate Change Action Plan. The plan calls on all its member states and provinces to reduce GHG emissions to 10% below 1990 levels by 2020, and eventually to 75% to 85% below 1990 levels.[1] The state of Massachusetts adopted the same goals in its *Climate Protection Plan* issued in April, 2004.[2]

For even New England to achieve the necessary reductions in GHG emissions will require many times the amount of renewable, non-fossil fuel electricity that Cape Wind will provide. On the other hand, Cape Wind would be the single largest source of renewable energy in the northeast, and thereby would make the single greatest contribution to mitigating the threat of climate change.

The staff of the Cape Cod Commission has argued that in examining relevant alternatives to Cape Wind the DEIS should have looked at smaller-scale wind farms, because wind turbine clusters are typically smaller in capacity than industrial-scale fossil fuel plants.[3] But to achieve the necessary reductions in GHG emissions, it is absolutely essential that multiple projects the scale of Cape Wind be sited throughout New England (and elsewhere).

Furthermore, whether or not Cape Wind goes forward will set a critical precedent for other wind turbine developments in the northeast and the nation as a whole. Should the Army

Corps deny a permit here, the likely result will be to set back by years the development of similar projects, both on- and off-shore. In contrast, Cape Wind's approval will encourage others to come forward with proposals to provide what is arguably the form of renewable energy with the greatest potential for expansion in coming decades.

Dangers of Climate Change

Below we review briefly the current scientific understanding of the likely course of changes to our climate, its impacts on human health and the environment, and the benefits from taking action help wind power expand its role in our electricity generation system. We urge the Army Corps to expand greatly on this material in its final EIS, giving it equal weight to the thousands of pages of research material concerning possible environmental harm from Cape Wind.

The world has a 10-year window of opportunity to avert potentially irreversible disruptions from an increasingly unstable climate. That is the finding of more than 2,000 scientists from 100 countries reporting to the United Nations in what is the largest and most thoroughly peer-reviewed scientific collaboration in history.[4]

In January, Dr. Rajendra Pachauri, chair of the UN's Intergovernmental Panel on Climate Change, declared that the world has "already reached the level of dangerous concentrations of carbon dioxide in the atmosphere" and called for immediate and "very deep" cuts in the pollution if "humanity is to survive." That declaration was prompted by new scientific findings that the average global temperature is slightly more than 1 degree C away from irreversible runaway climate change. With the world already having warmed by nearly 1 degree C in the last century, that threshold will arrive will arrive when the concentrations of atmospheric carbon dioxide reach 400 parts per million.

Today the atmospheric concentration of carbon emissions is rising by more than 2 parts per million per year. The most recent reading puts them at 379 ppm -- a level of atmospheric carbon this planet has not experienced for 420,000 years. Given the increase in atmospheric CO2 of more than 2 parts per million per year, the "point of no return" is about a decade away.

Already scientists have documented the fact that the deep oceans are warming; the tundra is thawing; the glaciers are melting; infectious diseases are spreading; violent weather is increasing, ice shelves are breaking off Antarctica and the Arctic and the timing of the seasons has changed. All that has resulted from one degree of warming. [5]

Cape Wind, both through its own generation of clean energy and, hopefully, as a flagship for a nationwide network of wind farms, is a major hope for expanding the short time window that is available to prevent catastrophic climate change.

On the other side, there seems to be no compelling environmental harm from Cape Wind that begins to match the magnitude of the windfarm's benefits. The worst-case impact -- the death of large numbers of seabirds -- should be investigated carefully for the Corps' final

EIS, and measures to mitigate those impacts should be considered for inclusion in the wind farm's operational plans.

But we are confident that any reasonable comparison of benefits and costs will still show that Cape Wind should move forward. The possible impacts on sea birds pale in comparison to whole island nations going under from rising sea levels, the die-offs of large tracts of the world's forests, the failure of crops from droughts, floods and other weather extremes, and the harrowing prospects of a rapid climate change event.

One unambiguous finding of the world's community of climate scientists is daunting: to allow our inflamed atmosphere to stabilize requires humanity, worldwide, to cut its use of fossil fuels by 70 percent in a very short time.

That goal can be attained through either a widespread industrial collapse -- or through a globally proactive switch away from fossil fuels to non-carbon, renewable energy sources.

The rest of the world is very aware of this threat. Even as the U.S. has dragged its heels on this challenge, other nations are moving aggressively forward. More than 140 nations have signed the Kyoto Protocol. More specifically, Holland recently completed a plan to cut its emissions by 80 percent in 40 years. Tony Blair recently committed the U.K. to cut emissions by 60 percent in 50 years. Germany has committed to cuts of 50 percent in 50 years. Only the U.S., which emits a quarter of the world's CO_2 emissions with about 5 percent of its population, is ignoring this threat.

Economic Benefits

Part of the reason for the failure of the United States to address climate change lies in a general failure to recognize the extraordinary economic benefits of a transition to clean energy.

Locally, the construction of Cape Wind would be a significant infusion to the local economy, with its creation of about 390 construction jobs and some 50 jobs related to ongoing operation and maintenance.

Beyond this specific facility, the developer envisions the Cape Wind project as triggering the implementation of a number of other wind energy projects in the region. That could lead to the creation a major production facility for wind towers and turbines, perhaps in the old Quincy Shipyard, which, if realized, would generate a substantial number of permanent new manufacturing jobs in the Boston area.

The final -- and incalculable -- benefit of Cape Wind involves the world's developing nations -- several of whom may well surpass the U.S. in the next decade as the world's leading carbon emitters. The developing world has used inaction by the United States as a reason not to change their own energy infrastructures. Given the coming pulse of carbon from India, China, Mexico, Nigeria and other developing countries, that inaction could trigger a rapid escalation of atmospheric warming.

By contrast, a transition to clean energy would trigger millions of jobs -- especially in developing countries. It would raise living standards abroad without compromising ours. Every dollar invested in energy in poor countries creates far more jobs and wealth than the same dollar invested in any other sector of the economy, according to the World Bank. Were to U.S. to spearhead a transition to wind and other forms of non-carbon energy, that would, in the long run, begin to turn impoverished and dependent countries into robust trade partners.

By providing the lion's share of the electricity needs for Cape Cod and the islands, Cape Wind would be a major step toward reducing carbon emissions in the United States. By providing a flagship example of the potential for clean energy in the rest of the country, it could provide a keystone for a global energy transition -- without which this world will be a very chaotic and difficult place to navigate in a very short time.

Ross Gelbspan MB. — Marc Breslow

Ross Gelbspan
Author, *Boiling Point* and
The Heat Is On

Marc Breslow, Ph.D.
MCAN Director

Endnotes

[1] *Climate Change Action Plan*, Conference of New England Governors and Eastern Canadian Premiers, August 2001, page 7.

[2] *Massachusetts Climate Protection Plan*, Office for Commonwealth Development, The Commonwealth of Massachusetts, April 2004, page 13.

[3] "Cape Cod Commission Staff Report: Cape Wind Energy Project," JR#20084, 2/8/2005.

[4] See for example, "Global Warming: Scientists Reveal Timetable," Michael McCarthy, *The Independent* (United Kingdom), 2/3/05.

[5] See, for example:

"Scientists Predict Widespread Extinction by Global Warming," James Gorman, *The New York Times*, 1/8/04.

"The Coming Tide: Rise in sea level likely to increase N.J. floods, *The Record* (New Jersey), 9/4/2002.

"North America, Europe to cool as world warms?," *Reuters*, 1/21/04.

"World's glaciers slowly disappearing, *Boston Globe*, 1/30/05.

Preparing for a Changing Climate: The Potential Consequences of Climate Variability and Change, New England Regional Overview, New England Regional Assessment Group, University of New Hampshire, August 2001.

MARINE MAMMAL COMMISSION
4340 EAST-WEST HIGHWAY, ROOM 905
BETHESDA, MD 20814-4447

23 February 2005

0044978

Colonel Thomas L. Koning
District Engineer
New England District
U.S. Army Corps of Engineers
696 Virginia Road
Concord, Massachusetts 01742-2751

Dear Colonel Koning:

The Marine Mammal Commission, in consultation with its Committee of Scientific Advisors on Marine Mammals, has reviewed and offers the following comments on the Draft Environmental Impact Statement, Draft Environmental Impact Report, and Development of Regional Impact Report for the Cape Wind Energy Project. The Marine Mammal Commission is an independent federal agency established under the Marine Mammal Protection Act. The Commission's duties include making recommendations to federal agencies on actions necessary for the conservation of marine mammals. Agencies that decline to adopt Commission recommendations are required, under section 202(d) of that Act, to provide the Commission with a detailed explanation, within 120 days of receipt of the recommendations, of the reasons why those recommendations were not followed or adopted.

The proposed project involves the construction of 130 wind turbine generators in a 24-sq.-mi. area in Nantucket Sound between Cape Cod, Martha's Vineyard, and Nantucket Island. This area includes habitat used by several species of marine mammals, including, on rare occasions, endangered North Atlantic right whales and humpback whales, and endangered sea turtles. The wind turbines would be installed on towers constructed using a monopile (i.e., pile driver). The pile driver is expected to produce noise of 180 db or greater up to 500 meters from each tower location during the construction period. The draft document reviews information on the physical and biological environment in the project area and concludes that marine mammals are likely to avoid the area during construction activities, but that, once the facilities are operational, significant effects on marine mammals or their behavior are not expected.

The draft documents do not provide an adequate assessment of the available information on marine mammals that occur in project area. <u>The Marine Mammal Commission therefore recommends</u> that the final document include a more complete assessment of available whale and other marine mammal survey and sighting data for Nantucket Sound.

The draft documents also suggest that underwater sound at levels of 180 dB will not cause a significant impact on marine mammals because sound at that level poses little risk of permanent hearing damage. We know of no data to document this for most marine mammals. Even if it is true, sound at or even below this level can alter marine mammal movement and behavioral patterns, causing them to avoid areas or react in ways that can place them at risk. <u>The Marine Mammal</u>

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Commission recommends that the final document provide a more complete assessment of the potential effects of the predicted noise levels associated with pile driving on the behavior of marine mammals found in Nantucket Sound.

In addition, the draft document does not adequately discuss the authorizations that likely will be needed under the Marine Mammal Protection Act and the Endangered Species Act. Section 101(a)(5) of the Marine Mammal Protection Act requires citizens that may unintentionally take small numbers of marine mammals incidental to activities other than commercial fishing to obtain a small-take authorization. This includes taking by harassment. Such authorizations may be issued only if the National Marine Fisheries Service determines that the incidental taking will have negligible effects on the affected marine mammal populations. Authorizations are to identify permissible methods of taking and include requirements for monitoring and reporting impacts on marine mammals. There is little doubt that activities associated with the proposed action, particularly the use of pile drivers for tower construction, will result in the taking of marine mammals by harassment. As such, the documents should discuss what the project proponents have done to meet the incidental take provisions of the Marine Mammal Protection Act. The Marine Mammal Commission further recommends that the Corps ensure that the applicant complies fully with section 101(a)(5) of the Act.

The draft documents indicate that informal consultation has been undertaken with the National Marine Fisheries Service pursuant to section 7 of the Endangered Species Act but provides no description of the results of that consultation. Given the potential impacts to endangered species during the construction phase of the project, the Commission believes that the final documents should discuss how the project proponents have met the consultation provisions of the Endangered Species Act.

If you or your staff have questions regarding these comments and recommendations, please call.

Sincerely,

David Cottingham

David Cottingham
Executive Director

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MARTHA'S VINEYARD
COMMISSION

004979

Ms. Karen Adams,
Project Manager, Regulatory Division,
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696 Virginia Rd.
Concord, MA 01742

Reference file no: NAE-2004-338-1

February 23, 2005

Re: **Comments on the Draft Environmental Impact Statement for the Proposal to Build a Windfarm in Nantucket Sound**

Dear Ms. Adams,

The Martha's Vineyard Commission asks the Army Corps of Engineers to postpone action on Cape Wind's proposal to build a 130-turbine windfarm on Horseshoe Shoal in Nantucket Sound until the federal government has adopted an Ocean Policy that allows for consideration of such proposals within a comprehensive planning and regulatory framework. If the approval process cannot be postponed, then we ask that the project be denied without prejudice.

As the regional planning and regulatory agency mandated by the Commonwealth of Massachusetts to protect the lands and waters of Martha's Vineyard, the Martha's Vineyard Commission is concerned about the impact of the Cape Wind proposal on these resources. Without taking a position on the merits of the proposal, the Commission expresses grave concerns about the process.

The Cape and Islands have a clear interest in seeing the United States move from an economy based on polluting and largely foreign fossil fuels to one based on "clean" renewable energy. Our communities have some of the poorest air quality in Massachusetts, mainly because of air pollution from up-wind power and industrial plants.

The area is also very vulnerable to air pollution's effect on climatic change, notably rising sea levels.

Nevertheless, the Martha's Vineyard Commission believes that the current improvised review process does not serve the long-term interest of developing renewable energy. The Commission notes that the project is not the result of a government request for proposals, but is a spontaneously initiated proposal from private interests that takes advantage of the absence of a comprehensive federal regulatory framework for offshore wind projects and capitalizes on regulatory loopholes such as the project's location outside the jurisdiction of the Commonwealth of Massachusetts – which has made most of Nantucket Sound a marine sanctuary where electrical generation projects are prohibited. It also appears that the applicant does not have any proprietary interest (ownership, leasing agreement) in the site. Approving this very controversial project will likely result in political and legal battles for years to come, which will set back, rather than advance, other efforts to develop offshore wind projects. Furthermore, dealing with this ad hoc proposal could create an inadvertent precedent that risks opening up the continental shelf for piecemeal development.

The Commission believes that the cause of developing offshore renewable energy in America would be better served by first adopting an Ocean Policy – pursuant to the Oceans Act of 2000 and as recommended by the U.S. Oceans Commission in 2004 – which sets out a clear planning and regulatory framework for offshore projects, balancing the need to ensure future development with the need to protect significant natural and cultural resources. Such a policy would allow appropriate future projects – perhaps even in Nantucket Sound – to be fully evaluated and proceed through the process more quickly and efficiently, while being less vulnerable to legal challenge and delay. The development of this policy should directly involve state and local authorities, including the Cape Cod Commission, the Nantucket Planning and Economic Development Commission and the Martha's Vineyard Commission in the decision-making process.

The Commission believes that the review of the Cape Wind project should not proceed at this time. Nonetheless, the Commission offers the following general comments on the Draft Environmental Impact Statement (DEIS), should our recommendation to postpone the project not be followed. We note that the DEIS, though extensive, is inadequate in several ways. It responds to a series of isolated specific technical questions in various degrees of thoroughness. However, the DEIS process does not adequately deal with the overall tangible and intangible impacts of implementing a project of this scale in a unique environment such as Nantucket Sound. The DEIS should address all factors that would impact the cultural and natural landscapes and the tourist based economies of Cape Cod and the Islands, in addition to impacts on Nantucket Sound itself.

We appreciate the opportunity to comment on this project and the efforts of the Army Corps of Engineers to deal with this proposal. However, we believe that the Cape Wind proposal cannot be appropriately evaluated, the Nantucket Sound cannot be adequately protected, and the promise of offshore wind energy cannot be advanced in America without a comprehensive and coordinated regulatory framework for offshore wind energy, involving federal, state and local authorities.

Truly yours,

Linda B. Sibley

Linda Sibley, Chair

cc:

United States Officials

President George W. Bush
Vice President Richard Cheney
Senator Edward Kennedy, Massachusetts
Senator John Kerry, Massachusetts
Representative William D. Delahunt
Speaker of the US House of Representatives Dennis Hastert
President Pro Tempore of the Senate Ted Stevens
Senate Majority Leader Bill Frist
Senate Minority Leader Harry Reid
Senator John Warner, Virginia
House of Representatives Majority Leader Tom DeLay
House of Representatives Minority Leader Nancy Pelosi

Secretary of Energy Spencer Abraham
EPA Acting Administrator Stephen L. Johnson

Commonwealth of Massachusetts Officials

Governor Mitt Romney
State Senator Robert O'Leary
State Representative Eric Turkington
Speaker of the House of Representatives Salvatore F. DiMasi
Senate President Robert E. Travaglini

Secretary of the Office of Community Development Douglas I. Foy
Secretary of the Executive Office of Environmental Affairs Ellen Roy Herzfelder
Massachusetts Attorney General Thomas Reilly

Cape and Island Officials

Dukes County Commission
Boards of Selectmen of the Towns of Dukes County
Barnstable County Commission
Boards of Selectmen of the Towns of Barnstable County
Nantucket County Commission
Nantucket Board of Selectmen

Cape Cod Commission
Nantucket Planning and Economic Development Commission

New England Fishery Management Council
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Frank Blount, *Chairman* | Paul J. Howard, *Executive Director*

February 23, 2005

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004980

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Re: Cape Wind Energy Project Draft Environmental Impact Study/Report and Cape Cod Commission Development of Regional Impact. NAE 2004-338-1 & EOEA #12643 ACOE NAE-2004-338-1, EOEA #12617

Dear Ms. Adams and Ms. Herzfelder:

The 1996 amendments to the Magnuson-Stevens Fishery Conservation and Management Act required the Regional Fishery Management Councils to designate essential fish habitat (EFH) for all fishery resource species managed under federal fishery management plans (FMP). The New England Fishery Management Council (NEFMC) designated EFH for 26 NEFMC-managed species in the Northeast region of the United States.

Section 305(b)(3) of the Magnuson-Stevens Act empowers the Councils to consult with federal and state agencies regarding potential impacts to EFH for species under Council's jurisdiction. Pursuant to this section, the Council is submitting comments regarding the potential impact of the Cape Wind energy project on EFH and fishery resources in federal waters.

The Council applauds the efforts of the project applicant to tap alternative energy sources other than fossil fuels. Oil (characterized as petroleum and any derivatives) may be a major stress on inshore fish habitats (see Wilk and Barr 1994, cited in NEFMC 1998). Short-term impacts include interference with the reproduction, development, growth and behavior (e.g. spawning, feeding, etc.) of fishes, especially early life-history stages (see Gould *et al.* 1994, cited in NEFMC 1998). Carcinogenic and mutagenic properties of oil compounds are receiving increasing attention around the world (Larsen 1992, cited in NEFMC 1998). Oil spills may cover and degrade coastal habitats and associated benthic communities, or may produce a slick on the surface waters which disrupts the pelagic community. Oil has been demonstrated to disrupt the growth of vegetation in estuarine habitats (Lin and Mendelssohn 1996, cited in NEFMC 1998). These impacts may eventually lead to disruption of community organization and dynamics in affected regions. Oil can persist in sediments for years after the initial contamination. This may cause problems to physiological and metabolic processes of demersal fishes (Vandermeulen and Mossman 1996, cited in NEFMC 1998).

With that said, the Council has several concerns about this project and the corresponding federal Draft Environmental Impact Statement (DEIS) and Draft Environmental Impact Report (DEIR):

Commercial and Recreational Fisheries

- The DEIS/DEIR relies on out-dated data for the bulk of the fishery analysis and does not utilize the best available data. Fishery data are available from NMFS through the end of fishing year 2004 and should be included in the DEIS/DEIR analyses. The finfish data for this project are limited to only the National Marine Fisheries Service (NMFS) and Massachusetts Division of Marine Fisheries (MA DMF) data sets, and are not based upon site-specific finfish sampling. In order to fully evaluate the proposed project and anticipated impacts, multi-year site-specific fisheries sampling program should be mandated to determine the usage of the site by specific fishery resources. Absent this resource survey, a conservative approach for assuming presence of fisheries resources must be taken for the proposed project site. The Final Environmental Impact Statement (FEIS) and Final Environmental Impact Report (FEIR) should include this analysis.

- The FEIS/FEIR should include an analysis of the impacts of the towers and the cables on commercial fishing operations. Once constructed, the turbines would preempt other bottom uses in this area similar to oil and natural gas leases.

- Section 5.4.3.3 of the DEIS/DEIR describes the commercial fisheries data for the proposed disturbance site alternative in Nantucket Sound. The analysis describes commercial fisheries largely by the pounds landed by each gear type from the NMFS and MA DMF databases. However, this is a flawed approach. The focus of the analysis should be placed on the variety and amount of time each gear type fishes within, and adjacent to, the proposed disturbance site. The DEIS/DEIR analyses equate commercial catch with abundance and imply that limited catch rates are a proxy for limited abundance, which they often are not. Catch rates depend on abundance, quotas, total allowable catches, size and bag limits, and seasonal closures, as well as fishing effort. In some cases, the lower catch rate for a particular year is the result of low relative abundance and the fishery regulations implemented in subsequent years in order to build spawning stock biomass.

- The map shown in Figure 1 depicts the four ten–minute squares (TMS) of latitude and longitude that overlap with, or are adjacent to, the proposed project area. For each of these TMS, respectively, Table 1 reports the fishing activity from federally permitted vessels. Fishing activity is reported as the number of 24-hour days absent from port by TMS for trawls and dredges and number of trips for fixed gears as compiled by the NMFS for the time period 1995-2001. Not all fishing trips are reported by latitude and longitude and, therefore, some trips cannot be binned into TMS. As a result, the data shown in Table 1 are a large sub-sample (approximately 75-80%) of all trips. Therefore, the numbers reflect the relative, not absolute, amount of fishing activity by gear among these four areas. As you can see the disturbance area is an important area for commercial fishing, between 267 and 749 trips have been logged by fishermen using fixed gears and between 398 and 922 days fished have been logged by fishermen using mobile gear.

- As stated within the DEIS/DEIR, a number of fishing activities actively occur within the project area using a variety of gear types. Gear types utilized by federally permitted vessels in the area include static gears such as pots and traps, as well as bottom tending mobile gears such as otter trawls. A significant number of the fishing trips occurring within the project area utilize trawl gear. The Council is concerned that the proposed project has the potential to adversely affect fishing activities within the wind park due to the uncovering of cables. Should the inner array of cables become exposed, or move towards the surface, commercial fishing activities may be excluded from the area due to potential conflicts with trawling gear. While the proposed inner-array of cables is to be buried to a depth of 6 feet, the extreme conditions analysis within Appendix 4.0 of the DEIS/DEIR estimates that scour could occur to depths of 6.0-8.5 feet. Should this type of scour occur and cables become exposed due to natural events (i.e. hurricane, nor'easter), there is the potential for fishing gear interactions with cables, or in extreme cases, the *de facto* exclusion of fishing activities from the 24-square mile project area. While the scour analysis presented in Appendix 4.0 is related specifically to the Electrical Service Platform (ESP) and the Wind Generating Towers (WTG), the FEIS/FEIR should analyze extreme scour projections for the inner-array of cables.

- As stated above, a target cable burial depth of 6 feet is anticipated. The FEIS/FEIR should identify provisions in the event that the target depths are not met or maintained. Specific issues include whether the applicant will continue burial until a minimum depth of 6 feet is achieved or whether the applicant will ensure that the cable remains buried to a depth of 6 feet throughout the life of the project. These issues are of great concern to the Council, due to the fact that the burial depth of the cable is presented as the primary mitigation method of avoiding conflicts with commercial fishing activities. Should interactions occur between cables and fishing gear, some form of contingency planning should be addressed within the FEIS/FEIR.

- Comparison of fishing activity and landings at the alternative sites are compromised by many of the same deficiencies as those noted for the resource characterizations. The DEIS/DEIR suffers from the presentation of incomplete or conflicting data, a reliance on superficial analyses, and the absence of data on private recreational fishing activity and its contribution to the economy. For instance, as presented in the DEIS/DEIR, the characterization of the recreational fisheries in Nantucket Sound underestimates the amount of effort expended and fails to characterize the financial contribution made to the economies of Cape Cod, Nantucket, and Martha's Vineyard by these fishermen. Additionally, the reporting of raw data from the NMFS' MRFSS database and that obtained through directed telephone surveys, may be inappropriate. Such data likely represent a fraction of the total effort and should be viewed as such. Lastly, as the DEIS/DEIR does not provide any estimates of the number of passengers carried by commercial party and charter boats or the geographic distribution of the vessels surveyed, one cannot determine if the level of effort reported for Horseshoe Shoals by vessel captains is in fact representative of actual activity in this area.

- Directed studies of commercial and recreational fishing activity in the preferred and alternative project areas are required to evaluate potential impacts resulting from the construction and operation of this facility. The DEIS/DEIR should be supplemented with such analyses.

Safety and Navigation

Commercial and recreational fishing activities take place in all of the proposed offshore project sites. Therefore, the project proponent's suggestion that fishing regulation is unnecessary in the project area is erroneous. In order to adhere to the Magnuson Act National Standard 10 "to promote safety of life at sea", restrictions on fishing activities in the project area would be required.

- The Council is aware that the U.S. Coast Guard has expressed concern with particular findings of the Navigational Risk Assessment (NRA) included at the Coast Guard's request in the DEIS/DEIR. Specifically, the Coast Guard has recommended that the NRA should:

  1) Address the impact, if any, that the proposed WTGs may have on ship-board GPS receivers, including commercial, recreational, and fishing vessels,

  2) Consider the effects of the WTGs may have on bottom contour, which may cause uncharted shallow areas to form, and

  3) Include an analysis of the possibility of large ice chunks being hurled from the WTG blades and its potential impact on navigation safety.

- The DEIS/DEIR states that the proposed project is not expected to have impacts to vessels navigating the project area. In our opinion, the FEIS/FEIR should further discuss impacts related to active fishing vessels within the project area. Of specific concern is that vessels utilizing trawl gears within the project area will be forced to maneuver throughout the wind park. The DEIS/DEIR states that due to the orientation of the structures, fishing vessels will be able to travel in a straight line. However, fishing vessels that attempt to maneuver in alternate courses may be impacted and efficiency may be reduced. The FEIS/FEIR should include an assessment of fishing gears utilized in the area, lengths of nets and lines, and anticipated tow speeds to determine any adverse impacts to commercial fishing navigation.

- The Council is concerned that the safe and effective use of mobile gear would be very difficult in a field of WTGs for the following reasons:

  1) The otter-trawl gear typically extends from about 775 feet to 1400 feet behind the boat depending on the size of the trawler and the species of fish being targeted. The trawl doors spread the gear 300 feet to 400 feet apart. The targeted species tend to be aggregated in schools, not evenly distributed over the area. Therefore, it will be very difficult for fishermen to fish with this gear in between a row of WTGs.

  2) Fishermen concentrate their efforts where they have located the schools and need to be able to turn to stay on the fish. A trawler cannot make sharp turns when its net is in the water. It requires a large turning radius of from ½ to 1 mile to keep the gear from collapsing. This is more than the distance between the WTGs.

  3) Fishing is a dynamic activity with boats towing along every possible compass heading and having to take account of the winds, tidal currents, location of the fish, and locations and courses of other boats in the area. It requires considerable skill and concentration on the part of the vessel captains to safely ply their trade. The presence of the WTGs throughout the fishing area would make safe maneuvering extremely difficult and pose an ever-present danger of collision. The probability of accidental collisions with the structures or other vessels, whose presence may be visually obstructed by the towers, would be enhanced under conditions of foul weather and poor visibility for which the area is noted.

Essential Fish Habitat (EFH)

The Council believes the proposed project in Nantucket Sound may negatively impact habitat of some or all of the species listed in Table 2, depending on the site that may be selected, thereby reducing the net benefits of our habitat protection and mitigation measures.

- The proposed disturbance site has been designated as EFH for between 15 and 18 species and between 42 and 47 life stages (see Table 2). The draft environmental impact statement very generally describes potential impacts on various life stages of these species and their associated habitats. The habitat impact assessment should focus on the ability of the area to continue providing the essential ecological services to these species that are necessary for spawning, breeding, feeding, or growth to maturity.

- Activities such as vessel anchoring, platform or artificial island construction, pipeline/cable laying, dredging, and pipeline burial can alter bottom habitat by altering substrates used for feeding or shelter. Disturbances to the associated epifaunal communities, which may provide feeding or predator escape habitat, may also result. Benthic organisms, especially prey species, may recolonize disturbed areas, but this may not occur if the composition of the substrate is drastically changed or if facilities are left in place after production ends.

- More specifically, the Council questions the DEIS/DEIR conclusions that the impact of 130 structures in the Nantucket Sound 24-square mile project area will have minimal consequences for the species listed in Table 2. Shifting a high energy, sandy shoal environment to one dominated by rigid vertical structures will impact habitat for many species listed in Table 2. The electromagnetic disruption that will occur in any of the proposed project sites has the potential to alter migratory patterns of fish sensitive to such changes, and the impacts of wind turbines and scour mats on oceanographic processes is insufficiently analyzed in the DEIS/DEIR.

- Adverse effects to EFH from the installation of pipelines, utility lines, and cables can occur through 1) destruction of organisms and habitat, 2) turbidity impacts, 3) resuspension of contaminants, and 4) changes in hydrology. Specifically, Section 5.3.4 and Table 5.3-3 of the DEIS/DEIR identifies that the proposed project will result in approximately 1,378 acres of temporary impacts to benthic habitats during construction. These temporary impacts are the result of the installation of submarine cables, inner-array cables, the monopiles and the ESP, as well as the associated anchors and anchor line sweeps. While the DEIS/DEIR states that these impacts are anticipated to be temporary and localized, the Council maintains that such benthic impacts have not been fully evaluated. Specifically, there is little discussion of the magnitude of anticipated impact and the anticipated recovery rate and this should be addressed within the FEIS/FEIR.

- Destruction of organisms and habitats can occur in the right-of-way of a pipeline or cable. This destruction can lead to long-term or permanent damage depending on the degree and type of habitat disturbance and the mitigation measures employed. Shallow water environments, rocky reefs, nearshore and offshore rises, salt, and freshwater marshes (wetlands), and estuaries are more likely to be adversely impacted than open-water habitats. This is due to their higher sustained biomass and lower water volumes, which decrease their ability to dilute and disperse suspended sediments (Gowen 1978, cited in NOAA Fisheries 2003).

- Increased water turbidity from higher than normal sediment loading can result in decreased primary production. Depending on the time of year of the construction, adverse impacts can occur, such as during highly productive spring phytoplankton blooms or times when organisms are already under stressed conditions. Changes in turbidity can temporarily alter phytoplankton communities. Depending upon the severity of the turbidity, these changes in water clarity can affect the marine habitat functions of species higher in the food chain.

- The Council understands that the Commonwealth of Massachusetts, Division of Marine Fisheries, has requested a site-specific evaluation of fishery resources in the proposed site in Nantucket Sound. Because this evaluation was not conducted, the Council believes the DEIS/DEIR analysis is insufficient. To address the deficiencies outlined in this letter, the Council suggests that a site-specific analysis of the potential impacts on fishery resources of the Cape Wind project be conducted and the DEIS/DEIR updated according to its findings. In addition to providing data on aquatic resources, the biological monitoring plan should evaluate recovery rates. This assessment of recovery rates will provide insight on potential long-term impacts on EFH and fishery resources. The Council feels that permit decisions regarding this project should not occur without the results of the biological monitoring plan in order to utilize the best science available.

- Section 5.1.3 and Figure 5.1-6 of the DEIS/DEIR notes several areas of short and long period sand waves throughout the project area on Horseshoe Shoals. According to recent evaluations of fishing gear effects (Stevenson, et al, *In Press*), the smoothing of sand ridges as a result of trawl gear can adversely affect fisheries habitat. Finfish resources utilize biogenic depressions and sand ridges for refuge and shelter and loss of these habitats can affect fish energy requirements. Furthermore, loss of this sand ridge structure habitat can impact the forage base for larger fishery resources in the area. The Council maintains that the proposed temporary impact from jet-plowing/cable laying and anchor chain sweeps can adversely affect sand wave habitat. While recovery is expected to occur within this dynamic environment, studies have shown that recovery may be prolonged for up to one year. The lost functions and values of this habitat – from initial impact to the time of full recovery to pre-construction contours – is important to understand. The Council recommends that the FEIS/FEIR analyze the anticipated effects of these temporary losses and the anticipated time period for recovery. Efforts to minimize impacts to benthic habitats, such as mid-line anchor buoys, should be utilized for the proposed project. For impacts that cannot be avoided, compensatory mitigation for lost functions and values for temporary impacts should be presented within the FEIS/FEIR.

- The current EFH analysis is presented as an abstract listing of species and their habitat preferences. Why is no effort made to tie EFH designations from the literature to actual occurrence and relative abundance as documented by survey data and landings? Due to the lack of site-specific information, the Council believes that the current Essential Fish Habitat Assessment (EFHA) for this project is inadequate. As such, the Council requests that this information be provided and an extension of time be granted to review the data and provide comments. The incorporation of the site-specific results of the state-required biological monitoring plan into the final EFHA may be the most effective means for obtaining this information.

- The EFHA describes the federally-managed species that have been designated by the Council as well as the anticipated presence within the project site. The EFHA concludes that impacts resulting from the construction of the proposed project will be localized and temporary and that little mitigation will be required. The EFHA however, does not discuss the impacts to fisheries habitat resulting from 1,378 acres of temporary impact during construction of the wind park. As stated above, further assessment of impact and recovery fishery habitats should be performed within the FEIS/FEIR prior to any conclusions regarding the approvability of this permit application.

<u>*Conservation Recommendation:*</u>

The Council is concerned with the potential impacts this project may have on the habitat necessary to maintain healthy fish stocks, especially coming at a time when some stocks are still depleted and other stocks are just beginning to show signs of recovery. Further, the project has a high likelihood of adversely impacting EFH for many federally-managed species in a manner that is more than minimal and less than temporary in nature. Accordingly, a broad list of conservation recommendations that the ACOE should consider as a condition for permitting this project has been provided here:

1) The project schedule should be arranged to avoid in-water work within Lewis Bay from January 15 – May 31 of any year in order to protect sensitive life stages of winter flounder EFH.

2) According to the DEIS/DEIR, the benthic footprint of the wind towers and associated scour mats will be 0.68 acres and 2.53 acres, respectively. These structures represent a permanent impact of 3.21 acres of benthic substrate. Based on our review of the DEIS/DEIR, compensatory mitigation for this permanent impact has not been explored and should be done so in the FEIS/FEIR.

3) Align crossings along the least environmentally damaging route. Sensitive habitats such as hard-bottom (e.g., rocky reefs), submerged aquatic vegetation, oyster reefs, emergent marsh, sand and mud flats, should be avoided. If unavoidable, compensatory mitigation should be implemented.

4) Use horizontal directional drilling where cables would cross salt marsh, vegetated inter-tidal zones, or steep erodible bluff areas adjacent to the inter-tidal zone to avoid surface disturbances.

5) Avoid construction of permanent access channels since they disrupt natural drainage patterns and destroy wetlands through excavation, filling, and bank erosion.

6) Store and contain excavated material on uplands. If storage in wetlands or waters cannot be avoided, alternate stockpiles should be used to allow continuation of sheet flow. Stockpiled materials should be stored on construction cloth rather than bare marsh surfaces, sea grasses, or reefs.

7) Backfill excavated wetlands with either the same or comparable material capable of supporting similar wetland vegetation. Original marsh elevations should be restored. Topsoil and organic surface material such as root mats should be stockpiled separately and returned to the surface of the restored site. Adequate material should be used so that following settling and compaction of the material, the proper pre-project elevation is attained. If excavated materials are insufficient to accomplish this, similar grain size material should be used to restore the trench to the required elevation. After backfilling, erosion protection measures should be implemented where needed.

8) Use existing rights-of-way whenever possible to lessen overall encroachment and disturbance of wetlands.

9) Bury submerged cables where possible. Marine cables that are not buried in areas where scouring or wave activity occurs may eventually result in cable exposure and a higher risk of cable damage.

10) Remove inactive submerged cables unless they are located in sensitive areas (e.g., marsh, reefs, sea grass, etc.) or located in areas that present no safety hazard.

11) Use silt curtains or other type barriers to reduce turbidity and sedimentation if sea grass or oyster reefs occur at or near the project site. These silt barriers should extend at least 100 feet beyond the limits of the sea grass beds or oyster reefs. If sea grasses and oyster reefs cannot be avoided, pre- and post-construction surveys should be completed to determine project impacts and mitigation needs.

12) Access for equipment should be limited to the immediate project area. Tracked vehicles are preferred over wheeled vehicles. Consideration should be given to the use of mats and boards to avoid sensitive areas. Equipment operators should be informed to avoid sensitive areas. Sensitive areas should be clearly marked to ensure that equipment operators do not traverse them.

13) Limit construction equipment to the minimum size necessary to complete the work. Shallow-draft equipment should be employed so as to minimize impacts and eliminate the necessity of temporary access channels. The size of the trench proper should also be minimized. The push-ditch method, in which the trench is immediately backfilled, reduces the impact duration, and should, therefore, be employed when possible.

14) Conduct construction during the time of year that will have the least impact on sensitive habitats and species.

15) Suspend transmission lines beneath existing bridges or directional boring under streams to reduce the environmental impact. If transmission lines span streams, site towers a minimum of 200 feet from streams.

Summary
The fishing industries of New England have made many great sacrifices to help rebuild these resources. Additionally, safety at-sea is a high priority for the Council as well as the U.S. Coast Guard. Issues with vessel assistance and rescue should be evaluated and proper solutions identified prior to permitting this project.

The Council requests that a more thorough assessment of the potential environmental, essential fish habitat and social and economic impacts, as required under both the National Environmental Policy Act and the Magnuson-Stevens Fishery Management and Conservation Act, should be conducted in the form of a Final Environmental Impact Statement. The Council looks forward to evaluating a revised impact document that more clearly and comprehensively describes the potential environmental effects to EFH and federally-managed species. Additionally, as is required under Section 600.920(k) of the Magnuson Act, we look forward to the detailed response in writing at least 10 days prior to final approval of any action.

Please feel free to contact me if you have any questions.

Sincerely,

Frank Blount

Frank Blount
Chairman

cc: Pat Kurkul, NMFS
Ricks E. Savage, MAFMC
Preston P. Pate, Jr., ASMFC
John V. O'Shea, ASMFC
Paul Diodati, MA DMF
Susan Snow-Cotter, MA CZM

Figure 1. Ten-minute squares of latitude and longitude that contain or are adjacent to proposed disturbance site.

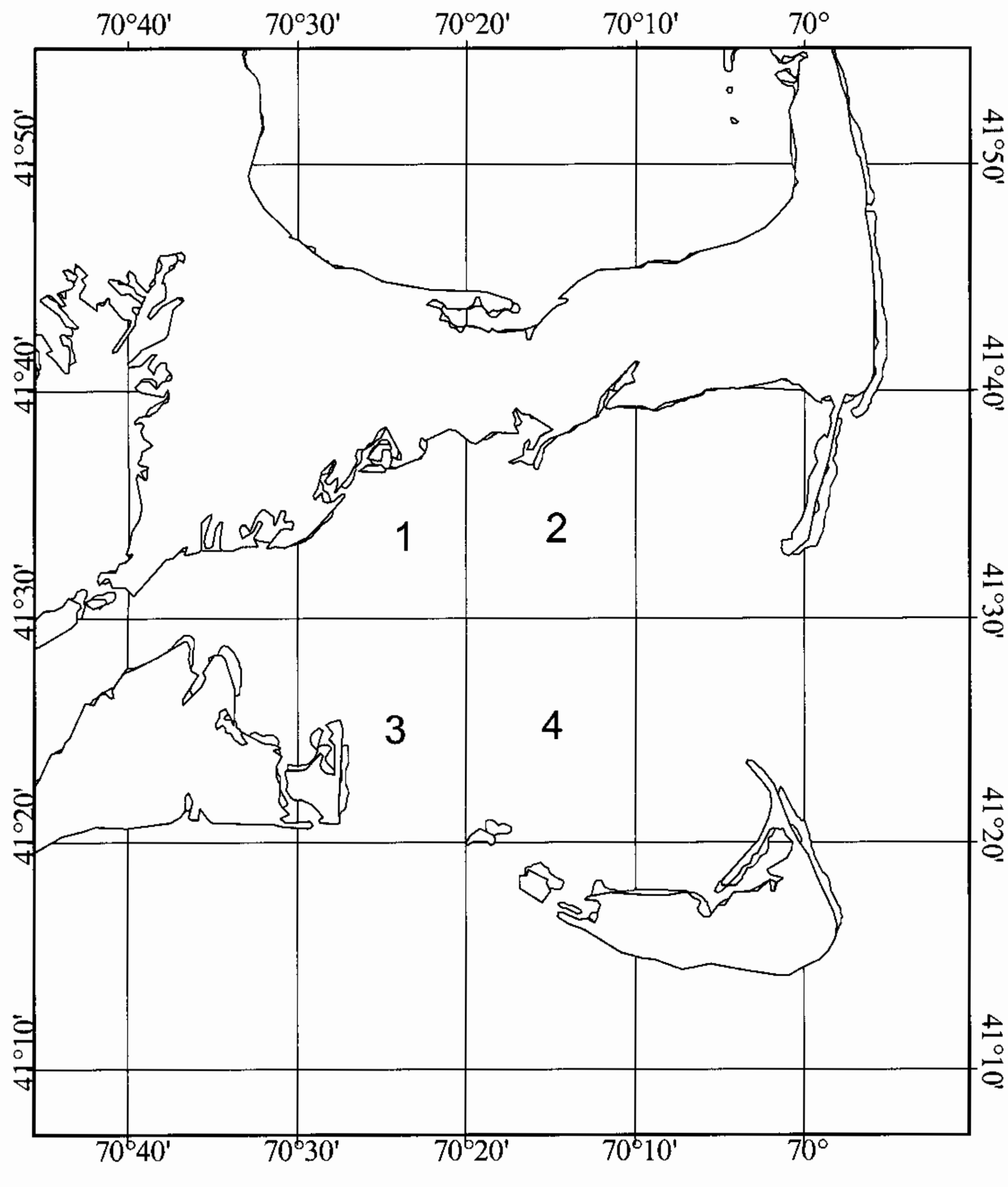

Table 1. Fishery activity by federally permitted vessels within the four ten-minute square latitude and longitude cells at or surrounding the proposed disturbance site.

	TMS 1	TMS 2	TMS 3	TMS 4

Fixed Gear				
Fish pots	279	67	344	226
Whelk pots	69	28	113	260
Lobster pots	42	52	26	18
Crab pots	1	1	3	18
Other pots	41	99	79	193
All pots	*432*	*247*	*565*	*715*
Sink gill nets	*1*	*14*	*5*	*34*
Bottom longlines	*1*	*6*	*0*	*0*
TOTAL trips:	434	267	570	749
Mobile Gear				
Fish otter trawls	441	646	389	903
Other trawls	6	33	8	19
All bottom trawls	*447*	*679*	*397*	*922*
Scallop dredges	*1*	*11*	*1*	*0*
Clam dredges	*0*	*0*	*0*	*0*
TOTAL 24-hour days fished:	448	690	398	922

** TMS: ten-minute square of latitude and longitude depicted in Figure 1.*
*** Numbers in table represent: fixed gear – number of trips; mobile gear - the number of 24-hr days absent from port by TMS.*

Table 2. EFH designations for species and life stages found within the four ten-minute square latitude and longitude cells at or surrounding the proposed disturbance site.

TMS 1	TMS 2	TMS 3	T MS 4
Species and Life Stage(s)			
Atlantic cod - A	Atlantic cod - A	Atlantic cod - A	Atlantic cod - A
winter flounder - E, L, J, A	winter flounder - E, L, J, A	winter flounder - E, L, J, A	winter flounder - E, L, J, A
windowpane flounder - A	windowpane flounder - A	windowpane flounder - A	windowpane flounder - A
little skate - J, A	little skate- J, A	yellowtail flounder - J	Atlantic sea herring - J
winter skate- J, A	winter skate - J, A	little skate - J, A	little skate - J, A
long finned squid - J, A	long finned squid - J, A	winter skate - J, A	winter skate - J, A
Atlantic butterfish - E, L, J, A	Atlantic butterfish - E, L, J, A	long finned squid - J, A	long finned squid - J, A
Atlantic mackerel - E, L , J, A	Atlantic mackerel - E, L, J, A	Atlantic butterfish - E, L, J, A	Atlantic butterfish - E, L, J, A
summer flounder- E, L, J, A	summer flounder - E, L, J, A	Atlantic mackerel - E, L , J, A	Atlantic mackerel - E, L , J, A
scup - J, A	scup - J, A	summer flounder - E, L, J, A	summer flounder - E, L, J, A
black sea bass - J, A	black sea bass - J, A	scup - J, A	scup - J, A
surf clam - J, A	surf clam - J, A	black sea bass - L, J, A	black sea bass - J, A
king mackerel - E, L, J, A	king mackerel - E, L, J, A	surf clam - J, A	surf clam - J, A
Spanish mackerel - E, L, J, A	Spanish mackerel - E, L, J, A	king mackerel - E, L, J, A	king mackerel - E, L, J, A
Cobia - E, L, J, A	Cobia - E, L, J, A	Spanish mackerel - E, L, J, A	Spanish mackerel - E, L, J, A
		Cobia - E, L, J, A	Cobia - E, L, J, A
Total # spp: 15	*Total # spp: 15*	blue shark - A	blue shark - A
Total # life stages: 42	*Total # life stages: 42*	bluefin tuna - J, A	bluefin tuna - J, A
		Total # spp: 18	*Total # spp: 18*
		Total # life stages: 47	*Total # life stages: 46*

** TMS: ten-minute square of latitude and longitude depicted in Figure 1.*
E: eggs; L: larvae; J: juvenile; A: adults

Literature Cited:

Gowen, A.W., 1978. The environmental effects of outer continental shelf (OCS) pipelines. Initial findings, New England River Basins Commission 4: 24-43, Boston, MA.

New England Fishery Management Council (NEFMC). 1998. Final Amendment #11 to the Northeast Multispecies Fishery Management Plan, #9 to the Atlantic Sea Scallop Fishery Management Plan, Amendment #1 to the Monkfish Fishery Management Plan, Amendment #1 to the Atlantic Salmon Fishery Management Plan, and components of the proposed Atlantic Herring Fishery Management Plan for Essential Fish Habitat, incorporating the environmental assessment. October 7, 1998. NEFMC.

Stevenson, D.K., L.A. Chiarella, C. D. Stephan, R.N. Reid, J.E. McCarthy and M. Pentony. In press. Characterization of fishing practices and the marine benthic ecosystems of the Northeast U.S. shelf, and an evaluation of the potential effects of fishing on essential fish habitat. NOAA Tech. Memo. 181.

MID-ATLANTIC FISHERY MANAGEMENT COUNCIL

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Daniel T. Furlong
Executive Director

Christopher M. Moore, Ph.D.
Deputy Director

February 23, 2005

Ms. Karen Adams
Cape Wind Project Manager
U.S. Army Corps of Engineers
New England District
Regulatory Division
696 Virginia Road
Concord, MA 01742-2751

004981

Dear Ms Adams:

As a matter of national security, the Mid-Atlantic Fishery Management Council (MAFMC) encourages and supports development of alternative energy sources so as to reduce our nation's reliance and dependence on foreign oil. To the extent that near shore windmill farms can help alleviate our dependence on foreign oil we support their development and operation. However, such development and operation should consider the impacts such activities might have on fishery resources in federal waters. It is our understanding that your office is reviewing the Cape Wind Energy Project Draft Environmental Impact Study/Report and Cape Cod Commission Development of Regional Impact. As this project moves forward into the permitting phase, please be aware that of the 13 species managed by this Council, a majority (summer flounder, scup, black sea bass, surfclams, Loligo squid, mackerel, and butterfish) of them at various times throughout the year and at various stages of their life history are in the water column or are in/on the Essential Fish Habitat (EFH) that underlies the "foot print" of this proposed windmill farm. Attached is a New England Council analysis that overlays known EFF (Figure 1 and Table 1) and reinforces our opinion about the presence of MAFMC managed species in proposed project areas. We also concur with the New England Council in that the DEIS/DEIR should be strengthened regarding the analyses of the commercial and recreational fishery impacts.

We believe that the proposed Nantucket Sound windmill farm may negatively impact habitat of some, or all, of the aforementioned species. It is possible that the electromagnetic disruption that will likely occur at the proposed project site has the potential to alter migratory patterns of fish sensitive to such changes. The impact of wind turbines and scour mats on oceanographic processes is still an open question and may adversely affect the local habitat of these species. On the other hand, oil and gas structures in the Gulf of Mexico have been effective fish aggregating devices and it has been theorized that these structures have added to the total biomass of marine fisheries in areas where they operate. This "Jekyll and Hyde" phenomenon will need to be addressed when the Corps of Engineers assesses the impacts of this proposed project.

In closing, please be aware that commercial and recreational fishing activities take place in the proposed offshore project sites. National Standard 10 of the Magnuson-Stevens Fishery Conservation and Management Act requires that our regulatory actions "promote safety of life at sea" and it is our understanding that the U.S. Coast Guard may have concern with its ability to deploy air search and rescue operations within the proposed project areas. If this is so, then this proposed windmill farm has the potential to compromise our national standards and in so doing jeopardize the state and federal fishing communities when they are engaged in fishing activities in this proposed area.

Sincerely,

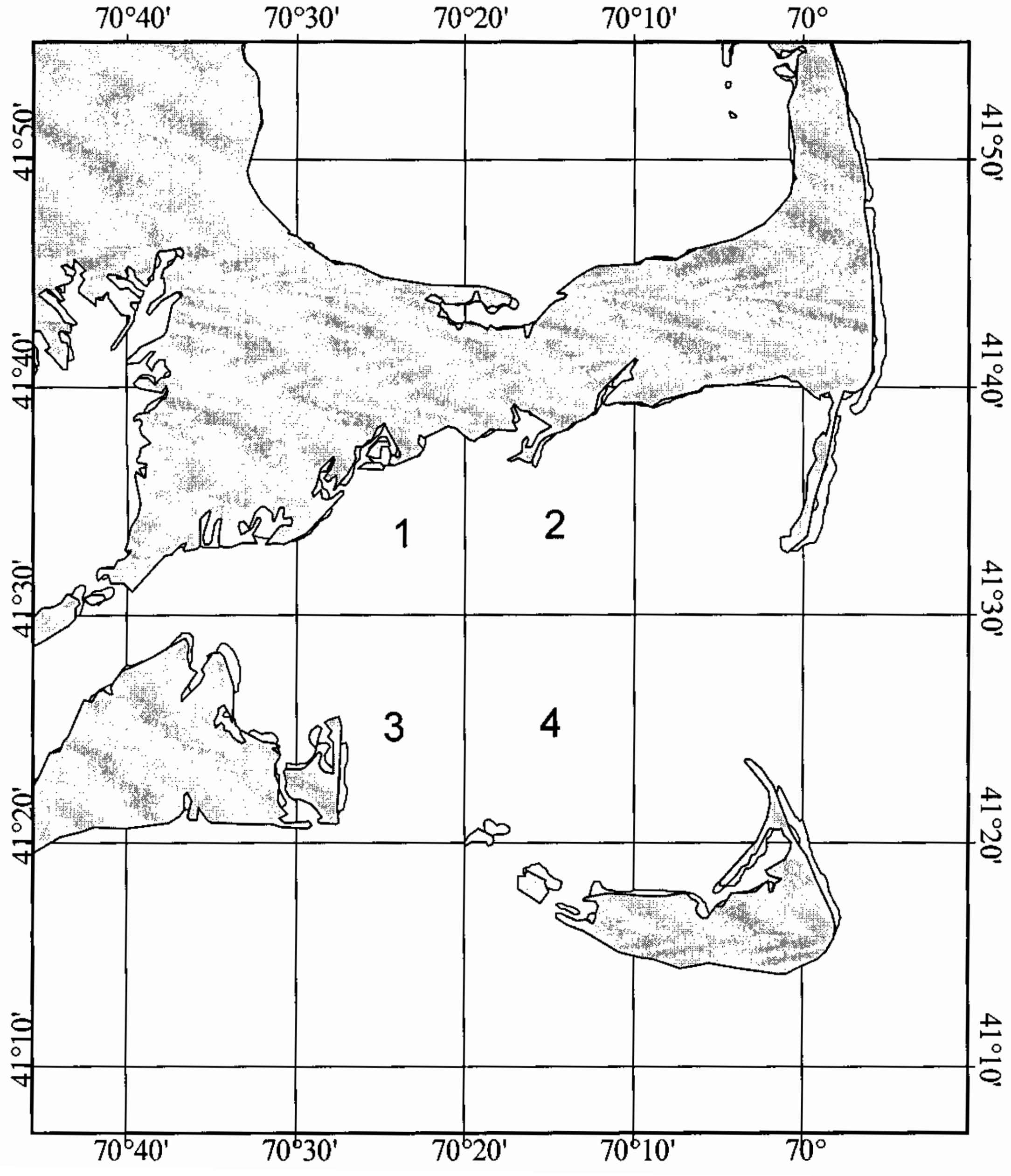
Daniel T. Furlong
Executive Director

DTF:d

cc: Secretary Ellen Roy Herzfelder, Commonwealth of Massachusetts
Ricks E Savage, Council Chairman
Ronal Smith, Council Vice Chairman
Christopher Moore, Deputy Director
Paul Howard, Executive Director NEFMC
Pat Kurkul, NMFS Regional Administrator
Joel MacDonald, NOAA General Counsel
Lt.Cmdr. Jeff Randall, U.S. Coast Guard Liaison to Council

Attachments: Figure 1 and Table 1

Figure 1. Ten-minute squares of latitude and longitude that contain or are adjacent to proposed disturbance site.



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windowpane flounder - A	windowpane flounder - A	windowpane flounder - A	windowpane flounder - A
little skate - J, A	little skate- J, A	yellowtail flounder - J	Atlantic sea herring - J
winter skate- J, A	winter skate - J, A	little skate - J, A	little skate - J, A
long finned squid - J, A	long finned squid - J, A	winter skate - J, A	winter skate - J, A
Atlantic butterfish - E, L, J, A	Atlantic butterfish - E, L, J, A	long finned squid - J, A	long finned squid - J, A
Atlantic mackerel - E, L , J, A	Atlantic mackerel - E, L, J, A	Atlantic butterfish - E, L, J, A	Atlantic butterfish - E, L, J, A
summer flounder- E, L, J, A	summer flounder - E, L, J, A	Atlantic mackerel - E, L , J, A	Atlantic mackerel - E, L , J, A
scup - J, A	scup - J, A	summer flounder - E, L, J, A	summer flounder - E, L, J, A
black sea bass - J, A	black sea bass - J, A	scup - J, A	scup - J, A
surf clam - J, A	surf clam - J, A	black sea bass - L, J, A	black sea bass - J, A
king mackerel - E, L, J, A	king mackerel - E, L, J, A	surf clam - J, A	surf clam - J, A
Spanish mackerel - E, L, J, A	Spanish mackerel - E, L, J, A	king mackerel - E, L, J, A	king mackerel - E, L, J, A
Cobia - E, L, J, A	Cobia - E, L, J, A	Spanish mackerel - E, L, J, A	Spanish mackerel - E, L, J, A
		Cobia - E, L, J, A	Cobia - E, L, J, A
Total # spp: 15	*Total # spp: 15*	blue shark - A	blue shark - A
Total # life stages: 42	*Total # life stages: 42*	bluefin tuna - J, A	bluefin tuna - J, A
		Total # spp: 18	*Total # spp: 18*
		Total # life stages: 47	*Total # life stages: 46*

** TMS: ten-minute square of latitude and longitude depicted in Figure 1.*

SAVE OUR SOUND
alliance to protect nantucket sound

000382

Attn:

Karen Adams

Project Manager for Cape Wind project.

396 Main Street, Hyannis, Massachusetts 02601 · 508-775-9767 · Fax 508-775-9725

February 23, 2005

Karen Kirk-Adams
Cape Wind Energy EIS Project
U.S. Army Corps of Engineers, New England District
696 Virginia Road
Concord, MA 01742

Cc: Ellen Roy Herzfelder
Executive Office of Environmental Affairs
Attn: MEPA Office, Anne Canaday, EOEA No. 12643100
100 Cambridge Street, Suite 900
Boston, MA 02114

RE: Cape Wind Associates Project, Nantucket Sound

Dear Ms. Adams

Thank you for taking the time to hear concerns on the Cape Wind project from Nantucket Sound fishermen and fishing representatives last week at the ACOE field office. The purpose of the meeting was to understand the details of concerns over fishing and navigation on Horseshoe Shoal. The following are comments and concerns about the project submitted formally to your agency in response to the DEIS and its deficiencies that came from the fishermen and their representatives at the meeting.
Attending the meeting on the 17th of February were representatives from NMFS, DMF and ACOE and Nantucket Sound fishermen including representatives from Massachusetts Potters and Trapper's Association, Massachusetts Fishermen's Partnership including
Andy Baler , Nantucket Fish Company
Ed Barrett, Dragger fisherman
Ron Borjeson, Nantucket Sound fisherman
Angela San Fillipo, Gloucester Fishermen's Wives Association
Cliff Caroll on behalf of Wayne Kurker and
Sarah Hedges , Alliance to Protect Nantucket Sound

Upon review of the DEIS, fishermen had concerns about the report: **Sections 3.4.3.2.5** Fisheries, **3.4.3.4.5** Fisheries, **5.4** Finfish Resources and Commercial/ Recreational Fisheries, **5.4.3.2** Finfish Resources, **4.4.3.3.** Commercial Fisheries, **5.4.3.4** Recreational Fisheries, **5.4.4** Essential Fish Habitat Assessment, **5.4.1.**Introdutction, **5.4.5.1.1** Direct Impacts. The report was

1. Incomplete with flawed and incorrect assumptions
2. Lacks independent assessment
3. Incorrect data used
4. Conclusions are generalized and inconsistent
5. Lacks quantitative information

Based upon the following comments and concerns, we would like to know why commercial fishermen—experienced with the area of Horseshoe Shoals—were not

asked to consult on the project's EIS and the potential impacts to their industry prior to its release by the Corps.

Specifically but not inclusively, Nantucket Sound fishermen and their representatives expressed the following concerns:

<u>**General Concerns**</u>

- Outraged by comments saying there is "insignificant impact." The DEIS makes it seem like nobody fishes in this area—**will this misconception be corrected now that you know that experienced fishermen work in Horseshoe Shoals at any given time?**
- The developer is going forward as if there was no impact on fishing. The fishermen who are the experts say that they will not be able to fish in the area if the project is permitted. **Is this an important enough impact for the ACOE?**
- In light of the added information given at the meeting, **will there be a supplemental EIS?**
- The style of fishing done on Horseshoe Shoal has been detailed in a report submitted in response to the project's EIS by Massachusetts Fishermen's Partnership it details gear types, methods of towing and charts of areas fishermen access to catch scup, squid, mackerel , butterfish, black sea bass and numerous other finfish, mollusks and shellfish.

<u>**Safety and Navigation**</u>

- It takes experience, and a certain code of communication to navigate Horseshoe Shoal. One would have to be constantly at the wheel while trying to fish in such a hazardous area, which is impossible to do while trying to work at the same time. One boat alone would have difficulties navigating this area, and in peak seasons there can be up to 40 boats.
- If your gear gets caught on any object, like a wind tower, the boat could easily tip and get dragged down.
- Even small boats will have a difficult time navigating an area with towers. Seaweed gets caught in the nets, and drags you into shoals.
- All components of fishing are complicated. One is at the mercy of nature, and having 130 turbines would add to danger of collision.
- There are all levels of expertise at the wheel, the turbines would be just more dangerous obstacles.
- There are a number of places that boats are coming from, not just from the Cape and Islands. Add recreational boats and the ferries, and there are high amounts of traffic exist at given times.
- There is not much towing bottom, people can't just go anywhere they want. You have to be careful of tides, other boaters. **Does the EIS take into consideration that commercial boats do not move in a straight line when towing for fish?**
- Fishermen commented they see million dollar boats, captained by professionals that end up on rocks of jetties. The area is just that difficult to navigate.

- Nantucket Sound is unique for its sand waves. **How do you *expect to* keep the cables buried?**
- While fishing, people are at the mercy of the sea. They have spent hundreds of years figuring out where we can tow, and this is an area that is well-known. **Where will they go if they lose this traditional historic fishing grounds? How will that impact other fishermen fishing different gear types in other areas of the Sound?**

<u>Environmental</u>

- The area is a known spawning ground for many fish species. In May, huge numbers of squid move into this area. Specific seasons have specific influxes. **Why does the project have to be in this area?**
- This area is unique. The diverse ecosystem does not need to be altered into an artificial reef. It should exist just as Mother Nature created it.
- This project will change the bottom of the ocean. Over the last 27 years, the government has spent millions of dollars to protect fish species, and now everything could be ruined.
- The impacts of construction could be extremely hazardous to the species in this area. By changing one little detail of the Sound, you change everything. **How are fish populations going to bounce back if the entire food pyramid is altered?**
- Towers change the bottom, change the current, change everything.This is a fraction of the size of George's Bank, and is even more diverse.
- The DEIS lacks any study of oil spill management. There is no study about which species will be affected if oil gets into the sound. **What would happen to the ecosystem of the Sound if an oil spill occurred?**

<u>Economics</u>

- Fishermen have been driven to this area due to regulations and loss of ocean. **What is the economic value of fish harvested on Horseshoe Shoal by regional fishermen from states like Rhodes Island, New Jersey, Maryland? What is the negative impact to the regional fishing industry if they can not access historic fishing areas on Horseshoe Shoal.**
- Boats would have no place to transit if there's a safety zone around the turbines. Cost of fuel is an issue.
- Certain species of fish (scup, flounder, black sea bass) stocks are rebounding and there is an increasing in quotas. This has been an economic boom for fishermen, but if this project goes through the fishing area , they'll take a major hit.
- There were 5690 fishing trips in 2004. There used to be 15 or 20 thousand trips, and fishermen believe they will get back to that because fish populations are bouncing back. They commented they have made sacrifices and put millions of dollars towards management and now we are beginning to receive the benefits.

Please take into consideration that this is an example of some of the concerns that fishermen have raised over the proposed Cape Wind project. Fishermen's groups and Nantucket Sound recreational and commercial fishermen have provided the Army Corps of Engineers with many detailed maps, charts, and written testimony which we urge you to consider while weighing the costs/benefits analysis. Please note that a comprehensive cumulative socioeconomic impact study on fishermen is needed before any decision is made during the permitting process.

Thank you for your attention to this matter,

Sincerely,

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February 23, 2005

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Re: Cape Wind Energy Project Draft Environmental Impact Study/Report and Cape Cod Commission Development of Regional Impact. NAE 2004-338-1 & EOEA #12643

The Division of Marine Fisheries (*MarineFisheries*) has reviewed the Draft Environmental Impact Study/Report (DEIS/R) and Development of Regional Impact (DRI) submitted for Cape Wind Associates to construct a wind energy generation facility on Horseshoe Shoals in Nantucket Sound with regards to potential impacts to marine fisheries resources. As has been noted in previous correspondence, Nantucket Sound provides very important feeding, spawning, and/or nursery grounds for many species of finfish and invertebrates, including bluefish (*Pomatomas saltatrix*), striped bass (*Morone saxatilis*), scup (*Stenotomus chrysops*), summer flounder (*Paralichthys dentatus*), black sea bass (*Centropristis striata*), tautog (*Tautoga onitis*), squid (*Loligo pealei*), and knobbed whelk (*Busycon carica*). Further, the success of spawning and juvenile development activities of some of these species in the Sound may impact abundance levels down as far as the Mid-Atlantic states due to historic migratory patterns. The commercial and recreational harvest of fish and invertebrates in Nantucket Sound provides tens of millions of dollars in revenue to the local economy and is an integral, indeed historic, part of life in many Cape Cod and Island towns

Review of the DEIS/R reveals a near total dependence on existing data sets from *MarineFisheries* and National Marine Fisheries Service (NMFS) resource surveys and reported landings. Despite the fact that all existing data sets are acknowledged by the State and Federal resource agencies and the applicant to be limited in their scope and resolution, no effort was made by the applicant to obtain comprehensive, representative, site-specific resource or habitat data. Similarly, there was little attempt to supplement landings data with direct assessment of commercial and recreational activity in the Sound, particularly at the preferred site, with the exception of an extremely limited telephone survey of commercial party boats. The overall level of information provided in the DEIS/R is inadequate to properly evaluate the potential environmental impacts of this large and precedent-setting project and this level of effort is particularly inappropriate when compared with similar efforts undertaken for the construction and operation of traditional power plants or the recent Hubline gas pipeline project. We recommend that the applicant be required to prepare a supplemental DEIS/R to address these deficiencies. To facilitate consideration of our specific comments and recommendations, they are grouped by resource and activity of concern.

Fisheries Resources, Benthic Species, and Habitat Characterizations

Characterization of potential impacts to fisheries resources and habitat are based solely on limited data sets taken from unrelated fisheries studies conducted for fisheries management purposes. Acknowledging that the use of existing data sets is an important component of an EIS, the limitations of these data for this purpose were identified by the resource agencies well in advance of the preparation of this EIS/R. Specific concerns and questions include:

- The DEIS/R presents *MarineFisheries*' Resource Assessment trawl survey data, collected only during May and September at randomly selected stations within predetermined depth strata, to describe year-round fish occurrence and relative abundance throughout Horseshoe Shoals and Nantucket Sound. Such treatment is highly inappropriate and the inclusion of a brief statement acknowledging the limitations of these data in no way justifies their extensive presentation in this manner.
- Despite acknowledgement by the authors that trawl gear is of the limited usefulness when describing the occurrence and relative abundance of pelagic and benthic species (finfish and invertebrates) not vulnerable to this gear type, no effort is made to present or obtain data from other sources.
- There is often little agreement between listings of the "most common" species, the discussion of their occurrence, and the data tables cited. Additionally, little information is given regarding the data source of these tables or its limitations.
- Many of the tables and text do not describe the years of survey data that are included, the number of stations or tows, the survey years included in the analysis, or even what the word "common" means in this context.
- The previous comment notwithstanding, there appears to have been a deliberate attempt to limit the trawl data set to just the tows within the preferred site boundaries when describing the fishery resource of the entirety of Nantucket Sound.
- Due to the limitations of the data, the DEIS/R refers to the number of tows a species was present rather than providing an estimate of relative abundance. These are very different pieces of information.
- Although the DEIS/R acknowledges that trawl gear is not 100% efficient and that species occurrence in catches is not representative of relative abundance, no effort has been made to supplement these data.
- The DEIS/R provides no description of the NMFS survey data used to describe the finfish resources for the alternative site located south of Tuckernuck Island. What time period was reviewed, how many stations have been sampled here, and how many were included in the analysis?
- Comparisons made between the New Bedford area and Horseshoe Shoals, and indeed all of the comparisons made between potential sites, do not present the same level of data for each site, nor is it presented in a uniform manner. The DEIS/R moves between the use of

relative abundance data to designate "select" species and the use of occurrence data to designate "common" species". This inconsistency renders such comparisons meaningless.

- The blank spaces included in the Essential Fish Habitat (EFH) table are misleading. Use of the designation "Not Available" would be more applicable in many cases as these absences often indicate a lack of information or examination, not a lack of habitat use. EFH has simply not been evaluated for many 'inshore' species. This would help to explain why the Tuckernuck site has more species on the EFH list than the Nantucket Sound or Buzzards Bay site. For example, tautog EFH has not been formally defined, yet Buzzards Bay is known to provide important habitat for tautog.
- The current EFH analysis is presented as an abstract listing of species and their habitat preferences. Why is no effort made to tie EFH designations from the literature to actual occurrence and relative abundance as documented by survey data and landings?
- As they are managed by the Atlantic States Marine Fisheries Commission (ASMFC) rather than NMFS, important species such as striped bass, bluefish, and fluke are not included in the EFH analyses. As such, the DEIS/R does not adequately describe their habitat requirements nor document their contribution to the high species diversity and ecology of the Nantucket Sound ecosystem.
- As with the fisheries section, characterizations of benthic resources and habitat in Nantucket Sound suffer from a lack of comprehensive data and consistent analysis. Statements such as "Horseshoe shoal is not a unique habitat in Nantucket Sound" are not supported by the data. Horseshoe Shoal is the most prominent bottom feature in Nantucket Sound and as such, likely fills an important role in the overall ecology of Nantucket Sound.
- Limited as they were, the few benthic surveys conducted revealed the benthic community to be highly variable from season to season and location to location. The DEIS/R concludes the patchy nature of these data was due to the presence of 'microhabitats'. Such findings would seem to indicate the need for rather intensive sampling to define these habitats, associated flora and fauna, and describe their functions and values. However, the applicants undertook no such efforts.
- Efforts to characterize all benthic habitat in Nantucket Sound as the same in terms of functions and values ignore the existence of the very microhabitats suggested by the DEIS/R. Such pronouncements are made on the basis of incomplete data and cursory analysis, and cannot possibly support the contention that fish and invertebrates will simply return after construction or fulfill their habitat requirements elsewhere in Nantucket Sound.

To address the deficiencies of those portions of the DEIS describing fisheries and benthic resources and habitat we recommend the following:

- The applicant should conduct directed resource surveys of sufficient spatial and temporal scale to characterize the marine resources inhabiting (permanent and transient occupation) the preferred and alternative project sites as well as their habitat functions and values.
- Resource and habitat studies should be sufficiently comprehensive to characterize the use of this area by all life stages of relevant commercial and recreationally important species, as well as those species that provide ecological services such as forage.
- The data from these directed studies should be integrated with existing data sets, landings data, and physical/oceanographic characteristics to produce an accurate characterization of the diversity and abundance of finfish resources in the Sound.

- The design and analysis of required supplemental studies should be coordinated with the appropriate State and Federal resource agencies.

Commercial and Recreational Fisheries

Comparison of fishing activity and landings at the alternative sites within Nantucket Sound, south of Tuckernuck, and in the New Bedford/Buzzards Bay area are compromised by many of the same deficiencies noted for the resource characterizations. The DEIS/R suffers from the presentation of incomplete or conflicting data, a reliance on superficial analyses, and the absence of data on private recreational fishing activity and its contribution to the economy. Specific concerns and questions include:

- Due in part to differences between the State and Federal landings data sets, catch statistics reported for select species often contradict each other in different sections of the DEIS/R and appendices. In some instances, total catch figures understate actual catches, sometimes by an order of magnitude.
- The DEIS/R errs in equating reported landings with relative abundance. Of particular concern is the repeated implication that limited landings reflect low abundance. In addition to relative abundance, catch rates (and landings) in a given year are dependent upon quotas, size and bag limits, seasonal closures, and fishing effort. It is even possible to have low catch rates in a particular year because of high relative abundance, due to management closures brought on by overfishing in the previous year.
- In view of the many gear types in use in Nantucket Sound and the known variation in reporting at the State/Federal level, it is critical that landings data be analyzed *in toto* for a given species to obtain an accurate estimate of harvest. This is especially important if these data are being used as a proxy for species occurrence, abundance, or fishing activity. Reporting landings strictly by selected gear types is not conducive to accurate data analysis, particularly when important gear types such as hook and line (the only commercial gear used to catch striped bass) are omitted from the analysis.
- Another limitation to the use of landings data to describe species occurrence or fishing activity is the fact that fishermen working Nantucket Sound may land their catch in ports outside Nantucket Sound or even out-of-state. Boats that carry Federal permits are required to submit trip reports that indicate the area of the catch, but this information is not currently required of in-state boats or dealers.
- Commercial fishing data for the alternative site south of Tuckernuck site is not available and no effort has been made to obtain it.
- As presented in the DEIS/R, characterization of the recreational fisheries in Nantucket Sound severely underestimates the amount of effort expended and fails to characterize the financial contribution made to the economies of Cape Cod, Nantucket, and Martha's Vineyard by these fishermen.
- The reporting of raw data from the NMFS' MRFSS database and that obtained through directed telephone surveys, is incomplete and misleading. Such data represent a fraction of the total effort and must be viewed as such.
- As the DEIS/R does not provide any estimates of the number of passengers carried by commercial party and charter boats or the geographic distribution of the vessels surveyed, one cannot determine if the level of effort reported for Horseshoe Shoals by these captains is in fact representative of actual activity in this area.

To address the deficiencies of those portions of the DEIS describing commercial and recreational fishing activity we recommend the following:

- Directed studies of commercial and recreational fishing activity in the preferred and alternative project areas are required to evaluate potential impacts resulting from the construction and operation of this facility
- Studies of fishing activity should be developed in concert with *MarineFisheries* and NMFS to quantify effort (magnitude and technique) and landings by area and season within the areas of interest, as well as the economic contribution these activities make to the local economy.
- Landings data reported by *MarineFisheries* and NMFS must be integrated into a unified format to allow comprehensive analysis of these data by species as well as gear type used in Nantucket Sound. The reporting of these data must include meaningful discussion of the limitations implicit in these data sets.

Physical Environment and Construction of the Facility

Viewed from the context of potential impacts to fisheries resources and habitat, the sections of the DEIS/R dealing with the physical environment and perceived construction impacts appear to be based upon incomplete data and analyses. Specific concerns and questions include:

- The circulation models that form the cornerstone of the physical impacts analysis appear to be based on three single-day data collection efforts and on data collected 65 to 100+ years in the past. Why was there no effort to collect representative contemporary information?
- No wave measurements were obtained at any of the alternative sites and there is no analog for the historic data recorded for Nantucket Sound.
- In the absence of actual data, estimates of current velocity are obtained from wave theory models. Given the evolving state of the art for offshore wind technology and dynamic nature of the preferred site, why are model projections used in place of real measurements?
- The frequency of coring and grab samples to support remote sensing of the sediment types in Nantucket Sound does not appear adequate when viewed from the perspective of the Hubline project. Far more effort went into their characterization of bottom type, yet that project was beset by numerous delays and operational changes as they encountered "unforeseen" conditions during construction.
- The DEIS/R states that the distance separating the towers will be sufficient to preclude cumulative/additive changes in water flow or sediment transport due interaction between the towers. However, no data or even models are offered to support this contention.
- Discussion of the anti-scour mats is superficial and consists primarily of marketing text from the manufacturer. Given the very limited amount of field data collected for the project sites, it would appear optimistic at best to presume that these mats will provide adequate scour protection. No rationale is offered in the DEIS for the suggested pattern of deployment, nor does there appear to be a contingency plan in the event of failure.
- The inconsistent level of sampling effort at the alternative sites greatly hinders comparison of potential construction impacts, and leads to contradictory statements regarding characterization of the sediments at the various sites. For example, the DEIS/R appears to suggest that the Buzzards Bay sites have more fine grain sediments than other alternatives, a supposition not supported by examination of the data collected in Nantucket Sound.
- Promotion of the use of jet plowing to install the power cables as being less environmentally damaging are unsupported and run counter to the conclusions

reached for the use of such equipment during installation of the Hubline gas pipeline. By default, jet plows will disturb far more sediment than conventional plows.

- Conclusions regarding the adequacy of the SSFATE model to predict turbidity plumes in Lewis Bay based on three core samples and an assumption of current patterns (no data were collected) are speculative at best.
- Speculation regarding potential changes in fisheries habitat or species communities due to the presence of the towers, in the absence of comprehensive resource or physical data, are inappropriate.
- Estimates of scour and recommendations for adequate burial depth for the cable network are not consistent with discussions of the extent of sand movement that appear elsewhere in the document.
- Discussion of efforts to monitor recovery of eelgrass beds disturbed during installation of the power cables through Lewis Bay, with the option of restoration as deemed necessary, fail to acknowledge their designation by the US Environmental Protection Agency as "special aquatic sites" pursuant to section 404(b)(1) of the Federal Clean Water Act. Impacts to these habitats are to be avoided.
- Similarly, evaluation of potential impacts to shellfish in Lewis Bay and elsewhere by virtue of reported low abundance fail to acknowledge the protection afforded shellfish habitat by the MA Wetlands Protection Act (310 CMR, 10.34).

To address the deficiencies of those portions of the DEIS describing physical conditions and impacts from construction we recommend the following:

- The applicant should conduct directed physical surveys of sufficient spatial and temporal scale to characterize water flow and sediment transport within the preferred and alternative project sites.
- The data from these directed studies should be used to model potential changes to water flow and sediment transport that may result from the installation of the wind towers and cable network, both as individual components and for the facility as a whole.
- The magnitude of potential changes to the physical environment of Nantucket Sound need to be evaluated in the context of proposed sand mining for beach fill projects along the Cape and Islands.
- Construction plans presented in the supplemental DEIS/R should follow the mandated progression of avoidance, minimization, restoration, and mitigation with regards to environmental impacts.

Evaluation of Impacts to Fisheries Resources, Habitat, and Harvest from the Construction and Operation of the Cape Wind facility

Identification of the numerous and extensive data deficiencies, and the incomplete analyses they support, presented in this DEIS/R render predictions regarding potential impacts at least premature, if not unsupportable. Evaluation of the potential impacts that may result from the construction and operation of the Cape Wind power generation facility cannot be completed in the absence of adequate site-specific data regarding fisheries resources, habitat, or harvest practices. As such, we request consideration of the following concerns when preparing a supplemental DEIS/R:

- Assertions that mobile finfish and invertebrates will simply move to other parts of the Sound with no disruption of their life history during construction of the Cape Wind facility are not supported by the DEIS/R. Substantial changes may occur in spawning, feeding, and juvenile development of the affected species and these changes may have far-reaching impacts on fisheries in other states as well as impacts on more local species, including birds, that rely upon them for food.

- Potential changes in finfish occurrence, relative abundance, and community structure could result if there are large-scale changes to water flow and sediment transport over Horseshoe Shoals as a result of this project. Additionally, the conversion of an open shoals fish community to one that is structure oriented may have a profound impact on the ecology of Nantucket Sound.
- The presence of 130 wind towers, with associated support structures and cable network, may serve to limit or even preclude traditional fishing practices in the project area. These could include:
    - Direct closure of the facility (24 square miles) to fishing and boating for security reasons.
    - Loss of access for fishermen, particularly mobile gear or recreational fishermen seeking to anchor near a wind tower, because of the presence of exposed cables and scour protection structures.
    - Loss of access for mobile gear fishermen due to an inability to maneuver between the towers while towing a net, doors, and ground gear. Such movement will be further restricted by the presence of other boats or fixed gear, especially during periods of low visibility and/or extreme weather.
    - Should a boat get "hung up", its ability to haul back and free itself may be severely hampered or even prevented by towers or the influence of waves and currents as altered by the presence of the towers.
    - Even if access is not restricted or completely lost, fishing success may be greatly reduced by an inability to follow traditional tows. The target species are not evenly distributed and may not be available between the rows of towers.
    - Many small vessels, including draggers, are fished single-handed, making navigation and fishing between the towers virtually impossible.
    - Recreational fishermen seeking to drift fish or troll in this area will face similar obstacles and may be at greater risk due to closer proximity to the towers.
- Many concerns have been expressed regarding the ability of the Coast Guard or other authorities to mount a rescue within the tower field, particularly if the sea state necessitates the use of helicopters. As these accidents rarely occur on calm seas during daylight hours, concerns about compromised rescue capability may preclude fishing and navigation in this area.
- Concerns remain regarding potential impacts from vibration, noise, electromagnetic fields, and heat output from the transmission cables. These issues must be addressed within due consideration to the species at risk.
- As well as meeting the baseline data needs, the applicants should be required to prepare appropriate plans for post-construction monitoring, restoration efforts, and compensatory mitigation for unavoidable habitat loss and impacts.
- To address requirements to minimize habitat/resource impacts, the applicants need to coordinate with the State and Federal resource agencies to develop appropriate time-of-year restrictions and plans for the use of containment technologies.

- The assertion that there will be no contribution to cumulative impacts in Nantucket Sound because there are no other wind farms being proposed is completely unacceptable. Analysis of potential impacts to fisheries resources, habitat, and harvest activities must include appropriate consideration of on-going and proposed construction activities such as cable installation, dredging, and sand mining. Projects of this nature are or will be under review, including one to remove one million cubic yards of sand from Nantucket Shoals.

MarineFisheries remains greatly concerned that this project may have substantial, even significant, impacts to fisheries resources, habitat, and harvest activities in Nantucket Sound, and the use of incomplete data is highly likely to result in an underestimation of potential impacts to these resources and the resource-based economy of the region. We strongly recommend the preparation of a Supplemental DEIS/R for this project.

The Division will provide any assistance needed to address environmental issues related to this project. Questions about these comments may be directed to Vin Malkoski at (508) 910-6318.

Sincerely,

Paul J Diodati

Paul J. Diodati
Director

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THE HUMANE SOCIETY OF THE UNITED STATES

CELEBRATING ALL ANIMALS 50th Anniversary THE HUMANE SOCIETY OF THE UNITED STATES

February 24, 2005

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Sent via e-mail and post

Dear Ms. Adams and Ms. Canaday:

Thank you for the opportunity to submit comments on the draft environmental impact statement (USACE # NAE-2004-338-1) and environmental impact report (EOEA File # 12993) prepared to consider a permit application by Cape Wind Associates to place 130 wind turbines, a service platform, and associated cables in state and federal waters in Nantucket Sound.

We submit these comments on behalf of more than 8 million members and constituents of The Humane Society of the United States and its local program, the Cape Wildlife Center. Based in West Barnstable, the Cape Wildlife Center is Cape Cod's only full-service veterinary hospital for wildlife, caring for nearly 2,000 injured, orphaned, and ill wild animals each year, including several species that live part or all of the year in Nantucket Sound.

Before expounding our specific concerns about the draft environmental impact statement/ report (DEIS/ DEIR), we would like to reiterate the request we made in our letter of May 9, 2003 that the U.S. Army Corps of Engineers (the Corps) conduct a programmatic environmental impact statement on permitting offshore wind energy facilities. While a number of wind farm proposals have been withdrawn since that time, others have emerged as more viable and the number is likely to increase once the first facility is built. Moreover, such permit requests continue to be processed over a wide geographic area. Erecting several of these facilities in coastal waters may jeopardize fragile marine ecosystems and seriously affect the avian and marine communities that depend on these regions. As we stated in our previous letter, "The fact that the Corps is processing these applications on an ad hoc basis with no apparent consideration of policy implications and cumulative effects highlights the need for a fresh start and new review."

If, however, the Corps decides not to issue a programmatic EIS, we strongly recommend that it issue a supplemental draft EIS on the Cape Wind application before proceeding to a final EIS, as recommended by the Cape Cod Commission staff and the Massachusetts Audubon Society. The supplemental EIS should include, at a minimum, these ten components:

1. Legal review of the Corps' responsibilities under Section 10 of the Rivers and Harbors Act of 1899 and any existing mechanisms for conveying land rights for the erection of wind power facilities in federal waters
2. Discussion of regulatory compliance with the Migratory Bird Treaty Act
3. Compliance with Section 101(a)(5) of the Marine Mammal Protection Act, which requires incidental harassment authorization for marine mammals that will be displaced and/or harassed during construction.
4. Rigorous analysis of alternative sites and turbine configurations, as well as the consideration of distributed and phased-in installations
5. A more accurate assessment of cumulative impacts to potentially affected wildlife species as defined by the Council on Environmental Quality and mandated under the National Environmental Policy Act
6. Risk assessment of this project's effect on marine mammals, turtles, and fish, similar to those conducted for European wind facilities (e.g., the Burbo project in the United Kingdom (SeaScape Energy 2002))
7. Detailed analysis of this project's potential effects on migratory bats
8. Results of the full suite of bird studies recommended by the U.S. Fish and Wildlife Service and the Massachusetts Division of Fisheries and Wildlife and a more accurate analysis of the risks to birds posed by the proposed action
9. Independent review of any wildlife studies conducted by the applicant's contractors
10. Mitigation plan for anticipated effects

We raised several of these issues prior to the publication of the DEIS/ DEIR and were disappointed not to see their inclusion in the public review draft.

1-3. Legal Issues

Cape Wind Associates has stated that it plans to construct "America's first offshore wind farm." This may well be: the only other offshore wind energy proposal that is moving through the permitting and review process is the Long Island Offshore Wind Initiative. Cape Wind and the Long Island project, however, are distinct, because Cape Wind originated as a permit application that would allow a private developer to use federal waters, while the Long Island project began as a request for proposals initiated by the state energy agency that would allow the development of state waters.

For this reason, if the permit application before you is approved, it is certain to set a legal precedent regarding the private use of federal waters. Additionally, in light of the admission in the DEIS/ DEIR that this project is likely to kill hundreds of birds each year, and displace marine mammals that would otherwise use the waters in and around Nantucket Sound during construction activities, we would also like to raise our concerns about the application of the Migratory Bird Treaty Act (MBTA) and the Marine Mammal Protection Act (MMPA).

1. Section 10 does not convey land rights

We challenge the Corps' legal authority to issue a permit under Section 10 of the Rivers and Harbors Act of 1899 to allow this kind of construction in federal waters. As we have previously stated in correspondence with the Corps, we believe that private developers must obtain the necessary land use authorization *before* using the public resources of Nantucket Sound or any other federal waters. To issue a permit without such authorization would appear to condone the privatization of public property.

In Section 3.0, the Alternatives Analysis, the authors state: "The Applicant does not have the power of eminent domain or other easement taking powers, and must therefore be able to obtain commercial land rights to sufficient amounts of area" (page 3-28). Given that the Corps recognizes that the ability "to obtain commercial land rights" is a prerequisite to the consideration of alternatives in its DEIS/ DEIR, we challenge whether the Preferred Alternative meets this standard.

We dispute the Corps' consideration of this project in the absence of a federal policy that would address the fundamental issue of land rights and leases. While wind power facilities should not be stalled indefinitely, large scale projects of this nature should only be permitted within the rubric of a system that grants permitting authority for use of outer continental shelf waters. The U.S. Commission on Ocean Policy concluded that Congress should enact legislation for the comprehensive management of offshore renewable power development. We envision a systematic policy for planning energy facilities in coastal waters, similar to the approach taken by the Bureau of Land Management for onshore wind farms. This is why in 2003, we supported H. 1183, a bill filed by Reps. William Delahunt and Jim Saxton that would have directed the Department of Commerce to establish a regulatory regime for licensing renewable energy facilities in federal waters.

2. Applicant must comply with the Migratory Bird Treaty Act

The DEIS/ DEIR explicitly states that federally protected bird species, most notably those protected by the Migratory Bird Treaty Act (MBTA), will be killed as a result of the Preferred Alternative; however, the document fails to explain how the Army Corps of Engineers or the applicant will comply with this law. We have appended a memo that outlines the agencies' and applicants' responsibilities in this matter (see Appendix A).

3. Applicant must comply with the Marine Mammal Protection Act

The Marine Mammal Protection Act (MMPA) requires that incidental harassment/ taking authorization must be granted under section 101(a)(5) of the MMPA for actions that are likely to result in the take of a marine mammal. A take is defined in part as "harassing" a marine mammal [16 U.S.C. 1362, Section 3 (13)]. Further, the act stipulates that harassment is defined as any act of pursuit, torment, or annoyance which has the potential to injure or disturb any marine mammal stock in the wild by causing disruption of behavioral patterns (ibid at paragraph 18). The MMPA requires that citizens of the United States who engage in a specified activity (other than commercial fishing) that create incidental, but not intentional taking ... of small numbers of marine mammals of a species or population stock must obtain a permit for this taking and be subject to regulations that may limit the activity and will require monitoring of effects [16 U.S.C. 1362 (Sec. 101 (a)(5)]. The applicant is required to obtain such a permit for the proposed wind energy project in Nantucket Sound because the Biological Assessment (BA) and the DEIS/ DEIR itself admit that marine mammals are likely to leave the area of Nantucket Sound during pile driving and other construction activities, due to the resulting aversive sounds. This constitutes a disruption of normal behavioral patterns and necessitates obtaining an incidental harassment authorization from the Secretary of Commerce.

4. Alternatives Analysis

Representatives of the Corps have rightly stated that the alternatives analysis is the "heart" of the procedures laid out by the National Environmental Policy Act. Thorough and objective selection and analysis of alternatives to a proposed action can result in the very highest level of decision making, one which puts the public's interest first. Conversely, sloppy or biased alternatives analyses tend to favor the objectives of a developer or special interest group.

We appreciate the effort that agents of the state and federal government have put into the alternatives analysis in the DEIS/ DEIR. The permit application under consideration is the first of its kind, and as such, it offers a considerable challenge to decision makers. Regrettably, however, we do not believe that the resulting alternatives analysis is sufficient.

In an October 30, 2003 letter to the Corps, we expressed our concern that the list of alternatives was incomplete and that the analysis of alternatives did not take into consideration the important research recommendations of the U.S. Fish and Wildlife Service and the Massachusetts Division of Fisheries and Wildlife. Sadly, the DEIS/ DEIR, released more than a year later, still does not address these concerns.

Criteria appear to be dictated by the applicant

We agree with the geographic scope that the DEIS/ DEIR identifies for the alternatives review: the New England electric grid. We recognize the importance of producing power as close to areas of high demand as possible. Moreover, this criterion is consistent with the nature of the project proposed in the permit application. Part of the promise of wind power is its abundance and wide distribution.

The six alternatives identified in public meetings for further review ("the potentially feasible alternatives"), however, could hardly be considered true alternatives to the development of Nantucket Sound. One is the applicant's preferred site, Horseshoe Shoal; two others are adjacent to the shoal; and a fourth combines the development of one of the first three sites with a site in Buzzard's Bay. The only "alternatives" truly different than the action described in the permit application – wind installations on the Massachusetts Military Reservation and a site south of Tuckernuck Island – are both curiously located in southeastern Massachusetts.

It appears that the criteria applied to selection of alternatives were too narrow to allow a true public interest review. For example, the DEIS/ DEIR dismisses distributed power generation facilities out of hand and also limits the consideration of renewable energy technologies and arrays that produce fewer than 200 MW. A distributed power generation facility may not provide a financial return on investment as high as a single large power plant, but the value of a thorough consideration of its environmental benefits should outweigh any concern over the developer's balance sheet. This makes sense, given that renewable technologies are (rightfully) subsidized by taxpayers. Likewise, newer wind power facilities often have a capacity rating of less than 200 MW. Since other private developers have recently constructed smaller wind facilities elsewhere, such as Mountaineer in West Virginia (66 MW) and Meyersdale in Pennsylvania (30 MW), both of which are considered "utility scale," one must conclude that smaller turbine installations can be profitable.

Should you still consider that a single facility of 200-1,500 MW is the only "commercially viable" alternative, consider the recent announcement from the governor of Kansas, the nation's third windiest state, calling on electric utilities to install a *total* of 1,000 MW of renewable energy capacity in Kansas by 2015 (Kansas Office of the Governor 2005).

The alternatives considered in the supplemental DEIS/ DEIR should be selected based on more realistic criteria and should include distributed power generation facilities, smaller (30-200 MW) renewable energy projects, and a phased-in installation of the Preferred Alternative. Moreover, the Corps should not wait for the public to suggest combinations of alternative locations and technologies, as it did during its initial scoping period, but should take a proactive and objective approach to identifying its own alternatives. Additionally, we would be interested to see a comparison of various configurations of turbines at the Preferred Alternative site.

Alternatives must be analyzed rigorously

Once the agencies complete an initial screening of alternatives to be considered in the supplemental DEIS/ DEIR, we recommend a rigorous review of the potential collision and habitat effects of each on birds, both seasonally resident species and migratory passerines. Additionally, turbine-based alternatives must consider:

1. Macro and microhabitat use and the ecological footprint of the turbines
2. Changes in the benthic environment (marine based alternatives only)
3. Noise associated with construction, operation, and decommissioning and its effect on wildlife species
4. Effects of lighting and the emission of electromagnetic fields on wildlife species
5. Species-specific cumulative effects

We are unconvinced that the existing DEIS/ DEIR adequately considers distinctions among the its limited alternatives. For example, Section 5.7.2 states: "Overall, the studies have shown that diversity and numbers of birds that use Horseshoe Shoal is a small subset of those that are found in other parts of Nantucket Sound and the adjacent coast and shoreline. The presence and use of the Horseshoe Shoal area by that subset is limited, indicating that the species or individuals that may be present at Horseshoe Shoal are likely to be present for relatively short periods of time for foraging and migrating through" (pages 5-116 and 5-117). However, as the U.S. Fish and Wildlife Service points out, the data in the DEIS/ DEIR do not support the claim that the diversity of birds in the project area differs from the diversity of birds elsewhere. Additionally, data were not collected on the "adjacent coast and shoreline," nor were the length of time or specific foraging activities observed (USFWS, 2004).

Below we evaluate the draft EIS/ EIR's treatment of the environmental consequences of the applicant's proposed alternative.

5. Cumulative Impacts

The National Environmental Policy Act (NEPA) requires federal agencies to analyze the cumulative impacts of their actions, such as the permitting of construction projects, on affected species and habitats. While the Cape Wind DEIS/ DEIR cursorily acknowledges in 26 different places that cumulative impacts may include "other activities in the past, present, or future," it nonetheless narrowly limits discussion of cumulative impacts to other projects in Nantucket Sound occurring at the same time as the proposed action and/or impacts from other proposed nearby wind energy facilities, finding no significant cumulative impacts are likely. The Council on Environmental Quality (CEQ) requires broader consideration:

> *"Cumulative impact is the impact...which results from the incremental impact of the action when added to other past, present and reasonably foreseeable future actions regardless of what agency or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time."* (Sec. 1580.7)

A guidance document by CEQ requires federal agencies to consider impacts of their projects on resources in other adjacent countries or of the actions of other adjacent countries on resources in our country. (July 1,1997) Clearly the impacts on a species from activities occurring elsewhere in *this* country should be considered.

> *"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 of non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time."* (40 C.F.R. § 1508.7)

In a memorandum to heads of agencies that is dated July 1,1997, Kathleen McGinty of the CEQ clarified that analysis of cumulative impacts must pertain even to transboundary impacts to or effects originating in other countries. The memorandum states, in part, that agencies must analyze effects:

> *"which are caused by the action, are later in time, or farther removed in distance, but are still reasonably foreseeable, including grown-inducing effects and related effects on the*

ecosystem, as well as cumulative effects. Case law interpreting NEPA has reinforced the need to analyze impacts regardless of geographic boundaries within the United States..." and *"Courts that have addressed impacts across the United States' borders have assumed that the same rule of law applies in a transboundary context."*

The various sections on cumulative impacts only address the impacts of concurrent projects in the same area. They do not address impacts on species in other areas or times. As examples:

- Avian Impacts Section concludes that no cumulative impacts are likely (Section 5.7.3.1.5) because maintenance dredging of Hyannis Harbor and the installation of a new submarine transmission cable will probably not occur at the same place and time as the jet plow installation of the wind farm cables. This section omits consideration of cumulative impact of collisions at this site with anthropogenic death and habitat loss elsewhere. The U.S. Fish and Wildlife Service (2004) criticizes this conclusion in its comments of June 29, 2004: "Since the applicant has concluded that at least some birds would likely be killed, this mortality would be additive and therefore, a cumulative effect attributable to the project."

- The Marine Biological Assessment (Appendix 5.5-A) states that "no cumulative impacts to the listed whale or sea turtle species are expected from the [project]." It bases this conclusion on the fact that, as described above, there are no similar concurrent projects taking place in the region. Because CEQ is clear that assessments of cumulative impacts must be based on an assessment of *all* impacts to the species, not just those coincident in time and space, this statement has no basis in fact. Right whales are subjected to additive mortality and harassment throughout their range, are killed by commercial vessel traffic and commercial fishing gear, and may be displaced from portions of their range as a result of habitat degradation. Sea turtles are subjected to mortality in commercial fishing gear, are struck by boats, and experience habitat degradation as well. These impacts must be considered in any assessment of cumulative impact of the displacement, harassment, or vessel collisions that could occur as a result of this project.

Since the DEIS/ DEIR fails to consider cumulative impacts, as defined by CEQ, we believe that the Corps must analyze the true cumulative impacts in order to comply with NEPA. We encourage the agency to do so in a supplemental DEIS before proceeding to the final EIS.

6-9. Effects on Wildlife

We cannot at this time support this permit application, because the risks to wildlife are unknown. Section 5 of the DEIS/ DEIR fails to provide a thorough and objective account of how wildlife populations will be affected by the construction, operation, and decommissioning of 130 wind turbines, a service platform, and the associated cables in Nantucket Sound.

We are dismayed to see that the applicant was not required to meet research standards such as those originally suggested by the U.S. Fish and Wildlife Service and the Massachusetts Division of Fisheries and Wildlife, and we are insulted by the dismissive tone used throughout the wildlife portions of the DEIS/ DEIR.

We have a number of general concerns with the habitual inadequacies of the wildlife portions of the DEIS/ DEIR. We have supported each of our main points with a single example, for illustration's sake, but our concerns are explained in greater detail below.

1. <u>DEIS/ DEIR dismisses potential risks to some wildlife.</u>

Section 5.7.3 dismisses the proposed action's potential effect on raptors (page 5-127), despite the large numbers of these birds that have been killed at Altamont Wind Resource Area, California and indications that collision may be a significant cause of death for merlins (BioResource Consultants, 2004, and Brown, 1976).

Moreover, page 5-127 reads, "[Raptors] are most likely to occur for four months during migration (April to May, September to October)." However, the next paragraph states that ospreys were observed in Nantucket Sound during August, and that ospreys, merlins, and peregrine falcons do forage over water. Merlins and peregrine falcons are known to reside on Cape Cod, Martha's Vineyard, and Nantucket during the winter, and ospreys breed on the islands and along the southern coast of Cape Cod in the spring (DeGraaf and Yamasaki, 2001). The potential presence of these species during times other than migration is significant, because an earlier draft of the DEIS admitted that foraging appears to be the behavior that puts these birds at greatest risk of collisions (agency review draft, page 5.7.31, lines 1305-06), although this was removed from the current DEIS/ DEIR.

2. <u>Lack of data is assumed to mean lack of impact.</u>

A consistent problem in the wildlife sections is the authors' tendency to disregard the precautionary principle by assuming a lack of data translates to lack of impact on a particular species. Simply put, just because we don't have data about a certain species or a certain event does not mean that it is absent or does not occur. Absence of evidence does not equal evidence of absence. Further research is clearly needed; however, at the very least, the authors should revise these sections of the DEIS/ DEIR to indicate that there is insufficient research to make conclusions about the presence or absence of wildlife species.

Section 5.6.4 (page 5-99) states: "Although the migration patterns of these bats are not well-documented, central Nantucket Sound is not documented as a bat flyway." Again, in the same section: "While there may be limited collision risk for migratory bats, Nantucket Sound is not known to be a bat flyway...." Lack of data does not mean that the collision risk is "limited," but rather reveals a data gap that requires further research.

3. <u>DEIS/ DEIR uses outdated data and omits mention of unfavorable studies.</u>

In differentiating between the existing Altamont Pass wind farm and the project proposed for Nantucket Sound, Section 5.7.2 states: "The Altamont Pass site has perch sites for raptors on turbines (lattice tower or accessible work platform), whereas the proposed Project would have tubular towers" (page 5-103). The turbine type is again mentioned on page 5-130: "The towers are tubular, rather than lattice, which reduces perching opportunities."

A recent report on bird mortality at Altamont found that previous studies on mortalities at lattice versus tubular towers failed to provide evidence that tubular towers minimize mortality (BioResource Consultants, 2003).

4. Authors fail to compare relevant data.

In the discussion of the late winter and early spring 2002 waterbirds survey, the authors present a table that compares the average number of loons observed in the proposed project site (391) to the Massachusetts Winter (300) and the North American Atlantic Flyway (>75,000) populations (Appendix 5.7-D, page 8).

A more interesting comparison, however, would be between the researchers' largest sighting in all of Nantucket Sound on April 5, 2002 (extrapolated on page 23 to nearly 10,000 loons) and the North American Atlantic Flyway population (>75,000, page 8). This suggests that a significant portion of the North American Atlantic Flyway population stages for migration in Nantucket Sound, suggesting that many of the birds might migrate through the proposed construction area.

5. The DEIS/ DEIR contradicts itself.

Page 21 of Appendix 5.5-A states that the population of North Atlantic right whales "appears to be growing at a very slow rate." In the same paragraph, it cites a number of studies indicating that the population is in decline. The next paragraph cites the "negative rate of recovery."

Clearly, the population cannot both be growing at a slow rate and be in decline. In fact, it is in decline as data presented since the late 1990s has indicated. As recently as November 2004, analyses continue to show a continued decline. Because right whales are arguably the most critically endangered of all large whales, it is important that potential risks to their population be adequately explored. This requires, in part, an accurate statement of their current status and trend in population.

6. Authors make gross generalizations.

Section 5.7.3 states: "Songbirds, shorebirds, and other 'landbirds' migrating at night fly well above the altitude of the turbine rotors, therefore any limited collision mortalities are not expected to have population-level effects" (page 5-122).

However, the U.S. Fish and Wildlife Service (FWS) disputes this generalization: "[U]ntil additional field data [are] collected to establish a reliable baseline on the number of birds in the rotor-swept zone and their species composition, statements about population-level effects are premature at best" (USFWS, 2004).

6. The DEIS does not adequately consider risks to fish, turtles, and marine mammals

The DEIS/DEIR concludes that there are likely to be no significant impacts to fish, turtles or marine mammals from the construction of this project. However, in many cases this conclusion is predicated on the use of outdated literature citations, failure to consider readily available data bases and published literature on habitat use and adverse effects, misunderstanding of basic facts of the natural history of the species, and conflicting information presented within the DEIS itself. Because of these flaws, it is difficult to adequately assess risk to species that traverse or rely on habitat in Nantucket Sound. Moreover until these deficiencies can be corrected, it is erroneous to make a finding of no significant impact to species. More specific comments on each of the main taxa follow.

Risk to Fish Species

Section 5.4 of the DEIS/ DEIR deals with potential impacts to finfish in Nantucket Sound. Like many other sections of the DEIS/ DEIR, the evaluation of habitat use and potential impacts are lacking. For example, the landings data for commercial fisheries in the Sound are no more recent than 2000 (Sec. 5.4.3.3) although fishery management actions (including FMC framework adjustments) have resulted in shifts in commercial fishing effort since that time. The DEIS/ DEIR should include more recent data along with a discussion of trends in fishing effort, to better understand the cumulative impact of construction this project on fish populations.

Despite the fact that the DEIS/ DEIR acknowledges that areas within the proposed project site have been declared Essential Fish Habitat (EFH) for 17 federally managed species, and that the eelgrass beds used by summer flounder have been designated a Habitat of Particular Concern, impacts to species using this area have been largely dismissed. There should be a greater discussion of relative habitat use, to quantify the degree which fish are likely to be displaced and to determine whether affected species have alternatives to the EFH if they are temporarily or permanently excluded as a result of degradation or loss of habitat resulting from construction. The Burbo wind park and other sites in Europe have attempted greater quantification of impacts and provide a model of site mapping and examination of relative habitat use.

Although the DEIS/ DEIR makes assurances that because these fish species are mobile, they can easily avoid areas of disturbance during construction, there is little discussion of effects of this temporary habitat exclusion on spawning success or fitness of localized populations. Additionally, there is little attempt to quantify in this section, or in the associated appendices, the likely mortality or consequence to spawning areas during construction. Many fish that habitually spawn in particular locales cannot use other areas, and, even if habitat is degraded, will attempt to use an historic spawning and nursery ground regardless of the high mortality of eggs and juveniles. This risk is unaddressed in the DEIS/ DEIR.

There is also an assurance that "marine organisms in this area are accustomed to substantial amounts of suspended sediment and should not be substantially impacted by a temporary increase in turbidity." While these fish may be accustomed to suspended sediment, it is not clear in the DEIS/ DEIR the degree to which this project will add to current turbidity and whether there is a threshold beyond which additional suspended sediments will degrade the habitat beyond tolerance by fish or to a degree that compromises viability of larvae or eggs. This requires a more in-depth analysis than is attempted in the DEIS/ DEIR, particularly since the construction of the project will take place over several seasons, during which time the disturbance and/or degradation will be protracted.

The DEIS/ DEIR asserts that electromagnetic emissions from cables and structures will not adversely impact finfish. There are a number of species in this area that are particularly sensitive to electromagnetic fields (EMF), including elasmobranchs, such as the two species of skate as well blue and mako sharks for whom this area is a designated EFH. There should be a greater discussion for each species about sensitivity and risk. For an example, see Sec. 3.3 of the Environmental Assessment of the Burbo wind project (Seascape 2002). While the DEIS/ DEIR states that finfish would not be impacted during the "normal operation" of the array, there is little information on various EMF levels that would occur if cables and equipment are exposed or closer to the surface as a result of the predicable shifting of the sandy bottom that characterizes this area.

Habitat shifts resulting from non-structure to structure-oriented systems in the otherwise sandy area of the shoals are dismissed as unimportant because "monopiles…would be spaced approximately 0.34-0.54 nautical miles apart." There is no basis in the text (5.4.5.1.1) for the assumption that species composition will not change, in fact the DEIS/ DEIR is apparently contradictory on this point. For example, he DEIS/ DEIR itself (section 5.1.3.) characterizes this area as having no exposed bedrock and instead is largely shallow sediments with large fields of sandwaves. Additionally, there is discussion in Chapter 5 on the impacts of construction on marine mammals ,specifically whether the changed environment would affect their foraging. This section makes contradictory claims that bear on whether this change to a structure-oriented system will change species composition or abundance. On Page 5-83, the DEIS/ DEIR states that "monopiles [are] not expected to greatly increase the production of finfish and benthic invertebrates in the Project area." Yet page 5-84 states that "monopole foundations would represent a source of new hard substrate…therefore, the [turbine] monopole foundations and [service platform] piles may attract finfish and benthic organisms, potentially indirectly affecting marine mammals or sea turtles by causing changes in prey abundance." Although the first statement denies increased production, the latter statement indicates that the monopiles will indeed increase production of finfish and benthic organisms, whether by immigration or reproduction. These sorts of contradictions call into question conclusions about impacts on animals in the environment and on consequent predator-prey relationship across trophic levels.

It seems clear from even the minimal information in the DEIS/ DEIR that the introduction of 130 monopiles and the associated foundation materials will appreciably change substantial portions of the shoals. Although environmental assessments for European wind facilities have done so, this DEIS/ DEIR lacks in-depth discussion of the species and or colonies that might be expected to increase in this changed environment. There is no real discussion of the nature and number of species that might be attracted to the area by a changed benthos. The DEIS/ DEIR states that "several finfish species" already found within the proposed site have life history characteristics (e.g., demersal, philopatric and territorial) that may allow them to benefit from this change." But these species are not identified in the text, nor is there any information on impacts to species that do not share these characteristics and thus may be displaced. There is also no significant information provided on species that may not normally be found in abundance in Nantucket but may be able to colonize the area once there is an artificial reef structure available. The information that is provided is so minimal that it is impossible for reviewers to determine the extent of impact to finfish. Broad assurances that species composition "is not predicted to substantially change" require substantiation that is not available in the text.

We also note, as above, that the discussion of cumulative impacts is inappropriately limited to discussion of "other submarine cable or pipeline installations, dredging activities, trawling, installation of pile supported marine structures and other offshore wind power installations." The direct and indirect impacts on finfish from this project must be added to impacts occurring from changes in fishery management practices and habitat loss or degradation elsewhere that may affect spawning success and/or juvenile and adult mortality.

Risks to Marine Turtles

The discussion of impacts on marine turtles and the species accounts make an error that is common throughout the DEIS/ DEIR: lack of survey effort does not mean that animals are not in the area. Stranding data bases and opportunistic sightings by the Massachusetts Audubon Society during its aerial surveys should be added to the information presented, with a better estimate of the habitat use by turtles. Furthermore, as we recommend elsewhere, the applicant and/or the Corps should conduct field studies prior to construction to establish a baseline and should conduct additional monitoring during the operation phase to assess affects.

Discussion of risks to endangered turtles, as presented in Chapter 5 of the DEIS/ DEIR, provides empty assurance of minimal risk and contains internal inconsistencies that call the conclusions into question. For example, page 5-79 dismisses risks of vessel collision by stating that "sea turtles are likely to dive at the approach of a vessel;" however, page 5-78 states that "loggerhead turtles swam toward the surface when exposed to low frequency, high intensity sounds…and may exhibit similar behaviors if present during pile driving activities. This may increase the risk of vessel strikes during pile driving." These statements, while not necessarily at complete odds with one another, nevertheless beg an explanation of the relative risk during construction, but none is offered. There is simply an unsubstantiated assertion that "turtles should be able to easily avoid vessels moving at slower speeds." The DEIS/ DEIR provides no information on what speeds vessels will use and/or what information exists to establish a threshold speed below which risk may be minimized; nor does the DEIS/ DEIR offer reasoned speculation on whether a turtle would choose to dive into an environment of intense noise rather than risk collision by a vessel whose approach it would not be as likely to hear with its head above water. Furthermore, the discussion of ranges of hearing sensitivity for endangered turtles is minimal at best.

Chapter 5 also provides assurance that suspended sediments are unlikely to affect endangered turtles and marine mammals because suspended sediment is "expected to settle back to the sea floor within a short period of time (one to two tidal cycles)." This would be reassuring but for the fact that the laying of cables will be a protracted process, and thus the impacts from this activity are not confined to one or two tidal cycles. There should also be some discussion of how this activity may limit foraging ability for animals that rely on eyesight to find food.

We also believe that discussions of impacts from electromagnetic fields (EMF) have been inappropriately minimized, with little explanation as to how the shifting bottom sediments may affect the cable shielding and thus exposure of these species, which are known to be sensitive to EMF.

Risks to Marine Mammal Species

Much of the information about the risks to marine mammals in the text (Chapter 5) is repeated verbatim in the Biological Assessment (Appendix 5.5). Rather than follow the model set in the DEIS/ DEIR of restating the exact information in multiple sections, we have consolidated all of our comments on effects on marine mammals in this single section. However, all of our comments below pertain to deficiencies that are often found in both the text and the appendices of the document.

Although the text of the DEIS/ DEIR suggests that it provides an exhaustive search of scientific literature, stock assessment reports, and consultation with resource agencies, it has omitted consideration of substantial and well-known data bases whose information is important to understanding the use of Nantucket Sound by marine mammals. For example, the NMFS maintains a database of opportunistic sightings of right whales in New England called the SAS system that has not been utilized to document sightings. The Cape Cod Stranding Network maintains a database of animals found stranded in surrounding towns that provides insight into the use of the Sound by marine mammals. Federal fishery observers have noted bycatch of marine mammals in waters surrounding the Sound that could be included in the DEIS/ DEIR review to provide additional insight into use of the Sound by marine mammals. Furthermore, a simple online search for relevant literature on particular species provides citations that are important but have not been included in the DEIS/ DEIR. Another over-looked data base can be found in the many citations available from European projects. Some of the species assessed in European-based projects are the same species that may be found in Nantucket Sound (e.g., harbor seals, harbor porpoise), although others (e.g., mysticete whales) in Nantucket Sound are not found in the areas of the Eastern North Atlantic that are home to European wind projects and will thus require additional study.

As a general comment, The HSUS notes that the DEIS/ DEIR states that "few studies of protected whale and turtle species have been conducted within Nantucket Sound." This is true; however, the DEIS/ DEIR makes the grave mistake of assuming absence of evidence equates with evidence of absence. This is a significant error, the result of which is that risk assessment is severely compromised. The applicant does not propose to remedy this situation with any focal studies that might elucidate the risk assessment.

We note that neither the applicant nor the Army Corps undertook any baseline surveys to determine relative abundance and habitat use of Nantucket Sound by marine mammals, despite the fact that all species are protected by either the ESA or the MMPA, and thus require special consideration. This sort of baseline study is widely accepted as necessary in order to undertake reasonable assessment and monitoring of risk and impacts.

In a presentation at the Woods Hole Oceanographic Institution in January of 2005, Jakob Tougaard of the National Institute for Environmental Research of the Danish Ministry of the Environment stated that baseline monitoring was essential in order to assess likely effects of wind energy projects and to monitor post-construction impacts. To illustrate this point, he provided an overview of research to determine effects on marine mammals from wind facilities proposed or sited in Denmark including the Horns Rev and Nysted projects. Much of what he discussed is available in published literature that was not cited in the DEIS/ DEIR. In his presentation, he outlined the baseline monitoring that was done prior to construction and the post-construction monitoring that is ongoing.

Dr. Tougaard listed three basic methods of study that were, and should be, employed in baseline monitoring and post-construction follow-up studies: satellite telemetry on a limited number of animals in key species, remote monitoring via cameras and microphones on fixed structures and buoys, and directed aerial and vessel surveys. He stated that a combination of methods was necessary to develop models and algorithms to portray habitat use and potential for adverse impacts. The Cape Wind project proponents have conducted no baseline studies.

The HSUS is concerned that without baseline studies, a more complete literature review, and accurate species accounts, the risk to marine mammals cannot be reasonably predicted nor can impacts be monitored following construction. Any finding of no significant impact to marine mammal species at this time would be premature at best.

We offer additional specific comments below.

Section 5.5.3.3. cites nine species of non-ESA listed marine mammals that may be found in Nantucket Sound. This list is incomplete. According to Katie Touhey of the Cape Cod Stranding Network, over 240 marine mammals have stranded in the towns surrounding the Sound in the past six years. They include several species not mentioned in the DEIS/ DEIR, including Risso's dolphin (*Grampus griseus*), several Kogia (spp.) and spotted dolphins (*Stenella frontalis*). Species accounts should be added for these species.

<u>Pinniped Species Accounts</u>
Among the species accounts that are provided, we note several errors and omissions. In the species account for harbor seals, for example, there is no mention made of pupping that occurs in the area. The DEIS/ DEIR states that little is known about natural mortality in the species, however there have been a number of unusual mortality events, related to naturally occurring biotoxins documented since the literature cited in the DEIS/ DEIR (i.e., Katona 1993). Additionally, the mortality estimates provided for interactions with commercial fisheries are outdated (1995-1999) and underestimated and should be updated. We suggest using more up to date NMFS stock assessments than those cited in the DEIS.

The species account for harp seals states that "it is possible that harp seals have the potential to occur in Nantucket Sound." It is, in fact, more than "possible." Indeed, they appear to be using the waters of Nantucket Sound on a regular basis. The Cape Cod Stranding Network (Katie Touhey, pers. com.) reports that harp seals are the most abundantly stranded pinniped in the area surrounding the Sound. In the past six years, 114 harp seals stranded compared to 62 gray seals, 18 harbor seals and 7 hooded seals. Impacts on this species and on hooded seals require additional consideration.

The gray seal species account similarly minimizes potential risk. This species and harbor seals have been studied in European wind energy sites. Little or none of this information or analysis of impacts is cited in the DEIS/ DEIR. For example, a 2001 study by Sundberg and Soderman concluded that construction work should be avoided during molting and breeding of gray seals. Koschinski et al (2003) suggest that the low frequency calls of males during mating can readily be masked by wind turbine construction activities, and that this could have a negative impact on reproduction. The expected duration of construction activities in the DEIS/ DEIR is not consistently provided, but it seems apparent that at least some of this construction will take place in the winter when molting and birth take place in gray seals. This is not addressed. The DEIS/ DEIR provides reassurance that construction and maintenance activities will be miles from the construction site, but in the face of literature on known effects, this seems facile. It does not discuss foraging in Nantucket Sound, nor the impact that construction and operation may have on this activity. Because there is little information on the preferred forage foods and their relative abundance in the areas surrounding haul outs, the consequence of displacement of seals from the Sound cannot be properly weighed. As we note below in our comments on acoustic impacts, the sounds of pile driving are likely to travel tens of miles and will easily be perceived at haul out and pupping areas used by harbor and gray seals. Again, the consequences of this are inappropriately dismissed, given the effects found in European sites and in other areas in which pile driving has taken place.

<u>Cetacean Species Accounts</u>
In general, the DEIS/ DEIR ignores stranding data that clearly indicate that white sided dolphins, striped dolphins, common dolphins and pilot whales occur in Nantucket Sound The species accounts and impact analysis in the DEIS/ DEIR need to be corrected to account for the presence of these species in the Sound rather than stating for many of them that "it is possible that [they] have the potential to occur." Furthermore, all of the species accounts for small cetaceans contain outdated citations and do not appear to have considered data available from sources other than the 2001 NMFS stock assessments. We reiterate our recommendation that the applicant conduct directed surveys effort prior to construction to establish baseline and following construction to determine effect.

Harbor porpoise
With regard to the harbor porpoise species account, data cited are old and often inaccurate. They are no longer a strategic stock and the bycatch and abundance data are outdated. Furthermore, the DEIS/ DEIR states that "no specific migratory routes to the Gulf of Maine/Bay of Fundy region have been identified." This is not entirely true. We know the pattern of movement from fisheries bycatch data as they move from the mid-Atlantic northward to feeding areas in the Bay of Fundy. Although there is little gillnet effort in Nantucket Sound, whose unfortunate bycatch of harbor porpoise might be used to gauge habitat use, gillnet activity to the west and east of the Sound documents predictable seasonal use of the area by harbor porpoise. Given their coastal distribution and preference for shallow waters (i.e., <150 feet), the most parsimonious logic would dictate that they would be in Nantucket Sound at the same time as they are distributed around it. The NMFS has a take reduction plan in place with conservation measures designed to

overlap the distribution of this species. For the waters south of Cape Cod, restrictions are in place from December through April, with peak occurrence (and greatest restriction) in the month of March (EPA 1998). Similar restrictions exist for the area just north of Cape Cod in Massachusetts Bay. Because the species is found in that area at the same time as in the area to the East of the Sound, it is reasonable to conclude that they are distributed throughout the coastline in between these two areas with heavy gillnet activity (and consequent bycatch of harbor porpoise), including Nantucket Sound.

The species account states, as do all others, that it is "possible that they have the potential to occur" in the Sound. The absence of focused survey effort does not mean that they do not occur in this area. In fact, we believe that NMFS bycatch data and telemetry data on individual animals combined with our knowledge of their largely coastal distribution and life history, and their well-documented seasonal movements through the coastal waters of Southern New England, mean that it is highly likely that they occur seasonally in the Sound in considerable numbers. European studies have shown significant effect on the abundance and behavior of harbor porpoise during construction activities for a distance out to 10 km. (Henricksen, et. al 2004). The impacts of pile driving on this population and its migratory and seasonal foraging require focused analysis, not the cursory dismissal of risk contained in the DEIS/ DEIR.

Minke whales

The species account for minke whales omits mention that they have been killed in collisions with vessels, including a collision with a whale watching vessel in Massachusetts that was a similar size as that of the vessels that will be used to maintain the wind facility once it is operational. Furthermore, stranding data cited above show that minke whales have stranded in beaches around the Sound, thus they are clearly using this area and do not just have a "potential to occur." This species account requires updating and correction, with greater attention paid to potential impacts to this species.

ESA-listed Cetacean Species

We note, in general, that the species accounts provide greater detail on the life history of the ESA listed species, which is appropriate for discussion of these protected species. However, some of the detail lacks relevance and appears to have been provided simply to add length to the section. For example, without context, there appears to be no reason for including information as to which sex is larger in a species or whether females are ready to mate again following birth or the mechanics of lunge feeding and prey encirclement. If facts such as these are relevant to understanding the risk of vessel collision or sensitivity to noise and disturbance on migratory or foraging behavior, this relevance was not provided. We would prefer to have seen greater depth in the analysis of potential adverse impacts.

Humpback Whales

There are errors and omissions in this species account that indicate a lack of rigor in the analysis. For example, the account states that Stellwagen Bank is a primary feeding ground for the species, although this is true only for some years and for some individual members of the population, which roams widely throughout the Gulf of Maine. Habitat use is maternally directed and other significant feeding habitats are used preferentially by different segments of the stock (e.g., George's Bank to the east of Nantucket Sound and Jeffreys Ledge off New Hampshire).

The DEIS/ DEIR quotes Weinrich et al (1993) as stating that there has been a dramatic decline in the use of Stellwagen Bank in "recent years." This finding was based on information from the late 1980s and early 1990s, and the situation is one of inter-annual flux; it's not a trend as the DEIS/ DEIR implies. In order to understand the vulnerability of the species to impacts in Nantucket Sound, either during the twice-annual migrations in and out of their northern feeding grounds, or while feeding in the vicinity of the Gulf of Maine, it is necessary for the DEIS/ DEIR to use the most recent and accurate information available. The use of a sightings data base for the years 1969-1992 omits sightings the most recent years, and the CeTAP data base that is cited is quite old. Although the DEIS/ DEIR minimizes the importance of Nantucket Sound to these whales, it later cites information from the die-off that occurred in 1987 that cost the lives of over a dozen humpback whales, stating that "14 humpback whales died in Cape Cod Bay and *Nantucket Sound* [emphasis added] after eating Atlantic mackerel containing a dinoflagellate toxin…" The DEIS/ DEIR contradicts itself in this way in several sections. Citations should be updated and information corrected. The use of outdated citations and conflicting information casts doubt on the rigor of the risk analysis.

The discussion of feeding and foraging ecology of humpbacks correctly points out that their diet is quite cosmopolitan and variable depending on prey availability. The author of this section of our comments is a co-author on some of the papers cited (SBY) and is thus familiar with their foraging ecology. In fact, they do use sandy bottoms for foraging, and the fish species on which they are known to feed are found within Nantucket Sound (e.g., herring, mackerel and sand lance). Should prey become scarce in other areas, they will willingly turn to less frequently used habitats (Payne et al 1986, cited in the DEIS/ DEIR). The paucity of survey data in the vicinity of the Sound does not mean that they have not been or may not be using that area for feeding. Conclusory statements such as "Stellwagen Bank is the only location where humpbacks have been observed feeding on the bottom" make a mistake that is rife in the DEIS/ DEIR. Stellwagen Bank hosts countless whale watching vessels which *can* observe bottom feeding; observations of feeding can only be made if someone is there to look. Nantucket Sound has had little attention paid to it because other areas are higher use areas. The fact that particular species and behaviors have not been observed in Nantucket Sound is largely an artifact of effort.

Data in section 4.1.4 of the Appendix, which discusses sources of known disturbance and mortality, are similarly outdated. For example, the level of entanglement-related deaths discussed in the first paragraph is only for the years prior to1990. In the intervening years, many more animals have been entangled and a great deal more is known about the risk factors that contribute to this source of mortality, some of which is relevant to this project (e.g., knowing the portions of the water column in which humpback whales travel and how they maneuver in the face of risk). We note that recent data from GeoZui3-D developed by the University of New Hampshire (Arsenault et al 2004) have provided great insight into how these animals utilize the water column and this has great bearing on the risk that they face from anthropogenic sources of disturbance and death. The authors of the DEIS/ DEIR should pay more attention to obtaining recent, relevant data and provide greater context for the information in the DEIS/ DEIR as regards risk assessment.

While we have gone into some depth with critique of the citations and life history of humpback whales, we will merely state that for fin whales, we have similar concerns regarding contradictory information, outdated citations, and sweeping generalizations. This species account needs to be updated and corrected and risk assessment re-considered. Additional comments on acoustic impacts to this and other species are considered below.

North Atlantic Right Whales
The species account for right whales uses an outdated common name for the species. Biologists generally refer to this species as the North Atlantic right whale, not northern right whale. A simple check of the recent NMFS stock assessments would have confirmed this. References to this species throughout the DEIS/ DEIR should be corrected to avoid incorrect terminology. In addition, the species account for this most critically endangered of large whales contains information that is egregiously incorrect.

Again, the information on the life history, population status, and mortality are outdated. The DEIS/ DEIR contradicts itself in several places in this section (4.3) of the Appendix, claiming in turns in the same paragraph that "the population of northern right whales [sic] appears to be growing at a very slow rate" and "the population was in decline [by] the 1990s;" and later, that it has a "negative rate of recovery." In fact the population continues to decline. In discussing the reasons for the "negative rate of recovery" this section (4.3.1) discusses reproductive health and inbreeding but omits mention of fishing and shipping-related deaths which are the proximal cause of the decline at this time (see Caswell 1999 and Best *et al.* 2001, which are cited in the DEIS/ DEIR).

Data in Section 4.3.2 on seasonal distribution are outdated in places. For example, there is considerable survey effort in the waters north and east of Cape Cod, and sightings in the Great South Channel are better documented than the 1991 citation that is used. Furthermore, the Kenney *et al.* citation documenting feeding distribution also pre-dates the increased survey effort, and the NMFS Sightings Advisory System (SAS) data base contains documentation of greater use of waters outside of critical habitat than was previously believed. In fact, wherever there has been greater sightings effort in the Northeast and Southeast seasonal habitats, we find that they are more broadly distributed than previously believed (see NMFS SAS and EWS data for northeast and southeast habitats). Furthermore, the DEIS/ DEIR states that few right whales have been sighted in Nantucket Sound but cites no recent data. There are additional recent sightings. The SAS has documented a number of sightings in and around the Sound, including a sighting in Nantucket Sound as recently as October, 10 2004. Additionally there is a scientific paper which provides data from satellite telemetry documenting seasonal movements through the Sound (Baumgartner and Mate in review).

While the DEIS/ DEIR correctly states that there are no dedicated surveys of the Sound, it is incorrect to imply that because earlier data (much of it from the 1970s) did not find whales in the area, they are not using it. Because of the inter-annual variability in their distribution, and recent improvements in technology, relying on incomplete data sets may provide an inaccurate portrait of their habitat use and an underestimate of risk. To provide another example that should be familiar to the Army Corps, there are no surveys that cover the nearby Cape Cod Canal, yet we know (USCOE and NMFS data) that right whales have been sighted swimming through the Canal on a number of occasions in the past decade. They may not be in the Canal very often, but they do occur there and the risk is very high when they are present. Similarly, they may not be in

Nantucket Sound in large numbers, but there is ample reason to believe that they are there regularly, if not predictably, and that the risk to them during construction and from regular vessel traffic to the area is elevated. As we discuss our comments on acoustic impacts, the spread of noise from pile driving will carry great distances and may significantly impact right whale migratory and seasonal habitat use. Information in the DEIS/ DEIR is incomplete and some of its assertions regarding risk are incorrect and should be amended.

Section 4.3.4 contains another example of internal inconsistency. It states in its opening paragraph that "many investigators consider habitat change to be the key environmental factor affecting the rate of recovery of the right whale," citing information from the 1980s. Within the past decade or more, scientists have concluded that anthropogenic death is the leading factor affecting recovery. Under NEPA, humans are considered part of the "environment" that requires analysis. Later in the section, the DEIS/ DEIR more correctly points out that" the most significant impacts to right whales…are ship strikes and entanglement in fishing gear." As we discussed earlier, all recent reviewers cited in the DEIS/ DEIR, most notably Caswell and Best, point to mortality from fishing and shipping as the greatest limiting factor to recovery of the species. Later in this section, the statistics used to estimate percentages of mortality attributed to various causes are outdated. The frequent use of outdated citations and data points to the lack of rigor in attempting to analyze likely impacts to the species.

Summary Concerns with Species Accounts
In general, it is impossible to reasonably speculate on whether there will be significant risk to marine mammals from the construction or operation of this proposed facility on the basis of the outdated, incorrect, or omitted information and analysis in the DEIS/ DEIR.

<u>Appendix 5.5 and the Impact Assessment for Marine Mammals</u>
Section 5 of Appendix 5.5A discusses a variety of potential impacts to protected species. These have been considerably understated for marine mammals. Different sections of the DEIS/ DEIR provide different estimates of the amount of time that is necessary for construction (variously 8 months and over a year) and of the number of vessel trips necessary to maintain the turbines (variously 250 days per year and two trips daily). There is also literature available (see citations in the DEIS/ DEIR for Horns Rev and Burbo wind projects for example) that indicate that construction time and the number of vessel trips appear to have been underestimated in the DEIS/ DEIR. For example, the Horns Rev project reported two regular maintenance trips per turbine per year and three unscheduled maintenance trips per turbine per year. For a project the size of Cape Wind's that would translate to over 600 vessel trips per year. Contradictory information in differing sections of the DEIS/ DEIR and the knowledge that additional information from other wind energy projects in Europe was not included in the DEIS/ DEIR make it difficult for reviewers to comment on statements made in the DEIS/ DEIR on the duration or level of risk that is likely. It would be helpful if the DEIS/ DEIR provided succinct discussion at the beginning of the chapter or in a single place in the document to which reviewers could be referred. This would also eliminate the internal contradictions that exist throughout the various sections of the document that compromise analysis of impacts.

Impacts from Total Suspended Solids
In section 5.2.1, the DEIS/ DEIR discusses impacts from total suspended solids (TSS) resulting from construction activities. It opines that whales and turtles "are mobile [and] capable of avoiding or moving away from the disturbances associated with construction." Even if this is true, it acknowledges that animals are likely to be displaced but does not discuss, model, or attempt to quantify the impact on animals resulting from this displacement. This should be part of the analysis included in this section.

Risk from Vessel Collisions
Section 5.2.4 includes some of the most baseless speculation and irresponsible assertions about risk to marine mammals in the DEIS/ DEIR. This section cites Laist *et al.* (2001) as support for its conclusion that vessels speeds of less than 14 knots "are less likely to cause collisions." This is not what the Laist paper says. The paper cited states that this speed is less likely to result in *fatality*. While slower speeds may allow for greater reaction time on the part of operators, the DEIS/ DEIR attempts to read meaning into a particular speed that the paper does not support. The DEIS/ DEIR further states that vessels used in the project that are typically traveling at slow speeds and thus "can be avoided by most marine mammals." It goes on to state "[b]aleen whales can easily detect and respond to sounds of the frequency range and intensity of those produced by tugboats and barges. Thus right, humpback and fin whales are likely to detect and respond to the sounds of an approaching tug and barge." Further, that "[f]in and right whales appear to be more wary of approaching boats, and are likely to move away from vessels." This statement is so wrong as to be shocking. The DEIS/ DEIR has already stated that vessel collisions are one of the largest sources of mortality to right whales and a principle contributor to the decline of the species. Although the authors are correct in pointing out that right whales can hear the approach of boats, they do not respond predictably. In many cases, they do not appear to respond at all and it is precisely because they *do not* move that they are hit by vessels. In fact, the NMFS has published an Advance Notice of Proposed Rulemaking to regulate speed and routing of vessels because right whales are not responding to ships in their immediate vicinity. In the past 12 months alone, six right whales have died, at least three of them (all pregnant females) as a result of collisions with vessels. Asserting that there is no risk to right whales from project vessels because they will move when they hear vessels approaching indicates a startling disregard for reasonable assessment of risks to fragile species.

Chapter 5 of the DEIS/ DEIR (5.5.6.1.1.) states that "vessels moving at slower speeds (less than 14 knots) such as the construction vessels to be used for the project, are less likely to cause collisions." This is incorrect on two levels. First, as stated above, the Laist citation that is used to support this contention discusses the role of speeds less than 14 knots in reducing likelihood of mortality, not necessarily in preventing collisions. Secondly, though some large construction vessels may be slow moving, the type of vessels that are typically used for maintenance in offshore wind facilities in Europe (generally crew boats) are capable of speeds that are much greater than 14 knots. We may presume that similar vessels will be used in maintenance of this project, and it is not clear in the DEIS/ DEIR why they would be moving at slower speeds unless this is anticipated to be a condition of the operating permit.

Moreover, the Laist paper that is cited notes a right whale death caused by a Coast Guard vessel that is 85 feet in length, a size similar to or smaller than those that will be used for maintaining this project. The risk of death, if a collision occurs, is not insignificant.

As noted above in our comments on the species accounts, this section's conclusion that "the probability of project related vessels colliding with marine mammals…is unlikely" is based on the assumption that there are no whales in Nantucket Sound. This, in turn, is based on a lack of survey information and further, the assumption that if a whale should enter this area it will move if it hears the approach of a vessel, an assumption that we know to be tragically wrong.

The paucity of information on sightings of marine mammals is largely an artifact of effort and this fact reinforces the need for year-round baseline surveys of this area to better document the use of Nantucket Sound by protected species. Then, based on this additional research (using a matrix of techniques discussed above) there can be a more realistic understanding of risk to protected species in and around Nantucket Sound.

Marine Mammals and Acoustic Harassment
Section 5.2.5 discusses acoustic harassment. It provides information on sound pressure source levels for typical vessels with most of the citations from the 1970s and 1980s, and the most recent being 1991 (Richardson *et al.*). There is more recent information available and contacting the appropriate NOAA experts would be a good place to start. We note that newer vessel and engine types are available and a recent NMFS workshop on vessel noise and marine mammals (NMFS 2004 draft report) recommended updating models of noise from ships in light of recent technological advances. The report further discusses effects of noise from shipping, both from individual vessels, but more importantly, as a cumulative impact from vessels that raise the ambient noise level.

The workshop report states that the most sensitive frequency range for mysticetes is ~0.01 kHz to 5 kHz, which is different than the estimate in the DEIS and, to some extent, contradicted in other sources (ibid) and we recommend a more thorough search of available literature for a better assessment of hearing sensitivity levels for pinnipeds and small and large cetaceans. There is literature available from projects in Europe that either tracks or speculates on sound source levels and impacts on marine mammals during the construction and operation of wind energy facilities. These data based should be utilized to assist in evaluating relative risk and in designing mitigation technology.

In its discussion of the impacts of noise, the DEIS/ DEIR omits discussion of the cumulative effects of noise. For example, when discussing the noise of jet plowing for cables, the authors state that the process "will produce sound typical of vessel traffic already occurring in Nantucket Sound." But there is little information provided on the frequency or intensity of the noise nor how it will add to the already elevated ambient noise levels in Nantucket Sound.

When discussing the impacts of noise, the DEIS/ DEIR rightly identifies the sounds generated during pile driving as likely to have greatest impact. These source levels are stated differently in various sections of the DEIS/ DEIR. Appendix 5.5a states that pile driving noise in this project's construction would be similar to that generated at the Utgrunden Wind Park in Sweden, which was 178 dB at 500 meters. The first paragraph of Section 5.5.6.1 of the DEIS/ DEIR states that the calculated maximum during construction "would range from 170 dBL at 4,003 feet (1,200 meters) to 145 dBL at13 miles (21 kilometers)." Thus, there are projections of similar sound levels at 500 meters and 1,200 meters and both cannot be true. This is a significant discrepancy that goes unexplained but has great bearing on understanding the degree of risk to which marine mammals are exposed.

Appendix 5.5a concludes that no harm is likely because the stated levels are below the 180dB level established by NMFS as a threshold for preventing injury. This assurance is misleading at best because, if we take the Utgrunden noise levels as an accurate projection of noise, it still means that within 500 meters (approximately ¼ of a mile) the sound levels will exceed an injurious level, though the DEIS/ DEIR does not explicitly state this fact. If we use the figure of 170 dB from Section 5.5.6.1, then the level of sound that can produce injury may extend to 1,220 meters—more than ¾ of a mile from the source! Thus, harm *is* likely to any marine mammal within a significant radius of the construction activity.

There are other estimates of noise from pile driving that have not been included in the DEIS/ DEIR but which influence understanding of potential effect. For example, the environmental analysis for the Burbo Offshore Wind Farm in the United Kingdom states "[p]ile driving may generate noise levels in the range of <150 dB to approximately 236 dB at source (i.e., in the location of the piling)" (Seascape 2002). An additional, and contradictory, analysis in San Francisco indicated that the sound level was approximately 200 dB at 100 meters (Anon. 2001). With sounds at that level, the 180 dB level at which injury would occur could extend for approximately 2 kilometers from the pile driving. In this section on impacts from construction, the DEIS/ DEIR provides no projected information about noise levels at source. This type of information is key to understanding the size of the zone in which injury to marine mammals will exceed the NMFS threshold criteria. This sort of discussion is a critical component of the DEIS and should be included in future drafts. Since there are estimates in the literature that are significantly higher than those provided in the DEIS/ DEIR, the DEIS/ DEIR must be revised to include discussion of these estimates and rationale given for why they may or may not be applicable for evaluating risk from this proposed project.

The analysis of effect of construction noise on marine mammals appears to omit significant literature. For example In Nysted, there is research indicating a 10-60% reduction in haul outs of harbor seals at a distance of 10 km when piles were being driven, yet the DEIS/ DEIR states that no impact is likely (Edren et al 2004). Additionally, research at Nysted and Horns Rev found significant impacts on harbor porpoise abundance, distribution and behavior during pile driving (Henricksen et al 2003, Tougaard presentation at WHOI, January 2004). There is also reason to believe that right whales may be significantly affected during their seasonal movement in the area. Nowacheck *et al.* (2004) speculated that research on bowheads may be applicable to right whales and supplemented this literature with a limited study of right whales that found significant behavioral response to loud sounds. The degree of response that they found indicates that right whales could be adversely impacted by construction noise over very large distances.

The DEIS/ DEIR states that the distance to seal haul outs precludes any disturbance of these animals, but the analysis omits inclusion of the analyses cited above and had given no consideration to their foraging in the Sound that would be disrupted by the construction or whether this would impact energetic requirements of seals forced to forage elsewhere.

The environmental analysis done for the Burbo Wind Project also states that the "zone of responsiveness" in which small cetaceans are likely to show startle or alarm response extends from 500 meters to more than 20 *kilometers* (Seascape 2002). This means that the sound will be aversive to any small cetacean within approximately 12.5 miles. Thus, conservatively, any marine mammal within one quarter of a mile risks hearing damage and any marine mammals within 12 miles or more of the area may avoid it for the duration of construction because of the level of noise. As a result, this project will exclude from their normal habitat or travel corridor, any marine mammal within a dozen miles of the project. This is a significant impact.

The potential impacts of pile driving have been understated repeatedly throughout the DEIS/ DEIR. Assurances that the noise is aversive enough that animals will avoid the area (and thus injury) are facile and, even if true, necessitate an incidental harassment authorization under the MMPA for at least the duration of construction.

There is no discussion in the DEIS/ DEIR of other the level of sound generated during construction of the project from sources other than pile driving. Some of these include sonar or seismic mapping of bottom topography, jet plowing of cables, vessel anchoring, moving of equipment to and from barges, and joining of pieces of equipment to one another, as well as other sounds that can be quite loud and have the potential to carry great distances through the water even when pile driving is not occurring. These sorts of impacts should be discussed and their impacts evaluated.

The DEIS/ DEIR states that "underwater sound monitoring would be performed during initial monopile construction." It is not clear whether this means that it would be done only at the onset of driving the first monopole or at the onset of driving each monopole. This needs to be clarified. Because environmental factors such as water temperature and salinity gradients can affect sound propagation, monitoring only at the onset of the initial pile driving would be insufficient because seasonal differences are likely. Furthermore, the Burbo project evaluation (ibid) states that as depth of pile driving increases the sound energy that is absorbed will radiate more into substrate and affect the radiated sound. This sort of effect, which would occur after onset of the pile driving, should be monitored. Additionally there has been no discussion of the impact of the substrate on sound propagation models nor whether the Lloyd Mirror Effect, which can occur in shallow water environments, may affect sound transmission. Sound monitoring should be continuous throughout the construction.

Additional Impacts
In the section on Impact Analysis, the DEIS/ DEIR does not discuss the issue of habitat exclusion that may result from the placement of a maze of over one hundred turbines in a previously unobstructed area. Some marine mammals, facing this sort of maze and an associated low frequency "hum" may choose to avoid swimming through the area.

A maze of turbine monopiles may not be a significant impediment to the swimming and maneuverability of small cetaceans and seals. This may be less the case for mysticetes, who may be ten to twenty meters in length. If low frequency noise emitted during operation of the turbines is aversive to marine mammals in the area, whose peak hearing range includes the operational frequencies generated by turbines, this may provide additional disincentive to traverse the area. They may instead choose to avoid passing within the range of this sound.

We have pointed out that the information in the DEIS/ DEIR has failed to consider less conservative estimates of sound source levels and propagation models. Nevertheless, if we take as fact the statement in the DEIS/ DEIR that the sound level will fall off to near baseline levels at 110 meters, this may still result in acoustic effects. Although the turbines are spaced 629-1000 meters apart, drawing zones of exclusion that encompass the radius of elevated noise levels around each turbine, results in narrow channels of baseline noise levels that may be only as wide as 400 meters wide between turbines. Thus, animals wishing traverse the turbine array, and yet avoid the operational noise, will be forced to choose a route that may require multiple course changes in order to stay in the channels through the turbine field that have baseline noise levels. They may prefer instead to avoid this area. This could exclude them from an area that may be productive in food resources or part of a migratory route. If other estimates of operational noise are accurate then this radius of acoustic exclusion could be greater. Again, this potential impact has not been addressed in the DEIS/ DEIR.

7. Migrating bats may be at risk

Some eastern wind power projects kill bats in such alarming numbers that the U.S. Fish and Wildlife Service (FWS), Bat Conservation International, the American Wind Energy Association, and the National Renewable Energy Laboratory of the U.S. Department of Energy have formed an alliance to understand why turbines at some locations kill bats and to find solutions that will allow both wind power and bats to prosper.

For this reason, we are skeptical of the DEIS/ DEIR's assertion that the proposed project's has "limited collision risk for migratory bats," based on three pieces of information:

1. Nantucket Sound is not known to be a flyway for migratory bats.
2. Most species of bats found in southeastern Massachusetts don't spend much time over open water.
3. Bats have echolocation.

Not only are there insufficient data to support an assertion that migratory bats do not traverse Nantucket Sound, but the Massachusetts Division of Fisheries and Wildlife (DFW) has indicated that it is highly likely that some red bats, which regularly fly over open water, traverse portions of Nantucket Sound and the south coast of Massachusetts. Additionally, Thomas Kunz speculates that silver-haired and hoary bats, two species that have been seen far offshore, could occur in Nantucket Sound (Kunz 2005).

The DEIS/ DEIR fails to distinguish among bat species sufficiently. For example, Section 5.6.4 reads: "Most of the seven bat species that occur in southeastern Massachusetts are, however, uncommon in the southeastern Massachusetts portion of their ranges and are not known to spend substantial periods over large bodies of open water such as Nantucket Sound" (page 5-98). This kind of broad, sweeping generalization is inappropriate.

Species-specific information is necessary. This section goes onto state, "In general, the collision risk to bats is expected to be minimal…." As the DEIS states elsewhere (pages 5-95 to 5-96), red bats are "migratory, arriving in the northern climates in mid-April and leaving in late October. They would usually winter from Maryland to the Gulf States …. Red bats are strong fliers, and are capable of covering great distances over water. They have been observed on Martha's Vineyard." Since this is the species of bat that appears to have been killed with the greatest frequency at wind energy facilities (Tuttle 2004), it is essential to determine if red bats are migrating through Nantucket Sound and hence, would be put at risk by wind turbines there.

Moreover, we are unconvinced by the DEIS/ DEIR's case that bats will detect and avoid turbines. The document reads: "By using echolocation, bats can discern objects in their path by listening to the echoes reflected back to them (Witt, 1999). Bat echolocation and collision mortality studies suggest that only a small fraction of detected bat passes near turbines result in collisions (Johnson et al. 2002). …[B]ats crossing the Sound should be capable of using echolocation to avoid wind turbines" (page 5-98).

High bat mortality rates at some wind energy facilities, ranging from approximately 30 bats per turbine per year in Tennessee to 70 bats per turbine per year in West Virginia, suggest that bats are not using echolocation when they collide with wind turbines. Some researchers speculate that while bats use echolocation to find food and navigate, it is possible that they may not use this ability continually during migration, perhaps to conserve energy. Another possibility may be that bats fly much more rapidly when migrating than when foraging and may outpace their echolocation's capability to detect obstructions or are unable to gauge the blade's movement. Or possibly the turbine's composition or shape may not reflect or return the bat's call. Researchers don't know why bats collide with turbines, but the simple fact that bats use echolocation certainly does not mean that they are able to avoid being killed by wind energy facilities. Infared images of bats interacting with wind turbines in the mid-Atlantic suggest that some bats may be attracted to turbines (Horn *et al.* 2004).

The portions of the DEIS/ DEIR that attempt to measure this project's potential effect on bats need to be completely overhauled. We recommend that the authors conduct a thorough literature review, beginning with the resources compiled in Gregory Johnson and Ed Arnett's bibliography of bat interactions with wind turbines (2004). Additionally, we encourage the applicant's consultants to collaborate with FWS and Massachusetts Division of Fisheries and Wildlife (DFW) to study red bat movements in southeastern Massachusetts. The radar studies paired with acoustic monitoring, recommended in the bird portions of these comments (below), may provide the data needed to assess this project's risk to bats.

8. Birds may be at risk

Many leaders in the wind power industry recognize that pre-construction surveys can help to select sites where avian impacts will be minimal; in fact, some admit to abandoning otherwise promising wind power sites because the risk to birds was too high. To establish a common set of methods and metrics for such surveys, the National Wind Coordinating Committee has published a guidance document entitled, "Studying Wind Energy/ Bird Interactions" (NWCC 1999). In the executive summary, the authors state, "Bird mortality is a concern and wind power is a potential clean and green source of electricity, making study of wind energy/ bird interactions essential" (page 1).

Thorough and objective surveys of bird presence and species, flight altitude and direction, and habitat composition at a given site are key to assessing the risks posed by erecting wind turbines at a particular location. These must be informed by species-specific biological information.

In other parts of the country, research shows that some wind energy facilities kill substantial numbers of birds, while others do not. Mortality levels tend to be higher at Eastern facilities than those in the Northwest or Rocky Mountains, and research at one Eastern facility found the number of birds killed per megawatt per year to be higher than the number killed at Altamont Pass (NWCC 2004).

Avian experts have postulated that the bird species that may be at greatest risk are migrants, which are unable to habituate to wind turbines and associated facilities. Sarah E.S. Mabey (2004) has identified several characteristics of migrants that may put them at risk from wind power developments, including:

1. The demands of migration make these birds physiologically vulnerable.
2. Migration concentrates individuals.
3. Population impacts from collisions are "cryptic" (i.e., more difficult to quantify than they may be for non-migrating birds).

Additionally, wind turbines may cause indirect effects, such as displacing birds or degrading habitat. While this concern has largely been considered in regard to prairies and their associated avian life, it is appropriate to consider it in the marine environment. Risk appears to correlate bird use of a particular site and the behavior of birds at the site (NWCC 2004).

Study designs fail to address some key issues

The DEIS/ DEIR attempts to dismiss "the concerns of those who believe a minimum of three years of research is necessary to understand the life history of avian species in and around [Horseshoe Shoal]"[1] by using Christmas bird counts and waterfowl studies to demonstrate typical abundance levels during the study years (Appendix 5.7-B, page i). The purpose of this substitution is to validate the results of the applicant's 2002 and 2003 aerial and boat surveys. As the FWS points out, these avian studies do not in fact prove typical abundance levels for the time period and geographic area studied by the applicant, because they were conducted during *different* time periods in *different* areas (USFWS 2004). Moreover, they may not accurately

[1] Please note: A three-year research protocol has been proposed by the U.S. Fish and Wildlife Service, the Massachusetts Division of Fisheries and Wildlife, and the Massachusetts Audubon Society; it has been supported by The Humane Society of the United States, Ornithological Council, Sierra Club, International Wildlife Coalition, Association to Preserve Cape Cod, and others.

capture data about the species studied in the DEIS/ DEIR, because they include inland areas, where some of these species are rarely sighted.

Even if it were valid to compare to data sets such as the applicant's aerial and boat observations and Christmas bird counts and if typical abundance were found, this alone would not validate the conclusions made in the DEIS/ DEIR. Simply proving the birds were there to be counted does not mean that the research design provided an accurate sample of these birds or made an accurate estimate of the total number of birds in the vicinity. Similarly, these estimates are insufficient to determine relative importance of microhabitat use of Nantucket Sound.

Moreover, the utility of boat surveys is limited. The authors identify one limitation by comparing the number of eiders seen from boat and plane (Section 5.7.2), "These numbers [seen from the boat] are considerably lower than numbers observed during the aerial surveys conducted at approximately the same time, principally because the boats could not visit the shallow waters typically used by eiders." It is also possible that the motion of the boat disturbed some bird species and affected their presence and/or behavior.

The most striking limitations, however, of both the boat and aerial surveys are revealed by the results of the applicant's radar studies. Whereas the boat and aerial surveys observed approximately 365 birds in the rotor-swept zone, the two-month radar study identified 127,697 targets at the same altitude. This discrepancy, according to FWS, demonstrates that the "boat and aerial survey estimates for birds in the rotor-swept zone are unreliable." More generally, it shows how skewed the results of fair-weather studies are, and brings into question the overall accuracy of these studies. For this reason, we disagree with the authors' assertion (Section 5.7.2): "These field studies combined with existing literature on specific species behavior provide the necessary information to determine the spatial and temporal distribution of birds within Nantucket Sound."

Even the results of the radar studies are insufficient to gauge bird use of Nantucket Sound in order to estimate the risk that would be posed by an array of wind turbines. FWS states that radar surveys need to include adverse weather and all seasons, for a total of twelve months, whereas a total of only two months of radar studies were completed by the applicant (USFWS 2004). Additionally, we would strongly suggest use of acoustic and thermal imaging technologies in conjunction with radar, to assist with distinguishing between birds and bats and among bird species.

The applicant should heed the previous recommendations of FWS and Mass. D FW, which outline three years of studies on terns, winter waterfowl, and migrating passerines (USFWS 2002 and Mass. DFW 2001). Additionally, the applicant should heed recommendations that the avian studies should record bird movements, in addition to documenting the occurrence of certain species, that the EIS/ EIR should include detailed information about the movements of both long-tailed ducks in the winter and night migrating songbirds in the spring and fall (Nisbet 2005 and Mass. Audubon 2004).

Collision estimates are completely baseless

Birds are injured or killed by wind turbines when they collide with the monopole or blades, or when they are swept downward by the wake behind the rotor (Winkelman 1994). The DEIS/ DEIR crudely attempts to quantify how many birds could be killed in this manner.

Section 5.7.3 provides an avian collision estimate for the proposed action, derived from a 2001 document published by the National Wind Coordinating Committee, in which researchers Erickson *et al.* compared bird mortality at land-based wind power facilities. Based on the finding (as reported in the DEIS/ DEIR) that these facilities typically killed 0 to 2.8 birds per turbine per year, the authors state that the 130 turbines proposed for Nantucket Sound may kill an equivalent number of birds: 2.8 birds per turbine, totaling 364 birds per year.

We are concerned that the authors misuse this resource document. Erickson *et al.* actually report that wind power facilities kill 0 to 4.45 birds per year (Erickson *et al.* 2001, page 16), not 0 to 2.8, as is stated in three places in the DEIS/ DEIR (pages 5-128, 5-129, and 5-130). Using the uppermost bound of this range from Erickson, one would estimate that 130 turbines would kill 578 birds each year.

Substituting the Erickson *et al.* mortality estimate for a site-specific analysis, however, is questionable at best. A more recent review of published and unpublished mortality studies at wind power facilities, also published by the National Wind Coordinating Committee (2004), offers an updated mortality range of 0.6 to 7.7 birds killed per turbine per year, but cautions that this estimate is not intended as a conclusion but rather as a summary of what is known to date. The authors also caution against applying land-based data to offshore wind power facilities.

Moreover, the Erickson *et al.* report has serious flaws that the DEIS/ DEIR fails to acknowledge. William R. Evans, a renowned ornithologist with expertise in nocturnal bird migration, recently critiqued this research in his comments on the Chautauqua Wind Power, LLC Avian Risk Assessment (2004). Dr. Evans' primary points are these:

1. The mortality estimate posited by Erickson *et al.* is based primarily on mortality studies from the western United States. "Given this," Evans writes, "it is a major oversight that Erickson, *et al.* failed to point out that songbird mortality at tall man-made structures is a phenomenon that is well documented in eastern North America but does not appear to be as large a phenomenon in the west.... Since the Erickson, *et al.* comparison was published, mortality studies are two wind plants in the east (Backbone Mountain, WV and Buffalo Mountain, TN) have shown mortality rates much higher than the Erickson, *et al.* derived 'national average.'"

2. Erickson *et al.* made a comparison among wind turbines and other sources of avian mortality too early in the build-out of commercial wind energy. There are now too few turbines to cause significant damage to bird populations, but eastern North America could support as many as 500,000 turbines, resulting in a projected impact of "1-5 million birds per year and 1-40 million bats per year."

3. Erickson *et al.* fail to differentiate species of birds killed by various mortality sources. Evans writes: "For example, the high mortality figures associated with cats and windows primarily involve plentiful species that are common in suburban and residential neighborhoods or in the vicinity of farms, whereas species killed at commercial wind turbine facilities and communications towers are largely neotropical migrant songbirds; species of conservation concern that nest in our wild lands."

We are confused as to why the authors of the DEIS/ DEIR used this outdated, misquoted, and controversial estimate of bird mortality at land-based wind power facilities when other estimates that may be more appropriate are available.

In section 5.7.3, the authors reference a study of "tubines located in low-lying areas in the Netherlands adjacent to the Wadden Sea" (page 5-129) that found mortality rates of 0.04 to 0.14 birds per turbine per day. An extrapolation of this figure to a wind energy facility the size of the Cape Wind proposal would lead to an estimation of 1,898 to 6,643 bird deaths each year.

Recent research from coastal wind energy facilities in Belgium found that collisions varied from 0 to 125 birds per turbine per year, with mean numbers for three different facilities ranging from 18 to 35 birds per turbine per year in 2002. The authors cautioned: "It is important to note that the numbers of victims given must be regarded as an absolute minimum." Species included herring gulls, lesser black-backed gulls, black headed gulls, mallards, coots, wood pigeons, peregrine falcons, kestrels, common terns, and little terns (Everaert 2004a). During the 2004 breeding season, 48 terns, primarily common and Sandwich terns, collided with 25 turbines at one of these wind facilities, with most of the mortality concentrated at 4 or 5 turbines. The actual number of terns killed in 2004 at this site (correcting for search efficiency and predation) is around 165 (Everaert 2004b). If the bird mortality rates from these facilities were extrapolated to a wind energy facility the size of the Cape Wind proposal, one would predict that the turbines would kill 2,340 to 4,550 birds each year, including up to 850 terns.

There is no explanation as to why the chosen estimate of 2.8 birds per turbine is more reliable for estimating mortality than these other, higher estimates from projects that are nearer coastal environments or whether *any* of these mortality rate estimates is reasonable.

We would expect that the project proponent would prefer to reject either of these extrapolations. Each of these sites has a different geography and avian composition than Nantucket Sound so estimates derived elsewhere must be used with great caution. So too should the Army Corps and MEPA reject the unreasonable estimate that this project will kill 364 birds each year. Instead, actual data from the proposed site of the wind power facility should inform any estimate of bird mortality, and this will require additional baseline study and modeling beyond that provided by the applicant.

Chautauqua Windpower recently completed a risk assessment that characterizes the site-specific effects of its proposed wind farm on birds, following the ecological risk assessment framework used by the U.S. Environmental Protection Agency (EPA). By using EPA's four-step process – problem formulation, characterization of effects, characterization of exposure, and risk characterization – allows researchers to evaluate and predict the likelihood of adverse effects, including death, injury, habitat loss, and population reductions, and characterizes their significance (Chautauqua *et al.* 2004). While this risk assessment is hardly flawless, it does provide an example of the application of quantitative risk assessment methodology to measuring a wind power facility's potential effect on birds.

The Chatauqua risk assessment formulates the problem through a literature search, as was done for the Cape Wind DEIS/ DEIR. It characterizes the potential effects of the project by identifying several factors that affect mortality rates at wind power projects: differences among species or avian groups, behavioral differences, environmental factors, and engineering design features. This is consistent with the methodology used to develop a vulnerability index to scale possible adverse effects of marine wind projects on seabirds in Europe (Garthe and Huppop 2004).

To examine the potential for mortality within the proposed wind project, Chautauqua's authors cited research that described birds' passage and survival rates through both the total area covered by wind turbines and the rotor-swept zone. Using models and observational accounts, they suggest that far greater than 99 percent of birds passing through a wind farm survive and that "a high percentage, generally more than half, of the birds passing through [a rotor-swept zone] survive" (page 6-19). The Chautauqua risk assessment then characterizes utilization and risk by applying group specific avoidance-mortality factors to abundance levels measured by radar studies during diurnal and nocturnal migration periods.

To apply a similar methodology to the proposed Cape Wind project, the authors of the DEIS/ DEIR would need to collect additional radar data, as has been recommended by state and federal wildlife agencies. Additionally, this method of characterizing avian risk is dependent upon the accuracy of observations at existing wind power facilities. Since so few marine projects are operational, it would be reasonable in some cases to substitute estimates of species vulnerability based on the factors identified by Garthe and Huppop (2004): flight maneuverability and altitude, percentage of time flying, nocturnal flight activity, sensitivity toward vessel and helicopter traffic, flexibility in habitat use, biogeographical population size, adult survival rate, and conservation status. While these authors' work is specific to European populations, it appears that wind facilities may pose greater risk to loons and scoters than other seabirds.

Turbines may obstruct migrants

Low-flying nocturnal migrants near coastlines may be at particular risk of colliding with wind turbines (Winkelman 1994). Additionally, wind power projects may cause a barrier to migration or may cause migrants to desert an area (Bairlein 2004). The DEIS/ DEIR acknowledges that Nantucket Sound is an important migration-staging area for seaducks (page 5-101) and appears to consider that migratory songbirds and shorebirds may change their behavior due to weather conditions (page 5-106). However, the applicant's consultants only collected two months of radar data on migrants during a single year and conducted a limited number of daytime boat and aerial observations. Ian Nisbet (2005) states that this research is "**seriously inadequate** to characterize the numbers of any of these species at risk from the project."

Dr. Nisbet identifies research that is necessary to assess potential risks to migrating birds:

1. Precise information on the numbers, times, specific locations, and heights of migrating landbirds in September, October, and early November and migrating waterbirds in April, May, September, October, and November
2. Information on birds' attraction to the lit turbines during different weather conditions and the associated risk of collision

Where the DEIS/ DEIR discusses potential effects of this project on bird migration, it fails to consider other human impacts on bird migration. The authors seem to dismiss the possibility that birds may already be migrating at or near the uppermost bound of their energetic budget, given the distance they travel, their limited fat reserves, and the other threats they face. Instead, the DEIS/ DEIR trivializes the impact the turbine array may have on migratory birds. Section 5.7.3 reads, "Day migrants may fly extra miles (perhaps 5 to 10 miles (8 to 16 km)) to avoid flying amongst the wind turbines; however, this additional distance would likely constitute less than 1% of their entire migration distance…" (page 5-133).

Additionally, in section 5.7.3, the authors use radar data from 1967 to conclude that songbirds migrate inland and at high altitudes (page 5-133). However, this does not incorporate the authors' own data from 2002 showing more than 127,697 targets over the water within the height of the rotor sweep (Appendix 5.7-E), many of which are likely to be songbirds.

Construction and operation may displace bird life

In Europe, the displacement of wildlife due to wind power projects is considered to be a greater threat to birds than the associated collision mortality (Strickland and Erickson 2003). The project described in the DEIS/ DEIR could displace birds due to the noise and activity of construction and/or the presence of structures and maintenance vessels during operation.

The DEIS/ DEIR estimates that the sound level above water is 80 dB at 320 meters from construction, a sound level comparable to the sound of a large diesel truck at 15 meters (DEIS section 5.11). This level of continual, intermittent pounding is likely to displace nearby waterbirds who would normally use this area during the winter when pile driving will be taking place. It is not clear where they will go as an alternative or what impact this displacement is likely to have on them.

Operation appears to displace migrating, foraging, and resting birds, which may avoid a buffer zone around turbines that ranges from 75 to 800 meters (Strickland and Erickson 2003). The degree of displacement, though largely unknown, appears to be variable depending upon site characteristics. A single study in Minnesota, for example, found that while turbines produced significant small scale effects on grassland birds, causing birds to use areas with turbines much less frequently than those without, the birds' use of the entire wind resource area was only slightly reduced by the presence of turbines (ibid). In the case of the project evaluated in the DEIS/ DEIR, continuous vessel traffic may stress birds, contributing to the level of disturbance or displacement caused by turbine operation.

From the information available , it appears that this project is very likely to displace birds during its construction. Additionally, its operation would probably cause small scale displacement of at least some birds and may affect overall bird use of the 24 square miles of water that would be occupied by turbines. The DEIS/ DEIR should consider appropriate mitigation.

Conclusions about population impacts to species of concern are unfounded

We are thankful to the Massachusetts Audubon Society for providing data to supplement the applicant's studies on bird species of concern, including roseate terns and piping plovers; however, since the full results of these studies are not included in the DEIS/ DEIR, we are unable to evaluate whether the applicant and Mass. Audubon have together collected sufficient data to analyze this project's potential population impacts to these species. Moreover, it is apparent that the authors of the DEIS/ DEIR did not adequately analyze the data available to them. The conclusions presented about this project's impact on bird species of special concern appear to be unsubstantiated by the information available.

The FWS and Mass. DFW submitted excellent comments on these issues when they commented on the agency review draft of the EIS/ EIR, but to our knowledge, the text was not significantly revised in response to their expert opinions before the public review draft was issued. The Army Corps and MEPA should address these issues, as well as those raised by Ian Nisbet (2005), in a supplemental DEIS/ DEIR.

We would like to take this opportunity to highlight just a few of the concerns that have already been raised about bird species of special concern:

1. Section 5.7.2 reads: "To date, no population impacts have been documented as a result of avian collisions with onshore wind turbines, and no endangered or threatened species have been involved" (page 5-103). In its comments on the agency review draft, FWS asks if "any wind project studies, excluding Altamont Pass … have determined the affected population of any bird subject to turbine mortality, the population dynamics for that species, other requisite data …. If no research or monitoring study has conducted such an analysis, the statement should be deleted because it is misleading and conclusory." Despite this comment, no change was made to the DEIS/ DEIR.

2. Later, section 5.7.2 reads: "There are no reports of large numbers of terns in the Project area, although terns are thought to be regular visitors to all parts of Nantucket Sound" (Page 5-111). FWS (2004) points out that this statement is "questionable, given the findings in Appendix 5.7-K. Tern densities were greatest in the proposed Wind Park site during this survey and are described as being abundant in Nantucket Sound in spring and summer."

3. Mass. DFW (2004) states that the biological assessment (BA) for piping plovers in Appendix 5.7-H fails to consider migrating plovers, uses outdated populations estimates, and makes the premature conclusion that the proposed action will not present significant risk to piping plovers.

4. Likewise, Mass. DFW (2004) points out these deficiencies in the BA for roseate terns in Appendix 5.7-I: it neglects to account for how "visitor" terns will acclimate to tall structures and makes the premature conclusion that the proposed action will not present significant risk to roseate terns.

All available data and an objective, rigorous analysis should be brought to bear on the question of whether turbines and a platform in Nantucket Sound will have a significant impact on bird species of concern.

9. Research by the applicant's contractors should be subject to independent assessment

As we have pointed out above, there are a number of instances in which citations are outdated, assertions of lack of significant impact are unsubstantiated, and data supplied by the applicant are stated as unsubstantiated fact. This assessment of impacts would have been greatly assisted by outside review of its contents. We understand that seventeen agencies have reviewed earlier drafts, but we understand that many of their comments have not been heeded. Furthermore requesting a review of specific sections (e.g., marine mammal impacts, impacts on sea ducks, acoustic impacts, etc) of the DEIS/ DEIR by outside experts in the field provides assurance that the DEIS/ DEIR is not simply serving the interest of the applicant but providing a legitimate review of impacts from the proposed project. We note that comments by the staff at a recent hearing of the Cape Cod Commission cite concerns with lack of transparency in the process and the need to verify assumptions made in the DEIS/ DEIR. We concur with these concerns.

10. Adequacy of Mitigation Measures

In a number of sections, the DEIS states "the Project has been planned, sited and designed to minimize impacts to [marine species] and habitat within the Project Area." For example, in Section 5.5, the DEIS/ DEIR assures that consultations with agencies have occurred and that "measures would be implemented to prevent and minimize" any local impacts. Mitigation measures should be proposed to reduce or avoid potential impacts. This requires more than simple discussion of the chosen technology that utilizes newer turbine designs and slower spinning rotors, and it requires substantiated assurances that the favored site for the project was not chosen merely for the fiscal benefit and logistic ease of the applicant. As stated above, information in the DEIS/ DEIR is not sufficient to assure that the preferred site will not pose a risk to birds and marine species. Further, there is little discussion in the DEIS/ DEIR of specific mitigation measures.

In Section 5, the DEIS/ DEIR proposed to post a NMFS-certified observer on-site during the "initial construction activities" to minimize impacts on marine mammals. There is no explanation of what is meant by the term "during initial construction activities." For example, would this observer, who is supposed to watch for marine mammals, be there only when the initial piles are driven or for the duration of construction? Would s/he be there during the entire construction phase but only observing for marine mammals during the start of each pile driving event; or would s/he be looking for turtles and marine mammals for the duration of each pile driving event? These important questions are not answered by the information contained in the DEIS/ DEIR.

Furthermore, the efficacy of an observer has not been proven sufficient to prevent injury. As the DEIS/ DEIR notes, turtles may stay submerged for well over an hour when feeding and it is not clear how far in advance the observer will begin scanning nor what equipment will be used to aid him/her. Additionally, small cetaceans are difficult to see in wave heights that are greater than 3 feet, especially if they are lone individuals or in small groups with little surface activity. For example, harbor porpoise, who generally travel as individuals or in very small groups, and who do not display surface activity typical of more active dolphins, would be extremely difficult to detect over distances of 500 meters or more. The DEIS/DEIR has specified that a minimum radius of 500 meters around the pile driving will be considered a "safety zone" inside of which sound levels will be injurious to marine mammals, thus it is key that observers be capable of seeing animals out to at least that distance. It is important to note that foggy conditions are common in Nantucket Sound and this will limit the ability of observers to detect marine mammals and turtles. The DEIS should specify whether construction will be allowed to proceed in conditions of limited visibility resulting from weather-related constraints (e.g., fog, precipitation, significant wind).

Since other sections of the DEIS/ DEIR have taken absence of evidence to equate to evidence of absence, and the DEIS/ DEIR does not indicate the sea conditions under which construction may be taking place, we are not assured that the presence of an observer will prevent harm from occurring to animals who may be in the vicinity of construction. There are other techniques that involve remote monitoring that may be helpful in mitigation but have not been considered (e.g.,T-PODs, also known as "click detectors;" and aerial surveys).

Section 5.5.7 lists under mitigation measures the fact that monopiles will be used for foundations, as though this somehow reduces risk. It is not clear how the use of this type of structure constitutes a mitigation measure for marine mammals and turtles. This should be explained.

Section 5.5 also states that there will be post-construction monitoring to document habitat disturbance and recovery. This measure is useless without baseline studies to which post-construction monitoring can be compared. No baseline studies have been conducted.

The use of "soft-starts" to begin pile driving is also listed as a mitigation measure for protected marine species. The DEIS/ DEIR has provided virtually no information as to how the sound level during soft starts will differ from those during normal pile driving. We believe that the sound level is likely to be the same or similar in intensity. If our understanding is incorrect, there is no information provided in the DEIS to correct this misapprehension nor to explain how this will assure that animals are not injured when pile driving starts if they enter the zone in which injury may occur (>180 dB) during pile driving. There are technologies that can be used to help minimize the spread of sounds from construction, most notably the use of bubble curtains, that have not been discussed as mitigation (Rodkin and Reyff, 2004). There is also no mention made of the use of acoustic harassment devices that have been used elsewhere to exclude marine mammals from perimeters of activities.

We are concerned that the EIS/ EIR misuses the term "mitigation." Section 5.7.4, for example, defends the applicant's proposed action by citing details where care was taken to minimize bird mortality through project design. Instead, this section should identify what *additional actions* should be taken by the applicant or regulatory agencies to minimize any harm that would be caused by the proposed action. Of course, this step must follow a detailed analysis of the risks posed by the project (which is lacking, as described above), or else prescribe a monitoring system and attendant strategies to mitigate the actual harm caused during the construction, operation, and decommissioning phases.

Section 5.5 ends with the statement that "no significant impacts are anticipated during project operation; therefore, no mitigation is proposed." As we have stated above, we believe that baseline studies of habitat use by birds and protected species are mandatory before construction of this project. This baseline can be used to help evaluate post-construction effects that can determine whether, in fact, there are no significant impacts during operation. Without a baseline, there is no way to determine effects.

The DEIS/ DEIR does not deal with the potential of habitat loss. In wind projects situated elsewhere, wildlife experts have proposed mitigating habitat loss caused by wind farms with conservation easements (Strickland and Erickson, 2003). The Washington Department of Fish and Wildlife has produced guidelines for selecting appropriate lands to replace areas disturbed by wind power installations. According to these recommendations, replacement habitat should be of like kind and equal or higher habitat value, located in the same geographic area, and should be afforded legal protection (Wash. DFW, 2003).

Mitigating mortality due to direct collision would be more difficult to achieve. For example, how could an agency or developer "replace" the life of a long-tailed duck or roseate tern? True mitigation (a one-for-one trade-off) is impossible in this scenario, but that does not prevent one from attempting to limit the effect of a single death or a certain level of mortality on a *population.* This could be achieved by taking measures to avoid other anthropogenic causes of mortality, such as hunting, ship strikes, or window collisions, or by improving neighboring human communities' capacity to respond to oil spills or marine mammal strandings that might otherwise cost additional lives. Furthermore, should post-construction monitoring identify that certain turbines are killing disproportionate numbers of birds, protocol could mandate that those turbines be removed or relocated.

Conclusion

We realize that this permit application has strained the resources of the Corps and MEPA, and we commend your agencies for the sheer magnitude of effort that must have been required to produce the DEIS/ DEIR. We would be remiss, however, if we were not steadfast in our resolve to ensure that wildlife will not be unnecessarily harmed by this project. Much more data and analysis than were provided in the DEIS/ DEIR are necessary to determine whether Nantucket Sound is an appropriate location for one of the nation's first offshore wind farms. We believe that, at a minimum, a supplemental DEIS/ DEIR is required.

Thank you for considering our comments. Please contact us if we can offer any further assistance.

Sincerely,

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MEMORANDUM

004985

TO: U.S. ARMY CORPS OF ENGINEERS
Att'n: Col. Thomas Konig, District Engineer, Concord MA

FROM: William J. Snape, III
Legal Advisor to Alliance to Protect Nantucket Sound, Endangered Species Coalition and The Humane Society of the United States

DATE: February 15, 2005

SUBJ: Comments on Draft Environmental Impact Statement USACE NAE-2004-338-1 (Formerly # 200102913): Draft EIR EOEA # 12643; and Development of Regional Impact (CCC JR # 20084) [November 2004]

RE: The Applicability of the Migratory Bird Treaty Act (MBTA), and Other Laws, to Waters Offshore the United States.

CC: Cape Wind Associates

I. Overview: The Applicability of the Migratory Bird Treaty Act to the Actions Proposed in the DEIS/DEIR/CCC

The Draft (combined) Environmental Impact Statement (DEIS or "Combined DEIS) for the Cape Wind Energy Project under the National Environmental Policy Act (NEPA), 42 U.S.C. §§ 4321 *et seq.*, explicitly admits in several places that federally protected bird species, most notably under the Migratory Bird Treaty Act (MBTA), 16 U.S.C. §§ 701 *et seq.*, will be killed or otherwise "taken" as a result of the proposed action. See, e.g., Combined DEIS at 3-137 (acknowledging fatal bird collisions with wind turbine generators or WTG). See also DEIS at 1:6-24; 3:38-49; 3:131-144; 5:100-139; Appendices 5.6 – 5.7. However, strangely, the Combined DEIS fails to mention regulatory compliance with the MBTA in the applicable chapter on the subject. See DEIS 7:1-28 (which includes a detailed discussion about the habitat requirements of the Coastal Zone Management Act, 16 U.S.C. §§ 1451 *et seq.*, but no requisite focus on migratory birds protection).

The proposed and preferred action, briefly described, would include (or already includes) construction of:

- a data tower consisting of a single monopole structure, reaching 197 feet, with three levels of instrumentation at 60 meter, 40 meter, and 20 meter elevations, as well as three 36-inch in diameter open-ending steel pipes supporting a platform set up about 33 feet above mean low water, in waters approximately 13 feet deep. This structure has already been built (and is relevant, *inter alia*, for cumulative impact purposes);

- a large-scale wind energy plant located in Nantucket Sound, consisting of the installation and operation of 130-170 wind turbine generators on Horseshoe Shoals in the Sound. The wind turbines are planned to be over 250 feet in height, fitted with three 160 foot blade rotors, reaching over 400 above mean sea level. The turbines will be supported on a 16 to 21 foot diameter monopole foundation driven approximately 80 feet below the ocean floor. The facility would occupy 24-28 square miles; and

- an electric service platform, 100 x 200 feet in size, with at least 10-12 miles of installed submarine cables that eventually, with not an insignificant amount of equipment and construction, connect to a land facility at Yarmouth.

The central legal question, addressed from the relevant factual inquiry into the statutory language, is whether birds protected by the MBTA will be illegally killed or "taken" by the proposed/preferred action in the DEIS, pursuant to 16 U.S.C. § 703 of the MBTA, which reads:

> Unless and except as permitted by *regulations* made as hereinafter provided in this subchapter[1], it shall be *unlawful at any time, by any means or in any manner*, to pursue, hunt, *take*, capture, *kill*, attempt to take, capture, or kill, possess, offer for sale, sell, offer to barter [etc.] ... *any migratory bird*, any part, nest, or egg of any such bird, or any product ... (italics added).

Based on this central statutory prohibition, the rest of this memorandum will discuss and describe how the Army Corps of Engineers, other federal permitting agencies, the proposed permitee(s), and other state and local actors <u>must</u> comply with this prohibition against "take" under the MBTA, or else risk criminal and civil sanctions.[2] Federal government agencies can also be found in violation of the MBTA and face injunctive relief sought under the Administrative Procedure Act by private aggrieved individuals, 5 U.S.C. §§ 551 *et seq.* This memorandum specifically concludes that all federal agencies purporting to grant valid permits to operate wind power projects within the well-established 200-mile exclusive economic zone (EEZ) of the United States (and indeed the high seas) must seek compliance documents from the U.S. Fish and Wildlife Service pursuant to 16 U.S.C. §§ 703 and 704 of the MBTA.

At over eighty-five years of age, the MBTA is one of this nation's, and the world's, oldest conservation statutes. The migratory bird program has both local grassroots *and* international relations origins. All three federal branches of the government have

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[1] <u>See</u> 16 U.S.C. § 704 (Determination as to when and how migratory birds may be taken, killed, or possessed).

[2] 16 U.S.C. § 707(a), (b).

consistently upheld its principles of bird conservation even as inevitable legal disputes have arisen as to the MBTA's interpretation in numerous contexts. See, e.g., Dale Goble and Eric Freyfogle, WILDLIFE LAW: CASES AND MATERIALS (2002) at 516-26, 759, 852-75, 999. One of our major points today is that federal agencies must "(u)se the NEPA process to identify and assess reasonable alternatives to proposed actions that will avoid or minimize adverse effects of these actions upon the human environment," which most certainly includes the certain prospect of take of legally protected migratory birds. 40 C.F.R. § 1500.2. Here, the Army Corps should not commit any funds to this action until it is certain that, *inter alia*, all its migratory bird (and consequently, its NEPA) obligations have been fulfilled. It is cruel irony that despite at least two Presidential executive orders seeking to protect the very natural resources at issue in this matter – migratory bird protection (E.O. 13186) and marine protected areas (E.O. 13158) – the birds and marine ecosystem in the Nantucket Sound area continue to be under significant threat from the wind power proposals presently on the table.

II. Some Important Definitions

The ***regulations*** described in MBTA § 703 are contained at 50 C.F.R. Parts 13 and 21. Of particular note is 50 C.F.R. § 21.27, which allows the issuance of a "special purpose permit" to take a listed migratory bird under § 703 for:

> … activities related to migratory birds, their parts, nests, or eggs, which are otherwise outside the scope of the standard form permits of this part. A special purpose permit for migratory bird related activities not otherwise provided for in this part may be issued to an applicant who submits a written application containing the general information and certification required by part 13 and makes a sufficient showing of benefit to the migratory bird resource, important research reasons of human concern for individual birds, or other compelling justifications.

This regulation has been neither mentioned nor analyzed in the DEIS.

Take is an term that "means to pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to pursue, hunt, shoot, wound, kill, trap, capture or collect." 50 C.F.R. § 10.12. It is clear from MBTA "take" case law that the unintentional but actual killing of protected birds from activities known to kill those birds is enough to trigger § 703. See, e.g., United States v. Corbin Farm Service, 444 F.Supp. 510 (E.D. Cal.), aff'd on other grounds, 578 F.2d 259 (9th Cir. 1978); United States v. FMC Corp., 572 F.2d 902 (2d Cir. 1978) (both cases concerned pesticide impacts on migratory birds and the willingness of courts to find both users and manufacturers liable under MBTA § 703). This crucial legal term of art, in other words, most definitely applies to the actual killing of protected birds by the blades of a wind turbine.

III. What Birds Are Protected by the MBTA?

In examining the list of impacted birds in the DEIS to the list of migratory birds 50 C.F.R. § 10.13, it is apparent that many potentially impacted species of birds intersect with this proposed project/action. These species include, but are not limited to:

common and red-throated loons
horned, red-necked, potentially other grebes
Wilson's storm-petrel
Northern Gannet
double-crested and great cormorants
Common Eider
black, white-winged and surf scoters
Red-breasted Mergansers
Goldeneyes
Great Black-backed Gull
Herring Gull
Bonaparte's Gull
Black-legged Kittiwake
Laughing Gull
Ring-billed Gull
Common Tern
Roseate Tern (also implicates Endangered Species Act)
Least Tern
Black Tern
Forster's Tern
Sooty Shearwater
Greater Scaup
American Black Duck
Canada Goose
Snow Goose
Piping Plover (also implicates the Endangered Species Act)[3]
Wading birds (e.g., herons, egrets, ibis)
Raptors (e.g., hawks, owls, falcons)
Bald Eagle (also implicates Bald and Golden Eagle Protection Act)
Landbird migrants ("large numbers … at a variety of altitudes" says the DEIS, p.5-114), including the roseate tern and piping plover.

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[3] The roseate tern and piping plover are bird species listed under the Endangered Species Act, 16 U.S.C. § 1531 *et seq.*, and that demonstrate the significant negative impacts that could afflict many migratory species covered by both the MBTA and the Convention with the United Kingdom concerning Canada, cite. Both the roseate tern and piping plover are protected not only by these two migratory bird laws, but also Sections 7, 8 and 9 of the ESA. 16 U.S.C. §§ 1536-38. The National Historic Preservation Act is also implicated by the proposed action.

IV. Who and What Are Bound by the MBTA's Prohibition Against Take?

In July 2000, the U.S. Court of Appeals for the D.C. Circuit ruled, in Humane Society of the United States v. Glickman, 217 F.3d 882, that federal agencies are subject to the provisions of the MBTA. Like the issue before the Army Corps in this DEIS, where the direct mortality of protected birds by wind turbines is a certainty, HSUS v. Glickman involved the direct take of nuisance Canada geese, where the Court merely held that a federal agency must get a regulatory permit from the Fish and Wildlife Service pursuant to 16 U.S.C. § 704 of the MBTA. Other courts had previously held, in the context of "indirect" take of migratory birds in the forest/timber harvest context, that federal agencies such as the Forest Service did not need to obtain a migratory bird take permit or otherwise comply with the migratory bird regulations. As of this date, we believe it is the current policy to consider the prohibitions of the MBTA to apply equally to federal and non-federal entities in accordance with the requirements and criteria set forth in the general permit procedures and the migratory bird permits at 50 C.F.R. Parts 13 and 21, respectively.[4] Migratory bird regulations define "person" as "any individual, firm, corporation, association, partnership, club, or private body, any one or all, as the context requires." 50 C.F.R. § 10.12.

V. Where Do the MBTA's Prohibitions Apply?

Nothing in the MBTA expressly deals with the geographic scope of its application. We believe that well-accepted rules of statutory construction lead to the inescapable conclusion that the MBTA applies to federal agencies and other persons under the jurisdiction of the United States from all of the United States and its territories, its territorial waters (broadly defined below), and the high seas or international waters. The nature of the MBTA applicability within the territory of other recognized nation-states is outside the scope of this memorandum comment. For sake of explanatory ease only, the waters of the United States will be partitioned as follows, followed by a legal discussion of international waters:

U.S. Inland water bodies and land:

There is, of course, no question that the MBTA's prohibitions apply within the sovereign boundaries of the United States – including all lakes, rivers, and other water bodies – based on the plain language of the statute as well as the U.S. Constitution itself.

[4] See, e.g., 50 C.F.R. § 21.21 (import and export); 50 C.F.R. § 21.22 (capture of birds for banding and release); 50 C.F.R. § 21.23 (scientific collecting and education); 50 C.F.R. § 21.27 (special purpose for rehabilitation, education, and other compelling purposes); 50 C.F.R. § 21.28-29 (falconry); 50 C.F.R. § 21.30 (raptor propagation); 50 C.F.R. § 21.41 (depredation permits); 50 C.F.R. § 21.42-47 (general depredation orders).

U.S. Territorial Sea from 0-12 miles:

There is similarly no question that the MBTA's prohibitions apply within the territorial waters of the United States, from the coast line out to at least twelve (if not twenty-four)[5] nautical miles. Presidential Proclamation 5928 (Territorial Sea of the United States of America), 54 Fed. Reg. 777 (December 27, 1988); Legal Issues Raised by Proposed Presidential Proclamation to Extend the Territorial Sea, 12 Op. O.L.C. 238, 240 (1988) ("The President has the authority to issue a proclamation extending the jurisdiction of the United States over the territorial sea from three to twelve miles out." *and* "The President also has the authority to assert the United States' sovereignty over the extended territorial sea, although most such claims in the nation's history have been executed by treaty."). Congress has determined the individual states' jurisdiction to be three nautical miles from the applicable coast. 43 U.S.C. § 1301(a)(2), (b).

U.S. Exclusive Economic Zone:

There is hardly more question, still, that the MBTA's take prohibitions apply within the U.S. exclusive economic zone (EEZ), out to 200 nautical miles, a legal concept grounded in customary international law. See, e.g., Presidential Proclamation 5030 (Exclusive Economic Zone of the United States of America), 48 Fed. Reg. 10605 (March 10, 1983):

> Within the Exclusive Economic Zone, the United States has, to the extent permitted by international law, a) sovereign rights for the purpose of exploring, exploiting, conserving and managing natural resources, both living and non-living, of the seabed and subsoil and the superajacent waters and with regard to other activities for the economic exploitation and exploration of the zone, such as the production of energy from the water, currents and winds; and b) jurisdiction with regard to the establishment and use of artificial islands, and installations and structures have economic purposes, and the protection and preservation of the marine environment.

See also Opinion of Office of Legal Counsel (O.L.C.), Department of Justice (September 15, 2000) (Administration of Coral Reef Resources in the Northwest Hawaiian Islands) (The Antiquities Act applies to both the territorial sea and the EEZ).

Case law from the Supreme Court on down, as well as administrative practice itself, makes it clear that the U.S. MBTA take prohibition applies to actions in the U.S. EEZ. For instance, in finding that NEPA applies to federal actions that may affect the environment in the EEZ, the court in Natural Resources Defense Council v. U.S. Navy, 2002 WL 32095131, *12 (C.D. Cal. Sept. 17, 2002) found it "undisputed that with regard

[5] See Presidential Proclamation 7219 (Contiguous Zone of the United States) (September 2, 1999) (Establishment of a contiguous zone out to twenty-four nautical miles from the baselines of the United States).

to natural resource conservation and management . . . the United States does have substantial, if not exclusive, legislative control of the EEZ." Indeed, the Marine Sanctuaries Act claims for the U.S. "sovereign rights and exclusive fishery management authority" within the EEZ, and bars foreign fishing there except as the U.S. may permit. 16 U.S.C. §§ 1811(a); 1821(a). See also Draft EIS--Seabird Interaction Mitigation Methods (NMFS August 2004) at §1.2.2 ("The assertion of jurisdiction over the EEZ of the United States provided a basis for economic exploration and exploitation, scientific research, and protection of the environment under the exclusive control of the U.S. government.").

International Waters or High Seas

Finally, for purposes of this comment letter[6], both U.S. case law and international law also strongly support the conclusion that the MBTA take prohibition applies to actions on the high seas, or international waters (i.e., outside the U.S. EEZ but before entering another nation-state's territorial boundary).

For starters, the MBTA's international genesis make application to the global "commons" particularly appropriate. The MBTA was designed in order to implement international bilateral agreements protect migratory birds. See, e.g., Convention Between the United States and Great Britain [for Canada] for the Protection of Migratory Birds, 39 Stat. 1702 (August 16, 1916). The United States also possess treaties with Mexico, Japan, and the Union of Soviet Socialist Republics (now Russia and other states). These treaties were necessary because individual countries proved unable to protect migratory birds without international cooperation, and the treaties specifically seek to protect migratory routes between the countries including the high seas. It has been acknowledged that birds do not follow political boundaries.

In this context, it is quite clear, though a court has not yet directly addressed the issue, that the MBTA's take prohibitions must apply to the high seas. NEPA, although it lacks an express extraterritoriality provision, has been held to apply on the high seas for reasons that apply equally to the MBTA. Center for Biological Diversity v. National Science Foundation, 2002 WL 31548073, *3 (N.D. Cal. Oct. 30, 2002). The Center for Biological Diversity court relied in part on the reasoning of Environmental Defense Fund v. Massey, 986 F.2d 528 (D.C. Cir.1993), holding that NEPA applied to an agency's failure to prepare an EIS for waste incineration in Antarctica. That court noted that in such regions, which lack a sovereign, "the presumption against extraterritoriality has little relevance and a dubious basis for its application." Id. at 534. The U.S. State Department testimony upon which the Massey court relied stated:

> application of [NEPA] to actions occurring outside the jurisdiction of any State, including the United States, would not conflict with the primary

[6] The DEIS indicates that all of the wind turbine and wind power equipment proposed in the preferred alternative at Nantucket Sound/Horseshoe Shoal by the applicant would be within the territorial boundaries of the United States, and well within the U.S. EEZ. DEIS at 1-4. Thus, there is no reason, here, to entertain the question of the applicability of MBTA take prohibitions to foreign territories and waters.

> purpose underlying this venerable rule of interpretation -- to avoid ill-will and conflict between nations arising out of one nation's encroachments upon another's sovereignty . . . . There are at least three general areas: **The high seas**, outer space, and Antarctica.

986 F.2d at 534 (citation omitted) (emphasis added).

The "territorial presumption" also does not apply where failing to apply the statute will cause adverse effects within the U.S. or to U.S. interests. See,e.g., Massey at 531. That is clearly the case for the proposed and preferred action in this instance, where U.S. protected birds that spend time in the U.S. would be killed. Further, the Supreme Court in United States v. Bowman, 260 U.S. 94, 98 (1922), has held that the territorial presumption does not govern the interpretation of statutes that implicate the interests of the United States outside its strict territory, as is the situation here with internationally protected migratory birds.

The Bowman Court concluded that the MBTA criminal provision should be applied to acts committed outside U.S. waters, despite lacking an express extraterritorial reference, reasoning that the presumption's application depends on the nature of the offense or action:

> The necessary locus, when not specially defined, depends upon the purpose of Congress as evinced by the description and nature of the crime and upon the territorial limitations upon the power and jurisdiction of a government to punish crime under the law of nations. Crimes against private individuals or their property, like assaults . . . which affect the peace and good order of the community must, of course, be committed within the territorial jurisdiction of the government where it may properly exercise it. If punishment of them is to be extended to include those committed out side of the strict territorial jurisdiction, it is natural for Congress to say so in the statute, and failure to do so will negative the purpose of Congress in this regard. . . . But the same rule of interpretation should not be applied to criminal statutes which are, as a class, not logically dependent on their locality for the government's jurisdiction . . . . Some such offenses can only be committed within the territorial jurisdiction of the government because of the local acts required to constitute them. Others are such that to limit their locus to the strictly territorial jurisdiction would be greatly to curtail the scope and usefulness of the statute and leave open a large immunity for frauds as easily committed by citizens on the high seas and in foreign countries as at home. In such cases, Congress has not thought it necessary to make specific provision in the law that the locus shall include the high seas and foreign countries, but allows it to be inferred from the nature of the offense.

Bowman, 260 U.S. at 97-99 (emphasis added). See also EEOC v. Arabian American Oil. Co. ("ARAMCO"), 499 U.S. 244 (1991).

Reportedly, a Solicitor's Opinion by the Department of the Interior from January 2001 supports this conclusion about the application of the MBTA in offshore and international waters.[7] Here, the fact that the United States entered into migratory bird treaties with all of its immediate foreign neighbors to protect certain birds and their migratory pathways, both inside the U.S. and out, means that the MBTA must be applied outside the territory of the United States (but not inside the territory of another nation-state) to have any meaning. This is completely consistent with international law. See, e.g., Restatement (Third) of the Foreign Relations Law of the U.S. §§ 402, 502.

VI. How Some of the Illegal Take will Occur in this Project and Action

As has been and will be further explained to you by other ornithological and scientific experts, wind power projects generally, and this one specifically, can and will take protected migratory birds in several ways. See generally *Proceedings of the Wind Energy and Birds/Bats Workshop: Understanding and Resolving Bird and Bat Impacts*, Washington, D.C. May 18-19, 2004. Prepared by RESOLVE, Inc., Susan Savitt Schwartz, ed. September 2004. (82 representatives from government, non-government organizations, private business and academia met to discuss these issues).

Although still a small component of overall energy output in the U.S. (less than 1%), wind energy is the fastest growing energy source in the country, with the capacity in megawatts (MW) increasing almost three times since 2000, and increasing 60,000% since 1980. As explained by the American Bird Conservancy, wind energy production affects birds in three ways: 1) fatalities resulting from collisions with rotors, towers, power lines, or with other related structures; 2) avoidance of both wind turbines and the important habitat/food sources for birds where the turbines now reside; 3) direct impacts on bird habitat and ecosystems from the "footprint" of turbines, roads, power lines, auxiliary buildings. Gerald Winegrad, *Proceedings of the Wind Energy and Birds/Bats Workshop*, supra, Why Avian Impacts Are A Concern in Wind Energy Development: Wind Turbines and Birds at 22.

VII. Why Do We Have the MBTA?

There are many reasons why people, and particularly Americans, love and admire and enjoy watching birds. Birds have economic value. Birds have ecological value. Birds are a way for many humans to connect to nature in a daily or intimate way. Famed Supreme Court Justice Oliver Wendell Holmes called the protection of birds "a national interest of very nearly the first magnitude." Missouri v. Holland, 252 U.S. 416, 435 (1920). It is no wonder, then, that several clauses of the Constitution provide a basis for

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[7] More evidence that Congress believed the MBTA applies outside U.S. territory is found in the Antarctic Conservation Act, 16 U.S.C. §§ 2403-12, prohibiting certain acts by U.S. citizens in the Antarctic. Section 2408 states that a criminal conviction under the act "shall not be deemed to preclude a conviction for such an act under any other law, including, but not limited to, the Marine Mammal Protection Act of 1972, the Endangered Species Act of 1973, **and the Migratory Bird Treaty Act**. 16 U.S.C. § 2408(c)" (emphasis added). Had Congress not believed the MBTA applied in Antarctica, it would not have so provided.

the strong federal statutory regime for migratory birds that now exists: the treaty clauses, the interstate and foreign commerce clauses; the property clause, the tax and duties clause, the government rules clause, among others. As the governments of the United States and Japan, for example, have agreed by treaty: "Considering that birds constitute a natural resource of great value for recreational, aesthetic, scientific, and economic purposes, and that this value can be increased with proper management ...The taking of the migratory birds or their eggs shall be prohibited." 24 U.S.T. 3329, Preamble and Art. III.

Birds are, thus, protected by federal law, and have been for almost a century. The United States has entered into foreign treaties with several of the leading nation-states (e.g., Great Britain, Canada, Russia, Japan, Mexico) of the world to protect birds. Certainly the U.S. Army Corps of Engineers can do a better job forthrightly assessing this proposed projects impact not only upon migratory birds (and other natural or historic resources) in Nantucket Sound, but frankly in the entire offshore geographic area of the United States. See Donald Baur and Jena MacLean, *The "Degreening" of Wind Energy: Alternative Energy v. Ocean Governance*, Natural Resources and Environment (ABA, Summer 2004) at 44-49.

VIII. Conclusion

The bottom line for this project is that protected birds will be taken by the actions proposed in the DEIS, take is prohibited by the MBTA without a permit, no such MBTA permits are presently available, and thus this project simply cannot proceed without strict MBTA compliance.

Commonwealth of Massachusetts

Division of Fisheries & Wildlife

Wayne F. MacCallum, *Director*

24 February 2005

Ellen Roy Herzfelder, Secretary
Executive Office of Environmental Affairs
Attn: MEPA Office
251 Causeway St., Suite 900
Boston, MA 02114

004986

Colonel Thomas L. Koning, District Engineer
U. S. Army Corps of Engineers
696 Virginia Rd.
Concord, MA 01742

Project Name: Cape Wind Energy Project
Proponent: Cape Wind Associates, LLC
Location: Horseshoe Shoal, Nantucket Sound
Document Reviewed: DEIS-DEIR
EOEA #12643
USACE NAE-2004-338-1

Dear Secretary Herzfelder and Colonel Koning:

These comments are offered in response to the Draft Environmental Impact Statement – Draft Environmental Impact Report (DEIS-DEIR) for the Cape Wind Energy Project. The proponent Cape Wind Associates, LLC, proposes to create a 454 MW wind power generation facility, consisting of 130 wind turbines, on Horseshoe Shoal in Nantucket Sound. We have reviewed the sections of the document pertaining to birds and bats, and offer the following remarks.

OVERVIEW OF PRIMARY CONCERNS:

The amount and design of the fieldwork conducted was insufficient to document avian use of the waters and airspace of Nantucket Sound, much less to evaluate risk. The aerial and boat surveys were inadequate or marginally adequate to describe daytime use of the Sound. The radar work (a few weeks of work in one year) was egregiously inadequate, it provided little information on situations during which birds would be at greatest risk (night and poor weather), and apparently no ground-truthing of the radar work was conducted -- rendering it of limited scientific merit. No radar work at all was conducted during winter months, when the Sound is used by hundreds of thousands of wintering waterbirds. The issue of disturbance and displacement of birds needs additional study. Additional fieldwork is needed to compensate for severe deficiencies in the work to date so that three years of data can be evaluated for the Final EIS-EIR.

The structures as designed, especially the Electrical Service Platform, are likely to attract birds and contribute to fatalities. There is no plan in place for evaluating their effectiveness in deterring birds or for maintaining the structures so that they do not become bird hazards. Bird deterrent systems must be more comprehensive.

The analyses (*e.g.*, passage rates, fatality rates, radar work) as presented in the DEIS-DEIR are cursory, simplistic, and sometimes inaccurate. At times the calculation methodology is not transparent, and some calculations contain procedural/mathematical errors that generally result in (sometimes vast) underestimates of bird use of the area. All the biological data need to undergo reanalysis (not just review) by independent experts, especially biologists, statisticians, and those with radar expertise.

To estimate avian fatalities as a result of the wind facility, the DEIS-DEIR ignores site-specific data collected for this purpose, and instead bases estimates on fatality rates from terrestrial wind turbine facilities. Such estimates should be derived from site-specific and project-specific data in combination with data from other studies. Evaluation of collision risk must extend to the tower monopoles in addition to the rotor blades.

The potential effects of the proposed project on Piping Plovers could be significant, but cannot be adequately assessed without data collection specific to use of the project site by Piping Plovers. Such data were not collected for the DEIS-DEIR. We are concerned that even small additional mortality caused by collisions with wind turbines or towers will impede progress toward recovery of New England or Atlantic Canada Piping Plovers, and we believe that these concerns are supported by the predictions of the population viability analysis (PVA). We ask that a minimum of 3 years of research be conducted to assess the flight behavior and migration patterns of Piping Plovers in the vicinity of Nantucket Sound, and that the data generated by such a study then be used in the Final EIS-EIR to evaluate risk to Piping Plovers.

This project also may pose a grave risk to recovery of the Roseate Tern. The fieldwork, due to its failure to address situations that are most risky for terns, does little to alleviate uncertainties and concerns. Additional data collection and analysis are needed. The PVA for the Roseate Tern is seriously flawed; thus, the conclusion that the population is not at risk is also flawed. In particular, the PVA assumes an increasing population, when in reality, the population is now declining or stationary.

Additionally, the Roseate Tern and the Piping Plover are listed as *Endangered* and *Threatened*, respectively, pursuant to both the U.S. Endangered Species Act and the Massachusetts Endangered Species Act. Any human-caused mortality of these species is prohibited pursuant to both of these laws. Other state-listed species that use the Horseshoe Shoal area and may be negatively affected by the Cape Wind Project are the Common Tern, the Least Tern, and the

Common Loon; all three are protected as *Special Concern* species pursuant to the Massachusetts Endangered Species Act.

The Alternatives Analysis of the four preferred sites is totally inadequate with respect to evaluating relative use of the sites by birds. Comparable levels of data collection are needed for these sites.

SPECIFIC COMMENTS:

AERIAL AND BOAT SURVEYS

The Massachusetts Division of Fisheries and Wildlife requested "several years of careful work" (20 December 2001 comments on the Environmental Notification Form) to document use of the Sound by birds. Other entities (U.S. Fish & Wildlife Service, I. Nisbet) requested a *minimum* of three years of study. The importance of a multi-year study is to address the environmental variation that exists in nature: what is observed in one year may be very different than what is observed the next -- especially when dealing with highly mobile organisms (birds), some of which track highly mobile prey (fish). The Applicant conducted two years of surveys for wintering birds (Fall/Winter 2002-3 and 2003-4) and two years of Spring/Summer surveys for terns and other birds in 2002 and 2003 for a total of 46 aerial surveys and 27 boat surveys. The Massachusetts Audubon Society (MAS) conducted surveys for wintering birds in 2003-4 and is currently conducting wintering birds surveys. MAS also conducted Spring/Summer surveys in 2002 (limited), 2003, and 2004. Some of the MAS data appear in the DEIS-DEIR; the rest should be incorporated into the Final EIS when available. The analyses of MAS and the Applicant's data, where possible, should be better integrated in the Final EIS-EIR.

As currently presented in the document, **the survey work is inadequate in time span** (two years) to provide sufficiently detailed information on bird use of the Sound. However, including the MAS fieldwork that has not yet been completed/released, three years of aerial/boat survey work will have been conducted. While we consider this marginally adequate in terms of time span, we consider the study design seriously inadequate to answer some of the critical questions. The Applicant notes that "surveys were not conducted in inclement weather or at night." While we understand the safety concerns behind this protocol, those periods of poor visibility are when birds are most likely to collide with turbines (Erickson et al. 2001). Therefore, there needs to be a complementary focus on alternate methods of ascertaining wildlife use of the area. (See comments on "Radar Study" and "Roseate Tern," below.)

Of particular interest is bird use of the "rotor swept zone," where most collisions will occur. Setting aside the substantial issue of lack of data at night and in poor weather, **estimations of bird use of the rotor swept zone via aerial and boat surveys have two other major flaws**.

(1) The first is methodological. Observers sighted relatively few birds flying in the rotor swept zone, but we suspect that many were not detected. The plane was flying at about 250 ft. (approximately the altitude of the rotor hub), and the rotor swept zone extends from 75 ft. to 418 ft. Observers primarily would have been looking at the sea surface to

count the substantial numbers of birds on or near the water. It is unlikely that observers could dedicate the same level of observation outward and upward to document higher-flying birds. In all likelihood, many birds (especially small or light-colored ones) flying near or above the height of the plane were missed. Comparison of simultaneous, aerial/boat surveys with *validated* radar work (see "Radar Results," below) could provide insight on this.

(2) The second problem is computational. The precise computation is unclear (p. 5-128), but the DEIR-DEIS roughly uses total number of birds in the rotor swept zone during surveys divided by the hours of survey work to arrive at a total number of birds using the zone during the course of a year (*e.g.*, 1 grebe observed in 202 hours = 0.005 grebes/hour = 33 grebes in 9 mo.). However, the number of hours the plane was in flight is essentially *irrelevant* to the calculation. What the Applicant has done in the survey work is, in effect, to take a "snapshot" of the area and count the birds, thereby arriving at a density estimate. In the absence of technology to do this instantaneously, the Applicant needed to fly transects through the area, a process that takes a few hours. But had a true instantaneous snapshot been taken, results would basically have been the same as those of an aerial survey taking a few hours. Employing the calculation methodology presented in the DEIS-DEIR, had the plane been traveling twice as fast, twice as many birds would have been determined to use the rotor swept zone during the course of the year, which is nonsense. **What is important to calculate is the rate at which birds enter the rotor swept zone**. In a simple hypothetical example, if one grebe per hour entered the rotor swept zone over the course of nine months, the total number in the rotor swept zone would be: 1 grebe/hr x 24 hr/day x 365 day/yr x 0.75 = 6,570 grebes. The authors did do something similar in analyzing the radar data, where a "passage rate" was calculated. (But note, as discussed below, that the radar data have not been validated, and the methods used to calculate passage rate were not sufficiently clear.)

RADAR STUDY

The radar work is grossly inadequate. Radar was employed only in May-June 2002 and September 2002. Although there was some correspondence with peak migratory periods, the study does not correspond with peak use of the Sound by waterbirds (late-fall to early-spring months). Hundreds of thousands of waterbirds spend the winter in the Sound, including species concentrations of regional and global significance. The radar period also failed to encompass important periods for shorebird migration (August) and tern post-breeding dispersal (July-August). Additionally, approximately half of the time, either the horizontal (TracScan) or vertical (VerCat) radar was not functioning. Radar should have been the primary tool for determining use of the Sound at night and during poor weather. **No sound conclusions can be drawn from what amounts to a several week study during one year, since variation in bird use from season-to-season and year-to-year is not addressed**.

We are greatly concerned by the apparent lack of ground-truthing of the radar work, despite the Corps' request that it be conducted (Environmental Impact Statement Scope of Work, www.nae.usace.army.mil/). This may have provided information on radar coverage (area effectively sampled) and sensitivity, species detected, individuals per target (a target may be composed of multiple individuals), target speed (affected by wind speed), quality/reliability of visual observations, and other potentially useful data. There is reference (Appendix F) to nine boat surveys in spring and some undescribed observations in fall whose purported purpose was to provide ground-truthing for the radar work, some of which occurred simultaneously. However, there is no evidence in this DEIS-DEIR of any attempt to directly compare results of these two different methods. This needs to be rectified in the Final DEIR-DEIS. **Without validation of the radar work, there can be no defensible estimates of numbers or passage rates of birds**. It is particularly critical to validate bird use of the rotor swept zone, where most collisions are expected to occur. For instance, in estimates of risk, the authors generally equate the number of targets with numbers of birds, failing to acknowledge statements elsewhere in the DEIR that a target may represent multiple birds. Geo-Marine's report (Appendix 5.7-J) classifies targets as small (<80 g), medium (80-800 g), large (>800 g), and flock ("significantly" > 800 g), but any of these categories may represent multiple birds, and the discussion of this work does not even separate out "flocks" from the rest of the data. Had ground-truthing of the radar work been conducted, some insight could have been gained on this issue.

The DEIR-DEIS should also differentiate between the Horseshoe Shoal site and the greater study area, and should separate analyses of activity in the rotor swept zone from other analyses.

As previously stated, one of the issues of greatest concern is birds' use of the Sound in conditions of restricted visibility (poor weather, nighttime), when collision risk is highest. The Applicant does provide some information on bird use in foggy/unclear conditions, but there is conflicting information on whether or not flight heights could be determined in periods of rain. The discussion in Appendix J on operation of the VerCat in rain needs elaboration, as conflicting information is presented. On p. 4, it is stated that "precipitation degrades the performance of VerCat." Also (p. 7-8), "rain appears similar to bird detections…[and] is difficult to remove via clutter processing methods; also, rain produces more clutter at X-band [VerCat] than can be removed from the data during processing of data. This makes detection of targets in rain (X-band only) unreliable." Nevertheless, Appendix J does present detections by VerCat during rain and section 5.7.2.3.3 makes some generalizations based on weather (clear vs. rain/fog). By what process were these data deemed reliable? What proportion of detections in rain was filtered out *vs*. kept in? What were the total hours of *reliable* VerCat data in rain, or is all of it suspect?

The discussion of the radar work is cursory at best (p. 5-115-116). In the rotor swept zone, 127,697 targets (26% of all targets detected by the VerCat) were detected in about 951 hours of observation. What were the characteristics of the targets detected in the rotor swept zone (speed, size, numbers, directions of flight)? How did this change during inclement weather? What were the passage rates in the rotor swept zone? Additionally, the discussion of total birds in the rotor swept zone over the course of the year (p. 5-128) does not provide sufficient documentation of how the calculation was performed. It incorporates the total number of hours that either radar was functioning, instead of just the hours that the VerCat, which can determine altitude, was working. Since the VerCat functioned only about half the time, the estimate of number of birds in the rotor swept zone (flawed though it may be) is approximately half of what it would have been had the proper denominator been used.

The Final EIR-EIS should include: (1) additional validated radar work to address seasonal and annual variations in bird use over a three-year period, (2) acoustic monitoring in

conjunction with the radar work (to identify species or species groups), if technologically feasible, and (3) an analysis of these radar/acoustic studies by independent scientists with significant biological expertise in radar/acoustic work (and reanalysis of the 2002 study). This additional analysis should include detailed evaluation of birds' responses to the data tower (SMDS), especially at night, which should be discernable with radar. While the data tower obviously differs in significant ways from the proposed turbines, it nevertheless may provide useful information on birds' reactions to an unusual structure in the offshore marine environment.

PIPING PLOVERS

The DEIS-DEIR acknowledges that about 28% of the Atlantic Coast population of Piping Plovers nests to the north of Nantucket Sound, and that some of these birds may cross Nantucket Sound and the project area at Horseshoe Shoal in the course of their spring and fall migrations (Appendix 5.7-H, section 3.1.7). We concur with the DEIS-DEIR that it is likely that some Piping Plovers will cross the project area during migration. We also concur that insufficient data are available to characterize the movements of plovers across the Sound (3.1.4).

We believe that the potential effects of the proposed project on Piping Plovers could be significant, but cannot be adequately assessed without data collection specific to use of the project site by Piping Plovers. Such data were not collected for the DEIS-DEIR. We are concerned that even small additional mortality caused by collisions with wind turbines or towers will impede progress toward recovery of New England and/or Atlantic Canada Piping Plovers, and we believe that these concerns are supported by the predictions of the population viability analysis (PVA) described in Appendix 5.7-H, Attachment 1, of the DEIS-DEIR (see below). **Any human-caused mortality of Piping Plovers is prohibited pursuant to the U.S. Endangered Species Act and the Massachusetts Endangered Species Act. We ask that a minimum of 3 years of research be conducted to assess the flight behavior and migration patterns of Piping Plovers in the vicinity of Nantucket Sound (see below), and that the data generated by such a study then be used in the final EIS-EIR to evaluate risk to Piping Plovers.**

<u>Omissions</u>: Figure 1 in Appendix 5.7-H of the DEIS-DEIR fails to identify one of the largest breeding concentrations of Piping Plovers in New England: Dead Neck/Sampson's Island in Osterville supported 16 pairs of Piping Plovers in 2002 (Melvin and Mostello 2003), and is located only 8 miles northwest of the proposed project site at Horseshoe Shoal. This information further demonstrates that the project site is surrounded by Piping Plover breeding sites.

In section 3.1.2 the statement is made that migrant Piping Plovers traveling directly between late-summer migration staging areas near South Beach and the Monomoy islands in Chatham and wintering areas to the south would not pass over Horseshoe Shoal. However, this is just one hypothetical scenario. If Piping Plovers migrate within sight of shorelines, so that they can land on intertidal flats or beaches to forage or rest as necessary or to avoid unfavorable winds or inclement weather, then a likely route for post-breeding migration from the Chatham area would be directly across Nantucket Sound in a west-southwest direction toward the coastline of Rhode

Island and eastern Connecticut. This route likely would take migrant plovers across the footprint of the project area.

Estimates of potential mortality: Given the lack of actual data on Piping Plover migration patterns and flight behavior, we believe that it is impossible to reliably conclude that the mortality of Piping Plovers from collisions with rotors or towers will be biologically insignificant. The estimates of potential mortality of Piping Plovers caused by collisions with wind turbines contained in the DEIS-DEIR (Appendix 5.7-H, section 4.2.5.2) may substantially underestimate actual mortality that could occur. We disagree with the apparent conclusion (section 4.2.5) that no Piping Plovers will be killed by collisions with the stationary towers. Rather, we believe that plovers could collide with towers if they fly through the project area at night or in foggy conditions. We believe that the estimate of 2,000 m as the mean migration elevation of Piping Plovers crossing Nantucket Sound may be inappropriate, given that it likely was derived from flight elevations of species other that Piping Plovers migrating southeastward from breeding areas in subarctic regions of North America (Richardson 1979). Flight altitudes of Piping Plovers crossing Nantucket Sound may be much lower on average, especially for birds just departing from or arriving at Massachusetts breeding sites or migration stopovers or staging areas. It seems plausible to us that the proportion of Piping Plovers passing within the elevation of rotors (23-127 m) could be 0.8 or higher. If we assume 0.8, and further assume that the number of plover flights crossing the Massachusetts coastline each year is 2,458 (from the DEIS-DEIR) and the fraction of these flights that actually pass through the project area is 0.1 (compared to 0.4 in the DEIS-DEIR), then the expected number of instances each year in which plovers would enter the rotor-swept zone where they would be at risk of being killed would be 2,458 (0.8) (0.1) = 197 flights. Multiplying 197 flights by 0.157 (the estimate from the DEIS-DEIR of the percent of birds flying through the rotor-swept zone that are actually killed, from Winkelman 1994) gives an alternative estimate of 31 Piping Plovers that could be killed each year by a proposed offshore wind park in Nantucket Sound.

Effects on Piping Plover population trends, viability, and recovery efforts: We concur with the results of the population viability analysis (PVA) (Appendix 5.7-H, Attachment 1) that conclude that population trends and population persistence of Piping Plovers are highly sensitive to changes in survival rates. It is precisely for this reason that we are so concerned about potential effects of plover collisions with wind towers and turbines. Under the "No Growth" scenario of the PVA (the scenario which most accurately depicts the recent population trend of Piping Plovers in New England and Atlantic Canada), an additional fatality of only 1 female/ year increased by 3% the risk that the New England sub-population could decline below current levels. This assessment assumes no change in current conditions, for example, declines in survival rates caused by declining quality of wintering or migration habitat south of New England, or the cumulative effect on Piping Plover mortality rates of multiple off-shore wind tower projects constructed elsewhere along the Atlantic Coast. If habitat conditions decline in the future enough to depress current rates of survival or fecundity, then fatalities caused by a proposed wind park in Nantucket Sound could be expected to cause an even greater increase in the risk of population decline of Atlantic Coast Piping Plovers.

The results of the PVA contained in the DEIS-DEIR suggest that the loss of even one female plover as the result of a collision with a wind turbine in the project area could

measurably increase the risk that the New England subpopulation could decline below current levels ("No Growth" scenario). This comes at a time when substantial efforts are being made by state and federal agencies, private conservation groups, and many others to restore populations of Piping Plovers along the Atlantic Coast. An estimated $500,000 is spent each year on Piping Plover recovery efforts in Massachusetts alone (U.S. Fish and Wildlife Service, unpubl. data). If efforts in Maine and five Canadian provinces are considered as well, the estimated annual cost of recovery activities likely approaches $ 1 million. Because so much effort is being expended to not only prevent human-caused declines in Atlantic Coast Piping Plovers, but also to increase their numbers as part of an international recovery effort (U.S. Fish and Wildlife Service 1996), we believe that data should be gathered that will allow the Final EIS-EIR to more accurately assess the risk of the proposed project to Piping Plovers.

Research Needs: Construction of a large, offshore wind power generation facility in Nantucket Sound, as proposed in the DEIS-DEIR, should not be permitted until a study of at least 3 year's duration is completed that examines flight behavior and migration patterns of Piping Plovers in the vicinity of Nantucket Sound, in order to better assess the risk that plovers will encounter a large wind tower array constructed on Horseshoe Shoal or at other locations in Nantucket Sound and be killed by collisions with rotors or towers. The study should use established techniques for radio-marking Piping Plovers (Zivojnovich and Baldassarre 1987, Drake et al. 2001) and long-distance radio-tracking of migrating birds (Cochran et al. 1967, Melvin and Temple 1987) to characterize migration behavior both in spring, as plovers approach Massachusetts from the south, and in late summer, as they leave nesting beaches or migration staging areas on Cape Cod and begin their southward migration. Radar may help to augment telemetry studies of Piping Plover migration, and should also be used to characterize migration patterns and flight behavior of other, more abundant species of shorebirds in and near the project area.

TERNS

Taken together, Cape Wind and MAS surveys span three tern nesting/staging seasons in the study area. In terms of time span, that is marginally adequate *if* all MAS data are included in the Final EIR-EIS, but insufficient as currently presented (only two years). However, constraints in study design and flawed analysis of risk render conclusions unsound.

The Applicant's studies have shortcomings in that they fail to provide sufficient information on situations during which terns are likely to be at greatest risk of collisions: during periods of restricted visibility and when commuting between daytime loafing/feeding areas and nighttime roosts. **The Final EIR-EIS should include: (1) additional validated radar work throughout the period when terns are present (April through September) to provide three years of data, (2) acoustic monitoring in conjunction with the radar work (to help identify terns), if technologically feasible, (3) an analysis of these radar/acoustic studies by independent scientists with significant biological expertise in radar/acoustic work (and reanalysis of the 2002 study), and (4) observations of terns at and near roosting areas to gain information on commuting flight heights**.

As discussed for other species elsewhere in these comments, the methodology for estimation of numbers of terns using the study site during the day is unsound due to methodological constraints and computational problems: (1) it would be easy to miss high-flying terns on surveys, and (2) instead of calculating passage rates, the authors have tried to use a "snapshot" density estimate to calculate number of terns that would be present in the study area over the course of a year. The majority of waterbirds the Applicant studied for this DEIS spend most of their time on the water (*e.g.*, eiders, scoters), diving from the surface to obtain food. Terns, however, forage from the air and spend very little time sitting on the water. **Therefore, terns glimpsed by the Applicant during surveys are a very small subset of the total number of terns that use the area**.

The collision rate for Roseate Terns predicted by the Applicant (Appendix 5.7-H) is partially based on observations of terns flying at rotor height: again, these were density data erroneously transformed into rate data. The Applicant identified 100 terns (49 Common, one Roseate, and 50 unidentified) in the rotor swept zone. This corresponds to *much larger* numbers of terns using the zone on an annual basis, had passage rates been properly calculated. Collision rates as high as 1 in every 600 terns passing at rotor height (collision rate for Common Terns, Everaert et al. 2002 unpublished report cited in Appendix H: p.23) could accelerate the decline of the Roseate Tern, and hinder recovery of Common and Least Terns, depending on the passage rate of these species. **It is critical to determine these passage rates for all state- and federally listed birds**. Once these rates are determined, other site-specific and project-specific data, in combination with data from the literature, may help to formulate a more realistic estimate of collision risk to all three species of terns.

Curiously, the authors (p. 5-136) predict a greater number of fatalities for Piping Plovers (0.08 individuals/year) than for Roseate Terns (0.0002 individuals/year). This is illogical. During site-specific studies, Roseate Terns were documented to regularly use Horseshoe Shoal, and were observed in the rotor swept zone. No studies were conducted that would be likely to result in detections of Piping Plovers.

The function of the Roseate Tern PVA presented in the DEIS-DEIR is to predict how the population will respond to different levels of mortality. **This PVA, however, is seriously flawed**. Especially in need of reexamination is the assumption that the population is now increasing at a rate of 2% per year, and is headed towards recovery. The population slowly increased overall from 1978 to 2000. Of great concern is the downward trend since 2000, both in Massachusetts and in the region. It appears that **the Roseate Tern population is now decreasing at a rate of about 4% to 5% per year**. It is unclear why the Piping Plover PVA would incorporate two scenarios, "No Growth" and "Intermediate Growth", while the Roseate Tern PVA does not, even though the latter population has declined – or, at best, stagnated (much like the plover population) -- in recent years.

Approximately 90% of the Roseate Terns in the endangered Northeast population breed to the west of Nantucket Sound in Buzzards Bay, MA and off of Long Island, NY. After breeding, a significant proportion (perhaps all) of the Northeast Roseate Tern population travels to staging areas in Chatham prior to migration (Trull et al. 1999), likely passing through Nantucket Sound. Therefore, the proposed turbine project may put the entire population at risk, not just "local" breeders.

We acknowledge that year-to-year numbers have fluctuated substantially, and this variability makes any predictions uncertain. However, **because of the Roseate Tern's listed status and evidence that the population may be in decline (or stagnant), any individual mortality is unacceptable**. It is irrelevant that tern use of Horseshoe Shoal may be lower than in other portions of the Sound.

COLLISION RISK EVALUATION

The DEIS-DEIR does not elaborate on the large number of birds using the rotor swept zone and instead focuses on "population-level effects" on night migrants, which they deem unlikely. The authors state (p. 5-123) that "it is more important to examine the behavior of night flying birds, especially migrants, since these are the birds that have been shown to be more susceptible to impacts from wind turbines." It is unfortunate that the nighttime radar work was severely deficient. The DEIS-DEIR also dismisses the possibility that any real mortality will occur from the turbine towers themselves, even though this has been documented (BirdLife International 2003). Evaluation of collision risk must extend to the towers.

The authors make some unsound (for reasons stated elsewhere in these comments) estimates of total numbers of various groups of birds expected to occur in the rotor swept zone per year based on aerial surveys conducted during the day and in good weather. (Note conflicting estimates for loons, p. 5-126 and 5-128.) **The best way to derive estimates of bird use of the rotor swept zone is to calculate passage rates from multiple years of *validated* radar work (in all seasons, at all times of day, and in all weather), in conjunction with acoustic monitoring (if technologically feasible) to provide species- or group-specific information. Without this, no serious estimates of avian use of the rotor swept zone can be made**.

We acknowledge that it is difficult to estimate the numbers of birds likely to be killed by turbines because of the complex interactions among a variety of factors. Additionally, data on collisions at offshore sites are limited. Strangely, however, **in projections of fatalities from the proposed project, the DEIS-DEIR completely ignores site-specific studies of bird use of the area that were conducted for the purpose of gauging bird use of the area and fatalities that would result from the proposed project**. Instead, an "upper-limit" mortality rate (2.8 fatalities/turbine/yr) is calculated from 12 *terrestrial* sites to estimate mortality (364 birds/year). Using mortality rates (0.04 - 0.14 birds/turbine/day) from a site near the Wadden Sea mentioned subsequently, mortality would range from 1,900 to 6,600 birds/year. The authors also cite a study that recorded 7 night migrating songbirds/turbine/year (p. 5-127); this rate would result in 910 songbirds/year. These examples are not offered as more accurate estimates than those provided by the authors; rather, their purpose is to demonstrate the great amount of variability in mortality estimates at wind turbine sites -- and thus uncertainty about the amount of mortality that will occur from 130 turbines in Nantucket Sound. **In our opinion, the Applicant's estimate of 364 birds/year is an underestimate of what the actual mortality would be, given the very high numbers of birds in the Sound, the frequent occurrence of inclement weather in the Sound (which will contribute to fatalities), and the large number of turbines**.

BATS

The DEIS-DEIR (pp. 5-98-99) gives a poor overview of bat use of the marine environment and current status of knowledge of bat collisions at wind turbine facilities. Bats are known to be present in the marine environment, sometimes many miles offshore (*e.g.*, Mackiewicz and Backus 1956). Because migratory tree bats occur on Martha's Vineyard and Nantucket, they must cross waters of the Sound during migration, but numbers of bats, flight characteristics and paths are unknown. The authors state that because of their echolocation capabilities "...it seems unlikely that foraging bats would be unable to detect turbines... bats crossing the Sound should be capable of using echolocation to avoid wind turbines... [and] collisions risk to bats is expected to be minimal." The authors completely ignore recent observations at the Mountaineer Wind Energy Center (WV) at which several hundred bats, mostly tree bats, have been found dead. The site-specific studies conducted by the Applicant are not useful in determining risk to bats, which are indistinguishable from birds on radar. **At a minimum, the DEIS-DEIR should include an unbiased review of bat mortality at wind farms, along with a thorough review of bat use of the offshore environment**.

DISTURBANCE AND DISPLACEMENT OF BIRDS

Evaluation of disturbance and displacement during construction, operation, and decommissioning needs to include estimated maintenance schedules, numbers of birds (especially sea ducks) likely to be affected by boat disturbance, displacement distances, total area from which species are displaced, and duration of disturbance. Facets of birds' responses to vessels should be gleaned from the radar study -- some of the Applicant's boat work was conducted simultaneously, and other vessels were surely within range of the radar during its operative period.

The proposed project area would occupy approximately 24 mi.^{2} of Nantucket Sound; thus, displacement effects must be taken seriously. Displacement may result in a significant reduction in carrying capacity of the Sound if portions of the habitat are functionally unavailable to the birds.

The DEIS-DEIR maintains that benthic habitat is similar throughout the Sound, and that displaced birds will likely find suitable habitat/prey "immediately adjacent" to the area from which they have been displaced. This idea of homogenously abundant resources is likely a fallacy. While benthic habitat may appear similar superficially, the patchy distribution of some bird species suggests that certain areas are more suitable than others. Areas may increase or decrease in importance over time, possibly related to prey depletion by seabird predators or environmental factors. **Three years of systematic sampling should be done throughout the Sound to examine prey abundance and distribution in relation to bird abundance and distribution**. This will permit more informed assessments of how a large turbine facility may affect avian carrying capacity of the Sound.

SITING AND MITIGATION

<u>Siting</u>: The most important factor to consider when attempting to avoid or minimize impacts of a wind facility on wildlife is siting. Although we do not have a complete, year-round picture (due

to limitations of the field and radar studies), it is clear from the Applicant's and MAS's biological studies that bird use of the Sound, including Horseshoe Shoal, is very high, as the authors cautiously concede (p. 5-127-128). BirdLife International (2003), after thorough review of the literature, stated that **"[t]he weight of evidence to date indicates that locations with high bird use, especially by protected species, are not suitable for wind farm development."** Nantucket Sound is clearly a wintering area of regional and global significance for wintering waterbirds, and is utilized by federally- and state-listed rare bird species (Piping Plover, Roseate Tern, Common Tern, Least Tern, Common Loon).

Instead of determining the suitability of the Sound for a turbine facility by quantifying bird abundance in the Sound *prior to* proposing this project, the Applicant simply stated (with inadequate supporting data) in their Environmental Notification Form (2001) that bird use of Nantucket Sound was low. Now – unable to support this previous statement – the Applicant is attempting to show that the extremely large numbers of birds using the Sound, and the presence of rare species, are of no real concern. The site-specific work to date does not alleviate our concerns.

Lighting: As acknowledged by the authors, it is well known that some birds are attracted to lighting, especially in poor weather. A discussion is needed of how and why the lighting scheme differs from that recommended by USFWS (2003) to minimize bird fatalities. Flashes should be synchronized among all towers (not just perimeter towers, as described on p. 5-229) to minimize the total amount of time that lights are visible. Discussion of lighting used during nighttime construction is vague and needs further elaboration (p. 5-120).

Bird deterrents: We are concerned about the bird deterrent systems described (p. 5-138, Appendix H: pp. 19-20.) for the wind turbine generators (WTGs) and Electrical Service Platform (ESP). Overall, much more description is needed of all potential perching areas, and how birds will be deterred in each type of area (*e.g.*, platforms, ladders, nacelles, railings). Specific problems:

(1) The deterrent system described for the WTG access platforms may work, but this is difficult to evaluate because the description of the platform itself is unclear. A diagram should supplement the description.
(2) It is very unlikely that this same system for the much larger ESP (200' x 100') will deter terns or other birds from perching, as acknowledged by the authors. The Applicant's system focuses on making the perimeter unattractive to birds, but there is simply too much interior surface area on the ESP that will remain available for perching. Terns using this platform to initiate courtship flights may ascend into the rotor swept zones of nearby turbines. The Applicant has not shown any initiative in creatively addressing this potentially large problem.
(3) Birds will be startled by helicopter arrivals and may collide with fences, wires, and panels.
(4) A system for deterring birds from perching on access ladders or nacelles has not been described.
(5) A monitoring plan to assure that the systems are indeed effective deterrents has not been outlined.

(6) There is no mention of a maintenance plan for these systems, which in and of themselves may become bird hazards through deterioration (*e.g.*, injury from loose or corroded wires).

These problems need to be rectified and discussed in the Final EIR-EIS.

MONITORING PLANS

No plan has been described for post-construction monitoring of bird movements or collisions with structures. This should be detailed in the Final EIR-EIS.

ALTERNATIVE SITES

With respect to avian impacts, **no meaningful comparisons of the proposed project location with the four preferred alternative sites can be made due to the lack of comparable data from the sites**. Parallel studies must be conducted at alternative sites to enable useful comparisons. The New Bedford locations are likely to pose greater risks to terns than would the Horseshoe Shoal location, since large tern colony sites are also within Buzzards Bay. At Massachusetts Military Reservation, construction of a turbine facility would result in extensive habitat fragmentation. At this site, it would be difficult or impossible to avoid impacts to rare species, especially herpetofauna, invertebrates, and birds.

* * * * *

Due to deficiencies in the wildlife studies, data analyses, assessments, and mitigation and monitoring plans, we are unable to adequately evaluate the degree of risk that the proposed turbine facility would pose to birds, including rare state- and federally listed species. We are concerned, however, that considerable avian mortality may result, given the large number of birds using the site and the large footprint of the proposed project. We request that the Applicant address these deficiencies in a Final EIS-EIR so that we can more completely evaluate the potential effects on wildlife. Please contact Dr. Scott Melvin (508-792-7270 ext. 150) or Carolyn Mostello (508-792-7270 ext. 312) if you have any questions. We appreciate the opportunity to comment on this project.

Sincerely,

Thomas W. French

Thomas W. French, Ph.D.
Assistant Director

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Cc:

Michael Amaral, USFWS
Diane Amirault, Canadian Wildlife Service
Anne Hecht, USFWS
Truman Henson, MA-CZM,
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Mass Audubon
Protecting the Nature of Massachusetts

004687

February 23, 2005

Ms. Karen Kirk Adams, Cape Wind Energy Project EIS Project Manager
U.S. Army Corps of Engineers, New England District
696 Virginia Road
Concord, MA 01742-2751

Reference File No. **NAE-2004-338-1**
EOEA No. **12643**
Cape Com. File No. **JR#20084**

Dear Ms. Adams:

Through this correspondence Mass Audubon formally requests that the US Army Corps of Engineers prepare a Supplemental Environmental Impact Statement (DEIS) for the *Cape Wind Energy Project* ("the Project") proposed for Nantucket Sound off the coast of Massachusetts. We have previously made this request in our brief public hearing oral and written testimony delivered to you on December 7, and 8, 2005. This request is consistent with *The National Environmental Policy Act of 1969* (Pub. L. 91-90, 42 U.S.C. 4321-4347, January 1, 1970, as amended; and accompanying regulations at: Part 1502/Section 1502.9.

We believe that there is *significant new... information relevant to environmental concerns and bearing on the proposed action or its impacts ((c)1(ii))*. The information necessary for the Corps to make a fully informed Record of Decision on the merits of the Project is contained in the accompanying Mass Audubon comment on the DEIS for the Project. Filling of the data gaps Mass Audubon highlights in the comment letter is information that should be available for public review and comment.

However, in order to fairly expedite the Corps' decision-making process, Mass Audubon supports *alternative procedures* as approved by the Council on Environmental Quality to the preparation, circulation and filing of a supplement, as provided for at ((c)4). Although we do not find the entire 4,000 page DEIS deficient, we do believe that certain and important information must be provided to the public in order for the Corps to proceed to a Final EIS and subsequent Record of Decision.

We appreciate the opportunity to make this request and thank you for your timely consideration.

Laura A. Johnson

President

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Mass Audubon
Protecting the Nature of Massachusetts

February 23, 2005

Ms. Karen Kirk Adams, Cape Wind Energy Project EIS Project Manager
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Secretary Ellen Roy Herzfelder
Executive Office of Environmental Affairs
MEPA Office
Anne Canaday, EOEA #12643
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Boston MA 02114

Margo Fenn, Executive Director
Cape Cod Commission
3225 Main Street
Barnstable, Massachusetts 02630

VIA OVERNIGHT

Reference File No. **NAE-2004-338-1**
EOEA No. **12643**
Cape Cod Comm. File No. **JR#20084**

Dear Ms. Adams, Secretary Herzfelder, and Director Fenn:

Mass Audubon appreciates this opportunity to provide written comments to supplement our public hearing oral testimony delivered to the Army Corps of Engineers (the Corps) on December 7, and 8 in response to the *Draft Environmental Impact Statement/Report/Development of Regional Impact* (DEIS) *for the Cape Wind Energy Project* ("Cape Wind") proposed for Nantucket Sound.

We request that these comments be considered under:

- *The National Environmental Policy Act* (*NEPA*);
- Section 10 of the *Rivers & Harbors Act of 1899*;
- *The Massachusetts Environmental Policy Act (MEPA)*;
- The Development of Regional Impact section of *The Cape Cod Commission Act*;
- *The Endangered Species Act of 1973 (ESA);*
- *The Migratory Bird Treaty Act; and*
- *The Marine Mammal Protection Act of 1972.*

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We also thank the Corps for extending the public comment period beyond the required 45 days.

Mass Audubon is the largest conservation organization in New England, concentrating its efforts on protecting the nature of Massachusetts for people and wildlife. We protect over 30,000 acres of land, conduct educational programs for 250,000 children and adults annually, and advocate for sound environmental policies at the local, state, and federal levels. Established in 1896 and supported by 65,000 member households, we maintain 43 wildlife sanctuaries that are open to the public and serve as the base for its conservation, education, and advocacy work across the state.

This project is the first offshore wind farm proposed in publicly owned, federal waters. It will be a large-scale facility, involving 130 turbines arrayed in a grid over approximately 24 square nautical miles on Horseshoe Shoal in Nantucket Sound. It also includes an Electric Service Platform for gathering the generated electricity, and two underwater cables that will transmit the power to the mainland on Cape Cod. The maximum height of the structures (tip of turbine blade) would be about 415 feet above mean sea level.

The proposed project site is located in a highly productive ecosystem. The area within the eastern US migratory bird flyway hosts high concentrations of wintering waterfowl, and is in close proximity to nesting, foraging and staging areas for federally endangered Roseate Terns and threatened Piping Plovers. Substantial numbers of federally endangered sea turtles and protected marine mammal species frequent the proposed project site. In addition, the proposed site provides important habitat for federally regulated finfish and shellfish populations in Nantucket Sound.

It is important that the environmental review documents for this project provide a thorough and objective presentation of information and analyses in order to provide a sound basis for the Corps and other agencies to make permitting decisions on the project. As the first and largest offshore wind energy project in the United States, this review process will set the standard for future environmental reviews of projects of this type.

Mass Audubon has focused its review of the DEIS on sections most relevant to our organizational mission and where we have expertise (i.e. avian and other living resources). These comments should not be construed to imply support or lack of concern regarding any other portions of the DEIS.

The alternatives studied for this project are limited to potential locations for commercial scale wind energy facilities. While we do not comment in detail on the alternatives analysis, Mass Audubon also recognizes and supports a host of other measures that can reduce reliance on fossil fuel and nuclear-based energy sources, including distributed generation, green buildings, energy efficiency, and conservation. We urge federal, state, and local governments to take steps to advance such measures.

As discussed further below and in the accompanying letter, Mass Audubon urges the Corps to require a Supplemental DEIS, as there are key data gaps and deficiencies in analysis of available data that need to be addressed. The additional information needed includes:

1. Long-tailed Ducks: further data on access, egress and evening roosting areas in and around Nantucket Sound;
2. Roseate Terns: reanalysis of radar data and/or additional surveys during April/May and September;
3. Nocturnal passerines: at least one additional year of data covering spring and fall migrations; and
4. Further assessment of collision risk for birds passing through the project area. Given the uncertainty surrounding this analysis, risk should be presented as a range of probabilities.

I. Mass Audubon and Energy Policy

As responsible citizens, stewards, and advocates, Mass Audubon strongly supports public policies and private projects that advance energy conservation and efficiency. We also support the development of wind farms as a renewable energy source to offset the effects of global climate change produced by the burning of fossil fuels. The question for permitting agencies and the public is what are the most appropriate locations for wind farm facilities.

We recognize that rapid climate warming is one of the most serious long-term threats to the nature of Massachusetts and the planet. This warming primarily results from the burning of fossil fuels to power cars, trucks, planes, and trains, and to generate electricity. Though we make up just 4 percent of the world's population, Americans produce 25 percent of the world's carbon dioxide pollution.

The development production, and consumption of fossil fuels also damages the public's health and environment including destruction of wildlife habitat from drilling and mining; the closure of shellfisheries and fouling of beaches by oil spills; damage to human health from air and water pollution; and contamination of groundwater from the disposal of solid and hazardous waste.

To reduce these impacts, the reliance on fossil fuels as a major source of energy must be dramatically reduced. Simultaneously, there must be an aggressive increase in the amount of energy derived from renewable sources. As such, we endorse the Commonwealth's goal to obtain 10 percent of electricity from renewable sources by the end of the decade. This goal, however, must be a minimum and not a maximum target.

Of the renewable energy options currently available, wind power has the greatest potential to mitigate the harmful environmental effects of rapid climate warming caused by the burning of fossil fuels. Technology to harvest wind is among the more advanced, widely available, and environmentally benign of the renewable energy options. While all energy choices have environmental impacts, the potential environmental risks associated with the operation of Cape

Wind must be evaluated against the proven destructive effects associated with the production and consumption of fossil fuels.

The potential environmental risks of wind energy development can be reduced by the development of responsible and informed standards for siting, operation, and decommissioning wind energy facilities.

Unfortunately, our state and federal governments have failed to establish such standards. While some regulatory programs do apply to wind energy projects, these programs were developed prior to today's large-scale proposal and do not specifically address potential risks to birds, wildlife and remote habitats. We therefore believe that the wind energy industry and permitting agencies would benefit from a framework of comprehensive planning and facility siting criteria to guide projects to the most appropriate locations, and we will work toward that end with our state legislators and Congress.

II. Mass Audubon's Scope of Review for the Cape Wind Project

Mass Audubon's review, assessment, and comments on the DEIS are focused on ensuring that the Corps obtains and properly analyzes sufficient information to adequately evaluate the project. Mass Audubon's ultimate position on the project will be based on a weighing of the environmental risks and benefits of the project in the context of the ongoing and known environmental impacts associated with not undertaking such renewable energy projects.

Several Mass Audubon staff scientists and other staff members with considerable expertise in applicable subjects undertook a detailed review of DEIS sections related to avian and marine life. A detailed technical commentary is attached to and should be considered part of this letter. In addition, the following staff assisted in preparing this comment letter:

Gary Clayton is Vice President for Programs, and is responsible for the management of the advocacy, education, and land protection programs at Mass Audubon. His graduate research focused on marine fisheries biology. He is the former state Director of the Department of Environmental Protection's Wetlands and Waterways Division and Assistant Director of the Massachusetts Coastal Zone Management (CZM) Office. He is presently a member of the state Water Resources Commission.

John J. Clarke is Director of Advocacy. He is a former Assistant Director of Massachusetts CZM, and CZM Regional Coordinator for Cape Cod. Prior to that he spent ten years with the National Park Service at the Cape Cod National Seashore. In addition he has served on the Secretary of the Interior's Advisory Committee on Outer Continental Shelf matters. He has a bachelors and masters degree from Boston College.

Heidi Ricci is a Senior Environmental Policy Specialist. She has an MS degree in Resource Management and Administration and a BS in Biology. She is Mass Audubon's MEPA/NEPA review coordinator and has reviewed and commented on hundreds of projects through MEPA/NEPA and various regulatory permitting programs.

Mass Audubon's Data and Previous Technical Comments: As the DEIS was being drafted, we offered, and you accepted, unsolicited, our primary research data on:

- Late Summer 2002 Common and Roseate Tern surveys, submitted in November 25, 2003; and
- Spring/early Summer 2003 Common and Roseate Tern surveys submitted in March 2004.

Although not in time for the DEIS, we also submitted our:

- Late Summer 2003 Common and Roseate Tern surveys, which we hope to see included in the next EIS document.

We are submitting for the next EIS our:

- Winter 2003/2004 winter waterfowl surveys (attached to these comments)

We will also be submitting for the next EIS our

- Spring/early Summer 2004 and Late Summer 2004 Common and Roseate Tern surveys.

We would welcome an opportunity to continue working with the Corps in researching and providing additional data for the next EIS document.

Further, on July 16, 2004 Mass Audubon provided you, at your request, with an independent peer review of a preliminary draft of DEIS *Appendix 5.7-H: the Avian Biological Assessment* for the project.

We appreciate the inclusion of our original data in the DEIS, along with our response to the draft Avian Biological Assessment.

Mass Audubon is also an invited participant in a broad-based stakeholder review process sponsored by the Massachusetts Technology Collaborative (MTC). Stakeholders include: environmental groups; proponents; opponents; and federal, state, regional, and local officials.

Mass Audubon is urging state and federal officials to develop, through the MEPA/NEPA process, a comprehensive statewide plan for siting wind energy facilities. The geographic area covered by this planning process should encompass all lands within the state as well as state and federal waters off the Massachusetts coast. We are also calling for the development of state and federal leasing programs for wind energy projects located in offshore waters.

III. State and Federal Planning and Regulatory Framework Needed for Wind Energy Development

State and/or federal measures needed to promote the development of wind energy and manage its effects include:

- Developing planning and siting criteria to guide environmentally sound facility site selection, including state and federal lands and waters;
- Refining regulatory permitting procedures;
- Establishing protocols for pre- and post-construction monitoring;
- Establishing procedures for decommissioning abandoned wind energy facilities; and
- Establishing leasing programs to compensate the public for use of state and federal lands and waters

Since the proposed Cape Wind Project site is located in the federally controlled Outer Continental Shelf (OCS), Mass Audubon continues to urge the US Congress to quickly pass federal planning and leasing legislation for such uses of the OCS. A long-term planning program should serve to better guide offshore renewable energy development while avoiding unacceptable environmental conflicts. A companion leasing and licensing program should ensure a proper public bidding process with commensurate compensation, fees, and resource rent paid to the public for use of public waters. While we do not call for a moratorium on Cape Wind, we urge that any leasing program be applied retroactively to this and any offshore renewable energy projects that may be permitted on the OCS prior to a leasing program becoming law.

IV. Supplemental DEIS/DEIR Needed for the Cape Wind Project

Mass Audubon urges the Corps to require a Supplemental DEIS, as there are some key data gaps and deficiencies in analysis of available data that need to be addressed (see accompanying letter of request). Although the DEIS is 4,000 pages, it is important to look beyond the number of pages and consider the quality of data and analyses employed in reaching key conclusions regarding environmental impacts. Adequate information has not been provided on some key aspects of avian, bat, and marine impacts, as discussed in further detail below. Much of the data that is presented is characterized by insufficient or flawed analysis. Many statements that could be described as assumptions are stated as conclusions consistently favorable to the project. The DEIS should forthrightly state when insufficient information is available to draw conclusions. Additional information should be provided, and the public should be given the opportunity to review and comment on that material through a Supplemental DEIS under the provisions of NEPA prior to your issuance of a FEIS and Record of Decision.

There are few offshore wind farms worldwide, and none of comparable size, from which to gauge the potential impacts of this project on birds and other wildlife. Therefore, Mass Audubon recommends that, should the project be permitted, it be subject to careful and specific permit conditions. We also recommend that detailed protocols be established to monitor the wind farm's environmental impacts, with monitoring starting as soon as feasible while the project is under construction. If the project is constructed and impacts are significantly greater than anticipated, there should be contingency plans in place for further mitigation, including potentially reducing the project scope and/or removing turbines if impacts are excessive and other forms of mitigation are not possible. A comprehensive mitigation package should be provided for the project. An independent scientific expert review panel should be established that would review and evaluate reports produced by consultants whose monitoring would be paid for by a fund established from proceeds of the electricity sales. The panel's findings should be reported directly to the supervising agencies and made available to the public.

V. Specific Comments on the DEIS

The following comments provide an overview of Mass Audubon's technical review of the DEIS and are organized in the same order as the first part of Mass Audubon's technical comments. The technical comments explain in greater detail the basis for these key concerns regarding data gaps and flawed analysis, which should be addressed in a Supplemental DEIS. These comments should be read in concert with technical comments. In addition, this letter provides recommendations regarding project mitigation measures that should be required.

A. Data Gaps in Relation to the DEIS Scope, and Analytical Flaws Requiring Further Analysis

1) Avian

As has been previously made known to you repeatedly over the past four years, Mass Audubon and the US Fish & Wildlife Service (USFWS) have asked that the Corps present a minimum of three (3) years worth of avian information as an important component of the NEPA review.

The Corps' Scope of Work for the DEIS states the following:

> *Data on use throughout the year, especially through November for migratory species, and under a range of conditions should be collected. Data collection methods should include remote sensing through radar and direct observations through aerial reconnaissance and boat-based surveys. Data gathered through radar should be validated with direct observations...Data collection should allow a statistically rigorous analysis of results.*
>
> *Known impacts to birds from former or current Wind Turbine Generators (WTGs) and other tall, lighted structures (such as communications towers) should be thoroughly reviewed in order to identify potential impacts which could result from terrestrial or coastal structures. Issues needing to be addressed include: (1) bird migration, (2) bird flight during storms, foul weather, and/or fog conditions, (3) food availability, (4) predation, and (5) benthic habitat and benthic food sources.*

Data on three groups of birds are needed: terns, winter waterfowl, and migratory songbirds (passerines). A large percentage of the northwest Atlantic (North American) Roseate Tern population passes through Nantucket Sound each year. Both the federal and state governments list roseate Terns as an endangered species. Nearly half of all North American Roseate Terns nest in Buzzards Bay. They spend significant amounts of time feeding in the Sound and staging in the area in preparation for migration. Nantucket Sound holds one of the largest concentrations of waterfowl anywhere on the Atlantic Seaboard; estimates are that a quarter to a half a million birds spend up to half the calendar year there every year. A wide variety of other water and land birds also frequent the Sound at various times of the year. Large numbers of migratory passerines pass over the Sound during spring and fall migrations.

Avian surveys are needed to quantify the extent of diurnal usage throughout the year and in all types of weather conditions. We have also requested that these data be submitted in the applications for any associated permits, licenses and authorizations

Specifically, information is needed to provide a reasonably objective assessment of the avian impacts including potential for:

1. Collision mortality;
2. Disturbance, displacement or exclusion from the project site and/or surrounding areas, including barriers to movement; and
3. Loss of, or damage to, habitat resulting from wind turbines and associated infrastructure and use.

The conservation status of potentially affected species, the magnitude of the potential impacts, the extent, availability and quality of alternative suitable habitat will be considered when evaluating the potential risks associated with the project. Mass Audubon will also weigh the benefits and detriments of this project against the known environmental impacts associated with nonrenewable energy sources.

The table attached to our technical comments (Appendix A) summarizes the avian survey periods that yield data: 1) provided in the DEIS by the applicant; 2) provided by Mass Audubon; and 3) remaining data gaps.

We have identified several avian data and analysis gaps in the DEIS that need to be addressed:

1. Long-tailed Ducks: further data are needed on the location of nocturnal roosting sites in and around the Sound as well as the movement patterns (e.g. flight heights and routes) as they enter and exit these sites. Nighttime winter waterfowl surveys utilizing radar and aerial surveys with infrared equipment should be conducted;
2. Roseate Terns: reanalysis of radar data, as well as additional surveys are needed during April to May and in September when the birds are arriving at and departing from

Nantucket Sound and the proposed project site area, specifically to determine flight heights and directions;
3. Nocturnal passerines: at least one additional year of radar data needs to be collected during spring and fall migrations. Information is needed on annual variation in numbers and timing, and the heights at which they pass over the project site during a variety of weather conditions; and
4. Further assessment of collision risk for birds passing through the project area, utilizing all available data. Given the uncertainty surrounding this analysis, risk should be presented as a range of probabilities.

Considerable data now exist on the presence of birds in the project area in most seasons during daylight hours, in good weather conditions. Available data comes from several sources including studies funded by the applicant, studies independently conducted by Mass Audubon, and data collected prior to the project proposal. Consultants hired by the applicant conducted approximately 47 aerial surveys and 14 boat surveys. Mass Audubon independently conducted 54 aerial surveys and 38 boat surveys, and we are continuing aerial surveys this winter through April 2005. We note in our technical comments some concerns regarding the survey methodologies and data interpretation of the surveys funded by the applicant, including a lack of defined transects in boat surveys, unsupportable conclusions regarding flight heights observed in aerial surveys, and inadequate analysis of the radar data.

There are insufficient data concerning the movements of birds through the area, especially at night and during foul weather conditions, as well as the number of birds, e.g., winter waterfowl, flying through the rotor swept zone in the project area. The collision risk analysis is seriously deficient and should be redone. **The conclusion reached in the DEIS/EIR that the project is likely to cause approximately 364 bird deaths per year due to collisions is not supportable.** By utilizing other bird mortality data provided in the DEIS, Mass Audubon staff scientists arrived at avian mortalities that ranged from 2,300 to 6,600 collision deaths per year. Our estimates are intended to be illustrative of some of the potential alternative approaches that could be applied in estimating collision risk. We do not claim that our results are definitive, and we recognize that a wide range of projections may be derived through application of a variety of methodologies. The Corps should further evaluate the potential range of collision risks.

We also note serious deficiencies in the analysis of radar and other data, and therefore we request significant re-analysis of data be included in the Supplemental EIS that we have requested. Many of our concerns on radar analysis are similar to those expressed by Ian Nisbet, an expert on terns and the use and limitations of avian radar. We are in substantial agreement with the technical flaws he has identified in the DEIS.

<u>Specific Information and Analyses Needed Regarding Avian Populations, Distribution, and Movement</u>

a) Winter Sea Ducks

It is clear from our data that hundreds of thousands of waterfowl use Nantucket Sound as winter habitat, and the project area can at any one time contain tens to hundreds of thousands of ducks. The Corps should provide information and analysis on the movements of winter sea ducks in Nantucket Sound and the proposed project area between November and April, focusing on flight heights of birds during periods of low visibility and poor weather. Nighttime data are also needed to adequately assess risks for the many thousands of Long-tailed Ducks frequently observed from Nantucket at dusk in winter, entering Nantucket Sound from the south.

The Corps should explicitly and simultaneously consider the risk to winter sea ducks of three potential impacts to sea ducks: collision mortality, disturbance, and habitat loss due to displacement.

There are substantial discrepancies in the number of ducks that we observed in our 2003-2004 winter aerial surveys compared to those reported in applicant-funded surveys in the DEIS, Appendix 5.7M (Table 4). The Corps should acknowledge these discrepancies and address the concerns expressed in our technical comments regarding inappropriate pooling of data.

b) Terns

Roseate Terns: Mass Audubon does not concur with the risk assessment for Roseate Terns, due to both inadequate data, and faulty and incomplete analysis of data that are available. See also comments below regarding flaws in analysis of radar data and in collision mortality estimates.

Additional information is needed on heights, times of day, and directional movements of Roseate Terns through Nantucket Sound, particularly during August-September when juveniles are first learning to fly and terns are moving to their staging areas, as well as during April and May when terns are arriving in the area. Additional radar and/or aerial and boat surveys are needed to provide a statistically valid sample size.

As with winter sea ducks, tern densities should accurately reflect periods when terns are actually present in the proposed project area, rather than including times when they are not (e.g., Appendix 5.7-K), which inaccurately lowered density estimates reported in the DEIS. Densities for terns are misleading because terns, unlike rafting waterfowl, are more likely to be moving through the area, to and from South Beach and Monomoy, than resting on the water. Data should also be separated into breeding season and spring/fall migration season estimates.

Further information is needed regarding proposed methods to deter terns from roosting on the Electric Service Platform in terms of effectiveness, risk to birds, and maintenance issues.

Mass Audubon supports the preferred route transmission cable route through Lewis Bay and strongly opposes any attempt to use the secondary alternative, which would involve laying the cable through Popponesset Spit. The spit is a barrier beach partly owned by Mass Audubon. It provides nesting habitat for Piping Plovers and terns. In addition to any construction related bird disturbance, Mass Audubon has serious concerns regarding the destabilization of the barrier beach if a trench were to be dug through it, as well as concerns about the impacts of cable laying on the shallow Popponesset Bay behind the beach.

The cable landfall route through Lewis Bay passes close to the Mass Audubon-owned Egg Island in Lewis Bay. Terns forage over and around this sand bar. Terns and Piping Plovers also nest on beaches within approximately 1,000 feet of the cable-laying route. Mass Audubon participated in the state Energy Facility Siting Board (EFSB) review of the cable portion of the project and submitted extensive technical and legal testimony in that process requesting that construction not take place in the vicinity of Egg Island during the breeding season when terns are present. The DEIS fails to incorporate or address the technical commentary Mass Audubon's expert witnesses submitted during the EFSB review process.

The draft EFSB decision approving the Lewis Bay route requires further consideration of seasonal restrictions on cable laying to avoid impacts to breeding terns and plovers, as well as the aerial photography just prior to construction to avoid impacts to eelgrass. The Corps should summarize the nearshore bird habitat and disturbance issues raised during the EFSB process, and should incorporate associated mitigation requirement into its documents.

c) Migratory Passerines

Tall, lighted structures have been documented to present a collision hazard to many species of migratory birds. Many species of songbirds migrate at night, therefore there needs to be more careful assessment of the potential for aviation warning lights to attract birds and cause mortality due to collisions with the towers or blades.

The Corps should collect an additional year of radar data during spring and fall migration seasons to provide estimates of annual variability in abundance, timing, heights, and behavior of songbird migrants as they pass over the project site during a variety of weather conditions.

d) Radar

There are many deficiencies in the radar analysis in the DEIS. Radar should be reanalyzed to more thoroughly discriminate targets such as bats and terns. The DEIS fails to show that radar data were validated through direct observation as called for in the Corps' scope. The DEIS does not make it clear that a radar "target" is not synonymous with "bird" or "bat." Radar "targets" could be individual or groups of birds or bats.

No targets were recorded below the heights of either deployed radar in either seasonal study (spring: 23 ft; fall: 36 ft), which is inconsistent with Mass Audubon's visual observations and typical seabird behaviors. This needs to be reexamined and explained.

Additional analysis should focus on greater discrimination of targets by flight speed and target density. The radar recorded hundreds of thousands of targets during the sampling periods, and tens of thousands of targets at the height of the rotor swept zone. The Corps should reanalyze May and September 2002 radar data to determine if possible, what percentage of the targets could be Tern species, including Roseate Terns.

e) Collision-risk

The Corps should conduct a more thorough assessment of collision risk for all avian species entering the project area. Such an assessment should utilize the most relevant information from published studies, the data collected by the Corps, and available models. Due to the high degree of uncertainty associated with collision risk in this first large scale offshore project in the U.S. a range of figures should be presented rather than a single number.

The conclusion reached in the DEIS/EIR that the project is likely to cause approximately 364 bird deaths per year due to collisions is not supportable. This number is derived from averaging data from studies of land-based wind farms with no explanation of why these ranges are relevant to the proposal for the largest offshore wind farm in the world, in an area that is perhaps one of the most important areas for birds in North America. The DEIS ignores substantial information from other studies that would project higher mortality rates. Data regarding actual avian use of the project site were presented in the DEIS, but were not utilized in projecting the avian collision risk number for the project. Based on available information included in the DEIS, our scientists calculated alternative estimates of collision mortality ranging conservatively from 2,300 to 6,600 bird mortalities per year. More rigorous analysis of the data gathered to date and additional data are needed to refine the analysis. A sufficiently rigorous review should be presented in a Supplemental EIS. Because of the high degree of uncertainty associated with the collision risk assessment, several different methodologies should be applied and the Corps should present a range of potential collision risks rather than a single number.

The risk assessment from radar data was based only on targets within the rotor swept zone. This assumes that the probability of collisions with monopoles is zero. This is a critical assumption, especially in light of the flight characteristics of waterfowl, which fly fast and have limited maneuverability

2) Sea Turtles and Other Marine Life

The Corps' Scope of Work stated:

Marine mammals and turtles to be addressed include northern right whale, humpback whale, fin whale, harbor seal and grey seal, loggerhead sea turtle, Kemp's Ridley sea turtle and leatherback sea turtle.

Sea turtles: The DEIS contains inadequate analysis of the impact of the proposed project on sea turtles. Because of frequent sightings of sea turtles in Mass Audubon's aerial surveys, it is apparent that turtles utilize Nantucket Sound more than previously supposed. The Corps should seriously reconsider the potential impacts of the proposed wind farm on sea turtles. In addition, the DEIS should include a synopsis of green sea turtles. This species does occur in the area.

If the monopoles develop a "fouling community" that attracts turtles, the risk of collision with maintenance vessels will increase unless strict rules are implemented to slow these vessels, and potential increased collision risk with boats in major shipping channels also needs to be evaluated.

Noise Impacts: The Corp describes construction related noise decibel levels of 180 at 1220 meters, but does not characterize the acoustic environment at a distance less than this. The Corps should provide a graphic illustrating the relationship between decibel levels and distance from the construction zone. The Corps should further evaluate the potential noise impacts to marine life including sea turtles and marine mammals.

We are not convinced that a "soft start" will be effective in avoiding acoustic impact. The DEIS does not analyze whether and how sensitive organisms will leave the area after a "soft start," or how long it will take various types of animals to move out of the area if they are motivated to do so by the "soft start" noise. Neither is it clear how this process would be monitored or enforced. The Corps should provide further details, and establish a specific protocol that will be followed during construction.

Eelgrass: The DEIS states that the submarine cable will pass within 21 meters of an eelgrass bed in Lewis Bay. We ask the Corps to be more specific about the effects of the sediment plume on eelgrass in Lewis Bay. The basis and justification should be provided for the statement that there would be no impacts on the eelgrass bed within 21meters of the jet plow.

3) Bats

The DEIS does not adequately evaluate potential risks to bats, particularly Red Bats, which are strong fliers that may migrate across large areas of water such as the Sound. The Corps should reanalyze radar data from May and September 2002 to determine if bats can be distinguished from other "targets" in order to provide information on the use of Nantucket Sound as a flyway by migratory bats. In the absence of such information, no conclusions on the risk posed by this project to migratory bats can be made.

B. Inadequate Synthesis of Information in the DEIS

The Scope of Work for the DEIS states the following:

> *The EIS will attempt to comprehensively address the interconnections between the benthic, fisheries and avian resources. The predator-prey interactions are*

important considerations in fully understanding the potential impacts in siting a project within Nantucket Sound.

The DEIS fails to do this. The Corps should provide a holistic or ecosystem level summary of environmental impacts of the project on the Sound's marine life and habitats. Because the major avian resources in Nantucket Sound, terns and waterfowl, rely on fish and shellfish as their food supply and in the case of terns, to feed their young, significant alterations or impacts to the benthic community could shift distributions of these species. The Corps should summarize the overall risks and benefits of the project on living resources in the Sound. For example, the relative magnitude of probable avian collision risks and overall habitat impacts could be synthesized and compared to the greenhouse gas and habitat impacts of production of an equivalent amount of energy from Cape Wind versus conventional sources. The EIS should clearly state all assumptions and uncertainties inherent in the overall project impact versus benefit evaluation.

C. Monitoring

As a condition of any construction permit, the Corps should require the development and implementation of a detailed construction and post-construction monitoring protocol to assess the impact of the wind farm on birds, bats, benthic communities, fish, turtles, and marine mammals. The monitoring program should assess the overall ecological impact of the project. Studies should be designed to address specific questions, such as the extent to which shifts in avian distribution following construction of the project due to avoidance, versus shifts in food supply.

Studies should include radar monitoring from the Electric Service Platform to monitor construction and post-construction impacts on avian life of Nantucket Sound for all seasons. The radar facility should be installed and monitoring should commence as soon as the platform is constructed. Such radar data should be collected, analyzed, and disseminated to permitting agencies and the public at the expense of the applicant. Bird collisions should be documented with available technology such as infrared cameras with digital recording triggered by a collision impact. This monitoring is especially critical given the lack of information on the impact of large offshore wind farms on birds. Monitoring should commence as early as possible in the construction process, and should be continued for at least three years following construction (See additional post construction monitoring recommendations in technical comments).

D. Lease Payments and Decommissioning

The project should be retroactively subject to any lease-sale payments and decommissioning requirements as may be adopted by the Congress. Regardless of whether or not such legislation is passed, the Corps should require specific decommissioning protocols and bond funding assurances.

E. Mitigation for Environmental Impacts

More robust plans for mitigation are needed, especially in regard to avian impacts. In most cases, what is described as mitigation is a preventive measure and not mitigation. Mass Audubon recommends that the following items be included in the project mitigation package.

1. Establish a fund for the acquisition and management of coastal waterbird habitat in and around Nantucket Sound (e.g. tern and Piping Plover nesting sites).

2. Establish and fund a sea turtle stranding recovery program for Nantucket Sound.

3. Significant adverse environmental impact to avian and or marine life shall be subject to Natural Resource Damage Assessments of relevant federal statutes and regulations.

If the post-construction monitoring shows impacts significantly greater than predicted, additional mitigation should be required.

Conclusion:

Mass Audubon requests that the Corps produce a Supplemental DEIS addressing key data gaps and analytical flaws, and that our other comments be addressed in detail in the Final EIS. Thank you again for the opportunity to submit comments on the Cape Wind Energy Project.

Sincerely,

Laura A. Johnson
President

Attachments: Technical Comments with Appendix A
Winter 2003/2004 winter waterfowl surveys

cc: Governor Mitt Romney
Massachusetts Congressional Delegation
Cape and Islands Legislative Delegation
Senator Pam Resor, co-chair Environment, Natural Resources and Ag. Committee
Rep. Frank Smizik, co-chair Environment, Natural Resources and Ag. Committee
Michael Bartlett, Regional Director, U.S. Fish & Wildlife Service
Tom French, Massachusetts Division of Fisheries & Wildlife
Susan Snow-Cotter, Acting Director, Coastal Zone Management
Jim Gordon, President, Cape Wind
Greg Watson, Massachusetts Technology Collaborative
Phillip Warburg, President, Conservation Law Foundation
Susan Nickerson, Executive Director, Alliance to Protect Nantucket Sound

Mass Audubon
Protecting the Nature of Massachusetts

Appendix A
Avian Data Summary

Avian Risk Category	Status of 3-year recommendation for avian studies	Mass Audubon provided studies	Mass Audubon will provide	Date of aerial and boat surveys conducted by Applicant (not sorted in DEIS by risk category)
Roseate Terns Staging Period (Aug. – Sept.)	Yes, combination of Mass Audubon and applicant data	2002[1] 2003[1]	2004[1] study in Mar. 2005	• March 17 – April 18, 2002 • May 1 – August 30, 2002 • September 25, 2002 – February 21, 2003 • March 19 – June 2, 2003 • June 16 – August 29, 2003 • September 15 – February 27, 2004
Roseate Terns – Nesting Season (May – July)	Not met yet. Will be met by Mass Audubon	2003[1]	2004[1] study in Mar. 2005	
Winter Sea Ducks (Dec. – Mar.)	• Not met yet. Will be met with combination of Mass Audubon and applicant data • Daytime surveys only; need to be supplemented with nighttime surveys.	Winter 2003-2004[2] (to be submitted with Mass Audubon comments on the DEIS)	Winter 2004 – 2005[2] study in May 2005	
Migratory Passerines	No, and no indication the applicant will meet this standard	None[3]	None[3]	Radar studies May 2002 September 2002

[1] Funded by the Massachusetts Technology Collaborative and the Island Foundation
[2] Funded by the Island Foundation and Foundation M
[3] No funding available

Mass Audubon Technical Comments on DEIS, Cape Wind Project
February 23, 2005

Mass Audubon engaged in a detailed technical review of sections of the DEIS related to avian issues. This technical analysis was utilized in preparing Mass Audubon's comment letter. It is appended to the letter and the two documents should be read in concert, as both are official parts of Mass Audubon's comments on the DEIS.

Sections of DEIS Reviewed in Detail

Our technical comments pertain to the following sections of the DEIS that have been reviewed by Mass Audubon staff.

Sections 5.1 through 5.8 and associated appendices.

Qualifications of Mass Audubon technical reviewers:

All of these individuals have participated in the avian surveys of Nantucket Sound that Mass Audubon has been conducting since 2002.

Dr. Taber Allison is the Vice President for Conservation Science and Ecological Management. Dr. Allison received his Ph. D. in Ecology in 1987 from the University of Minnesota. Dr. Allison is the project manager for Mass Audubon's avian surveys in Nantucket Sound.

Dr. Robert Buchsbaum is the Southeast and Islands Regional Conservation Scientist. He received his Ph.D. in Marine Ecology in 1985 from the Boston University Marine Program. Dr. Buchsbaum's research career has included studies of salt marshes, eelgrass meadows, marine invertebrates, and estuarine fish.

Ellen Jedrey is the Assistant Director of the Coastal Waterbird Program. She is currently working on her master's in Cognitive and Behavioral Ecology at Memorial University, Newfoundland, Canada, and she has worked with coastal shorebirds and seabirds since 2000 including study of Piping Plovers and terns on Monomoy National Wildlife Refuge.

Andrea Jones is Director of the Coastal Waterbird Program. From 1993 - 2000, she coordinated the Grassland Conservation Program. Andrea has a Masters of Sciences degree in Wildlife Conservation from the University of Massachusetts. Most recently, Andrea has been managing native grassland restoration projects on several Massachusetts Audubon sanctuaries and co-coordinating the Massachusetts Important Bird Areas Program.

Simon Perkins is Senior Field Ornithologist. Simon is a New England Regional Editor for North American Birds magazine, is a founding member of the Massachusetts Avian Records Committee, and leads international bird watching tours for Mass Audubon. Simon designed and implemented bird census methodology and bird checklists for Mass Audubon's sanctuary system. Simon has extensive experience in conducting bird surveys, particularly for seabirds and waterfowl along the Massachusetts coastline and offshore.

Robert Prescott has been the Director of Massachusetts Audubon's Wellfleet Bay Wildlife Sanctuary for over 20 years. He organized and manages a major sea turtle stranding rescue network that contributes to scientific understanding of sea turtles and their distribution. He was appointed the southern Massachusetts Sea Turtle Stranding Coordinator by the National Marine Fisheries Service. He is very familiar with the marine life of Cape Cod and is particularly acknowledged as an expert on sea turtles.

Giancarlo Sadoti is Bird Conservation Assistant and has been the technical coordinator of the Nantucket Sound Avian Surveys since November 2004. Giancarlo also is the technical manager for the Massachusetts Important Bird Areas Program. He has extensive experience with database and GIS analysis and participated in dozens of aerial and boat surveys of Nantucket Sound. Prior to coming to Mass Audubon, Giancarlo conducted research on Black Hawks.

Summary Comment and Request for Additional Information

The DEIS contains a wealth of information that unfortunately is characterized by insufficient or flawed analysis. In key areas relevant data are lacking. Many statements that could best be described as assumptions are stated as conclusions consistently favorable to the project. The DEIS should forthrightly state when insufficient information is available to draw firm conclusions.

In reviewing a document of this length, Mass Audubon has chosen to focus our comments in Part 1 of this technical commentary on key data and analysis gaps that should be addressed by the Corps in order to provide an accurate risk assessment before a permitting decision is made. We highlight further specific examples of flawed reasoning, faulty analysis, or inappropriate certainty in Part 2. We do not attempt to comprehensively identify every specific point within the document that may need refinement or revision.

PART 1. PRIMARY DATA GAPS, ANALYTICAL CONCERNS, SYNTHESIS, AND MONITORING

A. Data Gaps and Analytical Issues

1) Avian Species

The Scope of Work for the DEIS states the following:

Data on use throughout the year, especially through November for migratory species, and under a range of conditions should be collected. Data collection methods should include remote sensing through radar and direct observations through aerial reconnaissance and boat-based surveys. Data gathered through radar should be validated with direct observations. The survey schedule is being coordinated with United States Fish and Wildlife Service (FWS). Data collection should allow a statistically rigorous analysis of results.

Known impacts to birds from former or current Wind Turbine Generators (WTGs) and other tall, lighted structures (such as communications towers) should be thoroughly reviewed in order to identify potential impacts which could result from terrestrial or coastal structures. Issues needing to be addressed include: (1) bird migration, (2) bird flight during storms, foul weather, and/or fog conditions, (3) food availability, (4) predation, and (5) benthic habitat and benthic food sources.

The attached table (Appendix A) outlines the avian survey time periods that yield data provided in the DEIS and data provided by Mass Audubon. During this period, the applicant's consultants conducted 47 aerial surveys and 14 boat surveys. This list of surveys does not include the preliminary aerial surveys conducted in 2001 and the 13 days of "ground-truthing" boat surveys conducted in 2002.

In addition to the surveys funded by the applicant, Mass Audubon has conducted surveys between August and September of 2002; May and September 2003; December 2003 and early April 2004; and late April and September 2004 for a total of 54 aerial surveys and 38 boat surveys. Mass Audubon characterized and separated surveys into 3 time periods to secure data on terns and waterfowl: 1) pre-migratory tern "staging period" August – September; 2) tern breeding season May – July, and 3) winter sea duck period December – April. Mass Audubon has provided three completed, peer-reviewed reports to the Corps, of which two are included in the DEIS. Mass Audubon submits, attached to these comments, the report for the 2003-2004 winter sea duck period. We will also submit reports for the 2004 tern nesting and pre-migratory staging period after completion of peer review. Mass Audubon is continuing its aerial surveys of Nantucket Sound during the winter sea duck season of November 2004 through April 2005.

Together, the applicant's and Mass Audubon's data sources provide a wealth of information on the distribution, relative abundance, and use of Nantucket Sound by focal species, including terns and winter sea ducks, primarily during conditions of good weather and visibility. We have identified key data gaps in 1) nighttime activities of winter sea ducks; 2) tern activity during the spring pre-breeding period and fall staging period; and 3) behavior of all birds during periods of poor visibility.

The DEIS also provides two months of radar data from May and September 2002. The radar studies fall short of that recommended by Mass Audubon and the USFWS. We recommend that at least one full year of additional radar data be gathered during spring and fall migrations. Our comments presented below reflect our analysis of all of the reports provided in the DEIS and the studies by Mass Audubon.

a) Winter Sea Ducks

The Corps should provide information and analysis on the movements of winter sea ducks in Nantucket Sound and the project area between November and April, focusing especially on flight heights of birds during periods of low visibility. Particular emphasis should be placed on the distribution and behavior of Long-tailed Ducks at night within the project area.

The data provided in the DEIS and by Mass Audubon provide useful information on the distribution and relative abundance of wintering sea ducks in Nantucket Sound. These data show thousands of ducks within the project area, indicating that the benthic environment of Horseshoe Shoal provides important food resources for waterfowl. Notably underrepresented in these daytime aerial surveys flown under optimal conditions of visibility is the Long-tailed Duck, which is perhaps the most abundant duck in Nantucket Sound. Long-tailed Ducks conduct daily flights, exiting the Sound at dawn and returning to the Sound at dusk. Numbers of this species are estimated in the 100,000's. It is important to determine the nighttime roosting locations of these ducks and to determine their flight behavior as they leave and return to their roosts.

In general, there is no information on the flight behavior of winter ducks at night or during periods of low visibility. Radar is the best means to gather such data (see below). The presence of boats disturbs the birds and data collected during boat surveys may not be indicative of typical flight behavior and movements of birds in the absence of such disturbance. Nighttime flights in aircraft fitted with infrared imaging equipment could provide data on the distribution of Long-tailed Ducks, although this technology is not well tested on ducks and will not provide data on duck movements.

Ultimately, the Corps should explicitly and simultaneously consider the risk to winter sea ducks from three types of impacts to sea ducks: collision mortality, disturbance, and habitat loss due to displacement. The first two will depend on movement and behavior of birds that fly through or remain in the project area after construction. Such data are not currently available for this project. Post-construction monitoring of wind farms in Europe, e.g., Horns Rev, suggests that ducks avoid wind farms, i.e., they fly around them, or that they are displaced to other areas. (Although at Horns Rev and other sites, these conclusions are based on only one year of post-construction surveys.) These two responses could reduce the risk of collision mortality, but could lead to other potential impacts – the loss of habitat and access to important foraging areas and increased flight time due to avoidance and/or disturbance behavior. Data on the distribution of winter sea ducks that are provided in the DEIS and Mass Audubon data suggest that Horseshoe Shoal is an important feeding area for ducks. The Corps should consider the potential consequences of the loss of feeding habitat to the long-term dynamics of sea ducks that utilize the Shoal for winter foraging habitat.

We also note substantial discrepancies in the number of ducks that we observed in our 2003-2004 winter aerial surveys when compared to those reported in the DEIS,

Appendix 5.7M (Table 4). For example, although the survey grids of the applicant and Mass Audubon were nearly identical, the applicant's consultants reported a total of 42,632 Common Eiders in 12 aerial surveys between September 2003 and February 2004 (a result presented with unwarranted precision) as opposed to the approximately 280,000 Common Eiders that we recorded in 13 aerial surveys between December 5, 2003 and April 8, 2004 – an average of approximately 22,000 Common Eiders per survey.

This difference may be due in part to the differences in survey period between the applicant and Mass Audubon. By beginning surveys in the fall before most sea ducks have arrived, and then pooling those results with winter surveys, the DEIS provides a dramatic underestimate of the number of ducks in the Sound and that can be found in the project area. The DEIS's inappropriate pooling of data across seasons leads to an underestimate of wintering sea ducks. Further, the DEIS extrapolates from survey counts to total numbers of ducks within the Sound and the project area. This extrapolation is invalid because of the non-random nature of the sampling design. The averages reported are meaningless because the error estimates generated from non-randomly collected data are only valid if the ducks are randomly distributed across the study area. This is unlikely to be the case; we expect that there is substantial spatial autocorrelation in duck observations. The data presented in these surveys can only be represented as relative abundance.

By our own estimates, our highest survey count of more than 50,000 Common Eiders on January 22, 2004 accounted for approximately 3% of the total estimated North American population of this species (Bellerose 1976). The area encompassed by our survey grid comprised 5% of Nantucket Sound. It is clear from our data that 100,000's of ducks use Nantucket Sound as winter habitat, and the project area can at any one time contain thousands of ducks.

b) Roseate Terns and Piping Plovers

The Corps should reanalyze May and September 2002 radar data to determine if possible, what percentage of the targets could be tern species, including Roseate Terns. Further studies are needed to accurately determine the movement of terns during the summer breeding season, especially during the period when juveniles first learn to fly and when terns begin to move to their staging areas (primarily at South Beach and Monomoy in Chatham).

Data in the DEIS and data collected by Mass Audubon show substantially fewer sightings of terns in the project area than other parts of Nantucket Sound, especially areas along the southern coast of Massachusetts and the western shore of Monomoy. From this information, the DEIS concludes that the risk to Roseate Terns is minimal and not likely to affect the species or the attainment of the goal of the USFWS Roseate Tern Recovery Plan. This conclusion may be correct, but it is based on an absence of sufficient and detailed analysis of the radar data collected in May and September 2002. The radar recorded 100,000's of targets during these sampling periods, and 10,000's of targets at the height of the rotor swept zone. The DEIS does not attempt to determine what percentage of these targets could be terns, and in turn, could be Roseate Terns. Instead the DEIS dismisses the utility of the radar data in Appendix 5.7-H, p. 22 para. 3 "The radar data could not be used to distinguish terns from other birds." Additional analysis should focus on greater discrimination of targets by flight speed and target density. Although we agree that specific identification of terns is unrealistic, the Corps, with the support of expert consultants, should attempt to estimate what percentage of the 10,000's of targets that fly through the rotor swept zone during the periods of the highest tern activity could be terns.

Additional information needs to be sought to ascertain directional movements of Roseate Terns through Nantucket Sound, particularly during the August-September pre-migratory staging period. While the largest numbers of terns were sighted near the south Cape and South Beach/Monomoy area, this is to be expected given the size of the Common Tern breeding colony here, and because the area is known as a point of departure for migration to areas South. Densities for terns are also misleading because terns, as opposed to sea ducks, are more likely to be moving through the area than resting on the water. Thus, densities are based on the chance of observing moving terns, which is low, rather than the higher likelihood of seeing more stationary sea ducks. The chance of encountering terns moving towards Monomoy from Buzzards Bay and then leaving Monomoy for South America is slim given the sample size. To gain more information, radar would provide the most comprehensive information. Otherwise, aerial and boat surveys would have to be increased dramatically to increase the probability of providing a statistically valid sample of moving terns.

Mass Audubon agrees that, most of the time, terns forage at low heights, below the rotor zone. Terns, however, may be more likely to come into contact with obstacles such as wind turbines during migration, at night, and during periods of bad weather.

USFWS staff at Monomoy have observed the entire colony of Common Terns, prior to incubation, departing in the evening from land and returning early in the morning but little is known about where they are going. This "nocturnal abandonment" was not a behavioral response to predators. Knowledge of movement of these terns during this period at night is essential.

As with winter sea ducks, tern densities need to accurately reflect periods when terns are actually present in the area, rather than including times when they are not, which inaccurately lowers density estimates. Data should also be separated into breeding season and migration season estimates.

DEIS reliance primarily on a study from 1990-1991 of Roseate Terns foraging near Bird Island is inappropriate. These data are 15-years old and do not address the possibility that feeding flocks may shift with availability of food resources. The surveys did not include Horseshoe Shoal or all of Nantucket Sound to determine how far from Bird Island their foraging trips might extend. This study was also conducted during the breeding season and not the migration periods when terns are more likely to be flying through or using Nantucket Sound. In addition, some breeding areas have changed substantially since this study; at present the majority of the population in Massachusetts breeds on Bird and Ram Islands in Buzzards Bay whereas in the early 1990's, Penikese Island (in the Elizabeth Islands chain) contained a large breeding colony which was subsequently abandoned (except for a small amount of recolonization during the 2003 Buzzards Bay oil spill).

Observations at daytime loafing areas should be explained in further detail rather than just mentioning two places observed (Waquoit Bay and Fernando's Fetch). Mass Audubon's studies of terns in August-September have suggested shifts in large groups of staging terns in Chatham, likely based on shifts in food availability. Staff at Mass Audubon's Coastal Waterbird Program have routinely observed Roseate Terns loafing at other sites along the south Cape and other areas during August (for example, Popponesset Spit, Mashpee; Gray's Beach, Yarmouth; Plymouth Long Beach, Plymouth; North Beach, Chatham). While these numbers are small, they suggest that terns utilize a large number of areas before staging in Chatham at South Beach/Monomoy.

The DEIS fails to address potential impacts to terns from construction activities involving the burying of cables in Lewis Bay near Egg Island, an area where tern are known to forage during the breeding season. Section 5.7.3.3 of the DEIS states that the landfall area for the cable is not used by birds for nesting or foraging. This is incorrect, as terns do forage in Lewis Bay and there are tern and piping plover nesting sites within approximately 1,000 feet of the cable route. Mass Audubon participated in the Energy Facility Siting Board review of the cable portion of the project and submitted comments in that process requesting that construction not take place in the vicinity of Egg Island during the breeding season when terns are present. The DEIS fails to incorporate or address the technical commentary Mass Audubon's expert witnesses submitted during the EFSB review process.

While the DEIS acknowledges risk to terns on the Electric Service Platform, it suggests methods to bird proof the platform. We suggest that known methods to deter terns from roosting on the platforms be evaluated for effectiveness, risk to birds, and maintenance issues. Specific measures should be evaluated by the USFWS and MassWildlife as well as the Corps prior to permitting rather than merely "investigated" as mentioned in the DEIS.

Tern disturbance and displacement caused by the presence of wind turbines have not been adequately addressed in the DEIS. If it is because of the lack of available studies, the DEIS should state this, rather than dismissing the issue by mentioning studies with limited applicability to the Cape Wind project.

Piping Plovers are considered at less risk for collision with the wind turbines because they are less likely to be using the Sound except during migration (although no one knows exactly how and at what height they migrate). We are therefore puzzled that the collision estimates in Section 4.2.5.2 of Appendix 5-H are higher for Piping Plovers than for Roseate Terns. This gives us little confidence in these numbers.

c) Migratory Passerines

The Corps should collect an additional year of radar data during the spring and fall migration seasons to provide an estimate of annual variability in abundance, timing, and behavior of songbird migrants.

As we stated in our comments during the Scoping Phase, the Corps should have required a minimum of three years of data on avian use of the Sound, including migratory songbirds. The DEIS provides samples for only two months in 2002. By missing substantial portions of the migration and by only sampling one year, the DEIS does not present an estimate of variability for a mass movement involving 100,000's of birds. At least one more year of data is needed. Radar studies should be conducted from mid April to late May and from the beginning of September to at least late October to adequately cover the spring and fall migration seasons. We discuss our concerns with the analysis of the radar data below.

d) Radar

As described previously, radar should be reanalyzed to more thoroughly discriminate targets such as bats and terns. While we are not experts in the use of Mobile Avian Radar Systems (MARS) and cannot comment in detail on the validity of the analysis of radar data, we have consulted with experts who are familiar with such analysis. We do note that the Scoping Requirements state "*Data gathered through radar should be validated with direct observations.*" The DEIS states that 13 boat surveys were conducted in May and September of 2002 to ground-truth radar data collected during this period, but we were unable to find any explanation in the DEIS about how these boat surveys were used to validate the radar data. Thus, the DEIS fails to meet the requirements of the Corps, and the value of the radar data are compromised.

We requested the raw radar data (email to applicant on January 25, 2005), but never received this information. We recommend that the Corps make this information available to interested parties on request.

We note that a radar "target" is not synonymous with "bird" or "bat" and these definitions are frequently conflated in the DEIS. Radar "targets" could be one or more birds or bats.

Radar records of "fast" versus "slow" birds pertain to ground speeds, and are meaningless unless they are correlated with local wind velocity. Because these critical correlations were not made at the time, the flight speed values are useless. For this same reason, flight-direction data are also highly suspect. Radar data should be reevaluated incorporating wind velocity.

The risk assessment from radar data was based only on targets within the rotor swept zone. This assumes that the probability of collisions with monopoles is zero. This is a critical assumption, especially in light of the flight characteristics of waterfowl: they fly fast and have limited maneuverability. Lighting is an important component of collision mortality in birds, but, until emerging scientific methods and technologies more clearly elucidate the circumstances under which birds and bats collide with tall structures, we cannot assume unlighted structures, or the unlit portions of lit structures (such as the monopoles below the rotor swept zone) pose zero risk to birds.

No targets were recorded below the heights of either deployed radar in either seasonal study (spring: 23 ft; fall: 36 ft). The radar beam was angled slightly downward such that it reached the water surface at some distance out from the radar (188 feet from barge in spring and 295 feet from bluff in fall). The DEIS fails to provide any explanation why lower flight heights were not recorded at greater distances from the radar, when they should have been expected. Virtually all waterfowl and terns remain at or near the sea surface when moving around the Sound. Unless it is assumed that monopoles pose zero probability of collision risk, this type of analysis is incomplete without knowing the number of targets near the sea surface.

1,052,761 targets were observed by TracScan (horizontal): 38% in spring; 62% in fall. 491,306 targets were observed by VerCat (vertical): 31% in spring; 69% in fall. Twenty six percent of all observations (127,697) were within the rotor swept zone. More than 371,000 of 412,418 (90%) of birds recorded during boat and aerial surveys in 2002-2004 were said to be below 23 feet. This suggests that many more birds were present within the study area than were detected by radar, and these individuals should be accounted for when deriving risk values.

e) Collision-risk

The Corps should conduct a valid assessment of collision risk for all avian species entering the project area. Such an assessment should utilize the most relevant information from published studies, the data collected by the Corps, and available models. Collision risk should be described as a range of probabilities rather than a single number.

A widely publicized number of 364 birds per year estimated to die from collision with the project's 130 wind turbines has been used in the DEIS to demonstrate the low risk to birds from the construction of the wind farm. (It is interesting to note that this figure was not included in the executive summary on which initial news stories were based.) This estimate relies on the data provided in a review of 12 onshore wind farms by Erikson et al. (2001, cited in DEIS) that yielded a mortality range of 0 to 2.8 birds/turbine/yr. As we discuss below, this is one of the more glaring examples of the DEIS's inappropriate use of information for estimating risk associated with this project.

The DEIS provides a reasonably detailed discussion of the many factors that influence collision risk of birds with wind turbines including a review of estimated collision mortality from studies in the United States and Europe from both upland and nearshore wind farms. It also includes a description of results from radar data that the DEIS concludes results in more than 600,000 birds flying through the rotor swept zone (an estimate, which we believe is flawed). The DEIS then uses a set of numbers to calculate collision mortality, without establishing the relevance of these numbers. We strongly disagree with the DEIS conclusion that these numbers represent a conservative estimate of the risk.

Alternative published data that are provided in the DEIS or that were available to the Corps at the time the DEIS was being drafted yield a very different estimate of risk. For example, on page 5-129, the DEIS cites a review by Winkelman (1995) of a nearshore wind farm in the Netherlands that indicates a substantially higher mortality of birds ranging from approximately 1,900 to 6,600 birds per year when extrapolating from the number of turbines proposed for the Cape Wind project (e.g., 0.04 – 0.14 birds per turbine per day * 365 * 13). We quote the DEIS (5-7, page 5-129) "Turbines located in low-lying areas in the Netherlands adjacent to the Wadden Sea experience a greater number of fatalities than turbines on uplands (Winkelman, 1995). Large numbers of migrants, including waterfowl, shorebirds, and some songbirds are thought to use these areas during migrations and also with low altitude flights among feeding locations." The similarity in avifauna between this site in the Netherlands and the Cape Wind project would suggest that these collision mortalities numbers are more relevant than the numbers quoted from Erikson (2001), but the DEIS never explains why these numbers were rejected for calculating collision mortality.

The DEIS references, with little detail, a study in Belgium that yields much higher mortality rates and rejects those numbers because the studied wind farms are not representative of the proposed Horseshoe Shoal project. This study by Everaert (2004) is one of the few studies that relate collision mortality with avian activity; from these estimates the author provides collision risk mortalities. This study reported an estimated average collision mortality of 18-35 birds per turbine per day for the different nearshore wind farms that were studied. Using the ranges reported in Everaert's study the estimated bird mortality for the Cape Wind Project ranges from 2,300 – 4,600 birds per year.

We provide the following example of a calculation of collision mortality that we feel the DEIS should provide, i.e., the example is intended to be illustrative not definitive.

We calculated estimated monthly collision mortalities for Roseate Terns in the proposed project area for the period beginning in May and ending in early September 2003 and 2004, the months that approximately correspond to the period when terns are present in the project area and Nantucket Sound. These figures were calculated using our tern sightings collected during our boat and plane surveys on Horseshoe Shoal and Nantucket Sound in 2003 and 2004, and they are summarized in Table 1.

The Biological Assessment (BA) of the Roseate Tern (Appendix 5.7-H) estimated a collision mortality of 0.0002 to 0.5 Roseate Terns per year. The BA applied a collision probability derived from Everaert (2004) for Common Terns of 1 in 600 terns passing at rotor height. The BA in the DEIS reduced this probability by multiplying the risk by fractions that reflected the authors' assessment of the effects of differences in turbine density, turbine height, turbine spacing, and degree of colony remoteness when comparing the Cape Wind Project to the wind farms in Belgium. The degree of discounting cannot be any more than a guess, although some of the variables are reasonable factors to discount, such as the effect of differences in activity due to the greater distance from a colony. It is not clear why the authors discounted for reduced activity at night when in the previous paragraph they state "these collisions could have occurred at any time, day or night, and in diverse weather conditions."

Our calculations are based on the assumption that it is the number of transits across the project area during the late Spring and Summer that is the key variable for assessing risk, not density of birds in the project area per se. This is primarily because terns rarely rested in the project area, but were generally seen flying through or foraging. To calculate transits, we first calculated the mean density of terns in the project area in a particular month by the average of the number of terns seen per survey in that month. We multiplied this density estimate by the size of the project area (110 km^2). We then made our most important assumption by estimating the number of transits by terns across the project area. Following Ian Nisbet, we estimated that a tern would transit the project area in 10 to 15 minutes, i.e., a tern is replaced by another tern every 10-15 minutes or approximately 4.8 times per hour. Thus, we multiplied our estimate of the total number of terns in the project area by 4.8 and then multiplied the product by the day length of 14 hours. We multiplied the result by the number of days per month and multiplied that result, the total number of transits per month, by the collision probability of one in 3,000. The results of all of these calculations are presented in Table 1. Estimates of Common Tern mortality can be calculated by multiplying the results for Roseate Tern by 3.167 or 0.76/0.24.

Because we based estimates of tern activity on our boat and plane surveys we did not discount for differences in density between Belgium and Horseshoe Shoal. We also used the collision probability from Everaert (2004) based on terns passing at all heights. So, in these calculations the greater height of the Cape Wind turbines is irrelevant. The effect of the other factors is not known, although the greater distance to nesting colonies and loafing areas in Nantucket Sound may indeed reduce risk. Rather than guessing on the magnitude of this reduction, we report our estimates without discounting. Neither do we provide a range of mortalities for each month, which are based on average densities of a variance that can be calculated.[1]

In performing these calculations we made several key assumptions that would need to be tested and these include 1) we estimated the number of tern transits per hour, i.e., turnover rate, of 4.8 terns per hour. This estimate was based on the rate at which terns fly and the average width of the project area; 2) we combined tern density estimates obtained by boat and plane surveys. We chose to use these different sources of information because we had a greater number of each type of survey in different survey

[1] The mean number of all terns per boat survey in Horseshoe Shoal in May of 2004 is 58.6 with a standard error of the mean (SE) of 21.0. Assuming a 95% confidence interval (CI) is approximately ±2 SE, the number of all terns in May 2004 on Horseshoe Shoal ranges between 16.6 and 100.6 with 95% confidence. If one plugs these values into our risk equation, the 95 % CI of Roseate Terns predicted to be killed in May 2004 by colliding with the 130 turbines on Horseshoe Shoal is between 4.7 and 28.6 birds. These calculations can be repeated for each estimate.

periods – boat surveys in Late Spring and early Summer and plane surveys in Late Summer. The area coverage of Horseshoe Shoal differed by the survey type. Boat surveys covered 64.5 km^2 and plane surveys covered 8.4 km^2. Each survey method has its own source of error regarding detectability of birds; 3) we utilized the collision probability of 1 in 3000 as cited in Everaert (2004), which the DEIS discounts in Appendix 5.7-H. We agree that this rate is probably an overestimate of the risk, but the effect of varying this risk on mortality figures can easily be calculated with the data provided in Table 1; 4) we used 24% for the percentage of all tern sightings that were Roseate Terns. Varying this percentage only influences the assessment of risk to Roseate Terns, and does not influence the assessment of risk to all terns. We do believe these estimates are closer to the worst-case scenario for tern mortality than that provided in the Biological Assessment by the applicant. By way of comparison, the DEIS cites an estimate of 364 birds of all species per year as their only estimate for collision mortality. By our estimates, the average number of Common and Roseate Terns alone that could be killed based on the period between May 1 and September 24 in 2004 is approximately 137.

Estimates of collision mortality at wind farms are fraught with enormous uncertainty, especially as it appears that location of the wind farm is the most important variable effecting risk to birds. Transferring results from one wind farm to another should be done cautiously. Mortality estimates from comparable offshore wind farms are few and based on limited observation. Mortality estimates are themselves estimates often based on correction factors of unknown accuracy applied to known mortalities based on searches of "plots" surrounding the turbines. Given this lack of certainty it is important to apply all best available methods and acknowledge that the actual risk lies somewhere within a broad range of predictions.

The DEIS ignores this uncertainty and its own data to produce the lowest estimate of collision mortality. The estimate of 364 birds per year has no connection to the specifics of the Horseshoe Shoal project area. The applicant spent a substantial amount of money to collect data on the avian use of Nantucket Sound and the project area. This data should be utilized to undertake further analysis of collision mortality risk.

As we described above, our results are intended to be illustrative of the kind of calculations that the Corps should conduct in the Supplemental DEIS – using data collected from avian surveys of the Sound to produce statistically valid estimates of collision mortality for all birds based on clearly described and defended assumptions. Given the uncertainty surrounding collision mortality figures, the Corps should report the results of these calculations as a range of collision probabilities. We note again that key data are missing, including sufficient data on flight height of sea ducks during the winter months.

Finally, the DEIS presents mortality estimates from other human-made structures, such as buildings, cars, and hunting to suggest that the additional mortality from the wind farm is inconsequential. Such comparisons are meaningless for the following reasons: First, as described above the mortality from wind turbines may be much higher than is estimated in the DEIS. Second, the mortality is cumulative. High avian mortality due to other sources is no justification for the acceptance of additional mortality from wind turbines.

2) Sea Turtles and Marine Mammals

From the Scope of Work:

Marine mammals and turtles to be addressed include northern right whale, humpback whale, fin whale, harbor seal and grey seal, loggerhead sea turtle, Kemp's Ridley sea turtle and leatherback sea turtle.

The proponents should reconsider the potential impacts of the proposed wind farm on sea turtles. The DEIS (e.g., Appendix 5.5A) refers to turtles as rare in Nantucket Sound and the project area. During late summer aerial surveys for terns between 2002 and 2004 along a regular flight grid, Mass Audubon counted 115 sea turtles in the Sound. This number likely underestimates turtle abundance since what is observed from aerial surveys is probably only a subset of those turtles that are present. These sightings indicate a degree of use of the Sound by turtles far exceeding that known prior to these studies. This new information was not incorporated into the Scope of Work requirements for the DEIS, but the assessment of impact on turtles is now necessary.

The rationale for requiring an additional special study of sea turtles is that:

1. Sea Turtles are all federally listed as endangered;
2. The 130 turbines in Nantucket Sound may alter feeding patterns of some sea turtles, particularly loggerheads. As the monopoles become covered with invertebrates, they may attract turtles; and
3. Sea turtles are more prevalent in the study area than realized when the scope of the DEIS was determined.

The DEIS presents substantial background natural history information on loggerheads, Ridley, and leatherbacks. Unfortunately, very little of it is relevant to Nantucket Sound. There is little information available for Nantucket Sound but there is information available for Long Island Sound. A consideration of sea turtle behavior in Long Island Sound would be relevant.

The DEIS implies that loggerheads do not come any farther north than Long Island. However, Table 1 shows that many loggerhead turtles strand in Massachusetts, indicating that they are present. Citing Shoop and Kenny is not valid because most of their work was offshore and involved adults, not juveniles. Work of numerous authors confirm Lazell's hypothesis that northern waters are critical habitat for juvenile sea turtles. (Lazell, 1980)

Mass Audubon's observations and our stranding data suggest that leatherbacks are far more active in late July and August than the DEIS indicates. Any increase in boat traffic raises the potential concern of collisions with boats. The DEIS indicates that construction vessels will travel at reduced speed (< 14 kts), but does not include maintenance trips, which the DEIS describes as occurring hundreds of times in a year. If the monopoles develop a fouling community that attracts turtles, the risk of collision with maintenance vessels will increase unless strict rules are implemented to slow these vessels. In addition, the possibility of creating a "habitat sink" within the turbine array needs to be addressed within the DEIS. Turtles and other wildlife will have to negotiate two major shipping lanes (The Main Channel and North Channel) outside the turbine array (Fig. 5-12.1), which surround the array on the west, south and eastern borders. These lanes will experience higher densities of boat traffic, particularly in the warmer months (April – Oct). Currently, there is no way to ascertain the numbers of boats using the two channels because vessel traffic is self-reporting. However, the average annual number of vessels utilizing the Main Channel in 1998 – 2001 was reported in the DEIS as 1361. This number is undoubtedly much higher, and the DEIS should provide a means to determine an estimate of total ship traffic on a daily/seasonal/annual basis to provide a parameter for incorporation into a risk assessment for turtles.

The DEIS should include a synopsis of green sea turtles. This species does occur in the area.

3) Bats

The Corps should reanalyze radar data from May and September 2002 to determine if bats can be distinguished from other "targets" in order to provide information on the use of Nantucket Sound as a flyway by migratory bats. In the absence of such information no conclusions on the risk posed by this project to migratory bats can be made.

The DEIS (Section 5.6.2.4.3.) states that "collision risk to bats is expected to be minimal" and that bats can use echolocation to avoid the turbines. In light of the recent determination of large bat kills at the Backbone Mountain, West Virginia wind farm (data that were available at the time of the preparation of the DEIS), these statements need to be reevaluated. Further, the DEIS states that although bat migratory routes are not well documented, Nantucket Sound is not known as a bat flyway. No data are provided to substantiate this statement. Red bats, in particular, are strong flyers that might regularly migrate across the Sound during the fall. The Corps has radar data that should be reanalyzed to determine whether target discrimination could provide data on the relative abundance of migrating bats. The strong statements made in this section of the DEIS are not warranted as the DEIS presents no data on which to base such statements.

B. Inadequate Synthesis of Information in the DEIS

The Scope of Work for the DEIS states the following:

The EIS will attempt to comprehensively address the interconnections between the benthic, fisheries and avian resources. The predator-prey interactions are important *considerations in fully understanding the potential impacts in siting a project within Nantucket Sound.*

The DEIS fails to do this. The Corps should provide a holistic or ecosystem level summary of environmental impacts. Nantucket Sound contains a complex food web, and the DEIS does not do an adequate job of relating the impacts of one component of the food web on the ecosystem as a whole. Because the major avian resources in Nantucket Sound, terns and waterfowl, rely on fish and shellfish as their food supply and in the case of terns, to feed their young, any alterations or impacts to the benthic community could shift food distributions of these species. Sea ducks in particular congregate in large numbers in the Sound during the winter, and our survey data over two winters have shown substantial shifts in distributions of large rafts. Theses shifts could be due to a number of factors including variation in weather and food availability; any alteration of this habitat will likely result in a redistribution of food resources.

In addition, there are few data available that describe the main shellfish and fish species preyed upon by sea ducks and other seabirds utilizing the Sound. While it is well known that sea ducks such as eiders and scoters forage on mollusks, scoters also utilize other resources, including invertebrates and fish species. The DEIS does not adequately connect the relationship between foraging sea duck and sea bird species and their prey items making a complete risk assessment difficult.

C. Monitoring

As a condition of any construction permit, the Corps should require the development and implementation of a detailed construction and post-construction monitoring protocol to assess the impact of the wind farm on birds, bats, benthic communities, fish, turtles, and marine mammals. This is especially critical given the lack of information on the impact of large wind farms on these species. The monitoring program should assess the overall ecological impact of the project. Studies should be designed to address specific questions, such as the extent to which shifts in avian distribution following construction of the project due to avoidance, versus shifts in food supply.

We recommend that an independent fund be established and that independent consultants be hired to conduct the construction and post-construction monitoring. Post-construction monitoring should be paid for from the proceeds of energy sales. Furthermore, we ask that an independent scientific expert review panel be established that would review and evaluate reports produced by the consultants. The panel's findings should be reported directly to the supervising agencies and made available to the public.

We recommend consideration of the protocols developed in Europe for post-construction monitoring of offshore wind farms, such as Horns Rev off the western coast of Denmark. Such monitoring should include regular aerial surveys conducted over three years. The aerial surveys should follow the same flight grid as utilized by the studies presented in the DEIS or undertaken by Mass Audubon. Radar should operate at least during the periods of peak movement of terns, sea ducks, and migratory songbirds into and out of the Sound, including April through June and August through November. Radar observations should be regularly "ground-truthed" by qualified technicians stationed at periodic intervals on the Electrical Service Platform using spotting scopes fitted with a range finder. Underwater sampling of the "fouling" community and the benthos around the turbines should be conducted, the latter to assess the effectiveness of the scour pads. The eelgrass community in Lewis Bay should be mapped immediately before and after laying of the submarine cable. Finally, if the technology is available, rotors should be outfitted with impact sensors to record avian and bat strikes.

PART 2. COMMENTS ON SPECIFIC SECTIONS OF THE DEIS

Section 5.3: Impacts on the benthic community.

General Comments:

We agree with the statement that much of the sea bottom is sandy and subjected to frequent natural disturbances. Thus the organisms that live there would tend to be those that can rapidly recolonize sandy substrata and should therefore not be affected permanently by construction activities, operations, or decommissioning.

In general, it is essential that the Corps adequately document the marine environment prior to construction, as this will provide the baseline for interpreting post construction changes should the wind farm be constructed. For example, the DEIS does not adequately characterize the rocky substrata, which do not lend themselves to sampling by grab samplers. Slipper Shells, *Crepidula fornicata* and *C. convexa*, were present in 25% (2001) and 9% (2002) of benthic grab samples, and this suggests a more widespread amount of relatively stable habitat that could include rocks and cobbles. The Corps should provide a more accurate and comprehensive estimate of the amount of existing rocky habitat.

p5-42. The Corps should require periodic inspections of the scour mats after construction to determine that they are working properly.
Shellfish

Detailed comments:

p5-38 Shellfish resources: The DEIS states that "Bay scallops are a negligible fishery in MA according to DMF." For the Cape Cod and Islands region, we would not characterize the bay scallop fishery as "negligible." It is a highly valuable resource, but varies much from year to year. It is particularly important to the economies of Nantucket and Martha's Vineyard.

p5-46. The Corps should provide an example of the type of mitigation for impacts to the recreational shellfish bed.

Section 5.4 Finfish

General comments:

Jet plowing should be timed and located to avoid winter flounder spawning.

p5-62. Here and in a number of other places the DEIS claims that the mortality of benthic organisms will provide a significant food source for predatory fish and marine mammals. We dispute the contention that any mortality during the construction will be beneficial to the ecosystem by providing an additional food source to predators and scavengers. It is logically flawed and sets up a situation where the DEIS appears to have it both ways, first by saying that there will be minimal impacts, and then claiming that impacts will be beneficial.

Section 5.5. Protected Marine Species

Specific comments:

Section 5.5.3.1. Federally Protected Species Under the ESA

p5-72. Why are piping plovers and roseate terns not listed as federally protected species in the study area?

Section 5.5.3.3

"....it is possible that (LF Pilot and Fin Whales and Harbor Porpoises) have the potential to occur in Nantucket Sound".
Harbor Porpoise is the only cetacean one of the reviewers has seen from Nantucket Steamship Authority ferries in over forty years of crossings. Both Long-finned Pilot Whales and Fin Whales have stranded on the Sound (north) side of Nantucket.

North Atlantic Right Whales occur frequently around the outer (eastern and southern) shores of Nantucket. Island.

Section 5.5.6.1.1. Acoustic Harassment

The Corp describes decibel levels of 180 at 1220 meters, but does not characterize the acoustic environment at a distance less than this. The Corps should provide a graphic illustrating the relationship between decibel levels and distance from the construction zone.

Section 5.5.7. Mitigation.

We are not convinced that a soft start will be effective in avoiding acoustic impact. Although it is an appealing concept, the DEIS does not analyze whether and how sensitive organisms will leave the area after a "soft start," or how long it will take various types of animals to move out of the area if they are motivated to do so by the "soft start" noise. Neither is it clear how this process would be monitored or enforced. The Corps should provide further details.

Section 5.7. Avian Resources

General Comments

The DEIS's claim that bird flight heights were determined from plane surveys is unjustified. Because of the vertical perspective, flight heights cannot be accurately estimated from a plane. The only accurate estimates of flight heights were made during boat surveys and radar scans.

Aerial surveys reported in the DEIS were conducted at 250 feet. At this height, birds will flush, despite claims to the contrary made in the document. In the survey layout utilized in this study, this could lead to double counting of birds. Further, it is likely that observers would not detect birds flying above 250 feet as the observers attention would be focused downward.

5.7.1, paragraph 4.

The DEIS states: "To validate whether the applicant's field studies occurred in years considered to have typical abundance levels of bird species in Nantucket Sound, existing databases from independent entities were reviewed to compare avian numbers in 2002 and 2003."

The data used for this comparison, such as Mass Wildlife coastal aerial surveys, were not collected within the project area. Other surveys, such as National Audubon's Christmas Bird Count (CBC) circles, contained different groups of species. Further, there is an unstated assumption that counts in different geographic units covary. No evidence is presented to support this assumption, and we believe that this comparison is irrelevant and cannot be used to validate the duck survey data as "typical".

5.7.2.2.5, paragraph 1.

The DEIS acknowledges "no systematic, qualitative studies have been conducted in the central portion of the Sound where the Project is proposed." As such, the data are not sufficient to correlate abundance patterns within the sound to National Audubon CBC or Mass Wildlife counts conducted from near- or on-shore vantage points. The DEIS suggests that CBC and Mass Wildlife data from these years represented typical abundance levels between 1989 and 2003, but these results do not validate information gathered during surveys conducted for the DEIS in an area where little to no data has been gathered previously.

5.7.2.3, paragraph 3.

The DEIS concludes that Horseshoe Shoal, compared with the other shoal areas studied and with the other areas of Nantucket Sound, exhibits lower abundance and diversity.

This statement is misleading. The abundance percentages within the alternative project areas were calculated by pooling totals over an entire field season, and over two years (March 2002 – February 2004). Because the data were presented in this way, any patterns that might have emerged within a shorter time frame were "lost". For example, Mass Audubon surveys of winter sea duck distribution in 2003-2004 indicated that, during December 2003, HS Shoal supported disproportionately higher numbers of scoters (~21% in an area comprising ~11% of the Sound). When these abundance values are pooled with abundance data compiled throughout the remainder of the winter season this pattern is obscured. Abundance and duration of occupancy represent equally important components of the avian risk equations, and by pooling the data, the apparent significance of the abundance component is diminished.

Section 5.7.2.3 The seasonal bird count totals for aerial and boat surveys represent *sightings, not individual birds,* given that recounting was inevitable between two or more surveys.

Section 5.7.2.3.1 The DEIS claims that none of the 90 terns recorded by Mass Audubon in May 2003 were Roseate Terns. Actually, 53 of those were "Common/Roseate types," i.e., some or all of them could have been Roseate Terns, but were unidentifiable to the species level.

Section 5.7 (throughout) With the exception of locally nesting terns, it is impossible to ascertain what "populations" are represented, especially in overwintering sea ducks. Without knowing this, even if we knew the death rate of each species, no claims could be made as to the likely impact on any given species at a population level.

Section 5.7.1 "Industry standard" claims risk is related to "number of birds/unit area/unit time as a measure of how much time birds spend in a given area; and the proportion of time spent flying at rotor height". This presumes monopoles pose no threat. This is inconsistent with findings at static structures such as telecommunication towers, skyscrapers, etc.

Section 5.7.3.2.1 "Visibility" (of turbines) - claim that movement of waterbirds is more limited during periods of reduced visibility is unsubstantiated. The DEIS claims that most collisions "apparently" occur with rotors versus the monopole and this claim is unsubstantiated.

Section 5.8. Coastal and Freshwater Wetland Resources

General Comments on Coastal Wetland Resources:

The DEIS states that the submarine cable will pass within 21 meters of an eelgrass bed in Lewis Bay. The proponent states in Section 5.8.4.2.1, p5-149) that, "Potential indirect impacts to SAV during cable embedment related to sediment resuspension would be minimized by maintaining an appropriate distance between the jet plow and the mapped SAV beds." We ask the Corps to be more specific about the effects of the sediment plume on eelgrass in Lewis Bay. We assume that use of the term, "mapped SAV beds" refers to eelgrass habitats mapped by the Massachusetts Department of Environmental Protection. The Corps should clarify whether it has noted any additional eelgrass beds in their surveys that could be affected by the installation of the submarine cable or any other component of the project. The basis and justification should be provided for the statement that there will be no impacts on the eelgrass bed within 21 meters of the jet plow.

The draft Energy Facilities Siting Board decision on the cable requires Cape Wind to aerially photograph Lewis Bay in the month of July immediately preceding construction and to use this information in final routing of the cable in order to avoid impacts to eelgrass. The Corps should incorporate this mitigation requirement into its documents.

ADDITIONAL REFERENCES NOT CITED IN DEIS

Bellrose, F.C., ed. 1980. Ducks, geese, and swans of North America. 3rd ed. Stackpole Books, Harrisburg, PA.

Everaert, J. 2004. Wind turbines and birds in Flanders: Preliminary study results and recommendations. Natuur. Oriolus 69(4): 145-155.

Lazell, J.D., Jr. 1980. New England Waters: Critical Habitat for Marine Turtles. Copeia 1980: 290-295

Table 1: Estimated collision mortalities by month for Roseate Terns (RT) based on density data calculated from a) 2003 and b) 2004 boat (May – July) and plane (August – September) surveys conducted by Mass Audubon. The area of Horseshoe Shoal was estimated at 110 km^2, and the number of tern transits per hour was estimated at 4.8. Day length was assumed to be 14 hours. Roseate Terns were estimated to be 24% of all tern sightings. The collision probability was estimated at 1 in 3000 based on data from Everaert (2004). N equals the number of surveys on which density estimates were based. Estimated Common Tern mortalities can be calculated by multiplying Roseate Tern mortalities by 3.17. Italicized months indicate that tern data were collected during plane surveys. All calculated numbers presented in the table were rounded after calculation.

a)

2003	N	RT Density (per km2)	Total # of RT in HSS	Number of RT Transits per month	Estimated RT collision deaths per month
May	3	0.24	26.9	56,000	18.7
June	4	0.02	2.0	4,130	1.4
July	6	0.02	2.3	4,690	1.6
August	*6*	0.005	0.5	1,090	0.4
September	*7*	0.3	36.6	61,530	20.5
Total	26				42.5

b)

2004	N	RT Density (per km2)	Total # of RT in HSS	Number of RT Transits per month	Estimated RT collision deaths per month
May	5	0.22	24.0	49,970	16.7
June	4	0.01	1.6	3,300	1.1
July	3	0.01	1.1	2,270	0.8
August	*3*	0.2	19.8	41,250	13.8
September	*7*	0.008	0.9	1,440	0.5
Total	26				32.7

RELATIVE WATERFOWL ABUNDANCE

WITHIN NANTUCKET SOUND, MASSACHUSETTS

DURING THE 2003-2004 WINTER SEASON

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Protecting the Nature of Massachusetts

INTRODUCTION

A proposed wind farm on Horseshoe Shoal in Nantucket Sound, Massachusetts would be the largest offshore wind farm in the United States and one of the largest in the world. Systematically obtained data on the use of Nantucket Sound that would enable an accurate assessment of the risk of this wind farm to the birds utilizing Nantucket Sound have not been available until recently (Cape Wind Draft Environmental Impact Statement, 2004). Annual and seasonal surveys of avian species inhabiting the waters of Nantucket Sound are important steps necessary to evaluate possible impacts of the proposed wind farm's construction and operation on birds. This report describes the results of our first year of winter surveys of the waterfowl within Nantucket Sound; the data reported here provide an important supplement to the data presented in the recently released draft Environmental Impact Statement prepared by the Army Corps of Engineers.

If the proposed wind farm is constructed, wintering waterfowl and other birds could be directly or indirectly affected in a number of ways. Negative impacts include 1) flying birds could strike turbine blades or supporting poles and become injured or die; 2) the construction and deployment of turbines could result in a decline or a spatial displacement of the benthic and pelagic food resources of Horseshoe Shoals; 3) turbines could result in temporary or permanent displacement of the birds from their wintering habitat; and 4) an array of turbines could create a flight barrier and alter traditional flight patterns of local and migrant waterfowl. All of these potential impacts could be ecologically significant. Alternatively, construction of the wind farm may have a positive if indirect effect on these bird species. Production of energy using wind releases few if any greenhouse gases, which are assumed to be the primary driver of recent climate warming. Reduction in greenhouse gas emissions could ameliorate potential loss of nesting habitat for terns and waterfowl that utilize Nantucket Sound resulting from sea level rise or the migration northward of plant communities.

According to Christmas Bird Count data collected from various land points around Nantucket Sound, hundreds of thousands of ducks occupy the Sound for most of each winter. For example, Griscom and Snyder (1955), cited in Bellerose (1976), reported 500,000 common eiders wintering off the coast of Massachusetts. Land-based Christmas Bird Count totals from Nantucket Island have exceeded one-half million individuals for Long-tailed Duck (525,505 in 2002; http://audubon2.org/birds/cbc/hr/count_table.html). Additionally, large numbers of other sea ducks including Surf, White-winged and Black Scoters are often seen from land on Cape Cod and the Islands during winter months. The actual abundance, distribution, and movement of these species of ducks within the Sound, particularly in relation to Horseshoe Shoal, are poorly known.

We completed 13 aerial surveys and 2 boat surveys of Nantucket Sound following designated survey routes between early December 2003 and early April 2004 (Figure 1). Our specific objectives were to

1. Estimate the relative seasonal abundance and distribution of wintering waterfowl that use the Sound during the winter months and determine whether these patterns vary seasonally.

2. Estimate the heights at which duck species fly when using the Sound
3. Document behavior of ducks (e.g., traveling, feeding, resting) in and around the waters of Horseshoe Shoal

The timing of these surveys corresponded to the period in which long-term birding records indicated waterfowl occurrence within the Sound (Bird Observer Records, M. Rines, personal communication)

Study Area

Nantucket Sound is a relatively shallow water body (maximum depth less than 50 ft) that encompasses approximately 600 square miles. It is surrounded by the southern shore of Cape Cod to the north, Monomoy National Wildlife Refuge and Nantucket Island to the east and south, Tuckernuck and Muskeget Islands to the southwest, and Martha's Vineyard to the west (Figure 1). Within Nantucket Sound we focused on three areas described as alternate sites for the wind farm: 1) Horseshoe Shoal – the site preferred by the applicant, Cape Wind Inc.; 2) Tuckernuck Shoal; and 3) Monomoy-Handkerchief Shoal. The bottom substrate of the Sound is mostly sand, with a few areas, including Horseshoe Shoal, that have a higher proportion of gravel (USGS 2003). The coarser material on Horseshoe Shoal may account for the Shoal's relative geologic stability compared to the sandier areas in this region. The abundance of scoters and Common Eiders observed in the Sound indicates that mollusks such as mussels, scallops, and clams, crabs, fish and other food sources are abundant. The benthic sampling reported in the draft Environmental Impact Statement for this project (USACE, 2004) supports this view and also indicates that the benthic fauna varies seasonally and spatially.

METHODS

Waterfowl behavior, distribution, and relative abundance in the Sound and the alternate project sites were estimated from data collected on aerial surveys, and behavioral data were collected during two boat surveys on Horseshoe Shoal. The methods were similar to the protocols developed for our tern surveys during the 2003 season (e.g., Perkins, et al. 2004) with slight modifications as described below.

Aerial Surveys

Thirteen aerial surveys were conducted during the period between December 1 and April 8 along sixteen fixed, parallel transects, oriented north to south (Figure 1). The winter aerial survey grid was similar to that used during our tern surveys (Perkins, et al. 2004); however the entire grid was shifted south by about 2.2 miles, with the southern limit of the grid at 41° 20' N latitude. This shift also resulted in the elimination of the easternmost transect flown during tern surveys to avoid flying over Monomoy NWR. This slight modification in the grid location was based on the assumption that locally wintering ducks have been regularly observed in the southern portions of the Sound and the waters around Muskeget Island. The shift of our study area did not omit any of the waters on or adjacent to Horseshoe Shoal or the other project alternate sites.

Our aerial survey grid included approximately 340 mi^2, or 60% of the waters of Nantucket Sound. Individual transects were separated at 7,500 ft intervals; the total combined length of all 15 transects was 249.2 mi. The actual area of the Sound that we surveyed was 30 mi^2, or approximately five percent. This area was calculated by multiplying the transect width (600 ft) by the combined length of all transects (249.2 mi).

Aerial surveys were flown with a high-wing, twin-engine aircraft (Cessna Sky Master 337), cruising at an average altitude of 500 ft and at an average airspeed of 90 kts. This altitude allowed us to identify most birds at the sea surface and reduced the possibility of flushing the birds from the water surface to another part of the Sound where they might have been recounted. The airspeed was the slowest at which the aircraft could safely fly. Flights were conducted only on days with light to moderate winds ($\leq$15 kts) and on days with good atmospheric clarity (visibility >10 miles). Flights usually began mid-morning to reduced glare due to low sun angles, and the average duration of each survey was approximately 2.5 hrs.

We recorded birds observed along either side of the north-south transects out to a distance of 300 ft from each side of the plane (Figure 2). Individual birds were identified with the aid of binoculars as needed. Criteria used for the selection of transect width included:

1. Determination of the distance perpendicular to the transect centerline at which birds were detectable and identifiable with the naked eye for observers.
2. A total width narrow enough to avoid situations in which birds were too abundant and/or were spread over too wide an area to count accurately. This was especially important because sea ducks occasionally congregate in large flocks or rafts.

Each survey team was composed of a pilot, a recorder in the co-pilot seat, and two experienced observers positioned opposite one another on each side of the plane. All members of the team communicated through an onboard intercom system. The observers verbally communicated all bird sightings to the recorder. The recorder entered number of birds observed, species, behavior (sitting on the water, traveling or actively feeding), and precise geographic location into a laptop computer equipped with dLog (v.2.0, R.G. Ford Consulting, Portland, OR) that linked with the plane's onboard GPS unit. This software enabled us to automatically and accurately enter the geographical location of the plane as data were entered at the time of the sighting. Additional information recorded included starting and ending times of the survey, wind direction and velocity (kts), sea state (Beaufort scale), visibility (mi), and % cloud cover for every survey. Surveys were conducted over a wide range of tidal stages, although no attempt was made to control for this variable due to weather and time constraints. We did not attempt to estimate flight heights of waterfowl during plane surveys *unless* the birds were relatively high (300 ft or higher) such that more accurate height estimates were possible. Most flying birds observed during aerial surveys were at or near the water surface, and accurate estimation of their flight height from 500 feet was not practical.

Observers were able to identify most birds to species. Scoters were identified to the species level whenever possible, but otherwise they were recorded as "Scoter spp". Birds were recorded continuously along transects. We did not count any birds observed while we were flying the short, east-west legs between transects. Observations of marine mammals and fish were also recorded, but the results are not reported here. These data are available from the authors upon request.

Analysis of Aerial Survey Data

We compared relative waterfowl abundance on Nantucket Sound, Horseshoe Shoal, Tuckernuck Shoal, and Monomoy-Handkerchief Shoal (Figure 1). We estimated relative abundance as numbers of birds per mile surveyed and as the proportion of the total number of birds counted in each geographic unit. A few surveys were not completed due to bad weather or equipment malfunction. Bird distribution across the sound is probably not random, our survey grid was not laid out or sampled randomly, and we always began our surveys at the western edge of the grid. These factors inject some unknown bias into the results, especially when considering the results of incomplete surveys. Incomplete surveys were not included in the analysis of proportional waterfowl abundance.

Proportional waterfowl abundance in each site was calculated first by overlaying the boundaries of the three wind farm sites over all point data collected during surveys. Using data from the completed surveys only, the total number of birds of a given species observed within each project area was divided by the total number observed on each survey. These proportions were compared to the proportional area of each project area to determine if sea ducks were evenly distributed across the project areas and Nantucket Sound.

Relative waterfowl abundance was also calculated as number of birds-per-mile. Each transect of the survey grid was subdivided into single-mile transect segments and all bird observations were assigned to a mile segment within each transect. To answer the question of whether bird distribution varied spatially across Nantucket Sound, we calculated relative abundance of each bird species as number of birds-per-mile for the entire Sound and the three alternate project sites. We determined whether bird distribution and relative abundance varied seasonally by arbitrarily dividing the survey period into four time periods: 1) December 5, 9, 16, and 24; 2) January 22, and February 10 and 12; 3) February 17 and 24, and March 1; and 4) March 11 and 23, and April 8. Because all data were normalized by the number of times each mile segment was surveyed, we included data from incomplete surveys in this analysis.

Common Eiders were found throughout the Sound in large rafts, and we calibrated our estimates of these rafts using imaging software - Adobe Photoshop and ImageJ (v. 1.32, 2004, National Institutes of Health). In December 2003, we took photographs of seven Eider rafts and used Photoshop to represent white Common Eider drakes as dark spots on a white background. From these photographs we estimated the average number of pixels per Eider drake. Image J counted the pixels providing an independent estimate of the number of male Eiders per raft. This was then compared to our visual estimates of the picture. Additional counts by observers provided estimates of hen: drake ratios of Eiders in rafts (3 hens: 4 drakes), and we used this ratio to estimate total number of Eiders in these rafts. This procedure was not followed for every Eider raft, but used only at the beginning of our surveys. We frequently referred back to these photos of know Eider abundance to recalibrate our estimates of the size of these rafts.

Boat surveys

We conducted two boat surveys along a series of transects oriented in two parallel tracks, one mile apart (Figure 1). The location of these transects was selected to sample the waters over Horseshoe Shoal as well as the waters in the immediate vicinity of the Shoal. Surveys were conducted from a 33 ft powerboat cruising at an average speed of 17 kts. Surveys lasted approximately 1.5 hours. The total linear length of the boat transects was 24.9 miles.

The survey teams consisted of two observers and one recorder. The observers were positioned on each side of the boat immediately aft of the wheelhouse; bird sightings were communicated verbally to the recorder. Observers used binoculars to confirm identification to species as needed. All birds observed within 0.5 mile on either side of the vessel were recorded. This distance was periodically checked with the range-finding function of the onboard radar in reference to visible objects such as buoys. The recorder entered number of birds seen, species, behavior (sitting on the water, traveling or actively feeding) and flight altitude of birds (in feet). Flight heights of the birds were estimated by referencing objects of known height such as the top of the wheelhouse, navigational buoys, and the Cape Wind test tower. The geographic location of all sightings was recorded in the laptop computer equipped with dLog2 (see above). Additional information recorded included start and end time, wind direction and velocity (kts), sea state (Beaufort scale), visibility (mi), % cloud cover, and water temperature (°C).

We recorded all waterfowl to the species level whenever possible. In cases where we were unable to differentiate between species when waterfowl occurred in high concentrations, we consigned these types of sightings to a more generic category, such as duck spp. or Scoter spp.

RESULTS

Aerial Surveys

Thirteen aerial surveys were initiated between December 5 and April 8 (Table 1), of which ten where completed. Surveys were conducted at one-week intervals throughout the survey period, but some surveys were postponed or cancelled due to poor weather. After January 22 and prior to February 10 we conducted no aerial surveys because the entire Sound was covered with ice. On February 10 and February 17 computer failure resulted in the loss of coverage along 36.9% and 19.3%, respectively, of the aerial survey route. On March 23, a plane instrument malfunction forced us to abort the flight after covering 38.8% of the route, and on January 22, ice covered approximately 33% of the survey route. The flights on February 10 and February 12 were flown within two days because of the loss of data on the first of these two surveys.

Relative Waterfowl Abundance

We observed 20 species of sea ducks and other waterbirds (Table 2). The most common species we observed was the Common Eider at approximately 280,000 birds counted over all surveys (all duck numbers have been rounded to the nearest one or two digits). Eider rafts ranged from a few hundred birds to tens of thousands of birds per raft. One raft recorded on the survey had an estimated 18,000 birds. Another raft observed off the survey route contained an estimated 50,000 Eiders. Approximately 82,000 Scoter spp. (including 8,000 Surf Scoters, 600 White-winged Scoters, and 300 Black Scoters) and 33,000 Long-tailed Ducks were also observed. The highest waterfowl count was made on January 22, 2004, when a total of more than 80,000 ducks were counted. This day also represented the highest total survey count for Common Eiders (53,000) and Scoter spp. (27,000).

Relative abundance of birds ranged widely from survey to survey. When results from completed surveys were standardized by birds per survey mile, Common Eider numbers per survey ranged from 26 to 316 birds per mi per (median = 84/mi), Scoter (all species) counts ranged from three to 159 bird per mi (median = 19/mi), and the number of Long-tailed Ducks ranged from two to 32 birds per mi (median = 11/mi) (Figure 3).

Waterfowl Distribution in the Sound

Waterfowl were observed throughout the entire survey area over the survey period. Most Common Eiders were observed in dense rafts, and there were substantial areas of the Sound where no eiders were observed (36 transect miles, approximately 14% of the survey area). Scoters were more evenly distributed; with 7 transect miles (3%) containing no scoter observations. Long-tailed ducks were absent from fewer transect miles (3, or 1%) than the two other groups. Of more than 240,000 ducks observed on nine full surveys, 8.3% of Eiders, 15.8% of Scoters, and 12.1% of Long-tailed Ducks were observed on Horseshoe Shoal. This distribution changed seasonally.

Numbers of birds in individual mile segment of the survey grid ranged widely and provides another perspective on distribution of ducks in the Sound. When averaged across all surveys, Common Eider had the highest abundance in any mile segment at over 4,000 birds near Muskeget Island. Other areas with consistently high Eider numbers throughout the survey period were near Monomoy Island, Horseshoe Shoal, and the northeastern section of the Sound (Figure 4). The highest average per mile Scoter abundance was 740 and was located in the southeastern section of Horseshoe Shoal. Other areas with high Scoter numbers included adjacent areas to the east, south, and southeast of the Shoal. The highest average number of Long-tailed Ducks was 170 per mile segment; this number was observed west of Muskeget Island

A slightly greater proportion of ducks were observed over Horseshoe Shoal in December versus later in the winter season (Figure 3). During four surveys in December, 13.4% of all waterfowl counted were observed on the Shoal (an area comprising 10.9% of the survey area); among Scoters observed in December, the proportion on Horseshoe Shoal was 21.3%—almost twice the expected proportion. After January, the proportion of ducks using Horseshoe Shoal was generally less than the proportional area. On five complete surveys from February 12 to April 8 (Table 1) an average of 8.8% of all waterfowl counted were observed on Horseshoe Shoal; among Eiders and Scoters, 8.5% and 4.2%, respectively, were observed over the Shoal. Conversely, 14.5% of Long-tailed Duck observations during surveys in this period were on Horseshoe Shoal versus 3.3% on the Shoal in December. The two alternate sites, Tuckernuck Shoal and Monomoy-Handkerchief, had waterfowl abundance in proportions greater than their area among several species and in several time periods (Table 3). Analysis of distribution in based on birds per mile yielded similar results (Figure 3).

Eiders consistently concentrated in the southeastern section of the Sound adjacent to Muskeget Island, and near South Monomoy Island in the west-central portion of the Sound (Figure 4). High concentrations of Eiders were not observed as consistently in other areas, including Horseshoe Shoal and the northwestern portion of the Sound. Scoters exhibited higher concentrations in the northeastern quarter of the Sound (Figure 6), though various areas—generally falling within a broad diagonal band from southwest to northeast through the entire Sound—had high, somewhat inconsistent, concentrations over the entire survey period. This area included Monomoy-Handkerchief Shoal (Table 3 and Figure 3), one of the alternate sites. Long-tailed Ducks did not exhibit consistent areas of concentration over the survey period (Figure 7), although they were observed in disproportionately higher numbers on Horseshoe and Monomoy-Handkerchief Shoals.

Seasonal Abundance

Changes in seasonal abundance of ducks were assessed by arbitrarily dividing the survey counts into four periods to observe changes in abundance over time. Time periods were chosen to contain at least three surveys and span a maximum period of four weeks – these periods are not considered to be "natural" units. The average number of Common Eiders per survey increased from 50 birds per survey mile in December to 105/mi in January-early February, to 119/mi in late February-early March, to 82/mi in March-April, respectively (Figures 3 and 5). Average Scoter abundance was highest in December (42/mi), decreased in January-early February (6/mi), and rose slightly again in February-early March and March-April (18/mi and 17/mi, respectively) (Figures 3 and 6). The number of Long-tailed Ducks increased from December (8/mi), through January-early February and later February-early March (11/mi and 21/mi, respectively), then decreased in March-April (10/mi) (Figures 3 and 7).

Waterfowl Behavior

The vast majority (98.6%) of waterfowl recorded in the Sound were observed sitting and/or feeding on the water. We combined "feeding" and "sitting" ducks because 1) we could not determine whether they were diving in response to the passage of the plane or whether they were diving for food, and 2) we did not attempt to ascribe these behavioral traits to birds within large rafts because accurately recording these types of data for all individuals within such a raft would have been impossible.

Boat surveys

Two boat surveys were conducted on Horseshoe Shoal – the first on December 19, 2003 and the second on February 27, 2004. We were unable to conduct boat surveys during the month of January due to the presence of ice in the Sound. A total of 3,813 ducks were counted on these two surveys (Table 4); 2,286 (60.1%) were traveling, and 1,522 (39.9%) were sitting on the water surface. Ten other bird species were observed and these results are presented in Table 4. The altitude range of all traveling ducks (n=2,286) was between 1 and 60 feet with an average height of 8.5 ft (SD=7.1) and a median height of = 5.0 ft. Only two birds (both Herring Gulls) were observed in the rotor swept zone between 75 and 425 feet.

During the two boat surveys, ducks were distributed throughout the entire Shoal area; concentrations of birds were in similar areas as observed on aerial surveys during the same periods (i.e., December 16 and 23, and February 24).

DISCUSSION

Common Eider, Scoter spp., and Long-tailed Ducks comprised nearly all (96.8%) of the waterfowl recorded during these surveys. To place the number of ducks observed in Nantucket Sound in context, Bellerose (1976) estimated that there are 1.5-2 million Common Eiders in North America; our highest count of 50,000 Common Eiders on one day in the Sound, therefore, represents approximately 3% of the total number of Common Eider in North America. Bellerose (1976) estimated scoter populations in North America at approximately 1.5 million and Long-tailed Duck at 3-4 million.

Published numbers of Long-tailed Ducks counted within the Sound have exceeded a half a million individuals (e.g., http://audubon2.org/birds/cbc/hr/count_table.html), but our surveys recorded relatively low numbers of this species compared to Eiders and Scoters. These results were not unexpected given the apparent diurnal foraging patterns of Long-tailed Ducks. The majority of wintering Long-tailed Ducks observed in Nantucket Sound likely spend at least a portion of each night roosting within the Sound; in the morning it is suspected that Long-tailed Ducks departed to feeding areas south and southeast of Nantucket via the west end of the island and, therefore, outside our survey area.

Determining the locations of the night-time roost sites of Long-tailed Ducks within the Sound will require detailed surveys at dusk and dawn, when the birds have been observed gathering in the Sound to roost, or preparing to exit the Sound for the day. Details regarding the nighttime use of Nantucket Sound by Long-tailed Ducks are important in the context of the project proposal, and we plan to pursue relevant studies this coming winter.

The relative abundance of Common Eider, Scoters, and Long-tailed Ducks changed during the course of the survey season, but changes in their distribution throughout the study period were less pronounced. This was especially true of Common Eider. While Eiders were distributed widely within the study area, the largest concentrations were found most consistently in only two areas - the vicinity of Muskeget Island and southwest of S. Monomoy Island, Chatham. Waterfowl studies in Denmark (Guillemette, et al. 1999) have demonstrated a direct correlation between the abundances of sea ducks such as Common Eider and the abundance and availability of their food supplies. Between-year fluctuations in local sea duck numbers were also directly related to food (Guillemette, et al. 1999).

The surface of the Sound froze almost completely from Nantucket Island to Cape Cod during the week following the January 22 survey. According to the meteorological records for Boston, January 2004 was the coldest since 1880. The highest single-day Eider and Scoter totals were recorded on January 22. We speculate that birds displaced by the ice already formed in areas surrounding the Sound (e.g., Buzzards Bay, the waters around Martha's Vineyard, the Elizabeth Islands) may have contributed to the high concentrations observed.

The presence of ice likely influenced the distribution and relative abundance of waterfowl in the Sound during the study period. Prior to January 22 when ice was first observed on the Sound, Scoters comprised a large percentage of the total recorded waterfowl (41%). After the Sound froze over, Scoters were not as abundant in Nantucket Sound, and therefore may have been permanently relocated to ice-free areas after initial displacement. . Anecdotal data from local bird records (Bird Observer, M. Rines, personal communication) suggest that Scoters may have moved to ice-free waters just to the west of the Sound around Martha's Vineyard. After the break-up of sea ice, Scoter numbers were not as high as the pre-ice period. It will be important to examine seasonal variation in the absence of sea ice in the following two years of this study, if freezing does not occur.

During the two boat surveys, estimating relative abundance of waterfowl was not possible. This was mainly because of the high numbers of waterfowl that flushed in response to the survey boat and other vessels. Often, the birds flushed when our vessel was one mile away or more. As the birds flushed, they scattered in all directions, making it impossible to avoid recounting birds. Additionally, we were unable to control for other boats in the area of Horseshoe Shoal prior to or during our surveys. We were able to estimate flight heights of flushed birds and none them were flying within the rotor swept zone from 75 feet to 425 feet. Although these data may not reflect the ducks usual flight behavior, they are indicative of how the birds might respond to the presence of vessels in the area. If the wind farm is constructed, the number of maintenance boat trips is expected to be substantial (ACOE, 2004).

The results from our initial survey indicate that Horseshoe Shoal is an important location for wintering sea ducks. Roughly one-third of all waterfowl recorded in December were observed within the region of Horseshoe Shoal, an area comprising approximately 11% of Nantucket Sound. Scoters were particularly abundant on the Shoal at this time. This disproportionately high numbers of Scoters on Horseshoe Shoal suggests that the Shoal area provided significant foraging habitat and stable and persistent patterns of prey availability during the study period.

We propose to continue our surveys for at least two additional years. In particular, we hope to determine the extent to which the distribution of ducks shifts within the Sound, presumably in response to shifts in food availability. During the scoping phase of the environmental review of the Cape Wind project, Mass Audubon and the U.S. Fish and Wildlife Service strongly recommended that three years of avian surveys was the minimum period necessary to begin to understand the short-term dynamics of avian use of Nantucket Sound and Horseshoe Shoal.

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Table 1. Dates of 13 aerial surveys on Nantucket Sound, winter 2003-2004.

Survey Date	Comments
12/5/2003	100% complete, though data missing for several species.
12/9/2003	100% complete.
12/16/2003	100% complete.
12/23/2003	100% complete.
1/22/2004	100% complete. 32% of sound covered by ice, generally in the northern part of study area (42% of Horseshoe Shoal, 32% of non-Horseshoe Shoal).
2/10/2004	63% complete. Missing 6.5 transects (10 - 15) in eastern part of study area. Missing 0% of Horseshoe Shoal, 46% of non-Horseshoe Shoal.
2/12/2004	100% complete.
2/17/2004	81% complete. Missing 3 transects (2 - 4) in western part of study area. Missing 68% of Horseshoe Shoal, 10% of non-Horseshoe Shoal.
2/24/2004	100% complete.
3/1/2004	100% complete.
3/10/2004	100% complete.
3/23/2004	33% complete. Missing 9 transects (7 - 15) in eastern two-thirds of study area. Missing: 17% of Horseshoe Shoal, 72% of non-Horseshoe Shoal.
4/8/2004	100% complete.

Table 2: Total bird numbers observed on aerial surveys of Nantucket Sound, winter 2003-2004. Numbers are typically rounded to the two left-most digits.

Species	Total Number
Brant	7
Common Eider	280,000
Surf scoter	7,500
White-winged scoter	600
Black scoter	270*
Scoter (undifferentiated)	83,000
Long-tailed Duck	32,000*
Red-breasted Merganser	55
Duck (undifferentiated)	18
Common Loon	160
Red-throated Loon	154*
Loon (undifferentiated)	3,400
Red-necked Grebe	1
Horned Grebe	1
Grebe (undifferentiated)	4
Northern Gannet	630
Double-crested Cormorant	1
Great Cormorant	3*
Cormorant (undifferentiated)	3
Shorebird (undifferentiated)	3
Bonaparte's Gull	33
Herring Gull	630
Great Black-backed Gull	170
Black-legged Kittiwake	560*
Gull (undifferentiated)	2,240
Razorbill	2,580
Alcid (undifferentiated)	4
Unidentified bird	1,020

* = Numbers include estimated numbers not recorded on December 5, 2003 due to computer errors. An estimated 40 Red-throated Loons, 2 Great Cormorants, 100 Black scoters, 1,000 Long-tailed ducks, and 15 Black-legged Kittiwakes are included.

Table 3. Relative waterfowl abundance observed in three alternative Cape Wind project sites and the remaining non-project area on nine aerial surveys of Nantucket Sound from December 5, 2003 to April 8, 2004. Survey periods include the following survey dates: 1) 12/5, 12/9, 12/16, and 12/23; 2) 2/12; 3) 2/24 and 3/1; 4) 3/11 and 4/8. Data from incomplete surveys is not included. Long-tailed Duck averages do not include data from December 5, when computer errors prevented recording this species. Species-area-period combinations with proportional abundances greater than the proportional area are shown in bold.

		Non-shoals (183.1 miles)	Proposed Cape Wind project areas		
			Horseshoe Shoal (28.7 miles)	Monomoy-Handkerchief Shoal (15.7 miles)	Tuckernuck Shoal (23.5 miles)
Species	Survey Period	Proportional area			
		72.1%	10.9%	6.9%	10.9%
Common Eider	1	90.3%	7.8%	0.7%	1.3%
	2	98.6%	1.3%	0.1%	0.1%
	3	93.5%	4.9%	0.3%	1.3%
	4	85.1%	**13.8%**	0.9%	0.2%
	All	90.3%	8.3%	0.6%	0.8%
Long-tailed Duck	1	91.5%	3.2%	2.1%	3.2%
	2	62.1%	**16.1%**	**14.0%**	7.8%
	3	62.2%	**12.4%**	**18.6%**	6.8%
	4	62.3%	**19.3%**	**11.5%**	6.9%
	All	68.4%	**12.1%**	**13.3%**	6.1%
Scoter species	1	46.8%	**21.3%**	**17.1%**	**14.9%**
	2	79.5%	3.7%	3.8%	**12.9%**
	3	75.9%	3.5%	9.1%	11.5%
	4	75.5%	5.1%	**9.3%**	10.1%
	All	56.3%	**15.8%**	**14.3%**	**13.7%**
Total	1	71.4%	**13.4%**	**7.9%**	7.3%
	2	92.0%	3.3%	2.1%	2.6%
	3	85.3%	6.2%	4.9%	3.6%
	4	82.3%	**13.1%**	2.7%	1.9%
	All	79.9%	10.5%	5.2%	4.4%

Table 4. Total bird numbers observed on two boat surveys of Horseshoe Shoal. Survey dates were December 19, 2003 and February 27, 2004.

Species	Total Number
Common Eider	794
Surf scoter	11
White-winged scoter	728
Black scoter	87
Scoter (undifferentiated)	924
Long-tailed Duck	1,209
Red-breasted Merganser	1
Duck (undifferentiated)	59
Loon (undifferentiated)	2
Horned Grebe	1
Northern Gannet	1
Bonaparte's Gull	5
Herring Gull	26
Great Black-backed Gull	6
Black-legged Kittiwake	6
Gull (undifferentiated)	9
Razorbill	19
Dovekie	1

Figure 1. Nantucket Sound study area and surrounding features. Project area polygons based on information from Cape Wind Associates.

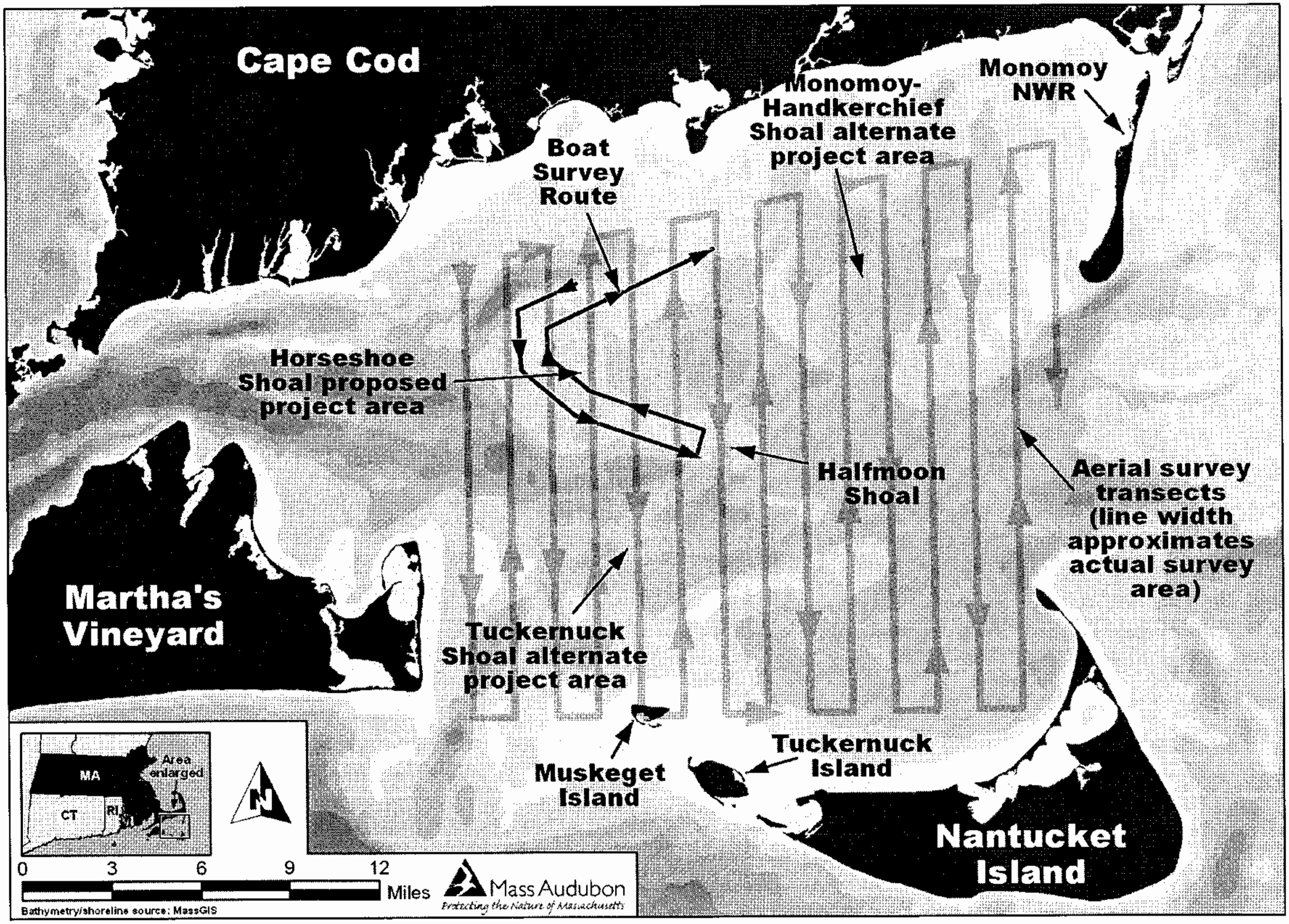

Figure 2. Diagram illustrating observation angles and distances of aerial surveys of Nantucket Sound.

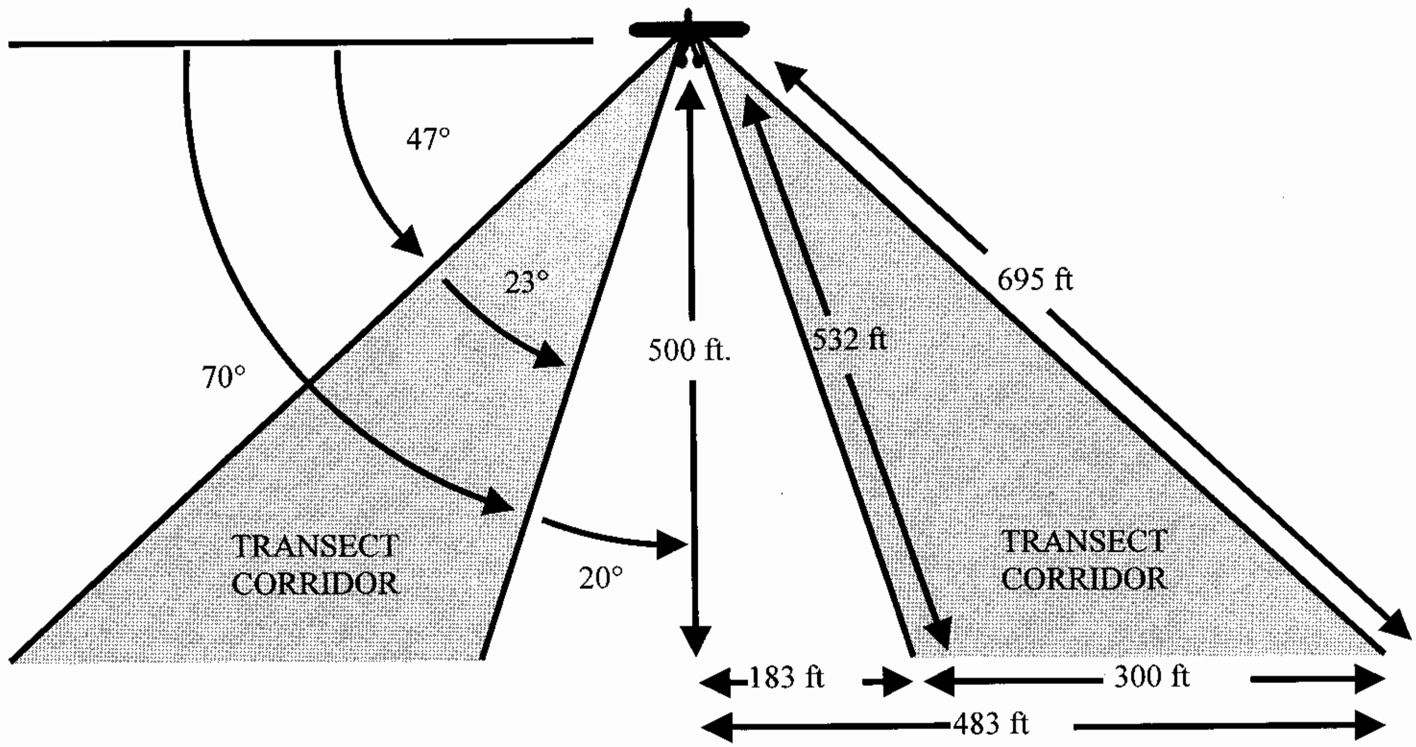

Figure 3. Numbers of Common Eiders, scoters (all species), Long-tailed Ducks, and waterfowl (all species combined) per mile, winter 2003-2004. Values are calculated from total birds observed in each area (Non-shoals, Horseshoe Shoal, Monomoy-Handkerchief Shoal, and Tuckernuck Shoal) divided by miles surveyed within each area. Incomplete surveys occurred on January 22, February 10 and 17, and March 23. Long-tailed Duck abundances do not include data from December 5, when computer errors prevented recording this species. Data from March 23 is missing for Monomoy-Handkerchief shoal due to an incomplete survey.

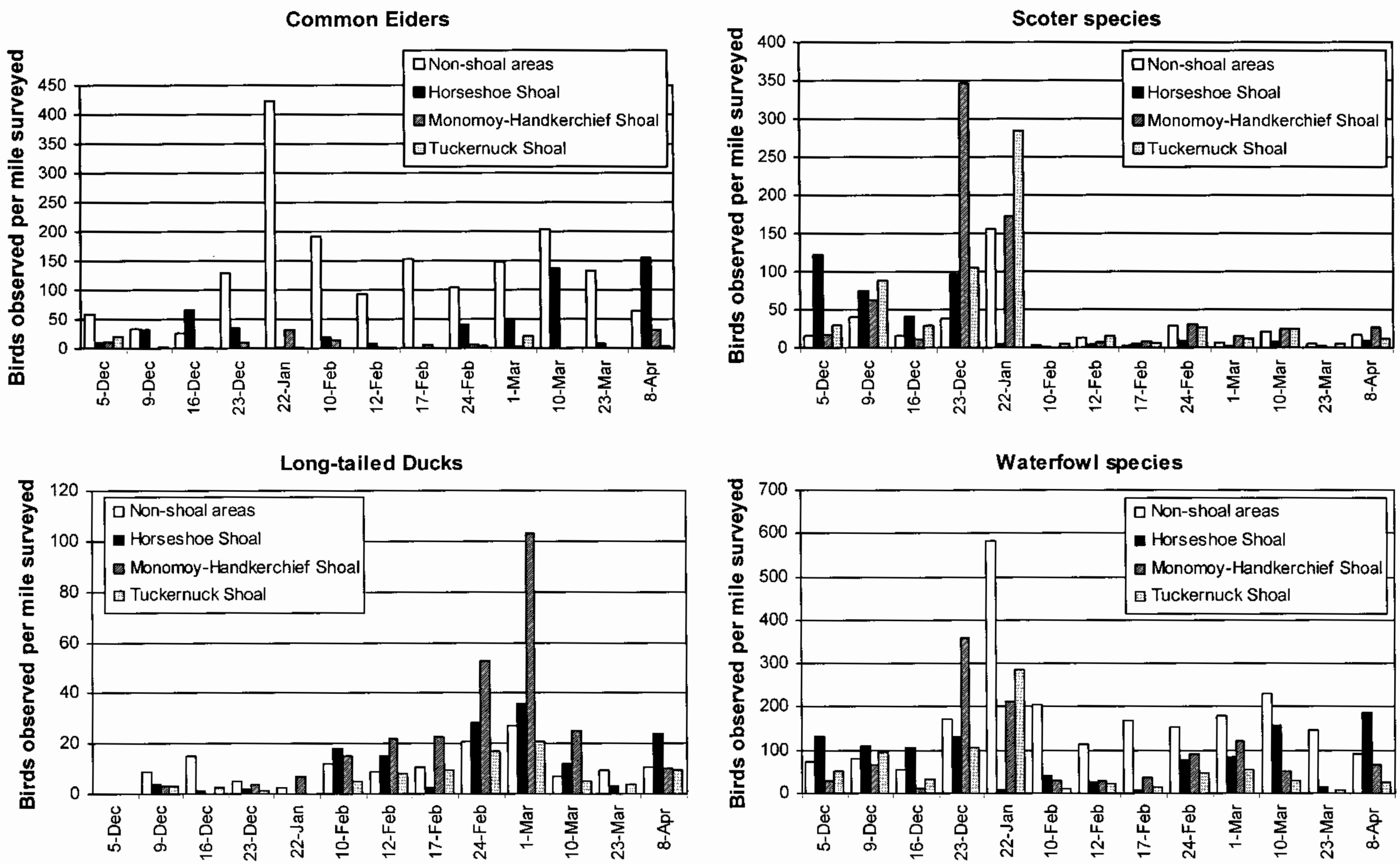

Figure 4. Distribution and abundance of approximately 280,000 Common Eiders, 91,000 scoters (all species), 32,000 Long-tailed ducks, and all waterfowl species combined (401,000) recorded on 13 aerial surveys, December 2003 - April 2004. An estimated 100 Black scoters and 1,000 Long-tailed ducks (observed on December 5, 2003) are not included. Bird per survey-mile values have been adjusted accordingly.

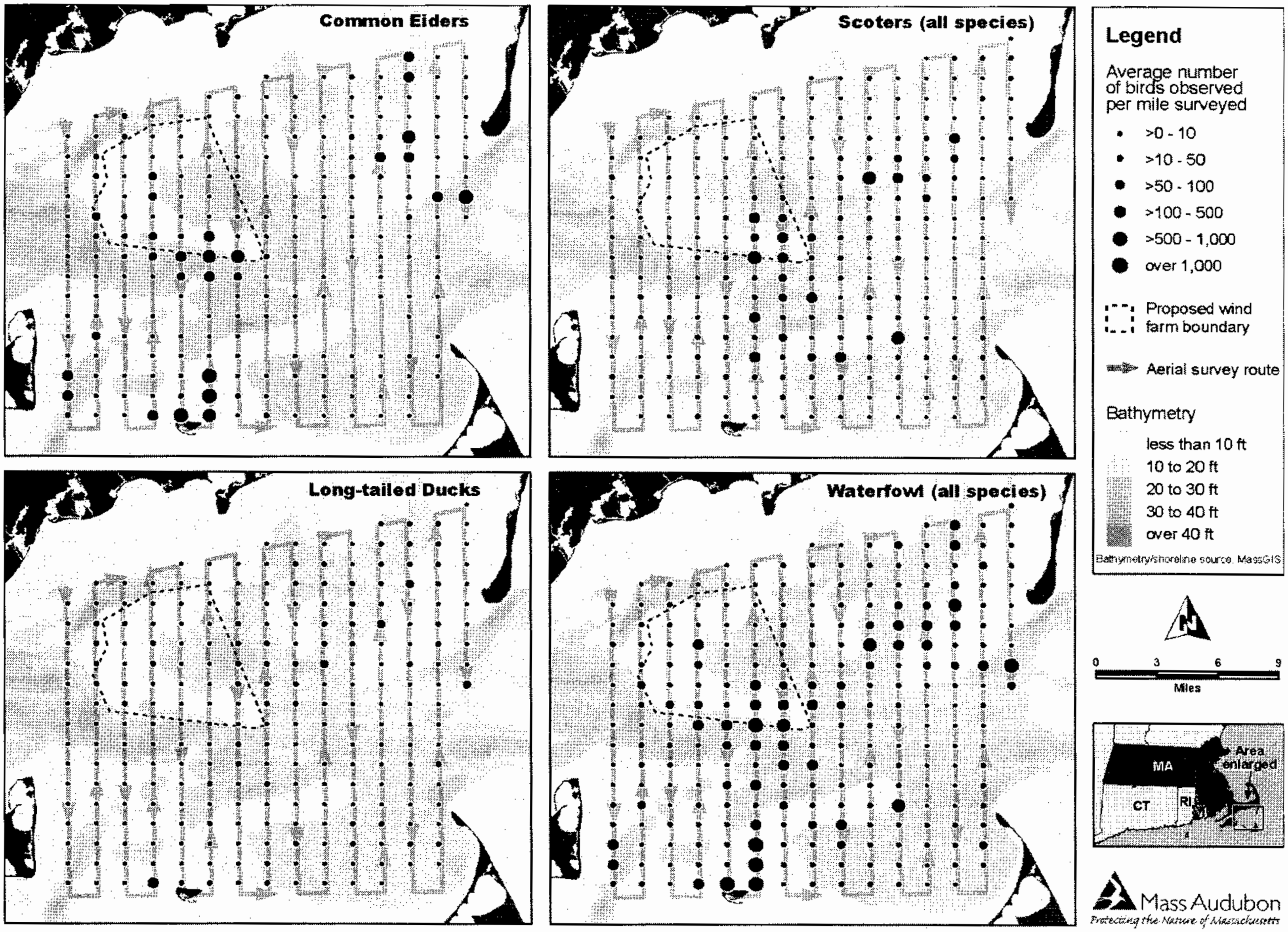

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Figure 5. Distribution and abundance of approximately 280,000 Common Eiders recorded on 13 aerial surveys between December 2003 - April 2004 broken into four periods. Abundance calculated as average number of birds per mile.

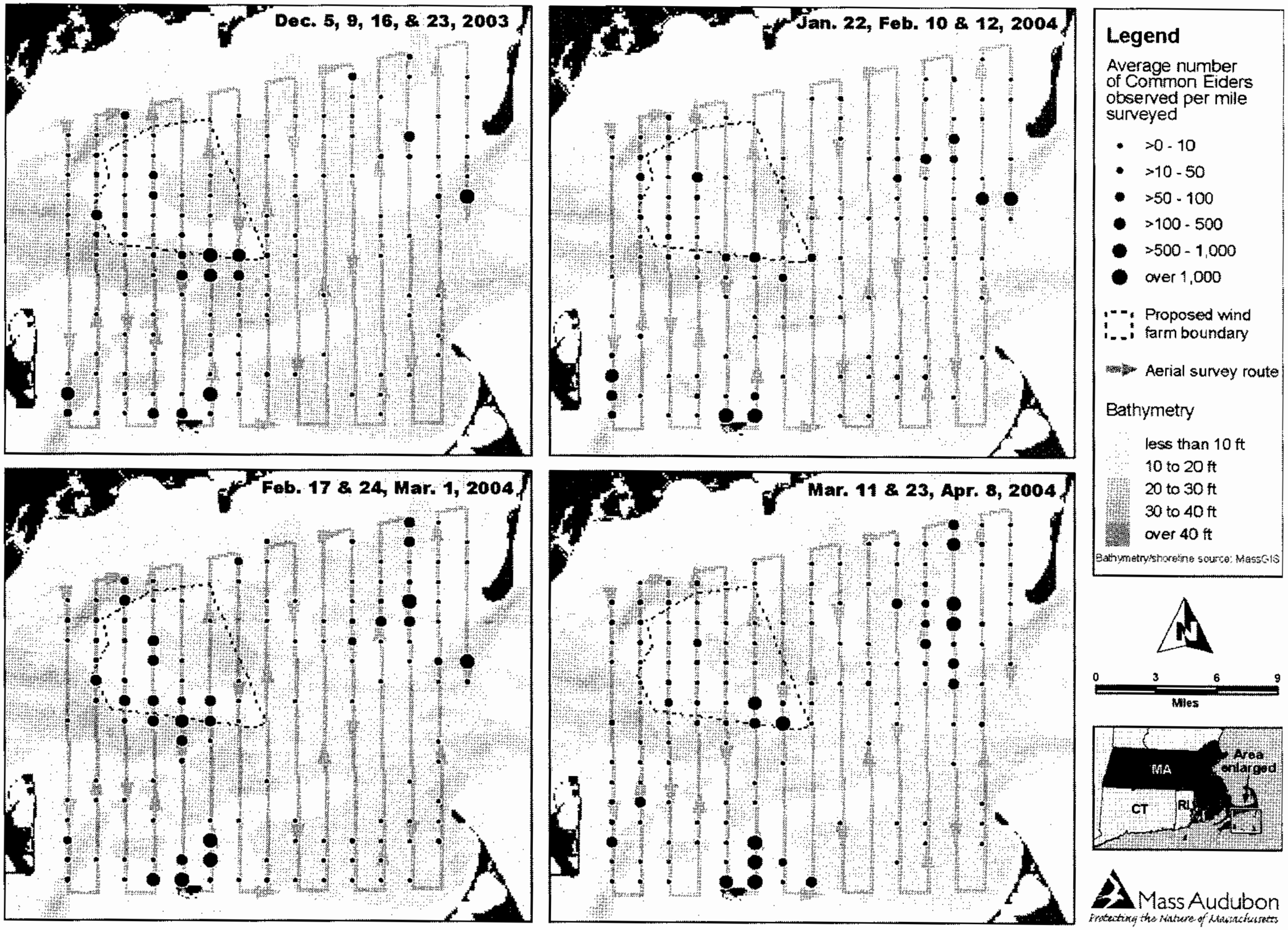

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Figure 6. Distribution and abundance of approximately 91,000 scoters (all species) recorded on 13 aerial surveys between December 2003 - April 2004 broken into four periods. Abundance calculated as average number of birds per mile. An additional estimated 100 Black scoters (observed on December 5, 2003) are not included.

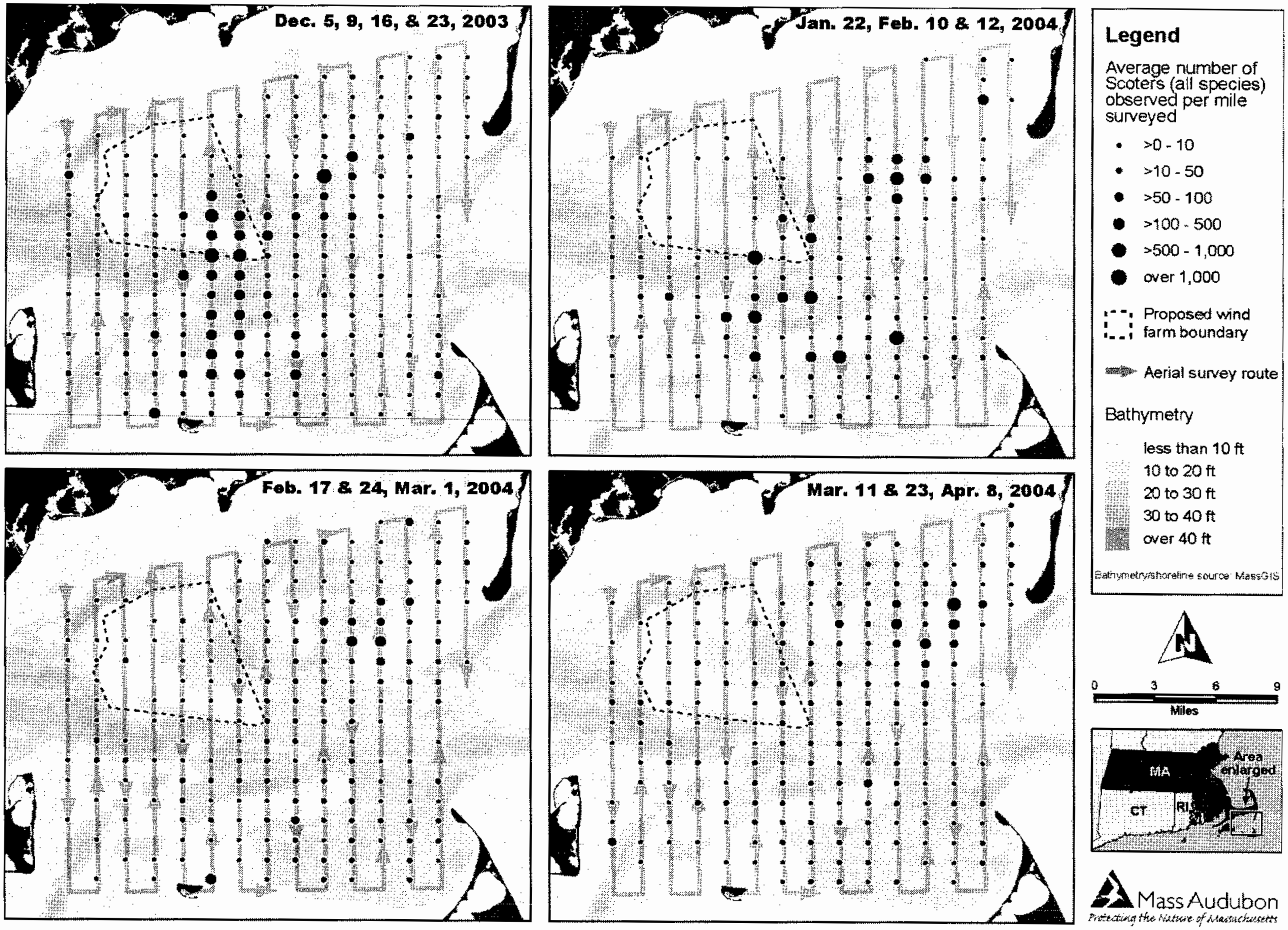
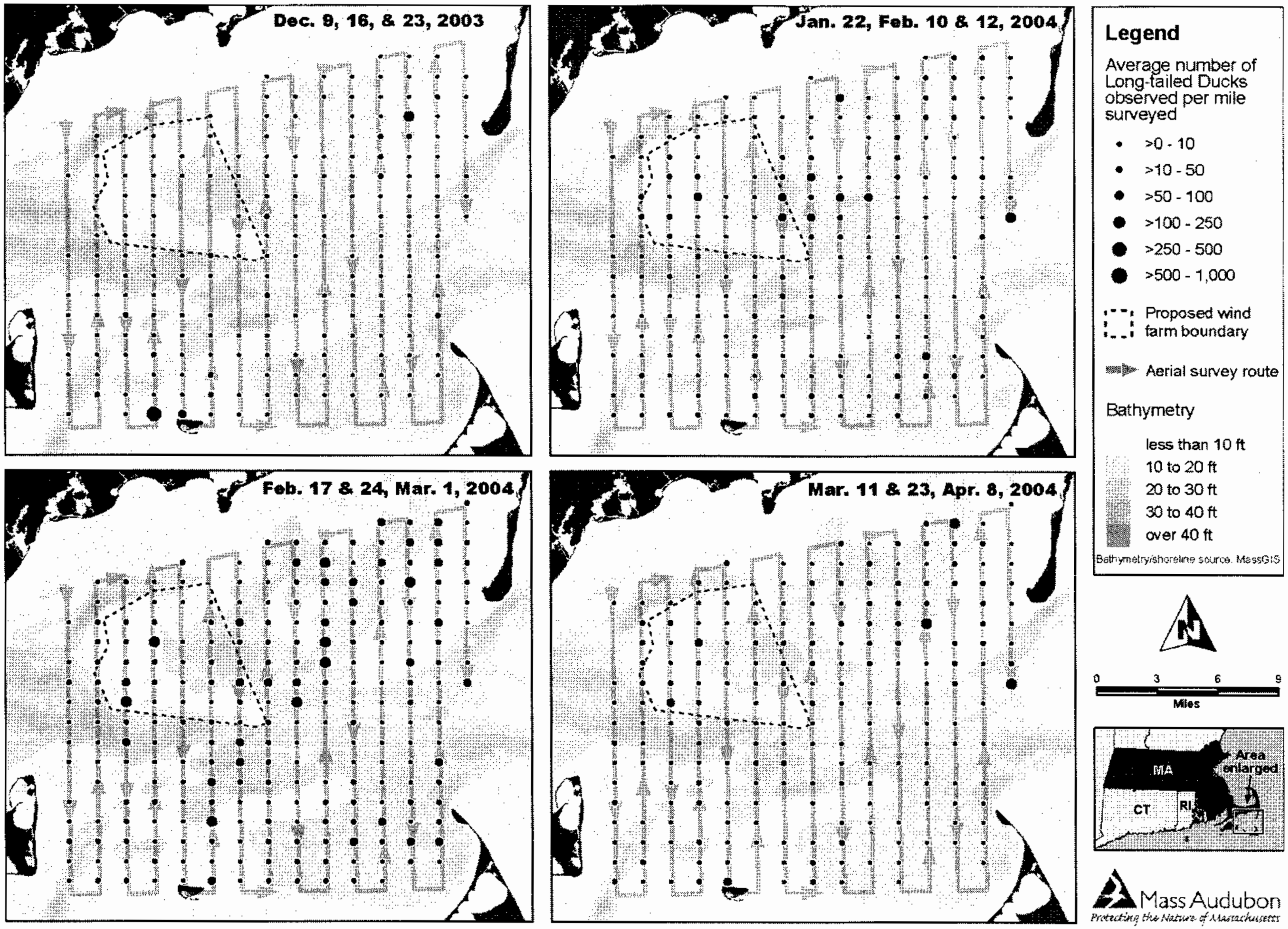


Figure 7. Distribution and abundance of approximately 32,000 Long-tailed Ducks recorded on 12 aerial surveys between December 2003 - April 2004 broken into four periods. Abundance calculated as average number of birds per mile. An additional estimated 1,000 birds (observed on December 5, 2003) are not included and this day was not included in calculations of abundance.



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Appendix

Individuals recorded by species on 13 aerial surveys between December 5, 2003 and April 8, 2004

Appendix A. Total counts of birds observed during aerial surveys of Nantucket Sound, Massachusetts, Fall 2003 – Spring 2004.

Species/Taxa	12/5/03*	12/9/03	12/16/03	12/23/03	1/22/04	2/10/04	2/12/04	2/17/04	2/24/04	3/1/04	3/10/04	3/23/04	4/8/04	**Grand Total**
Brant	0	0	0	0	0	7	0	0	0	0	0	0	0	**7**
Common Eider	11,541	6,933	6,488	24,432	53,278	20,196	17,079	23,610	20,080	28,511	40,551	8,085	16,393	**277,177**
Surf Scoter	919	658	1,148	2,359	1,046	168	549	219	102	414	69	38	47	**7,736**
White-winged Scoter	73	68	75	71	48	6	47	14	126	42	6	11	17	**604**
Black Scoter	100	9	3	4	3	0	141	1	0	10	0	0	0	**271**
Scoter species	6,150	11,813	3,637	15,398	25,727	294	2,199	507	6,300	1,346	5,005	363	3,894	**82,633**
Long-tailed Duck	1,000	1,782	2,820	1,111	349	1,903	2,566	2,244	5,770	8,087	2,049	685	3,013	**33,379**
Red-breasted Merganser	32	7	9	1	0	0	1	1	0	2	0	0	2	**55**
Red-throated Loon	40	12	2	17	4	2	7	4	1	55	0	10	0	**154**
Common Loon	25	76	0	13	4	6	10	4	0	20	2	0	0	**160**
Loon species	49	168	21	35	28	88	77	86	214	372	118	67	2,119	**3,442**
Horned Grebe	0	0	0	0	0	0	0	0	0	1	0	0	0	**1**
Red-necked Grebe	0	0	0	0	0	1	0	0	0	0	0	0	0	**1**
Grebe species	0	1	0	0	0	0	0	0	0	2	1	0	0	**4**
Northern Gannet	22	13	39	6	1	1	0	0	0	0	1	5	541	**629**
Cormorant species	2	0	0	0	0	1	0	0	0	0	1	0	1	**5**
Shorebird species	0	3	0	0	0	0	0	0	0	0	0	0	0	**3**
Bonaparte's Gull	15	3	0	4	11	0	0	0	0	0	0	0	0	**33**
Herring Gull	17	177	78	91	23	19	58	30	38	35	33	4	25	**628**
Greater Black-backed Gull	12	41	30	27	9	9	1	8	2	9	2	0	18	**168**
Black-legged Kittiwake	15	245	77	184	8	5	27	2	7	0	7	0	0	**577**
Gull species	271	572	735	411	4	35	16	2	76	5	54	0	45	**2,226**
Razorbill	0	173	13	488	3	100	128	64	366	757	117	14	353	**2,576**
Alcid species	0	0	1	2	0	0	1	0	0	0	0	0	0	**4**
Grand Total	**20,283**	**22,754**	**15,176**	**44,654**	**80,546**	**22,841**	**22,907**	**26,796**	**33,082**	**39,668**	**48,016**	**9,282**	**26,468**	**412,473**

* = Totals include estimated numbers not recorded on December 5, 2003 due to computer errors. An estimated 40 Red-throated Loons, 2 Great Cormorants, 100 Black scoters, 1,000 Long-tailed ducks, and 15 Black-legged Kittiwakes are included.

Conservation Law Foundation

February 23, 2005

Col. Thomas L. Koning
District Engineer
United States Army Corps of Engineers
New England District
696 Virginia Road
Concord, MA 01742
Attn: Karen K. Adams

004588

RE: Cape Wind Energy Project, Reference File NAE-2004-338-1

Dear Colonel Koning,

Please find enclosed the comments of the Conservation Law Foundation regarding the Cape Wind project Draft Environmental Impact Report.

We believe that the regulatory review process should proceed forward with preparation of a Final Environmental Impact Report and Statement. This process should be informed by creation of a science advisory committee that can provide guidance regarding questions where this embryonic and developing industry and technology is still gaining experience, including the avian impacts of offshore wind facilities.

One of the key charges for this committee should be to formulate a robust and effective monitoring program that can shape appropriate adaptive management of the project after it is built and provide answers to questions that simply can not be answered prior to construction and operation of the facility.

The task of siting the quantity of utility-scale renewable energy projects in New England that are necessary to offset our own regional fossil fuel emissions to the atmosphere will not be cost-free to the environment or to the quality of our lives. On the other hand, that same quality of life will inevitably be altered at a scale and with consequences that can hardly be imagined unless we act to take all responsible actions to bring renewable wind energy to the region now.

CLF is committed to the timely and responsible development of significant renewable energy resources in New England. We believe that such sources can be developed in ways that minimize the impacts to the region's native flora and fauna and as well as its quality of life. The Cape Wind Energy Project gives CLF and the region its first credible opportunity to struggle to achieve this outcome. We look forward to working with the Corps, Cape Wind Associates, and the science advisory committee to address our concerns more fully both in the coming months.

Sincerely,

Philip Warburg /ps

Philip Warburg
President, Conservation Law Foundation

cc: Secretary Ellen Roy Herzfelder
Governor Mitt Romney
Attorney General Thomas Reilly
Margo Fenn
James Gordon

62 Summer Street, Boston, Massachusetts 02110-1016 • Phone: 617-350-0990 • Fax: 617-350-4030 • www.clf.org

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Conservation Law Foundation

February 23, 2005

Secretary Ellen Roy Herzfelder
Massachusetts Executive Office of Environmental Affairs
100 Cambridge Street 9th Floor
Boston, MA 02114
Attn: Anne Canaday, EOEA #12643

Dear Secretary Herzfelder,

Please find enclosed the comments of the Conservation Law Foundation regarding the Cape Wind project Draft Environmental Impact Report.

We note the limited MEPA jurisdiction in this case. The comment letter submitted by Arthur Pugsley, who was until recently on your staff, addresses this point quite succinctly.

Substantively, we urge you to allow the regulatory review to proceed forward with preparation of a Final Environmental Impact Report and Statement. This process should be informed by creation of a science advisory committee that can provide guidance regarding questions where this developing industry and technology is still gaining experience, including the avian impacts of offshore wind facilities.

The task of siting the quantity of utility-scale renewable energy projects in New England that are necessary to offset our own regional fossil fuel emissions to the atmosphere will not be cost-free to the environment or to the quality of our lives. On the other hand, that same quality of life will inevitably be altered at a scale and with consequences that can hardly be imagined unless we act to take all responsible actions to bring renewable wind energy to the region now.

CLF is committed, as you are, to the timely and responsible development of significant renewable energy resources in New England. We believe that such sources can be developed in ways that minimize the impacts to the region's native flora and fauna and as well as its quality of life. The Cape Wind Energy Project gives CLF and the region its first credible opportunity to struggle to achieve this outcome.

We are certain that you and your office will make the determination about the adequacy of the Draft EIR on the merits, regardless of the personal opinions about the project held by high state officials.

We look forward to working with you on the important questions of environmental and energy policy raised by this review.

Sincerely,

Philip Warburg fs

Philip Warburg
President, Conservation Law Foundation

cc: Colonel Thomas Koning
Governor Mitt Romney
Attorney General Thomas Reilly
Margo Fenn, Cape Cod Commission
James Gordon

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CONSERVATION LAW FOUNDATION COMMENTS ON THE CAPE WIND ENERGY PROJECT U.S. ARMY CORPS OF ENGINEERS REFERENCE FILE NAE-2004-338-1 FEBRUARY 23, 2005

The Conservation Law Foundation (CLF) is pleased to submit these comments on the Draft Environmental Impact Statement / Draft Environmental Impact Report / Development of Regional Impact ("DEIS/DEIR/DRI" or "DEIS") for the proposal by Cape Wind Associates LLC ("Cape Wind") to construct a utility-scale wind turbine installation in Nantucket Sound ("Cape Wind Energy Project" or the "project").

In the controversy that has surrounded Cape Wind's proposal to date, heated debate has revolved around legal and aesthetic issues. Other efforts to promote wind power in Nantucket Sound have been launched based solely on the obvious crisis presented to this region by our extravagant and unsustainable combustion of fossil fuels. Climate change issues are, indeed, an essential part of the understanding the environmental and social benefits of wind power projects such as Cape Wind's and we begin our comments with a presentation of some of these broad contextual issues.

The specific task at hand is *not* an evaluation of the evidence for global climate change or the need for wind power *per se*; those, unfortunately, appear to be givens for New England at this stage. These comments, rather, are part of a critical review of the draft of an environmental impact statement so that a Final EIS can be produced that supports an informed decision about the impacts and alternatives associated with this project. CLF believes that this task must be born in mind as the community moves forward with the review of this project. We contribute these comments to the review process in that spirit.

I. Introduction

CLF is a public interest advocacy organization that works to solve the environmental problems that threaten the people, natural resources and communities of New England. Founded in 1966, CLF is a nonprofit, member-supported organization. CLF promotes clean, renewable and efficient energy production in New England and has an unparalleled record of advocacy on behalf of the region's marine environment and the scenic qualities of Cape Cod and the Islands. As part of its 40-year legacy in this region, CLF has prevented drilling for oil and gas on Georges Bank, led the legal effort to clean-up Boston Harbor and other major coastal estuaries, fought to reduce damaging off-road vehicle use on the beaches and dunes of the Cape Cod National Seashore and successfully advanced legal strategies to restore groundfish to the Gulf of Maine and southern New England waters.[1]

[1] *Conservation Law Foundation v. Clark*, 594 F. Supp. 1373 (D.Mass. 1984); *Conservation Law Foundation v. Secretary of the Interior*, 790 F.2d 965 (1st Cir. 1986); *Conservation Law Foundation v. Clark*, 590 F. Supp. 1467 (D.Mass 1984); *Conservation Law Foundation v. Metropolitan District*

Our goal in these comments is to offer perspective, insight and practical suggestions on a variety of important topics that should be at the core of the review and permitting process for this critical renewable energy project. The contextual backdrop to CLF's consideration of the Cape Wind Energy Project is the imperative need to evaluate this project in the larger context of the global crisis of climate change, a context that includes overarching environmental, public health, energy policy, legal and regulatory considerations that are not present with most other development projects. To the degree that New Englanders fail to understand and act effectively on the crisis presented by climate change, the regional ecosystem that New Englanders have experienced throughout human history could be irrevocably changed. To pretend that any of these contextual considerations do not exist would be an abdication of the responsibility the living generations have as stewards of this regional resource.

It is especially important for New England to address the forces that are driving climate change, because New England is both a major source of the climate change problem *and* likely to be affected dramatically by it. According to the National Environmental Trust, Massachusetts alone emits more greenhouse gases than 72 developing countries with a combined population of more than 300 million people.[2] Since 1970, New England's total energy consumption has increased by 23%, about 1% per year, despite the expansion of energy conservation programs.[3]

To meet the challenge of reducing fossil fuel emissions and the associated threats to public health and the global climate, New England must immediately embrace the process of bringing sources of clean energy into the region. The Cape Wind Energy Project provides a chance to begin this process, providing the region's first major source of wind energy-based power production and the opportunity to obtain experience that will allow the region to more rapidly build a full portfolio of clean energy facilities that is needed. If built, the Cape Wind Energy Project should be both a rich source of clean energy and a source of essential new information for guiding future projects.

II. The costs and benefits of the Cape Wind Energy Project must be evaluated in a larger environmental and social context.

A. The Environment and Public Health Context

The world is in the midst of a fundamental ecological crisis flowing from the unsustainable dependence on and combustion of fossil fuels; extravagant and polluting patterns of energy consumption, particularly in the developed world; and the deep, ubiquitous and systemic damage to the environment and public health that is resulting

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Commission, 757 F. Supp. 121 (D.Mass 1991); *Conservation Law Foundation v. Evans*, 209 F. Supp.2d 1 (D.D.C. 2001); *Conservation Law Foundation v. Evans*, 203 F.Supp.2d 27 (D.D.C. 2002); *Conservation Law Foundation v. Evans*, 211 F. Supp.2d 55 (D.D.C. 2002).

[2] National Environmental Trust, *First in Emissions, Behind in Solutions*, 2002, p. 35.

[3] New England Council, *New England Energy Supply & Demand: 2001 Report & Agenda for Action*, Polestar Communications & Strategic Analysis: Boston, MA, 2001, p. 5.

from our energy choices. The combustion of fossil fuels to power our life styles and our economies is at the heart of the problem. Recent scientific estimates conclude that actions must be taken to reduce anthropogenic sources of these gases within 10 years to avoid natural climate change sequences from initiating, which may well be beyond our ability to control thereafter.

This is a crisis that will not be resolved simply by improved "end-of-the-pipe" technology solutions or bandaged approaches. The answer requires significantly increased conservation and efficiency in homes and buildings as well in our transportation systems at all scales of human organization. The answer also requires the development of significant sources of non-polluting renewable energy. These responses must be immediately implemented.

The symptoms of this fossil fuel-driven crisis are already present on and around Cape Cod and the nearby islands, the proposed site of the Cape Wind Energy Project. Cape Cod suffers from some of the worst air quality in the entire New England region during the summertime. Sunlight and heat catalyze air pollution from distant and local power plants and from cars, turning these vapors into the searing ground level ozone that prompts public health warnings for vulnerable populations to restrict their activities. Increased storm activity and severity which are associated with the early stages of the climate change phenomenon place all south-facing sandy shorelines of the Cape Cod region at heightened peril to erosion.

The very physical shape and present contours of Cape Cod and the islands of Nantucket Sound and Buzzard's Bay, not to mention the hundreds of millions of dollars of private and public investment associated with these shorelines, are threatened by the relentless rise of sea levels. Numerous local scientists associated with distinguished institutions of international repute, such as the scientists of Cape Cod at the Woods Hole Oceanographic Institution, the Woods Hole Research Center and the U.S. Geological Survey research center in Woods Hole, are included in the ranks of those who have concluded that immediate actions need to be taken at all levels to avert the worst potential consequences of climate change.[4] While some of the south-facing beaches of Cape Cod may well be the area that would experience the greatest aesthetic impact of the proposed project, these same beaches are the "south facing outwash plain" that has been identified by scientists as particularly vulnerable to sea level rise.[5] These resource areas, which are so uniquely at risk to extensive climate change damage, are critical both to the world-famous recreational aspects of this area as well as to the ecological characteristics that make these beaches critical habitat to several endangered bird species.

Moreover, the migratory bird species that are understandably the subject of so much concern in the review of the Cape Wind Energy Project are greatly dependent on the stability and health of ecosystems in many other parts of the world that are already experiencing wrenching transformation as the climate changes. These critical habitats

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[4] *See, e.g.,* Graham S. Giese and David G. Aubrey, "Loss of Coastal Upland to Relative Sea level Rise," *Coastal Brief:* 1994-02, Woods Hole Oceanographic Institution, Coastal Research Center.
[5] *Ibid.*

will see far worse alterations as global warming continues.[6] This fundamental ecological context is what sets the environmental review of the Cape Wind Energy Project apart from virtually any other development project that CLF has reviewed. It is a context that cautions against using narrowly drawn perspectives or conclusions.

If the DEIS for this project has one fundamental shortcoming from CLF's perspective, it is its failure to spell out with specificity the public health and climate change consequences of continued failure to immediately reduce greenhouse gas emissions by aggressive use of conservation, fuel-switching, end-of the-pipe reduction technologies, renewable energy development, and efficiency investments. This fundamental context, on which so much of what all New Englanders hold precious depends, should be more clearly described in the Final EIS and considered in the ultimate decision-making and public interest evaluation process.

B. The Energy System Context

Motivated by a variety of concerns, Massachusetts and, to a lesser degree, the federal government have made fundamental decisions about the direction of energy policy and development. Massachusetts has charted a clear policy direction in favor of the development of renewable energy sources through the creation of the Renewable Portfolio Standard[7] along with launch of the Massachusetts Renewable Energy Trust.[8] Congress has provided the much smaller and recently renewed incentive of federal Production Tax Credits for renewable energy.[9] It is also noteworthy that a significant regional multi-state initiative going beyond New England is underway to control greenhouse gas emissions from electricity generation throughout the entire northeastern United States.[10] The project under review in this process represents a positive, even hopeful, response to these policies: a private facility being built to supply electricity from a renewable source.

The policy choice to provide incentives for renewable energy was made not only with the ecological perspectives noted above in mind, but also in order to buffer ratepayers and the Massachusetts economy from the chaos and economic pain that fluctuations in fuel prices will continue to bring to our energy markets. The U.S. Energy Information Agency has forecast that a serious national commitment to renewable energy would yield $9.1 billion in savings on natural gas bills and $4.4 billion in savings on electricity bills over a 20-year period.[11] This conservative estimate highlights the critical importance to the economy that renewable energy programs can make and the importance of getting this precedent-setting decision in Nantucket Sound right. We believe that this context should be more clearly, plainly and effectively presented in the Final EIS, by

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[6] *See generally*, documents at http://www.acia.uaf.edu/.
[7] *See generally*, 225 Code Mass. Regs. 14.00.
[8] *See generally*, Mass. Gen. Laws c. 40J § 4E.
[9] 26 U.S.C. § 45.
[10] *See generally*, www.rggi.org.
[11] EIA, Impacts of a 10-Percent Renewable Portfolio Standard, SR/OIAF/2002-03. February 2002.

explicit identification of how the project advances significant energy policy goals articulated in state and federal statutes, regulations and executive orders.

Moreover, the DEIS accurately notes that "under the No Action Alternative, or if the permit is denied, it is likely that commercial development of offshore wind power in the United States, at a comparable size and scale of that proposed by the Applicant, will not advance significantly." DEIS at 3-27. Significant wind power development has occurred in areas of the United States such as the Midwest and Texas where large areas of private lands are available and useable for this purpose. Similar opportunities in New England are rare and are not readily connected to the power distribution network.

The Cape Wind review will likely establish a precedent for future reviews of offshore wind projects as well as wind-powered energy projects on federal land. Given that the policy choice noted above looks to the private market to advance the renewable energy initiative, development barriers have to be set at reasonable levels and must acknowledge that many of the first marine projects will move forward with less than perfect information or scientific assessments of the interactions between the projects and important marine and coastal mammal, fish and avian species. The responsible course of action, given the climate change imperative driving renewable projects such as the Cape Wind Energy Project, is to ensure that a credible and thorough environmental review analysis has been done to ensure that risks and benefits of the project are as clearly identified as possible given the developmental stage of technology.

If such analysis concludes that it is environmentally responsible to move the project forward given both the specific project impacts as well as the larger ecological context to which renewable projects are responding, the project should be moved forward. However, it should be conditioned to insure the collection and analysis of monitoring data as necessary to minimize environmental impacts of the project and to allow improved reviews and decision-making with respect to future projects. Indeed, the sobering truth is that in order to meet critical objectives for reducing emissions of CO_2, SO_2, NO_x and other pollutants in New England, the region must develop a number of onshore and offshore utility-scale wind facilities. The pioneering Cape Wind Energy Project, if properly executed, could provide information essential to reaching the regional objective in a timely manner. As the accuracy and scope of this information would provide significant public benefits beyond those to the individual wind project itself, CLF concludes that it is appropriate and necessary for government and other stakeholders in the wind industry to assist in the financing, design and oversight of systems for data collection.

C. The Regulatory Context

CLF has followed the Cape Wind Energy Project very closely since it was first announced nearly three years ago. In April of 2002, CLF submitted detailed comments on the proposed scope for the Cape Wind DEIS/DEIR/DRI. In May of 2002, CLF submitted comments urging approval of Cape Wind's application for an Army Corps of Engineers "Section 10" permit for construction of a Scientific Measurement Devices

Station ("SMDS" or "data tower") that would supply important data for the review of the proposed Cape Wind Energy Project itself.

CLF has invested considerable research and analysis into the legal, regulatory and permitting questions raised by the Cape Wind Energy Project and by the fact that the project would be located in federal waters. In a November 7, 2002 letter, CLF, joined by several other environmental groups, responded to concerns raised by Massachusetts Attorney General Thomas F. Reilly about the sufficiency of the Army Corps of Engineers' ("Corps" or "ACE") Section 10 permitting. In that letter and in subsequent congressional testimony[12] as well as in *amicus curiae* briefs filed in the Federal District Court for the District of Massachusetts[13] and in the First Circuit Court of Appeals,[14] CLF has defended the adequacy of the Section 10 review process and the environmental review requirements of the National Environmental Policy Act ("NEPA") to identify and assess the Cape Wind Energy Project's potential benefits and adverse impacts.

While CLF strongly believes that an integrated, ecologically-informed ocean management approach for federal and state marine waters is needed and that a comprehensive permitting framework for offshore renewable energy development is desirable, CLF strongly disagrees that a moratorium is necessary or prudent on offshore wind development pending enactment of a new framework for managing offshore wind development. Renewable energy is urgently needed in order to offset harmful fossil fuel emissions that pollute the air, cause global warming and damage the public health. A moratorium does more long-term harm than good for New England. The review process currently underway with the Cape Wind Energy Project can meet the challenge of responding in a timely and appropriate manner to the larger environmental and energy policy context while staying true to the essential mission and function of the existing statutes and regulations that guide the process.

III. Specific Comments on the Draft EIS

CLF's staff have identified specific gaps and concerns about the data and analysis presented in the DEIS that we presently believe need to be addressed before federal decision-makers can be determine whether the project can move forward in an environmentally responsible manner. These issues should be resolved and addressed in the Final EIS prior to the issuance of any permits. We have identified other issues that we believe can be properly addressed and managed after permit issuance. All regulatory issues that are dealt with through post-permitting mechanisms and conditions need to be the subject of clear statements regarding what those mechanisms will be. CLF's experience with many large-scale projects is that it is possible to create effective post-

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[12] Testimony of Peter Shelley of the Conservation Law Foundation on behalf of the Conservation Law Foundation, the Union of Concerned Scientists, Natural Resources Defense Council, and Environmental Defense, before the Subcommittee on Energy and Mineral Resources, Concerning HR 793, A Bill to Amend the Outer Continental Shelf Lands Act, March 6, 2003.

[13] *Alliance to Protect Nantucket Sound v. U.S. Dept. of the Army*, C.A. NO. 02-11749 JLT (D.Mass.), Brief of Amicus Curiae Conservation Law Foundation, Jan. 15, 2003.

[14] *Alliance to Protect Nantucket Sound v. U.S. Dept. of the Army*, Docket No. 03-2604 (1st Cir.), Brief of Amicus Curiae Conservation Law Foundation, May 19, 2004.

construction monitoring and management programs for complex projects if the program requirements are well-designed, executed and enforced. It is also all too easy to find examples in our region where post-permitting monitoring and management programs have failed to protect the public interest and avoidable environmental harms have occurred. To avoid the latter situation, we make suggestions below such as the creation of an independent science advisory board to oversee development of this project and to ensure that legitimate environmental concerns are identified and addressed in a timely and responsible manner during and after construction.

A. The DEIS does not adequately address the dangers of climate change and the benefits of renewable energy.

The discussion of project benefits in the DEIS is scattered throughout the document, in many cases buried toward the end of the Corps' consideration of potentially adverse impacts in Section 5 of the document. This is confusing and CLF urges the Corps to include a prominent separate section on "Project Benefits" in the Final EIS, either within or immediately following the section on "Project Purpose and Need." Such section should describe the importance of the project in terms of furthering the deployment of renewable energy.

The substantive discussion of project benefits is too cursory and should be expanded in the Final EIS in order to give the reader an understanding of the substantial advantages of advancing this renewable energy project. This is especially true with respect to the interaction between the project and emissions from other forms of electricity generation, particularly with regard to the local fossil fuel power plants that would be displaced, i.e. not dispatched, as a result of the operation and generation of the Cape Wind Energy Project.

An understanding of climate change, also known as "global warming," is essential to assessing the significant potential benefits of utility-scale renewable energy projects such as the Cape Wind Energy Project, and to balancing the potential environmental costs of the project with the corresponding environmental benefits of the project to the environment and public health. Unfortunately, the DEIS contains only very little information about climate change and the importance of utility-scale renewable energy projects in reversing the global warming phenomenon. DEIS Section 5.15 does address "Air and Climate," but it addresses the problem of climate change – and the corresponding potential benefits of the Cape Wind Energy Project – in an unfortunately cursory manner. The Final EIS should include a prominent discussion of climate change and the benefits of renewable energy. This discussion and analysis should be in a "Project Benefits" section.

1. The fundamental challenge of global warming

The discussion of climate change in the Final EIS should note that the U.S. federal government, in its 2002 "Climate Action Report," has acknowledged the existence of global warming and made a commitment to curb greenhouse gas emissions.[15] More recently, a Pentagon-commissioned report predicted a "plausible" scenario of abrupt climate change in which resulting "food, water, and energy resource constraints will first be managed through economic, political, and diplomatic means," but that over time, "conflicts over land and water use are likely to become more severe – and more violent."[16] The November 2004 release of the Arctic Climate Impact Assessment revealed to the world dramatic findings and predictions about Arctic warming – including the fact that climate change is *now* affecting the Arctic, and that at least half of the summer sea ice in the Arctic is projected to melt by the end of this century, significantly contributing to further warming, global sea level rise and habitat losses.[17]

The need to act now to combat climate change has also been recognized at the regional and state level. In 2001, the Conference of New England Governors and Eastern Canadian Premiers acknowledged that greenhouse gas emissions must be reduced from current levels by 75-80% to eliminate the threat of climate change and issued a regional climate action plan.[18] In the spring of 2004, the Commonwealth of Massachusetts released its own state-based plan, known as the "Climate Protection Plan," for reducing greenhouse gas emissions and promoting energy efficiency to combat climate change.[19]

Indeed this pressing and preemptive need to address the CO_2 emissions causing global warming is already a prime mover behind state energy and environmental regulatory policy, as the Department of Environmental Protection of the Commonwealth of Massachusetts noted in support of its groundbreaking rules regulating CO_2 emissions from coal-fired power plants:

> To avert dangerous climate disruption, the IPCC states that the current global emissions of about 6 billion tons carbon equivalent, now projected to increase to about 20 billion tons by the end of this new century, would have to decrease to less than three billion tons by that time. Even then, the carbon equivalent in the atmosphere would reach about 450 parts per million, about 60 percent above pre-industrial levels, which would still entail some climate change, sea-level rise, and ecological impact.[20]

Recent international processes have highlighted the essential need for industrialized nations, like the United States, to address this crisis by, among other

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[15] U.S. Dept. of State, *The United States of America's Third National Communication Under the United Nations Framework Convention on Climate Change* (May 2002).
[16] Peter Schwartz and Doug Randall, An Abrupt Climate Change Scenario and Its Implications for United States National Security, October 2003.
[17] ACAI, *Impacts of a Warming Arctic: Arctic Climate Impact Assessment*, Cambridge University Press, 2004.
[18] New England Governors/ Eastern Canadian Premiers, Climate Change Action Plan 2001, August 2001.
[19] Commonwealth of Massachusetts, Massachusetts Climate Protection Plan, Spring 2004.
[20] STATEMENT OF REASONS AND RESPONSE TO COMMENTS FOR 310 CMR 7.00 et seq.: 310 CMR 7.29 – Emission Standards for Power Plants, April, 2001, http://www.state.ma.us/dep/bwp/daqc/files/regs/finalrsn.doc

measures, generating at least 25% of their electricity from clean, renewable and non-emitting resources like wind power.[21]

The statutorily prescribed energy policy of Massachusetts is clear in its direction to favor and build renewable energy. This energy policy is articulated through the regulatory mandate of the Renewable Portfolio Standard[22] and the financial incentive mechanisms that flow from the Massachusetts Renewable Energy Trust.[23] The Climate Protection Plan unveiled by Massachusetts Governor Mitt Romney identifies the development of renewable energy as being a primary tool that must be used to address the fundamental threat to our environment posed by global warming: "access to cleaner energy supplies, including the building of renewable and green resources - from photovoltaic panels and wind generators to ultra-clean fuel cells - represents an important way to meet future energy needs while dramatically cutting carbon emissions."[24]

2. <u>The impact of climate change on New England</u>

Global warming has dramatic implications for New England's weather and natural heritage. Conservative computer models suggest that within the next century, the climate of Massachusetts will resemble that of North Carolina or possibly Georgia. New England's autumn foliage, maple syrup production and ski season will all become a distant memory.[25] Habitat areas that now support familiar wildlife species, including beloved songbirds and sought after fishes, will no longer be suitable and these species will move to new areas or perish.

While Section 3.3 of the DEIS describes conditions and impacts that could be expected if the Cape Wind Energy Project were not developed, far more can and should be said on this subject. This section of the DEIS highlights certain anticipated adverse effects of additional or expanded fossil fuel power plant facilities including:

- The visual landscape at one or more locations elsewhere in New England would change with the likely addition of one or more stacks and associated facilities from a natural gas-fired power plant. DEIS at 3-27.
- Local impacts to birds, fish and other resources would occur to a greater or lesser extent (depending upon resource and location) as the result of the development and operation of a fossil fuel power plant elsewhere in New England. DEIS at 3-28.

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[21] *See*, Recommendations of International Climate Change Taskforce, January 2005, http://www.americanprogress.org/atf/cf/%7BE9245FE4-9A2B-43C7-A521-5D6FF2E06E03%7D/CLIMATECHALLENGE.PDF.
[22] *See generally*, 225 Code Mass. Regs. 14.00.
[23] *See generally*, Mass. Gen. Laws c. 40J § 4E.
[24] Massachusetts Climate Protection Plan, Executive Summary at p. 10 (Spring 2004) (http://www.mass.gov/ocd/docs/MAClimateProtectionPlan.pdf).
[25] *See* Conservation Law Foundation, *Heritage in Peril: New England and Global Warming*, p. 2-6 (and sources cited therein). Report available at http://www.clf.org/general/index.asp?id=335.

Notably absent from this list, however, are the observed and predicted environmental impacts of climate change in the New England region, including sea level rise and coastal degradation, for which utility-scale renewable energy projects are urgently needed. Among these impacts are the dislocation and wide-scale transformation of the bird species traditionally found on Cape Cod.[26] Similar dramatic and negative population shifts in commercial and non-commercial marine fish populations are anticipated with climate change.[27] The Final EIS should expand the list of anticipated environmental impacts of the No Action Alternative to include climate change impacts attributable to fossil fuel power generation. A direct impact of the No Action Alternative is the loss of the Cape Wind Energy Project's offset of about 1,000,000 tons per year of carbon dioxide emissions.

3. <u>The positive impacts of the Cape Wind Energy Project on public health</u>

Substantial reduction in fossil fuel power plant emissions and other pollutants is critical as a matter of public health. Air pollution causes thousands of premature deaths in New England every year, with a substantial and well-documented part of the mortality attributable to the region's old fossil fuel power plants.[28] Southeastern Massachusetts has New England's heaviest concentration of coal-fired power plants.

The DEIS contains a brief discussion of public health benefits and related cost savings of the Cape Wind Energy Project at Section 5.16.4.3, as well as a brief discussion of the adverse public health impacts and economic costs imposed by fossil fuel power generation at Section 5.16.3.3. Notably, the DEIS estimates beneficial health effects of the Cape Wind Energy Project to include a reduction of about 12 premature deaths, 20 cases of bronchitis, 200 emergency room visits, 5,000 asthma attacks, 15,000 restricted activity days and 35,000 respiratory symptom days. The cost savings of these reductions in health problems is estimated at $53 million. These findings constitute significant project benefits, which should be included, along with the discussion of climate change, in a "Project Benefits" section recommended above.

Additionally, the DEIS fails to address the adverse health consequences of the No Action Alternative. As noted above, Section 3.3 of the DEIS describes conditions and impacts that could be expected if the Cape Wind Energy Project were not developed. The Final EIS should expand its discussion of the No Action Alternative to include health

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[26] *See* Ivan Valiela and Jennifer L. Bowen, *Shifts in Winter Distribution in Birds: Effects of Global Warming and Local Habitat Change*, Ambio Vol. 32 No 7 (Nov. 2003).
[27] *See generally*, Donald F. Boesch, John C. Field, and Donald Scavia, The Potential Consequences of Climate Variability and Change on Coastal Areas and Marine Resources: Report of the Coastal Areas and Marine Resources Sector Team, U.S. National Assessment of the Potential Consequences of Climate Variability and Change. U.S. Global Change Research Program. NOAA Coastal Ocean Program Decision Analysis Series No. #21. NOAA Coastal Ocean Program. (Silver Spring, MD, 2000); Victor S. Kennedy, Robert R. Twilley, Joan A. Kleypas, James H. Jr. Cowan and Steven R. Hare, Coastal and Marine Ecosystems & Global Climate Change. Potential Effects on U.S. Resources, Prepared for the Pew Center on Global Climate Change, 2002.
[28] *See* Jonathan I. Levy and John D. Spangler, *Modeling the Benefits of Power Plant Emission Controls in Massachusetts*, 52 J. of the Air & Waste Mgmt. Ass'n. 5 (2002).

impacts attributable to fossil fuel power generation. Direct health impacts associated with a decision to not proceed with the Cape Wind Energy Project are attributable to the loss of Cape Wind's offset of nearly 1,000,000 tons per year of carbon dioxide emissions, 1,180 tons of nitrogen oxides (NO_x), and 4,000 tons of sulfur dioxide (SO_2). The indirect health impacts are much more far-reaching, as denial of a permit to the Cape Wind Energy Project may chill utility-scale renewable energy development in New England for years to come.

4. The positive impacts of the Cape Wind project to electricity consumers

Section 5.16.4.2 of the DEIS correctly documents the conclusions of the staff of the Massachusetts Energy Facilities Siting Board, based upon a study by La Capra Associates that the project would have a positive impact on electricity rates and costs across the region. The estimate of a total annual savings to ratepayers of approximately $25 million per year for the first five years is significant and should be highlighted prominently in the "Project Benefits" section recommended above. It should also be noted that the cost savings estimate is very conservative and that actual cost savings are likely much higher. The La Capra study itself notes that its simulation used an assumed cost of fossil fuels that was lower than actual prices, which spiked in 2000, early 2001 and late 2002. Natural gas prices have continued to rise in 2003 and 2004. This trend suggests that La Capra may substantially have underestimated ratepayer savings.

The renewable energy that would be generated from the Cape Wind Energy Project is also needed for compliance with Massachusetts Renewable Portfolio Standards (RPS) obligations. Accordingly, the Final EIS should include, in its "Project Benefits" section, the satisfaction of near- to medium-term RPS obligations and the consumer cost savings associated with meeting the RPS standards. The Final EIS should also highlight the likelihood of higher consumer energy costs in the "No Build" portion of the Alternatives Analysis.

5. The positive impacts of the Cape Wind Energy Project on system reliability

Section 5.16.4.2 of the DEIS recognizes the fuel diversity and reliability benefits of the project, but fails to highlight the specific analysis performed by the U.S. Department of Energy (DOE) that is presented in Appendix 2.0-A. The Final EIS should cite to the DOE's specific findings regarding the added reliability that the proposed project would bring the regional electricity grid. In particular, the Final EIS should highlight DOE's conclusion that: "During the January 14-16, 2004 period of natural gas shortage, the Cape Wind Energy Project, if it had been constructed and was online, would have made a significant contribution to the power supply and reliability of the regional grid." DEIS Appendix 2.0-A at p. 7. The Final EIS should also include a discussion of the unique combination of "cold snap" factors that led to DOE's conclusion: high demand for gas for space heating during "cold snap" conditions; difficulty in operating a combined cycle gas plant during such conditions; economic pressure on such plants to sell gas for heating rather than burn it for electricity production; and the proven, high likelihood that such conditions will coincide with peak operating conditions for the proposed wind energy facility.

B. Existing regulatory programs provide a sufficient legal basis for reviewing the Cape Wind Energy Project.

The specific regulatory context for the Cape Wind Energy Project has two critical frameworks. The first framework is the specific legal and regulatory structure for the permitting of the project. Below we present our perspective of that regulatory structure, both with regard to the federal review conducted by the Corps and the specific aspects of the state review. This perspective is necessary as a result of the unusual amount of disinformation and false controversy created around these existing regulatory mechanisms by project opponents.

The second framework for project review is more factual – the "nuts and bolts" analysis of the potential impacts of the project through the frame of the regulatory statutes, an analysis that we employ to shape and present specific recommendations regarding the specific further analyses, monitoring requirements and permit conditions that need to be developed by the regulatory authorities in order to move the project forward.

1. The permitting jurisdiction of the Army Corps of Engineers, NEPA, and the Section 10 "public interest review"

The DEIS in Section 7.2.2.1 correctly notes that the construction "of any structure in, over, or under navigable waters of the United States requires a Section 10 permit," that the wind farm and the underwater transmission cables "are considered structures in navigable waters of the U.S.," and, accordingly, that "Section 10 jurisdiction applies to the proposed project." DEIS at 7-3. Notwithstanding the claims of project opponents, the Army Corps' Section 10 authority *is not* limited to state waters, structures used for oil and gas mining, or to questions of navigability. CLF argued this point extensively in an *amicus curiae* brief in the Cape Wind test tower litigation, in which the Massachusetts District Court confirmed that the Corps' Section 10 authority extends to all structures on the Outer Continental Shelf regardless of their purpose.[29]

This Section 10 permitting process requires that the Corps engage in an extensive "public interest review" and act as the "lead" agency for a number of inter-agency review processes, most importantly an environmental analysis under the National Environmental Policy Act ("NEPA"). In conducting its "public interest" analysis pursuant to Section 10, the Corps must consider all factors that may be relevant to the proposal and then grant a permit unless, upon review, the Corps determines that the project would be against the public interest. Factors include "conservation, economics, aesthetics, general

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[29] *See* Alliance to Protect Nantucket Sound v. U.S. Dept. of the Army, 288 F. Supp. 2d 64 (D. Mass. 2003). That legal conclusion was recently upheld by the First Circuit Court of Appeals. *See* Alliance to Protect Nantucket Sound v. U.S. Dept. of the Army, -- F.3d --, 2d 64 2005 WL 357,636 (1st Cir. Mass. Feb. 16, 2005)

environmental concerns, wetlands, historic properties, fish and wildlife values, flood hazards, floodplain values, land use, navigation, shore erosion and accretion, recreation, water supply and conservation, water quality, energy needs, safety, food and fiber production, mineral needs, consideration of property ownership and, in general, the needs and welfare of the people." 33 C.F.R. § 320.4(a)(1).

The Section 10 public interest review significantly overlaps with and guides the work of the Corps as the lead federal agency in the NEPA process. The Corps is required – based on quantitative and qualitative data supplied by the project proponent – to prepare an Environmental Assessment ("EA") or an Environmental Impact Statement ("EIS"). 33 C.F.R. § 325, App. B. In this case, the Corps has determined that an EIS is required and engaged 16 other federal and state agencies in relevant review processes. The alternatives analysis is "the heart of the environmental impact statement." 40 C.F.R. § 1502.14, *cited in* Sierra Club v. Marsh, 714 F.Supp. 539, 572-3 (D. Me. 1989). A proper analysis of alternatives requires the lead agency to be extremely careful in identifying the purpose of the project and evaluating alternatives that may or may not achieve that purpose.

Appropriate formulation of a project purpose focuses on the project need. The Army Corps of Engineers has determined that the purpose and need of the Cape Wind Energy Project is "to provide a utility-scale renewable energy facility providing power to the New England grid." DEIS at 2-2. This formulation of need arises directly out of New England states' laws and policies to stimulate renewable energy production.

Indeed, it is impossible to imagine that the challenge of the Regional Greenhouse Gas Initiative (mentioned above), which is attempting to fashion a "carbon cap and trade" program for electricity generating facilities in the Northeastern United States,[30] can be met without multiple facilities of this sort and scale coming on line in the near future. The preliminary baseline modeling for that process suggests that efficient economic operation of the regional power system (that maintains current positive trajectories for reduction in nitrogen oxide and sulfur dioxide emissions) will require the siting and building of roughly 4 Gigawatts (4,000 Megawatts) of wind generation in the near future.[31] It is reasonable to assume meeting a carbon cap will require even more wind generation and that a significant percentage of this generation will need to be sited in New England, reinforcing the "purpose and need" determination in the DEIS.

The alternatives analysis presented in Section 3.0 of the DEIS is a solid and competent attempt at meeting this "purpose and need" determination and substantially responds to the issues identified in federal and state scoping documents (the Army Corps' EIS scope of work and MEPA Scoping Certificate) in this critical area. This analysis, moreover, could be strengthened in the Final EIS.

2. <u>Questions of renewable technology and site location alternatives</u>

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[30] *See generally*, http://www.rggi.org.

[31] http://www.rggi.org/docs/prelim_results_11_12_04.pdf.

The DEIS comes to the sound conclusion that the only viable renewable energy technology currently capable of shouldering a utility-scale load is wind generation. The other renewable technologies presented and analyzed in Section 3.2.2 of the DEIS are important elements in building a clean energy future for Massachusetts, New England, the United States and the world, but they are not currently capable of fulfilling the function of providing large "utility-scale" energy generation in New England.

The DEIS could be improved by inclusion of a chart in the Final EIS that summarizes the different renewable energy technologies, clearly delineating technologies that are not suitable for large-scale centralized electricity generation (e.g., solar photovoltaics), technologies that can be operated on larger-scales but not on the scale of the proposed wind facility (e.g., biomass), technologies that are not yet ready for commercial operation in any significant measure (e.g,, tidal power), and technologies that can produce substantial power in other regions but not in New England (e.g., hydroelectric or concentrated solar). Such a chart could also highlight the alternative renewable technologies with significant negative environmental impacts including air emissions (e.g,, biomass) and habitat disruption (e.g,, hydroelectric power). While such factors are not determinative in the initial screening analysis – where the key question is whether the technology can serve the stated "purpose and need" – they nonetheless remain important pieces of information.

Additionally, the Final EIS should more clearly explain the major technological leaps that will be needed to accommodate wind turbines in substantially deeper and/or stormier waters. As documented in Section 3.4.2.2.10 and Appendix 3-F, the proposed Cape Wind Energy Project would be close to the cutting edge of current technology in terms of water depth and wave heights. A more detailed explanation of the factors that will need to be overcome in order to pursue wind development in deeper waters, however, would be helpful. Such an explanation would detail the engineering issues associated with the stress of stormier waters on the towers, the operation and maintenance issues raised by more remote locations, and the significant issue of increased distance that transmission lines would need to traverse and the potential need to make use of direct current ("DC") and/or advanced superconducting transmission infrastructures. The increased costs and dispatching implications for the power generated by such remote sites should also be developed.

The Final EIS should also provide updated information on wind resource mapping. The state of the art in this arena continues to advance and additional data that is in the public domain and/or is readily available from sources like the Massachusetts Renewable Energy Trust would buttress the analysis in the DEIS in this area.

The extensive location analysis in the DEIS that underlies the alternatives analysis provides some important insights worthy of mention. The assertions that the Massachusetts Military Reservation should be considered as a viable alternative to the proposed site (in the context of avian impacts as well as other questions) needs to be viewed both through the lens of the lower wind potential but also in terms of the plain statements from the military authorities who control that facility that wind development at that site is not possible. See Appendix 3-L. The analysis of other locations provides strong evidence that the relative impacts of those sites are either greater or the feasibility is significantly lower in terms of meeting the project purpose and need.

3. Scope of state-level review process

As illustrated in the DEIS at Figure 7-1, the jurisdiction of Massachusetts agencies extends to the segments of the project that are overland and in state waters (up to 3 miles from shore). Thus, a portion of the submarine cable is subject to review by the Energy Facilities Siting Board (EFSB), the MEPA Office in the Executive Office of Environmental Affairs and the Massachusetts Department of Environmental Protection (DEP), among others. Installation, operation and maintenance of the wind turbines and the electric service platform will take place exclusively in federal waters and are not subject to state agency review. While Cape Wind has voluntarily submitted information about the entire project to MEPA to facilitate coordinated review, state permitting jurisdiction is limited to the segments of the project that affect Massachusetts land and waters: "The state permitting agencies … must base their permitting decisions and Section 61 Findings upon the portions of the project within Massachusetts." MEPA Scoping Cert. at 4-5.

It is also important to note that the MEPA process is *not* a permitting process. Rather, "it is a process designed to ensure public participation in the state environmental permitting process, to ensure that state permitting agencies have adequate information on which to base their permit decisions and their Section 61 Findings, and to ensure that potential environmental impacts are described fully and avoided, minimized, and mitigated to the maximum feasible extent." MEPA Scoping Cert. at 3. The key state agencies with permitting authority are the EFSB, which must issue a permit, and DEP, which must issue a Chapter 91 Waterways license to authorize placement of the underwater transmission cable. CLF concentrates its comments here on the Chapter 91 process.

a. Chapter 91 Waterways Licensing

Under the public trust doctrine, Massachusetts holds shorelands in trust for use by the public. *Boston Waterfront Dev. Corp. v. Commonwealth*, 378 Mass. 629, 631-32 (1979) (discussing history of the public trust doctrine). Generally, the Commonwealth's public trust authority and obligations are set out in M.G.L. c. 91. *Fafard v. Conservation Commission of Barnstable*, 432 Mass. 194, 200 (2000).[32] Chapter 91 does not bar development on public trust tidelands. Rather, it sets out a test for determining whether the development should be allowed. M.G.L. c. 91 § 2. If DEP determines that the use is water-dependent, then it is presumed to serve a proper public purpose and is authorized. Water-dependent uses are defined in the statute, M.G.L. c. 91 § 1, and in the waterways regulations, 310 CMR 9.00 *et. seq.*

[32] But these provisions are not "precisely coextensive with its authority and obligations under the public trust doctrine." *Id.* at 200.

The waterways regulations require DEP to determine that a use is water-dependent "upon a finding that said use requires direct access to or location in tidal or inland waters, and therefore cannot be located away from said waters." 310 CMR 9.12(2). Clearly, the transmission cable from the proposed Cape Wind Energy Project cannot be located wholly inland because it connects to an offshore wind energy facility located in federal waters. The core function of the underground cable is to transmit energy from an offshore facility to shore, by definition, a water-dependent use.

The cable also qualifies as water-dependent under a requirement that DEP must classify "any energy facility for which the proposed location has been approved by the Energy Facilities Siting Council" as a water-dependent use. 310 CMR 9.12(2)(c)(1). The term "energy facility" incorporates the term "infrastructure facility," which is defined as a "facility which produces, *delivers*, or otherwise provides electric ... services to the public," *Id.* (emphasis added). This construct necessarily includes an electric transmission cable that *delivers* electricity from an offshore generating facility.

C. Comments on specific environmental impacts identified in the DEIS

In the following section, CLF has identified certain key issues associated with the environmental review of the Cape Wind Energy Project. These comments are not intended to be exhaustive. Other commentors with more particular interests in specific areas will comment on issues that particularly apply to those interests. CLF has chosen to focus on those areas of potential or actual environmental impact that we judge to be the most significant in the environmental review process: the aesthetic and visual impacts of the project and the potential impacts of the project in its interactions with avian species, marine mammals, and marine fish. CLF commends the Corps and the project proponents for providing a fairly exhaustive, comprehensive and accurate picture of the range of potential environmental impacts from the project and reasonable alternatives to the project. In many instances, the level of scrutiny in the environmental review exceeds comparable projects with similar profiles but far fewer environmental benefits than the Cape Wind Energy Project.

Having said that, there are some areas noted below where further data and analysis is required in order to provide decision-makers with an adequate factual base for permitting and other regulatory decisions. There are other areas where existing data is limited and there are no reasonable approaches that will allow a better understanding of the potential interactions between avian and marine biota with the project in a timely manner. In other instances, there is no theoretical basis for understanding the adjustments marine and avian species will make in response to the towers. Should the project move forward, management and regulatory activities would have to develop adaptive approaches to any problems that emerge after construction.

1. **Potential aesthetic and visual impacts**

One of the most controversial issues regarding the alternative location analysis is the question of aesthetic impacts. There is no question that the proposed wind facility will have major visual impacts, simply by virtue of the fact that its structures will be visible from shore and from numerous boats that travel Nantucket Sound. The key questions from an environmental review perspective, however, are whether the DEIS adequately assesses the project's visual impacts, how those visual impacts compare to the visual impacts of the alternatives considered, and, on balance, how the visual impacts of the preferred alternative should factor into the Corps' Section 10 public interest analysis.

The aesthetics of wind energy facilities are subjective and present open-ended debates. There is even dispute about whether this question can even be aired in this context. As then-EOEA Secretary Bob Durand noted in the MEPA Scoping Certificate for the project, "Whether the wind turbine generator array will be beautiful or ugly has been hotly debated, but such a subjective issue lies beyond the scope of the environmental review process." MEPA Scoping Cert. at 10. CLF believes that the aesthetics issue is a proper subject of environmental review but notes that the environmental review process is not charged with resolving this aesthetic debate, except to the degree that there is an underlying substantive statutory standard to be applied. The NEPA process and related environmental reviews do provide a venue where such impacts and issues can be rigorously, clearly and accurately aired.

An exception to the general conclusion that the environmental reviews cannot readily characterize visual impacts as "positive" or "negative" arises in connection with impacts on statutorily protected aesthetic resources or resource areas, including historic properties. To the extent that visual impacts "may affect the specific characteristic(s) of the property, such as location, setting, or use that resulted in a determination of eligibility for listing on the National Register…" DEIS at 5-198, a finding of adverse impacts may be appropriate. In the present case, the "Area of Potential Effect" for visual effects includes historic properties from which there are open views of the wind turbines or components of the facility. DEIS at 5-173.

The visual impact assessment for historic properties recommends adverse impact findings for two of three National Historic Landmarks (including the Kennedy Compound, Hyannis, MA), four of five historic districts, and ten of twelve individual historic properties examined. See table 5.10.5. A Programmatic Agreement (see DEIS at App. 5.10-G) is being developed to address measures to minimize or mitigate adverse visual effects on historic properties. Since the Section 10 permit for the project will contain conditions to ensure implementation of these mitigation measures, (DEIS at 5-211) a final version of the Programmatic agreement should be included in the Final EIS for the project.

Like the analysis of the proposed project, the visual assessment of each of the four alternative sites proceeded from viewpoints of historic properties. Consequently, the DEIS met the standard presented in MEPA Scoping Certificate for the project that "the visual impacts on historic resources will capture a good sense of the overall visual impacts of the project." MEPA Scoping Cert. at 10.

It is essential, however, that the visual impacts of the project be judged in the proper context, that is, in terms of comparison to other alternatives. In terms of landside visual impacts only the deeper water site alternative south of Tuckernuck Island would reduce visual impacts associated with the proposed project. The Nantucket Sound alternative would generate equivalent visual impacts as the proposed project on Horseshoe Shoals. See DEIS Figures 3-54 – 3-63. The remaining two alternatives would involve placing turbines closer to shore and therefore would create greater visual impacts than the proposed project. While the DEIS points out that the Massachusetts Military Reservation alternative is the only one that offers partial visual screening from mature vegetation and topography, DEIS at 3-202, the Sagamore bridge viewpoint, located 0.8 miles from the closest turbine, DEIS 3-100 & Figure 3-53, demonstrates a dramatic, close-up view of some of the wind turbines that would be seen by travelers coming onto Cape Cod. Similarly, the New Bedford viewpoint, located 0.9 mi from the closest turbine, DEIS 3-102 & Figure 3-64, illustrates that the New Bedford sub-site would be far more visible than the project at its proposed location.

The visual simulations included in the DEIS are consistent with the scoping requirements for the EIS/EIR and follow standard methodology for visual simulations. As noted in the DEIS, the visual simulations present a conservative, "worst case" (i.e., most visible) scenario because the simulations "were conducted using clear sky conditions that maximize visual contrast, at locations with little or no visual screening from topography or intervening vegetation available" and because the simulations "do not take into account factors such as the blocking effect of the curvature of the earth … or haze on the horizon." DEIS at 5-198. Nonetheless, it is apparent that the visual aspects of this project represent a significant negative environmental impact of this project to some people, regardless of where it is located.

2. Potential biological impacts

a. Avian impacts

The DEIS evaluates the potential avian risks of a wind power project proposed for several alternative sites within Nantucket Sound, with particular focus on Horseshoe Shoals. This part of southern Massachusetts is used by a large number of birds from a diversity of species (roseate terns and piping plovers), including sea birds that winter in Nantucket Sound, birds that migrate through Nantucket Sound, and two endangered species that use Nantucket Sound for their reproductive season (May-September). Because of this fact, the assessment of the potential risks to birds is critically important and presents a formidable challenge. Important issues and approaches to risk assessment were identified during the scoping period, with input from leading ornithologists, an avian risk assessment (Curry and Kerlinger, 2001- Appendix 5.7-A of the DEIS), U.S. Fish and Wildlife Service, and comment letters from MA Audubon (13 Dec 2001) and from CLF (5 April 2002). A general synthesis of this guidance from the scoping process is reflected in the Corps' *Scope of Work Notice* (June 2002).

The Corps and Cape Wind development team have put a substantial effort into addressing the extremely complex issue of avian risk assessment and the results of this effort are provided in the DEIS. This work is the leading compendium to date on avian activities in this region and is more exhaustive than any prior effort to understand the potential interactions between birds and development activities in southern Massachusetts. These materials are extensive and include 13 appendices, two of which specifically deal with wintering water birds, a total of three appendices dealing with birds during at least a portion of the winter period, and a radar study that examined flying birds during one month of spring and one month of fall migration. The analysis presented in the DEIS provides substantial new information on avian uses of the proposed project area, and Nantucket Sound more generally.

The analysis of potential avian impacts is further complicated by the experience at other wind turbine locations where some species have adapted their flight patterns and behaviors in the vicinity of similar wind turbines in ways that have reduced interactions between the species and the wind turbines. Theoretical calculations of risks based on current flight patterns, therefore, may overstate the "as-built" risks. CLF concludes, nevertheless, that further analysis is needed in the Final EIS to improve the characterization of potential bird mortality and allow an improved basis for sound decision making on this project.

A number of efforts have been made to synthesize the available information on experiences with wind turbine facilities and bird mortality from around the world (e.g. Everaert et al., 2002;[33] Report of the Convention on of European Wildlife and Natural Habitats on Wind Farms and Birds 2003; Winkelman 1995; NWCC, 2004[34]). Impacts vary substantially from species to species and from site to site. Well-sited wind facilities can have a very low impact on birds; less well-sited facilities may kill large numbers of birds and, depending upon the species, these impacts could be significant in the context of the cumulative impacts to populations and population viability. Some of the types of sites that have proven problematic are sites that are near shorelines, particularly where there is a high frequency of local flights for foraging, mating and transiting between roosting and other sites (e.g. Winkelman 1995; Everaert et al., 2002). Nantucket Sound is surrounded by shorelines of various types and is heavily used by birds, including endangered species, for local flights to and from a multitude of destinations. Given these characteristics of Nantucket Sound, and experiences elsewhere, particularly close attention to the potential impacts to birds is warranted.

i. <u>General comments on avian mortality risks</u>

Because birds in flight use the same airspace as the proposed wind turbines, the potential for mortality is clear. The proposed 130 wind turbines will create a "rotor-

[33] Everaert, J. 2004. Wind turbines and birds in Flanders: Preliminary study results and recommendations. Natuur Oriolus 69: 143-155

[34] NWCC (2004) Wind turbine interactions with birds and bats: a summary of research results and remaining questions - *Fact Sheet*: Second Edition. National Wind Coordinating Committee, 2004.

swept zone" through which birds will fly at various times of year and times of day, with varied speeds and paths, and at varied heights. Some uncertain proportion of the animals that attempt to fly through these zones will be killed. Determining the likelihood that a particular bird species will enter these rotor-swept zones is not simple, since flight behavior varies with many factors. The diverse numbers of bird species in the area have flight behavior that depends on many factors including weather, wind direction relative to flight direction, time of day and year, age, and the presence or absence of the turbines themselves. Even the task of producing good mortality estimates is challenging because it requires knowledge of a species' population size, an understanding of the specific role from turbine-induced mortality with respect to the cumulative impacts on the species from all mortality sources, and a weighing of the potential benefits to birds of substituting wind power for power generated with fossil fuels. At this stage in the development of wind power, our understanding of the interactions between birds and wind turbines is inexact and will be so for some time.

It is critical to bear in mind, however, that the fossil fuels that New Englanders and people who reside in the vicinity of the Cape Wind Energy Project are currently using to generate power – primarily coal and oil – also have a significant and well documented impact on birds directly and on the habitats used by birds and other wildlife. For example, the population of the sea bird that is most abundant in Nantucket Sound, the common eider, underwent a massive population crash in Massachusetts during World War II in response to an oil spill. (Burnett and Snyder 1954) Spills of oil being transported for power generation continue to be a major source of water bird mortality. For example, the *Bouchard No. 120* spill on April 27, 2003 in Buzzards Bay killed at least 450 protected birds and negatively impacted 90 miles of coastline.

The combined scale of this known source of mortality to avian species is orders of magnitude greater than any documented impact from a wind power facility. The mining of coal, acid precipitation, deposition of mercury and other metals, and global warming are all having serious impacts on forest habitat, breeding areas in the arctic, loss of estuarine habitat, and impacts to the aquatic life that serves as food for so many birds. Climate change will reliably alter whole ecosystems, eliminating resident and migratory bird populations that have been identified with New England throughout human history.

As discussed in the DEIS, wind turbine-induced bird mortality is usually small, and not sufficient to harm populations. For the sake of comparison, data combined for all of the U.S. indicates that mortality due to wind turbines is much less than that attributed to glass windows, domestic cats or hunting, each of which produces over a million bird deaths per year. In the cases where mortality is unusually high at wind facilities, it is due to some unfortunate aspect of the selected site.

Relatively high mortality in water birds has been observed in locations where turbines are situated in areas of high use, with lots of local flight activity (i.e. non-migratory flights; e.g. page 18 of Appendix 5.7-A). At a high use site near the Wadden Sea in the Netherlands, 14 to 50 bird deaths per year per turbine were observed, and most of these were water birds, including many sea ducks. (Winkelman, 1995) The present project is proposed for an area that is heavily used by sea ducks and other birds, making high quality assessment of the risk important.

ii. **Risks to roseate terns**

Roseate terns are a federally endangered species that will have interactions with the Cape Wind Energy Project. The total species population is small, sub-populations of roseate terns breed at sites around Nantucket Sound and nearby Buzzard's Bay, and the entire North American population congregates in Nantucket Sound each year during migratory periods. Because there are potential roosting, staging, and feeding destinations in almost every direction from the proposed Cape Wind Energy Project site on Horseshoe Shoals, a number of these birds are likely to transit the proposed site frequently, and some of these transits may be through the rotor-swept zone of the proposed project.

The Final EIS should provide a better analysis of the likely interactions between the proposed project location and roseate terns, based on better estimates of the use of the preferred project area by these birds. Specifically, better analysis of data on tern flight altitudes and paths with respect to the project area is needed. In the absence of additional data, an improved risk analysis for the species may be able to be conducted based on known behavioral patterns. Much of the data presented in the DEIS is derived from survey methods that are relatively good for estimating abundance near the sea surface, but relatively weak for critically needed data on altitudes of flying birds. The Final EIS should provide analysis that would allow decision-makers to understand mortality risks and population viability risks based on credible estimates on the rates at which roseate terns might transit the proposed site at Horseshoe Shoals at altitudes high enough to be within the rotor-swept zone of the turbines. The critical time period for this particular analysis appears to be May to early June.

A second area of concern for potential impacts to roseate terns from this project stems from an absence of data on flight paths and altitudes for flocks of birds (1) departing in the fall for migration to South America and (2) returning to Nantucket Sound in the spring. Because there are management actions that can be taken to reduce or eliminate mortality risks during these concentrated periods of species concentration, i.e. temporary shut down of turbine operations, CLF believes that this information should be developed before operations commence in the event the project is successfully permitted. The protocol for doing so should be developed and identified in the Final EIS and made a binding condition of any permit issued for the project.

Finally, CLF is concerned that the roseate tern population viability analysis presented in the DEIS extrapolates population growth from a period of time in the past when the population was increasing at a rate that does not appear to have prevailed in recent years. In the Final EIS, the population viability analysis should reflect guidance from experts on this species, including those who have conducted field studies of these birds.

As noted above, the impacts of this project on roseate terns must also include the positive impacts that wind-powered energy production may have on roseate terns. Because the project will displace energy production that uses oil as a fuel, the project will reduce the known mortalities of these same species from oil spills. Estimates of oil-spill-induced mortalities in roseate terns should be included in the Final EIS. Moreover, if this project helps contribute to the larger strategy of reducing greenhouse gas emissions and slowing the consequences of climate change, this project will be helping to protect critical habitats of the roseate terns that will otherwise be virtually eliminated in Nantucket Sound by sea level rise, sea and air temperature shifts and prey shifts.

iii. Risks to sea ducks

The DEIS provides strong documentation of the well-known importance of the Nantucket Sound area for wintering sea ducks, including common eiders, long-tailed ducks and scoters (November to March). Combined, the number of sea ducks in the vicinity of the project site on Horseshoe Shoals may be near a million birds.

While the populations of these ducks are large with all the species subjected to recreational hunting, these species will also be killed by turbine blade strikes if the project is permitted. Better estimates are needed in the Final EIS of what these mortalities might be and when they might be expected to occur in order to allow decision-makers to reach reasonable conclusions with respect to the benefits and costs of the project. Improved data of these risks would also improve the ability to develop appropriate monitoring and mitigation measures for these species.

The long-tailed ducks are of particular concern as they are well known to make flights to and from external shoals from resting sites on the water in Nantucket Sound during darkness. They are also known to occasionally make flights high into the sky, ascending vertically from the sea surface. (Forbush, 1925) These flights have not been studied for the DEIS, and it is therefore difficult to relate their behavior to the rotor-swept zone of the project. A better analysis of the use of the intended rotor swept zone by sea ducks should be developed in the Final EIS and used as the basis of an improved estimate of expected mortality. Specifically, more information on duck flight behavior in and around Horseshoe Shoals during the winter period, when ducks fly to and from feeding areas in the dark, particularly an understanding of the near-darkness flight numbers, altitudes and paths, is important. This information and analysis is important to estimating potential risks for sea-ducks.

Since the behaviors of long-tailed ducks suggest that there is a mortality risk from the wind project, it is reasonable to consider how this mortality risk compares to estimates of this species' population size. The Final EIS should analyze this based on better data on the winter flights of this species, especially during the low-light and nighttime hours. This mortality estimate must then be related to the population estimate for long-tailed ducks for Nantucket Sound, which is approximately 180,000, based on the DEIS. The estimated mortality risk must also be evaluated against the numbers of long-tailed ducks that are killed in the NW Atlantic region annually by recreational hunters (i.e. about 10,000). Turbine mortality estimates would need to be factored into the cumulative impacts to this population, but CLF has no reason to believe these mortality rates would jeopardize duck populations. Moreover, because the project will displace energy production that uses oil as a fuel, the project will reduce the known mortalities of these same species from oil spills. Estimates of oil spill-induced mortalities in sea ducks should be included in the Final EIS.

iv. Risks to migrating birds

The Final EIS should develop a more robust analysis of spring and fall bird migrations through the project area. Large numbers of land and water birds migrate through this portion of southern New England, including birds traveling to and from boreal forests of the north and the Arctic. At present, the DEIS suggests that hundreds of thousands of birds may pass through the intended rotor-swept zone of the project area on Horseshoe Shoals. The radar studies are too limited in their temporal scope, however, and the analysis of the existing radar data with respect to migratory bird migration could be improved. Higher quality radar analysis in the Final EIS would allow for the needed improvements in the evaluation of roseate tern and sea duck behavior, and would allow a more complete assessment of the uses of the rotor-swept zone by migrating birds during the fall and spring.

v. Construction design considerations

Design features for the underwater portion of the monopoles must take into account that increasing the abundance of fishes around the turbines could increase the mortality of fish-eating birds attracted to the site by an increased abundance of fish. The foundation system for the monopoles should minimize increases in available cover for fishes (e.g., spaces between rocks, or other supporting structures) since such increases in fish habitat will increase fish abundance and attract fish-eating birds. A well-designed monitoring protocol could produce the data needed to evaluate this issue.

vi. Avian monitoring and mitigation

The interaction of birds and turbines is complex and is determined by many factors including the presence of the turbine structures themselves. Under many circumstances, birds seem to avoid turbines, thus reducing risks significantly below that which might be predicted on the assumption that flight behavior in the intended project area will remain unchanged once the turbines are in place. Under other circumstances birds may be attracted to turbines, or at least be unable to avoid them. The task of determining what percentage of a bird species passing through a rotor-swept zone would in fact collide with a turbine blade is even more of a speculative enterprise and is the subject of disagreement and controversy amongst experts.

For these reasons, it is imperative that a strong plan for rigorous monitoring of bird mortality be developed if the Cape Wind Energy Project is permitted. The monitoring proposal in the DEIS is not strong enough. Data from effective monitoring should be used to guide mitigation measures, and as a critical input to a responsible program for adaptive management during the life of the project.

Since experience with offshore wind is non-existent in this geographic region, careful thought must be given to experimental approaches that will allow the development of valid monitoring of avian impacts and mitigation measures. An independent scientific advisory team should be assembled to develop and oversee this program. The team should include individuals with experience studying impacts at the wind facilities that have been in operation for some years in Europe.

Methods for accurately sampling animals killed by impact at turbines, for rapid data analysis, and for use of that data to guide management must also be included, with particular attention to the challenge of data collection at the turbines during operation. Plans should include the testing and validation of a range of complimentary data collection approaches with particular focus on the difficult problem of reliable recording of mortality at offshore locations. Data collected from this public resource area should be made available to the public via the web.

b. Noise impacts

The presentation of information on acoustics, in Section 5.11 and in the various other sections where potential noise impacts are considered, should be improved in the Final EIS. It is strongly recommended that the Corps make reference to other analyses that have dealt with the complex issues surrounding ocean acoustics and impacts of construction sounds, including, for example, the EIS and associated technical reports from the Alaskan Northstar Project of BP Exploration, Inc. and the OEIS for the LFA program of the U.S. Navy. In the Cape Wind Energy Project DEIS, there is an over-emphasis on human hearing. The treatment of underwater acoustics and the biological impacts of underwater sounds should be improved. The discussion of acoustics in the Final EIS should not be dominated by measurement approaches that are suited to studies of human hearing, should avoid human perceptual terms such as *loudness* (Section 5.1.1), and should use physical descriptions that are appropriate to bioacoustics broadly - intensity, energy flux density and pressure.

Energy and intensity are very important measures when considering impacts on marine animals. Maximum pressure (Lmax as stated in the DEIS) and equivalent pressure (Leq as stated in the DEIS) do not provide a complete description. Section 5.11.2.1.

In each section of the Final EIS, the reference being used for the deci-Bell scale should be consistently indicated. In addition, information on analysis bandwidth should be provided in the discussions of potential acoustic impacts. According to the appendices, all analyses and modeling were done assuming that a human auditory system was most relevant, even under water (i.e. 80 Hz to 20 kHz). *Noise Report*, Appendix 5.11A. However, the Final EIS should evaluate potential impacts to great whales and fishes for which very low-frequency sounds are particularly important, and to dolphins and bats which rely on hearing in the ultrasonic range, well outside of the human hearing range. Consequently, the anthropocentric acoustic characterizations in the DEIS are inappropriate and do not allow one to gauge the full range of potential impacts of the project on animals likely to be exposed to noise from the project.

The Final EIS should clearly indicate the frequency bandwidth in any discussion of sounds. When discussing potential impacts to animals, a description of the animal's auditory threshold (i.e. its audiogram) should be provided and the discussion should make it clear how the acoustic signals, whether from field measurements or modeling, relate to the hearing abilities of the animal, including bandwidth and thresholds. If data are not available for the particular species of concern, this needs to be made clear, and a justifiable surrogate species should be selected. Specific areas where the DEIS is weak include ultrasonic frequencies in air (see comments on bats) and ultrasonic frequencies underwater (see comments on protected marine species – dolphins in particular).

i. Atmospheric acoustics

In the Final EIS, the acoustic characterization of the wind turbines should include the ultrasonic range in which the auditory sensitivities of endemic bat species are highest. There is evidence that wind turbines can be a mortality source in bats (e.g. Scientific American, February 2004), and while it is not yet understood why these animals collide with turbines, one of the hypotheses is that the turbines are generating ultrasonic sounds that may be attractive to bats, or may interfere with the bat's sonar system. This type of risk could be quickly ruled out if it where demonstrated that the turbines are not ultrasonic sources. A great deal is known about the auditory sensitivity of bats, and this should be used to define the range of frequencies examined in the EIS. In the Final EIS, characterization of sounds produced during the operation of turbines should include frequencies out to 120 kHz. Turbines should be equipped with wind sensors that are not based on acoustic Doppler shift technology unless it is rigorously demonstrated that this technology does not impact any of the relevant species. Additional discussion of this topic is set forth below under our comments on bats.

ii. Underwater acoustics

The treatment of underwater sound in the DEIS needs improvement. The characteristics of the various underwater sounds expected during construction and operation of the facility are of particular importance for understanding the potential sound impacts on marine mammals. Well-developed recording and analysis methods are readily available for the characterization and quantification of underwater sound. However, in the DEIS, there is over-reliance on questionable acoustic models for predicting sound fields. The Final EIS should include better acoustic characterization of the site based on actual recordings and should include plans for on-site underwater recording during construction. For example, the DEIS characterizes sounds generated by jet plows based on subjective reports from human divers. Section 5.11.2.6 - Construction Impacts. This analysis should be improved for the Final EIS with existing data from field recordings, including calibrated sound spectra showing the acoustic signals generated by jet plowing, pile driving, and the steady sate operation of the marine-based wind turbines. These should be based on sounds recorded with hydrophones, and include analysis bandwidths relevant to the various marine life being considered. It is likely that such data are available.

The animals of primary concern for underwater acoustic impacts are those whose auditory systems are adapted to underwater life, not humans. The most serious category of potential noise impacts is that caused by *pile-driving* during an estimated construction period of 8 months. Section 5.1.1.1.6.1. These noises can pose a potential risk to the hearing and navigation of marine mammals and sea turtles. Such intense, broadband sounds certainly pose a risk of behavioral avoidance of the area. The DEIS fails to include considerations of the impact these responses might have on survivorship and reproductive success. The Final EIS should provide sound levels expected closer than 500 meters and should indicate the analysis bandwidth.

The analysis of pile driving sounds in the DEIS (Tables, pp 166-167) appears to be based on predictions derived from spherical spreading models (TL = 20 Log R), assuming a source level of 204 dB. The use of this kind of model in a shallow water environment like Horseshoe Shoals may not be justified and could lead to inadvertent exposure of marine life to dangerously intense sounds. There are now reasonably good, empirically validated models for shallow water sound propagation in the frequency range of interest here (<1000 Hz) in similar habitat types. Use of appropriate models will be essential when estimating the ranges out to which a noise from project activity will remain above some level of concern. Nevertheless, real-time on-site data from an array of hydrophones should be used for monitoring so that modeling errors will not lead to unacceptable noise exposures during construction.

Information on source levels (i.e. at 1 meter, 10 and 100 meters) should be added along with analysis bandwidth, and information on the auditory sensitivity of marine mammals and turtles. Even based on the current modeling in the DEIS (Figure 40, Appendix 5-11A), sounds in the 100 Hz to 1.0 kHz band will clearly be above the NOAA Fisheries threshold specified for risk to the hearing of marine animals at distances less than 500 m. In the Final EIS, the concept of thresholds for hearing risks to marine animals should be made more sophisticated by considering acceptable intensities within a range of bandwidths that are chosen based on the hearing of various species using the area. This should include a safety limit within the ultrasonic range used by dolphins. The Final EIS must include a more detailed and realistic plan for ensuring that these intense impact sounds are not produced when there are marine mammals or turtles within the 500 m *safety radius* (see additional comments under marine mammals).

In the DEIS, the definition of the safety radius rests on a 180 dB (re 1.0 μPa) threshold for injury. It is stated that 180 dB is "generally thought to be the threshold level for preventing injury in marine mammals in sea turtles," with a reference to a letter from Patricia Kurkal, Regional Director of NOAA Fisheries. The Final EIS should include more discussion of what this 180 dB guideline means, where it comes from, and how it is meant to be applied to a range of marine mammals with vastly different hearing ranges. It must be indicated what bandwidth is associated with this criterion, and what sort of integration time is intended when measurements are made.

iii. Acoustic monitoring protocols

There is a risk of auditory harassment and hearing damage to marine animals during the proposed eight month construction period. A simple, distributed network of underwater acoustic monitoring stations should be in operation throughout construction, operation and decommission phases of the project. This network should at least be used for three functions: (1) to increase the probability of detecting and identifying marine mammals in the area, (2) to monitor acoustic signal strength due to pile driving and (3) to halt operations if sound levels exceed thresholds at the perimeter of the safety radius (see below), or if rare or endangered marine species enter the area.

The Final EIS should include viable mechanisms to monitor for acoustic events that might put animals at risk and should identify an effective mechanism in place to mitigate should the monitoring system detect/predict the approach of an unacceptable level of risk. This risk assessment could logically be divided into subgroups as a function of the group members' auditory, physiological and behavioral parameters. Thus, for example, we already know enough about cetaceans to cluster them into groups that are low-frequency (< 1000Hz) and higher frequency (< 2-30 kHz) specialists, and we know about the likelihoods of occurrence for the species of concern. Sea turtles are in the low-frequency group and so are fishes. Pinnipeds would be in the higher frequency group.

The proposed monitoring system for sound level measurements proposed in the DEIS needs improvement in the Final EIS in order to adequately describe the spectral content of the sound field generated by the project's activities. The stated drops in RL for the European site do not give enough detail to allow proper interpretation. Furthermore, there must be a more serious effort to implement an adequate underwater acoustic monitoring system. This can be done using existing technology and will provide near-real-time data as part of the overall sensor system for monitoring. For example, the BP Northstar Project used hydrophones with seafloor recorders to monitor during periods of potential high impact. A system like this would probably be appropriate here. Such a system should provide feedback when hearing damage thresholds are exceeded with the safety zone, and guidance for an acoustic schedule for the "soft-start" plan for pile driving.

Underwater, hydrophone-based acoustic alert systems have been developed for detection of sounds made by whales and should be considered as part of the plan for monitoring for the presence of whales during construction. These systems can also be used to detect sound-producing fishes, and may be an aid to detecting breeding aggregations of fish. Plans for this type of monitoring should be developed in consultation with experts at NOAA Fisheries and appropriate science advisors.

The monitoring plan must also be improved to provide data on potential impacts while the facility is in operation for use in adaptive management responses.

iv. <u>Safety radius (500 m)</u>

The DEIS proposes use of a *safety radius* of 500 m to protect marine mammals and sea turtles during construction. Section 5.5.5.1.1. The area of the safety radius, about 1/3 of a square mile, is substantial. The Final EIS should develop more effective controls to ensure that the safety radius for noise exposure will be *safe* by including a strong plan for monitoring for animals of interest approaching and within this radius, as well as proposing a strong mitigation response once an animal comes within the safety exclusion zone. The DEIS indicates that one qualified NMFS observer will be stationed at the site during construction to monitor for marine animals of concern within the 500 m perimeter of pile driving sites. Depending on the scale of construction activities at any one time, this observation plan should be augmented by more on-site spotters in conjunction with the underwater acoustic monitoring system described above. This approach would allow for the early detection of marine mammal sounds (particularly of engendered species) and for monitoring the intensity of the sounds produced by construction activities (e.g., pile driving, vessel traffic). Any permits should be conditioned with a strong mitigation protocol for ensuring that intense noise production is halted immediately if and when these animals enter the radius. This protocol would include a number of modeling exercises predicting the potential exposures and risks to a representative suite of animals (mysticetes, odontocetes, pinnipeds, sea turtles and fishes). Such procedures have become standard components of Final EIS documents in which noise impacts are of concern.

The Final EIS should also discuss the benefits of the scheduling of pile driving with respect to periods of off-peak use by marine mammals and turtles. Pile driving should be scheduled only during time periods when the probability of marine mammals and sea turtles in the area is low. Data from NOAA Fisheries and other sources should be used to examine questions about scheduling and seasonal use of the area by marine animals.

c. Potential impacts to bats

The Final EIS should improve the analysis of the potential impacts to bats (DEIS Section 5.6.3.3) at the proposed Nantucket Sound site, particularly since there is no field data included in the document for the Nantucket Sound site, or any of the alternatives. The DEIS does include a reasonable summary of the ecology of the bats of the New England area, based on secondary sources. None of the bats expected in the area are federally listed as endangered species.

The potential impacts of the proposed wind turbine facility to bats should be considered carefully for several reasons. First, there are seven species of bats known in this part of southern New England, and at least one of these – the red bat – is known to make significant migratory flights, sometimes over coastal waters. Bats are nocturnal mammals that feed and migrate in flight, sometimes using the same airspace as wind turbines. Second, there are well-documented cases of mortality in bats caused by wind turbines at terrestrial sites (e.g. Scientific American, February 2004), with mortality as high as approximately 43 bats/MW/year at sites in Eastern U.S. (NWCC 2004).[35] Mortality tends to be particularly high in red and hoary bats, both common in southern New England. Mortality is quite variable among sites that have been studied, suggesting that impacts are dependent upon the particular site and its role in the ecology of bats.

There has been too limited a characterization of any of the alternative sites for this project to allow any conclusions as to the specific risks posed by this project to bats, and there are no known migratory patterns over the proposed Horseshoe Shoal site, although it is likely that there is some transit activity. There are also a number of significant unknowns with respect to scientific understanding about the reasons for the known mortalities associated with bats and wind turbines. Further field studies at the site may not yield fully usable data because the presence of bats in the area, prior to erection of turbines does not necessarily mean that the bats would be impacted by turbines, and, conversely, the absence of bats in the area does not necessarily mean that bats might not be attracted to the area or killed by turbine blades once the turbines were erected.

While it is not known why bats collide with wind turbines, it is known that bats use a highly developed sonar system during their nighttime flying. Bats emit ultrasonic calls (30-80 kHz), and form images of their surroundings by analyzing the characteristics of sounds that return from their surroundings in the form of echoes. It is possible that mortality is due to some kind of failure of this system. Perhaps the echolocation system does not detect the turbines for some reason. If the turbines themselves produce ultrasonic sounds, this could result in interference (i.e. jamming) or be attractive to the bats. Unfortunately, the acoustics analysis in the DEIS (Section 5.11, and Appendix 5.11A) presently does not characterize sounds produced by turbines at frequencies in the ultrasonic range (i.e. above 20 kHz). The Final EIS should include these data so that one could evaluate the possibility that operating sounds produced by the turbines might contribute to bat mortality. In the description of the nacelle (Section 4.1.1.1), for example, it is indicated that a wind sensor will be included, yet no details are provided on the mechanism are provided. Wind turbines are often equipped with acoustic Doppler anemometers and the sounds produced could be audible to bats depending upon the frequencies employed. Since bats use sounds for echolocation and for communication with other bats, such ultrasounds produced by the towers may need to be eliminated to reduce impacts to bats.

CLF's view on this issue at this time is that the Final EIS must include a thorough characterization of the acoustic signals measured in air while wind turbines of the type to be used are in operation, including sounds in the ultrasonic range from 20 to 120 kHz. There should be existing field data on this issue. If the wind turbines require wind sensors or other active sensors, they should be based on technology that does not require production of sounds that are audible to bats. Acoustic Doppler anemometers should not

[35] Williams, W (2004) When blade meets bat unexpected bat kills threaten future wind farms. Scientific American, February, pp 20-21; NWCC (2004) Wind turbine interactions with birds and bats: a summary of research results and remaining questions - Fact Sheet: Second Edition. National Wind Coordinating Committee, 2004.

be used on the wind turbines. If they are essential, they should be placed outside the perimeter of the facility, on towers that do not have rotor blades.

The monitoring program described in the Final EIS should also require data collection at a number of test turbines distributed throughout the project area to characterize the interactions of bats with turbines at this site. Since bats, like most animals, exhibit distinct seasonal behavioral patterns, the above quantifications would need to be done during all seasons. In order to have confidence that data collected in a particular season on a given year, at least several replications of data collection would need to be done over a succession of years.

d. Potential impacts to fish and other marine life

CLF does not expect this project to have significant adverse environmental effects to most species of fish or crustaceans present in Nantucket Sound. There are several issues where the analysis in the DEIS can be improved and where construction protocols and monitoring measures are needed to avoid potential adverse impacts.

i. Construction and spawning periods

The proposed jet plow and horizontal directional drilling methods for bringing the submarine cables to the shore will cause disturbance to the bottom and some increased amount of sedimentation. Since sedimentation is known to increase mortality for fish eggs, these activities should be timed to avoid known spawning periods and to avoid spawning habitats. As well, the creation of trenches for the submarine cables can have a negative impact on the migratory patters of some species. For example, the existence of trenches on the sea bottom may impede the seasonal migration of lobsters from offshore to inshore waters and back. The Final EIS should include information on spawning and migration periods and locations after consultations with NOAA Fisheries and the Massachusetts Division of Marine Fisheries, and propose a work schedule that will minimize impacts to reproduction and migration of fishes, crustaceans and other marine life.

Efforts should also be made in bringing the submarine cables to shore to minimize direct and indirect impacts on submerged aquatic vegetation ("SAV"). The DEIS does a good job of characterizing the mapped location of existing beds of SAV and the permits should be conditioned on requiring the submarine cable contractor to use divers and other approaches to bringing the cable ashore to minimize any SAV losses as the actual route is laid down.

ii. Electromagnetic fields ("EMFs") and marine life

The DEIS properly documents that the Nantucket Sound site is frequented by a number of elasmobranch fishes (i.e. sharks and rays), and that NOAA Fisheries considers the area essential fish habitat for four species. Table 3-15b. As noted in the section of the DEIS dealing with electromagnetic fields (Section 5.13), these fishes are known to be exceptionally sensitive to low frequency electric fields (i.e. in the nV/cm range), and, indirectly, to magnetic fields due to induced currents. The section dealing with this potential interaction in the DEIS needs to be expanded to include a more complete recognition of the role of weak fields in the feeding and orientation biology of these animals and to recognize the possibility that artificial fields from cables could impact these animals. The effects of electric fields on those aquatic animals that have evolved electrosensory systems are profound and have been studied extensively. Information on the known detection thresholds should be included and related to the EMFs expected near the sea floor. These data should be included in the table on biological processes. Table 5.13-9.

While it is correct that the biological electroreceptors are most sensitive to near direct current, or "DC," fields, like most sensors, they have a sensitivity curve that yields responses over a range of frequencies including 60 Hz. Data should be provided in the Final EIS that estimates the magnitude of the electric field near the buried cables and the spectrum of the electric field. While the fields generated are nominally 60 Hz, it is unlikely that the spectrum of the fields will be pure, and possible that there may, in fact, be DC components present. DC fields could result from galvanic fields associated with shielding or other materials in contact with the sea water.

Though a number of reasonable precautions have been taken to reduce the strength of EMFs in the sea water, they will not be eliminated and their actual characteristics will not be fully known until the system is in operation. The most probable influence of the weak EMFs is to cause some disorientation during feeding or navigation. Artificial EMFs can result in misguided feeding attempts in elasmobranch fishes. Animals migrating in the water (not in the air above) could also be disoriented by perturbation of the earth's magnetic field. Other marine animals may also use the magnetic field for orientation. See Section 5.13.1.5.

The monitoring plan should include provisions for identification of both types of potential impacts, and plans for mitigation if the impacts are severe. Since the magnitude of the electric field drops exponentially with distance, structures that prevented marine life from approaching too close to the buried cable could solve these problems (e.g. a mound of gravel).

e. <u>Other issues</u>

The characterization of the geophysical and oceanographic conditions at the project site appears to be comprehensive, and the conclusion that the project will not have significant impacts on these conditions is well-reasoned and supported in the record. Issues with sediments suspended during the construction do seem more likely to be short-term and moderate to insignificant in most cases, particularly offshore. The chemical sampling does not indicate significant presence of chemical constituents that would present exposure risks to marine organisms. The DEIS relies heavily on sediment transport models to conclude that "the majority of disturbed sediments are expected to settle and refill cable trenches and areas immediately surrounding the trenches shortly after installation (generally minutes to less than one hour…).” DEIS 5-18. However, even this model – which is based on assumptions of constant tidal currents and bathymetry (see App. 5.2-C) – predicts that there will be variation in transport across the project area with the highest levels of transport being in the shallow areas of the Sound and with “little potential for sediment transport along the deeper portions of the shoal, especially the east side.” DEIS 5-9.

The proposal to use anchored scour mats to address potential scouring and artificial habitat creation around the tower bases is innovative and appropriate. The Final EIS and any permits issued for this project should require post-construction inspection/monitoring of these mats over time, as well as a requirement to replace them with appropriate rip-rap if significant scouring occurs. In light of the uncertainties associated with sediment transportation in the project area and in Lewis Bay, CLF recommends that post-construction monitoring and remediation be required where necessary.

3. Recommendations regarding monitoring protocols and adaptive management practices

As stated above in reference to particular sections of the DEIS, a number of improvements can and should be made to the DEIS using existing or readily collectable data and analytical tools and approaches. To the degree these suggestions are pursued rigorously, CLF is hopeful that the Final EIS will be a responsible document on which the necessary federal decisions can be made.

At the same time, there is no escaping the reality that marine wind turbine facilities are an emerging technology and that the ecological information and modeling necessary to understand and manage the environmental impacts with projects like the Cape Wind Energy Project are still underdeveloped. The information available for the preferred site at Nantucket Sound indicates that the ecological impacts of the project could be relatively small. At the same time, there are a number of unknowns with respect to important marine and avian species and how they will interact with the project infrastructure. Substantial uncertainty with respect to a full characterization of all the reasonably expected environmental impacts from this project will remain, even after construction.

As a result, CLF believes that a properly conceived and well-designed environmental monitoring program will be critical to the success of this project. Such a program should be developed and described in the Final EIS before any permits are issued.[36]

[36] While CLF expects that the monitoring protocols for this program will continue to develop over time as experience with this and other wind turbine projects is gained, a core program should be prepared at this time in order to insure that construction and operation of the project sets a positive precedent for offshore wind energy.

In coming to this understanding of the function and value of such an approach to the inherent project uncertainties with the Cape Wind Energy Project, CLF looked to other projects that presented clear environmental benefits on balance but where environmental impacts could not be fully anticipated or understood prior to construction. A prime example of such an approach in the New England region was the siting of the new outfall for the Deer Island sewage treatment facility, where new discharges of substantial quantities of freshwater and treated effluent were introduced for the first time offshore into Massachusetts Bay. An outfall monitoring protocol and Science Advisory Panel was established and overseen by the two permitting agencies overseeing that project, the U.S. Environmental Protection Agency and the Massachusetts Department of Environmental Protection. This monitoring program and oversight committee has provided a unique and objective approach to monitoring that project which might provide a useful template with regard to this project.[37]

Monitoring for the Cape Wind Energy Project should produce credible information of sufficient scale to insure compliance with permit conditions, to minimize environmental impacts through adaptive management, and to improve planning and siting of future wind power projects. The Final EIS should be used to launch the development of such a monitoring regime by providing, as best as can be done at this stage, a delineation of specific adaptive responses that could be implemented to deal with environmental impacts that are judged to be reasonable possibilities at the chosen site. Such impacts might include, for example, impacts to a particular bird species, where the mortality rate is found to be sufficiently high to pose a threat to the population. Potential adaptive responses should include the option of short-term shut-downs if it is determined that a shut-down within a particular time window could substantially reduce population-level impacts. A reasonable budget for annual number of days allocated for possible use in such rare situations where a shut-down response is appropriate (e.g. a finite and defined number of days maximum per year) should be established, and utilized, if necessary, with guidance from the science advisory board and data collected under the monitoring program.

A program of environmental monitoring and adaptive management should be developed with the benefit of a third party scientific advisory board, perhaps modeled on the Massachusetts Water Resources Authority Outfall Monitoring Science Advisory Panel. Such a panel should draw on academic, private, and government scientists to help develop an appropriate set of protocols for data collection and adaptive responses to unacceptable environmental impacts.

While costs of developing basic data collection and analysis should be considered to be part of the operating expense of the Cape Wind Energy Project, the data collected will be of tremendous value to many industry, governmental and other stakeholders. In order to generate the full range of useful information and to insure the credibility of the data collected, it would be appropriate to draw on financial resources of private, public and quasi-public organizations to put in place a monitoring infrastructure that Cape Wind alone could not afford to put into place. Such funds for data collection and analysis

[37] Information on the Outfall Monitoring Program can be found at http://www.epa.gov/region01/omsap/.

should be administered through the science advisory board to ensure that data collection is objective and transparent. All environmental data collected from this project, sited on a public resource, must be made available to the public, in electronic form, in a real-time fashion when possible or with a minimal delay when necessary for data processing.

With respect to the monitoring program, the Final EIS should specifically develop the following protocols, broken down by project phases into construction, monitoring and adaptive management during wind farm operation.

a. Construction phase

The following elements need to be incorporated into the monitoring program during the construction period if the Cape Wind project is permitted:

- With regard to protected marine species (whales, dolphins, sea turtles) it is both important and feasible to ensure that these species are not adversely impacted by intense sounds produced under water during construction through simple monitoring and adaptive responses to avoid and mitigate such impacts. An automated acoustic warning system for whales, based on their vocalizations, should be implemented in consultation with experts at NMFS, and science advisors as appropriate. Real-time acoustical monitoring of impact sounds during construction should be implemented to reduce or eliminate the risk of injury to protected marine species. Based on the current modeling in the DEIS (Figure 40, Appendix 5-11A), sounds in the 100 Hz to 1.0 kHz band will clearly be above the NMFS threshold specified for risk to the hearing of marine animals at distances less than 500 m. This system should be operated throughout the construction phase, not just during the startup of installation.

- With regard to flying animals, Cape Wind needs to continue to gather data for the improved quantification of the risk of mortality to flying animals. These data must include the frequency, heights and the seasonal patterns and timing of transits by those species of the project site. This data need is particularly critical for wintering sea ducks, terns (specifically roseate terns) and migrating birds because of the lingering issues regarding those species during key seasons. Such data will be critical for regulatory oversight as well as for the development of avoidance and mitigation strategies for the project.

- With regard to fish, crustaceans and other marine life, spawning and migration activities and locations of key species must be monitored and coordinated with NOAA Fisheries and the Division of Marine Fisheries to ensure that submarine cable installation activities do not disrupt spawning and migratory activities.

b. Monitoring and adaptive management during wind farm operation

A carefully planned program of ongoing data acquisition (i.e. monitoring) and adaptive management of the wind farm should be developed and included in the Final EIS, including innovative approaches to sampling so that reliable estimates of environmental impacts can be made during turbine operation.

- With regard to birds and bats, the monitoring program must be capable of measuring species-specific mortality rates for birds and bats flying in the rotor-swept zone. Even with the fully developed pre-construction analysis based on observations in the project area and throughout Nantucket Sound, uncertainty will inevitably persist about the potential avian impacts that will occur if turbines are placed in the Sound. The interaction of birds and turbines is complex, and is determined by many factors including the presence of the turbines. Under many circumstances, birds avoid turbines, thus reducing risks way below that which might be predicted on the assumption that flight behavior in the intended project area will remain unchanged once the turbines are in place. Under other circumstances birds may be attracted to turbines, or at least unable to avoid them.

  For these reasons, it is imperative that a strong plan for rigorous monitoring of bird and bat mortality be developed with the guidance of a range of competent scientists. The monitoring proposal in the DEIS is not strong enough. Data from effective monitoring should be used to guide mitigation measures, and as a critical input to a responsible program for adaptive management.

  The monitoring program should be expanded to include two phases of post-construction monitoring. Phase I should be a period of relatively intensive monitoring during the first five years of the project. During this period, the ecological impacts to birds and bats should be quantified, any unacceptably high impacts identified, and mitigation measures developed and implemented, as needed. The monitoring program should be designed with a number of specific objectives but must also be designed in such a fashion as to increase the likelihood of detecting effects that have not been anticipated through monitoring an array of ecological indicators. The data and protocols developed during phase I should be used to set the objectives for long-term monitoring conducted during phase II, with guidance from the scientific advisory board.

  Protocols used during phase II must be adequate to detect changes in steady state impacts, and provide the information needed for adaptive responses. For example, there may be a particular time window each year when some form of biological impact was demonstrated to be unacceptably high during phase I. Should this be the case, phase II monitoring, and adaptive management, should include protocols for reducing impact during a specific time window defined by ecological or behavioral criteria.

  The essential objective for this bird and bat monitoring program is to quantify the species-specific mortality rates for flying animals in the rotor-swept zone. The Final EIS must include a solid plan for the use of scientifically sound methods for reliably estimating the mortality rates for flying animals at all times of year and at all times of day and night. This will be challenging due the offshore nature of the project, and will require development and testing to identify reliable sampling protocols. The precise contours of the plan should arise from the efforts of the science advisory board. The effectiveness of these sampling methods should be validated.

To make this possible, individual turbines might be equipped with small radar systems that monitor incoming and outgoing bird or bat traffic and/or centralized radar data collection might be employed if such can be done effectively. Alternative technologies such as video, infrared imaging and impact triggered photography should be also explored. Acoustic methods for monitoring impacts to turbine blades should also be considered.

- With regard to marine mammals and sea turtles, a behavioral sampling protocol must be developed to examine the behavior of marine mammals as they navigate through the project area. This part of the monitoring program should be designed to detect aberrant behavior such as collisions with towers, disorientation in and around the farm or increased stranding rates within Nantucket Sound. Monitoring should be carried out in a coordinated fashion with other ongoing marine mammal monitoring (e.g. NOAA Fisheries) during phase I.

- With regard to fish, crustaceans and other marine life in the vicinity of the Cape Wind Energy Project, the monitoring plan must include a program of field observations within the wind turbine site and at background comparison sites that will detect unanticipated effects on marine life. Particular attention should be given to species composition and abundance in and around turbines, and to the behavior of electro-sensitive fishes near buried cables. This program should include a component directed at assessment of impacts in the near shore region along the cable route to shore. Design features for the underwater portion of the monopoles must take into account that increasing the abundance of fishes around the turbines could increase the mortality of fish-eating birds. Additionally, this issue must be addressed by monitoring to evaluate whether this becomes an issue and, if so, how it should be addressed.

- With regard to the benthic habitats disturbed or altered by the project, a program for assessment of the benthic communities, including both flora and fauna, within the project area must be developed. This will require a series of monitoring sites in the project area and habitat matched control sites outside that area for comparison. An evaluation of species composition and abundance should be made, including specific examination of the communities near buried cables, and at the bases of turbine towers. This program should include a component directed at assessment of impacts in the near shore region along the cable route to shore. Such monitoring should, in fact, be appropriate for all underwater cables in coastal and marine waters.

- The post-construction monitoring program for the project should include inspection and remediation of all submarine trenches and tower structures that fail to achieve background profiles within one month of construction.

IV. Conclusion

It is not an easy task to strike the appropriate balance between the very real concerns associated with the actual and potential impacts of the proposed Cape Wind Energy Project on the present environment and ambiance of Nantucket Sound and the equally real but overarching concerns about the devastating impacts of climate change to Nantucket Sound and New England. And yet it is clear that action must be taken immediately, actions that will reverse our catastrophic reliance on fossil fuels whose emissions threaten multiple species at a population scale in the region and that are responsible for cardiac and respiratory death and disease in our communities. The costs and benefits of these choices rest on models that have inherent and inevitable uncertainties.

The task of siting the quantity of utility-scale renewable energy projects in New England that are necessary to offset our own regional fossil fuel emissions to the atmosphere will not be cost-free to the environment or to the quality of our lives. On the other hand, that same quality of life will inevitably be altered at a scale and with consequences that can hardly be imagined unless we act to take all responsible actions to bring renewable wind energy to the region now.

The Corps and Cape Wind have done an impressive job in preparing environmental review documents that try to capture and quantify the expected impacts and risks of impacts that would be associated with the approval of a wind energy facility in the Cape Cod area. The scale of this effort, while impressive, is also appropriate given the importance of this public resource to so many. The reality is that wind technologies are new in many respects and our background understanding of the many coastal ecosystem processes is limited.

As the earlier comments indicate, CLF has some uncertainties and concerns with respect to the DEIS' treatment of the some of the potential interactions between the Cape Wind Energy Project and important marine and avian species. We believe these uncertainties and concerns can be reduced with relatively modest additional efforts by the project proponent and the Corps. We also believe that the immediate creation of a science advisory board will aid the Corps and improve the process of completing the Final EIS and monitoring this project.

In return, the Final EIS will be a better record on which to make the momentous and difficult decision on permitting this project that is before the federal regulators. CLF urges the Corps to take additional steps in preparing the Final EIS that we have detailed in these comments. Given the pressing nature of the need to move forward aggressively with the development of renewable energy sources, we believe that these steps can properly be taken in all circumstances in connection with the preparation of the Final EIS and without resort to additional NEPA filings by the proponent.

CLF is committed to the timely and responsible development of significant renewable energy resources in New England. We believe that such sources can be developed in ways that minimize the impacts to the region's native flora and fauna as well as its quality of life. The Cape Wind Energy Project gives CLF and the region its first credible opportunity to struggle to achieve this outcome. We look forward to working with the Corps, Cape Wind Associates, and the science advisory board to address our concerns more fully both in the coming months.

CONSERVATION LAW FOUNDATION

Col. Thomas L. Koning
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Attn: Karen K. Adams

Secretary Ellen Roy Herzfelder
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Attn: Anne Canaday, EOEA #12643

Re: Cape Wind DEIS/DEIR/DRI (USACE Reference File NAE-2004-338-1) 004989

Dear Colonel Koning and Secretary Herzfelder,

This letter is intended to place into the formal record the attached report prepared by ISO New England and is distinct from the previously filed comments of Conservation Law Foundation. The attached report, the 2003 NEPOOL Marginal Emissions Rate Analysis released during December of 2004, is also available at http://www.iso-ne.com/Planning_Reports/Emissions/Marginal_Emissions_Analysis_2003.pdf.

That report shows that the presence of lower emitting resources has a real effect on regional emissions. Specifically the reports documents the impact of 5,500 MW of capacity added during 2000-2002 (nearly all of which was high-efficiency combined-cycle natural gas plants) and 3,000 MW added during 2003 alone (all combined-cycle gas) on emissions from power plants.

I reprint below graphs from the report that document the reduction in emissions that has come as these plants have come on-line. It is noteworthy that these reductions reach pollutants that are regulated by "cap and trade" regimes as well as those (like CO2) that are no yet regulated by such a program.

A fair reading of this report yields the inescapable conclusion that putting low emissions electricity generation resources into service in New England actually reduces real emissions from the power plants of New England. This analysis should prove very useful in determining the likely impact of an electricity generating facility that has no air emissions itself on the collective emissions of those power plants.

Sincerely,

Seth Kaplan
Senior Attorney & Director, Clean Energy and Climate Change Program

cc: Governor Mitt Romney
Attorney General Thomas Reilly
Margo Fenn, Cape Cod Commission
James Gordon

Figure 5.2: Calculated SO_2 Marginal Emission Rates

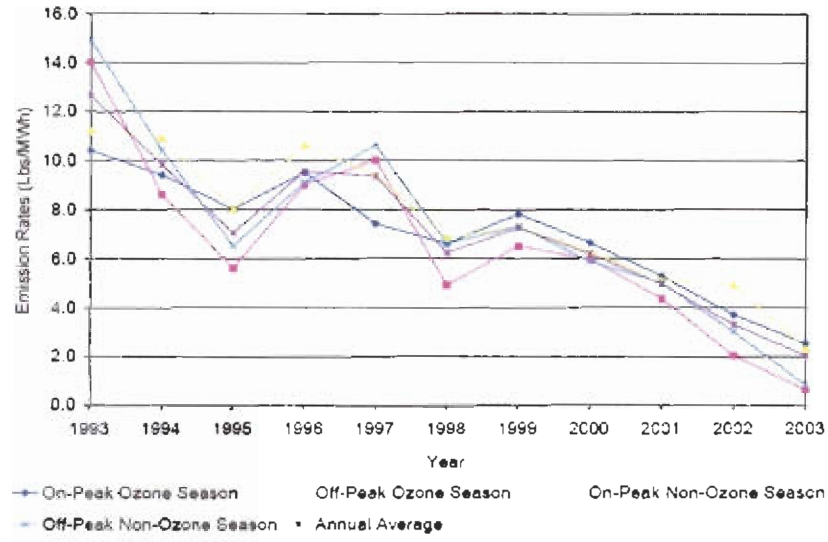


Figure 5.3: Calculated NO_X Marginal Emission Rates

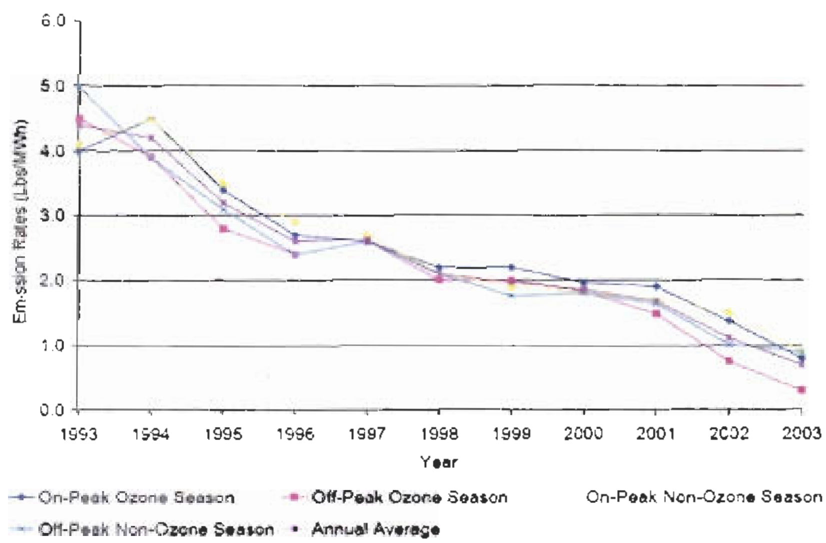
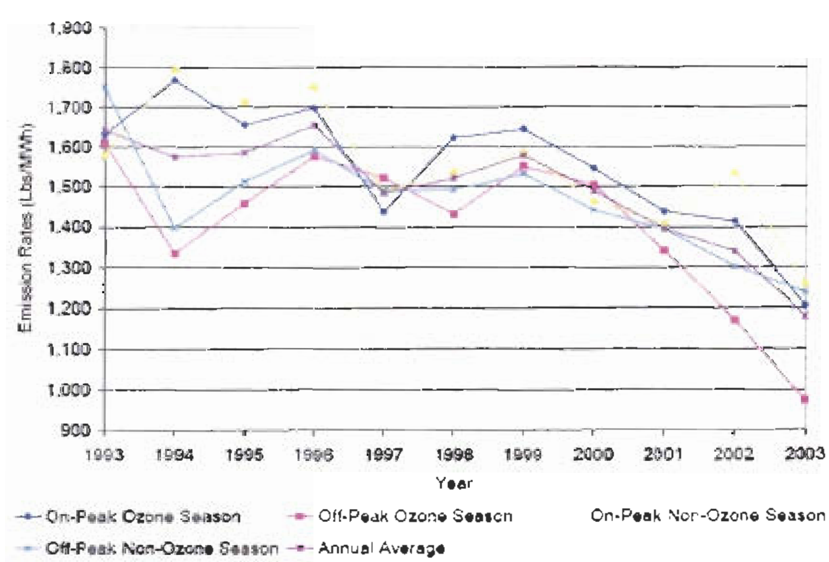


Figure 5.4: Calculated CO_2 Marginal Emission Rates



2003 NEPOOL MARGINAL EMISSION RATE ANALYSIS

for

THE NEPOOL ENVIRONMENTAL PLANNING COMMITTEE

by

ISO New England Inc.

December 2004

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1. EXECUTIVE SUMMARY

ISO New England analyzed the impact that demand side management (DSM) programs have had upon New England Power Pool's (NEPOOL) aggregate SO_2, NO_X, and CO_2 generating unit emissions. This 2003 NEPOOL Marginal Emission Rate Analysis (MEA Report) provides an estimate of marginal SO_2, NO_X, and CO_2 emissions for the calendar year 2003. The results of the 2003 marginal emission rate calculations are shown in Table 1.1 in Lbs/MWh and Table 1.2 in Lbs/MBtu. The NEPOOL Environmental Planning Committee (EPC) has published MEA reports for calendar years 1993 through 2002.

Table 1.1: 2003 Marginal Emission Rates (Lbs/MWh)

Emission	On-Peak Ozone Season	Off-Peak Ozone Season	On-Peak Non-Ozone Season	Off-Peak Non-Ozone Season	Annual Average
SO_2	2.46	0.59	2.26	2.39	1.98
NO_X	0.79	0.29	0.89	0.86	0.73
CO_2	1,204	974	1,259	1,236	1,179

Table 1.2: 2003 Marginal Emission Rates (Lbs/MBtu)[1]

Emission	On-Peak Ozone Season	Off-Peak Ozone Season	On-Peak Non-Ozone Season	Off-Peak Non-Ozone Season	Annual Average
SO_2	0.30	0.07	0.27	0.29	0.24
NO_X	0.10	0.04	0.11	0.10	0.09
CO_2	146	118	153	150	143

The 2003 values were developed using the Inter Regional Electric Market Model (IREMM) production simulation model under two scenarios. This is a different model than what has been used in previous MEA reports. The Reference Case scenario simulates, as closely as possible, the actual operation of the NEPOOL system during the year 2003. To calculate the amount of additional (marginal) SO_2, NO_X, and CO_2 emissions that would have been emitted if DSM programs were not in place, the second or Marginal Case was created by increasing all hourly loads by 500 MW (incremental load increase). The difference in total emissions between the two cases was calculated in Lbs/MWh and the resultant values are noted above in Table 1.1.

A 2003 Marginal Heat Rate was also calculated using simulation results and used to convert the Marginal Emission Rate in Lbs/MWh to Lbs/MBtu. The formula used to calculate the 2003 Marginal Heat Rate is:

2003 Calculated Marginal Heat Rate

$$= \frac{\text{(Marginal Case Fuel Consumption} - \text{Reference Case Fuel Consumption)}}{\text{(Marginal Case Generation} - \text{Reference Case Generation)}}$$

The 2003 Marginal Heat Rate was calculated to be: 8.25 MBtu/MWh.

[1] To convert from Lbs/MWh to Lbs/Mbtu, the 2003 calculated Marginal Heat Rate, as described in Section 5.1, is used.

Compared to the 2002 MEA results, 2003 Marginal Emission Rates are lower during all investigated time periods. In addition, the calculated marginal heat rate has dropped from 8.66 Mbtu/MWh in 2002 to 8.25 Mbtu/MWh in 2003. This drop in marginal emission rates and marginal heat rates can be attributed to the commercialization of almost 2,800 MW of natural gas-fired combined cycles during 2003.

2. BACKGROUND

In early 1994, the NEPOOL EPC conducted a study to analyze the impact that Demand Side Management (DSM) programs had on NEPOOL's NO_X emissions in the calendar year 1992. The results were presented in a report entitled, *1992 Marginal NO_X Emission Rate Analysis*, which was used to support applications for obtaining NO_X emission reduction credits (ERCs) resulting from those DSM program impacts. Such applications were filed under the Massachusetts ERC banking and trading program, which became effective on January 1, 1994. The ERC program allows inventoried sources of NO_X, VOCs, and CO_2 in Massachusetts to earn bankable and tradable credits by reducing emissions below regulatory requirements. One of the activities is electric utility DSM programs installed since January 1, 1992. In 1994, the *1993 Marginal Emission Rate Analysis (MEA Report)* was published, which provided analysis on the impact of DSM programs on SO_2, NO_X, and CO_2 emissions for the calendar year 1993. The MEA Report was also published for the years 1994 through 2002 to provide similar analysis.

The *2003 NEPOOL Marginal Emission Rate Analysis* provides an estimate of the impact of DSM programs on NEPOOL's SO_2, NO_X, and CO_2 emissions for the calendar year 2003. The MEA Report is used by a variety of stakeholders including consulting firms, environmental advocacy groups, and state air regulators. For example, the MEA Report can be used to gauge the value (avoided emissions) of Renewable Energy Certificates (REC) by providing both REC suppliers and stakeholders with a consistent methodology that results in the calculation and communication of the environmental benefits of RECs and works to enhance the overall REC marketplace.

3. METHODOLOGY

3.1. Models Used

Past MEA analyses were performed using Henwood Energy Services Inc.'s PROSYM model. For conducting the 2003 MEA, ISO-NE used the Inter-Regional Electric Market Model (IREMM) to simulate the system as ISO-NE's licensing agreement with Henwood Energy Services Inc. was not renewed. The use of the IREMM model is consistant with other ISO-NE published assessments as it has been used for economic assessments within the four Regional Transmission Expansion Plans[1] published by ISO New England.

Similar to the PROSYM model, IREMM is a chronological simulation tool that approximates the minimization of costs using the traditional short-run marginal cost based methodology. In modeling generating unit characteristics, IREMM uses a more simplistic method. For example, full load heat rates are used as opposed to heat rate curves when modeling the dispatch of generating units. Also, minimum up/down times and ramp rates are not modeled in IREMM. Although there are differences between the two models, results appear consistant based on last years results and trends.

IREMM was used to replicate, as closely as possible, actual 2003 NEPOOL system operations. However, because IREMM is a simulation model, there are modeling limitations and it is not possible to exactly replicate the discrete hourly events that occurred historically, such as daily changes in fuel prices, sudden forced outages, and unit deratings. IREMM simulates the NEPOOL power system as a one-bus model

[1] Copies of the Regional Transmission Expansion Plan can be obtained through ISO-NE's Customer Service Department.

and thus the impacts resulting from transmission constraints are not captured. A more detailed description of IREMM can be found in Appendix C.

3.2. Calculating Marginal Emissions

Marginal emissions are calculated by comparing two simulations. The first simulation is the Reference Case. This case was created to replicate, as closely as possible, the actual 2003 NEPOOL system operation. The Reference Case is created by running IREMM and comparing the calculated annual energies to the actual energies on a unit by unit basis. If a unit's calculated annual energies are not within 25% of the actual annual energy, the unit variable costs are adjusted and the program is re-run. This process is continued until all unit's calculated annual energies are within 25% of the actual annual energies. Because of modeling constraints, peaking unit capacity is not considered in the 25% analysis of actual vs. calculated annual energy production. The second simulation, the Marginal Case, calculates the amount of additional (marginal) emissions that would have been emitted if DSM programs were not in place. This Case is created by increasing all hourly loads by 500 MW (incremental load increase).

The 1994 Report entitled, *NEPOOL Forecast Report of Capacity, Energy, Loads and Transmission 1994-2009 (1994 CELT Report),* identified 1994 aggregate summer DSM programs in the amount of 1,034 MW. The incremental 500 MW was originally used to estimate the impacts from DSM programs because it represented an amount that was an average or median value. Marginal emission rates could have been calculated for the first (1) MW of incremental load and could also have been calculated for the 1,034 MW of incremental load. In 1994, the NEPOOL EPC decided to model the average effects of not having DSM programs at the average or median value of 500 MW incremental load. The 500 MW incremental load has been used in all MEA Reports since 1994, and thus provides a consistent base line for historical observations. The 2004 Report entitled, *NEPOOL Forecast Report of Capacity, Energy, Loads and Transmission 2004-2013 (2004 CELT Report),* identifies 2004 summer DSM programs totaling 1,534 MW and winter DSM programs totaling 1,452 MW.

ISO New England dispatches all the generating units in NEPOOL (New England) economically based on market offers to meet the hourly load and operating reserve requirements, subject to transmission constraints, contingency protection, self-scheduling of units, and Reliability Must-Run (RMR) contracts. This means that multiple units may increase output in response to an increase in load. Therefore, there is typically no single marginal unit that can be identified at any given time. Rather, typically there are multiple marginal units located throughout the six New England states.

This report calculates 2003 NEPOOL marginal SO_2, NO_X, and CO_2 emission rates that are expressed in both Lbs/MWh and Lbs/MBtu. Also included is incremental tons of emissions associtied with incremental generation by SMD Load Zone. This data is calculated by increasing the actual 2003 NEPOOL loads by 500 MW in all hours. Based on a comparison between the two simulations, Reference Case and Marginal Case, monthly differences in energy output and the corresponding SO_2, NO_X, and CO_2 emissions are then determined. These marginal emission rates are based on calculated energy production in 2003 and other discretely modeled system conditions. Caution should be exercised in using this information for years other than 2003 since the system changes every year as do fuel prices and electrical demand. It should also be noted that although Reference Case simulations approximately match actual operation, the simulations are run on a single-bus model and are subject to differences from actual hourly dispatch where transmission system constraints come into play. The final hourly NEPOOL marginal emissions are divided into the four time-periods described below.

1. On-Peak Ozone Season (where the Ozone Season is defined as occurring from May 1 to September 30) consisting of all weekdays between hour ending 9 A.M. and hour ending 10 P.M. from May 1 to September 30.

2. Off-Peak Ozone Season consisting of all weekdays between hour ending 11 P.M. and hour ending 8 A.M. and all weekends from May 1 to September 30.

3. On-Peak Non-Ozone Season consisting of all weekdays between hour ending 9 A.M. and hour ending 10 P.M. from January 1 to April 30 and October 1 to December 31.

4. Off-Peak Non-Ozone Season consisting of all weekdays between hour ending 11 P.M. and hour ending 8 A.M. and all weekends from January 1 to April 30 and October 1 to December 31.

4. ASSUMPTIONS

The key parameters and assumptions modeled within the 2003 Marginal Emissions Rate Analysis are highlighted below.

- Full Outages (forced and scheduled) that lasted three or more days during 2003 were modeled discretely within IREMM.
- NEPOOL DSM programs for 2003 have been modeled at the average aggregate of 500 MW in all hours.
- Actual historical hourly loads for 2003 were modeled for the NEPOOL system for the Reference Case based on aggregate hourly energy produced from New England generators. NEPOOL pumped-storage pumping load is included within the hourly NEPOOL loads.
- Interchange with external systems, New York, New Brunswick, and Hydro-Quebec is not modeled for purposes of this study. This results in the modeling of the actual native NEPOOL load and generation only.
- For all major hydro-electric stations and pumped storage facilities, actual 2003 monthly energies were input into all modeling runs. IREMM then used this input to dispatch the hydro-electric stations to meet the targeted monthly energies. All other generators were operated according to system economics.
- Monthly fuel prices for generating units were based on EIA data and then adjusted on a per unit basis through the unit variable costs as needed to mimic 2003 dispatch.
- Individual generating unit emission rates were calculated from the 2003 actual emissions as reported to the US EPA's Acid Rain Division and published in the preliminary US EPA Emissions Scorecard 2003[1]. For those units that were not required to file with the US EPA Acid Rain Division, the assumed emission rates were either the rate noted in EPA's E-Grid2002 version 2.0 data or defaulted to assumed emission rates based on similar unit types.

[1] Final data was not available from the US EPA as of September 1, 2004

5. RESULTS

5.1. 2003 Calculated Marginal Heat Rate

In MEA reports prior to 1999, a fixed Marginal Heat Rate of 10.0 MBtu/MWh was used to convert from Lbs/MWh to Lbs/MBtu. In the 1999 – 2003 *NEPOOL Marginal Emissions Rate Analysis*, the Marginal Heat Rate was calculated using the results of the modeling runs. This methodology has again been used to calculate the 2003 Marginal Heat Rate. Since heat rate is equal to fuel consumption divided by generation, the 2003 Calculated Marginal Heat Rate is defined as follows:

2003 Calculated Marginal Heat Rate

$$= \frac{\text{(Marginal Case Fuel Consumption – Reference Case Fuel Consumption)}}{\text{(Marginal Case Generation – Reference Case Generation)}}$$

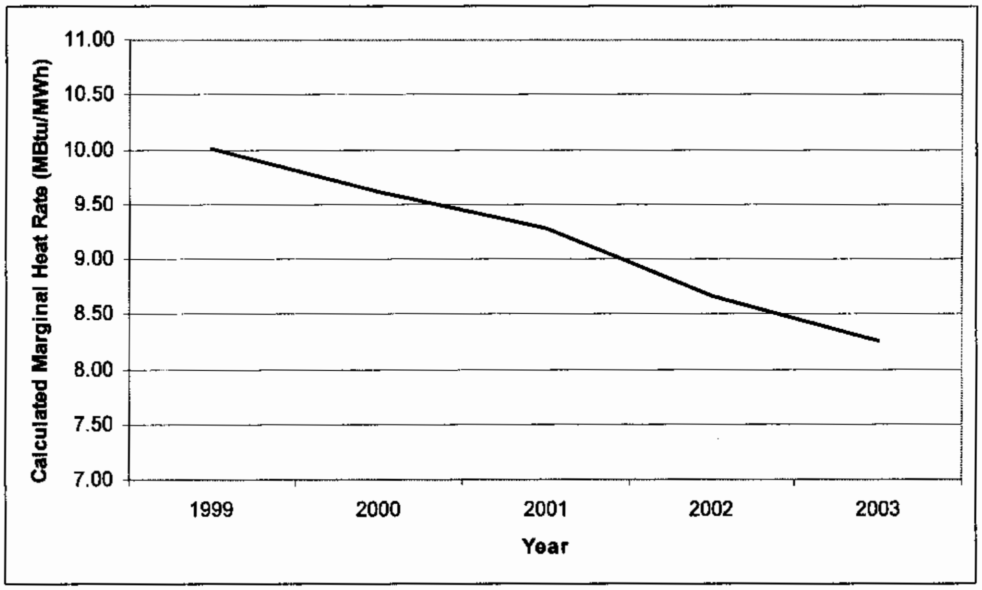
The calculated marginal heat rate reflects the average annual efficiency of the units dispatched to meet the additional load requirement in the marginal case. The lower the heat rate value, the more efficient the system or marginal generator is.

Table 5.1: Calculated Marginal Heat Rate (Mbtu/MWh)

Year	Calculated Marginal Heat Rate (Mbtu/MWh)
1999	10.013
2000	9.610
2001	9.279
2002	8.660
2003	8.249

As shown in Table 5.1, the 2003 Calculated Marginal Heat Rate has decreased since 1999 from 10.013 MBtu/MWh to 8.249 MBtu/MWh. This is primarily due to the addition of approximately 13,100 MW of gas-fired combined cycle units with high efficiency rates. Figure 5.1 illustrates the calculated marginal heat rate spanning the 1999 – 2003 timeframe.

Figure 5.1: Calculated Marginal Heat Rate (MBtu/MWh)



To convert from Lbs/MWh to Lbs/MBtu, the 2003 Calculated Marginal Heat Rate is used as the global conversion factor for all calculations within this report.

5.2. Incremental Generation By SMD Load Zones

Table 5.1 shows the incremental generation, by SMD load zones, for the Ozone Season and Non-Ozone Season time-periods. Also shown is the percent of total NEPOOL generation increase, by SMD load zones, resulting from a 500 MW increase in all NEPOOL hourly loads.

Table 5.2: 2003 Incremental Generation By SMD Load Zones

	Ozone Season		Non-Ozone Season		Annual	
State	GWh	%	GWh	%	GWh	%
Connecticut	193	10.5	424	16.7	617	14.1
Maine	305	16.7	455	18.0	760	17.4
New Hampshire	193	10.5	214	8.5	407	9.3
Rhode Island	261	14.2	273	10.8	534	12.2
Vermont	4	0.2	0	0.0	4	0.1
Massachusetts	876	47.8	1,166	46.1	2,042	46.8
Massachusetts (Divided into Load Zones)						
Northern MA & Boston	322	17.6	512	20.2	834	19.1
Southeastern MA	373	20.3	490	19.3	863	19.8
Western & Central MA	182	9.9	164	6.5	346	7.9
New England Total	1,832	100.0	2,533	100.0	4,364	100.0

5.3. 2003 Marginal Emission Rates

Table 5.2 shows SO_2, NO_X and CO_2 marginal emission rates in Lbs/MWh for the NEPOOL system for each of the four time-periods. Table 5.3 shows the same information expressed in Lbs/MBtu. As noted earlier, the 2003 Calculated Marginal Heat Rate of 8.25 MBtu/MWh was used as the global conversion factor.

The overall NEPOOL emissions for each state are very dependent on the specific units that are available to serve NEPOOL load. Therefore, there could be wide variations in the seasonal emissions, primarily due to changes in unit availability, fuel consumption, and load level.

The calculated marginal emission rates for SO_2, NO_X and CO_2 during the 2003 off-peak ozone season tend to decrease when compared to the annual average emission rates. This could possibly be attributed to the difference between oil and natural gas prices during the summer ozone and winter non-ozone periods. During the summer ozone period, when natural gas is usually less expensive than oil, gas-fired units tend to be dispatched or kept online during off-peak periods primarily due to system economics therefore lowering the marginal emission rate for this period. The opposite may be occurring during the winter non-ozone season, when natural gas tends to be (seasonably) more expensive than oil. This difference in fuel price may cause more oil units to be dispatched or kept online during the off-peak non-ozone period and therefore, would subsequently result in a higher marginal emissions rate versus the off-peak ozone season.

Table 5.3: 2003 Marginal Emission Rates (Lbs/MWh)

Emission	On-Peak Ozone Season	Off-Peak Ozone Season	On-Peak Non-Ozone Season	Off-Peak Non-Ozone Season	Annual Average
SO_2	2.46	0.59	2.26	2.39	1.98
NO_X	0.79	0.29	0.89	0.86	0.73
CO_2	1,204	974	1,259	1,236	1,179

Table 5.4: 2003 Marginal Emission Rates (Lbs/MBtu)

Emission	On-Peak Ozone Season	Off-Peak Ozone Season	On-Peak Non-Ozone Season	Off-Peak Non-Ozone Season	Annual Average
SO_2	0.30	0.07	0.27	0.29	0.24
NO_X	0.10	0.04	0.11	0.10	0.09
CO_2	146	118	153	150	143

5.4. Calculated Historical Marginal Emission Rates

Table 5.4 through Table 5.6 illustrates the calculated marginal emission rates for SO_2, NO_x, and CO_2 in Lbs/MWh for the years 1993 through 2003. Figure 5.2 through Figure 5.4 are graphical representations of Table 5.4 through Table 5.6, respectively. There is a noticeable decrease in the marginal emission rates for NO_x in 1995 primarily due to the implementation of NO_x RACT regulations as required under Title I of the 1990 Clean Air Act Amendments. This decrease in the calculated NO_X marginal emission rate continues into the 2003 time frame. Most of the continued decrease can be attributed to the commercialization of many new gas-fired combined cycled plants in each year[1]. In 2003, there was almost 2,800 MW of new gas-fired capacity added to the NEPOOL system.

The increase in natural gas-fired capacity has also had an affect on the calculated CO_2 marginal emission rates during the ozone off-peak and on-peak periods. Specifically, a decrease can be seen in the 2003 calculated CO_2 marginal rate from the year 2000. This decrease is primarily due to the increase in natural gas-fired marginal generation coupled with the decrease in coal-fired marginal generation during the ozone off-peak period.

In 1997 to 1998, there is an increase in the marginal emission rates for CO_2 primarily attributed to the lower availability in nuclear generation and the subsequent increase in fossil-fired generation to compensate for that loss. A drop in marginal CO_2 emission rates into 2003 is most likely the result of the addition of the newly commercialized, highly efficient, low emitting natural gas-fired generating plants in New England. Overall, results for 2003 illustrate that marginal emission rates continue to decline with the commercialization of additional highly efficient natural gas-fired generating plants. This trend will not likely continue as no new such plants are currently under construction in the region.

Table 5.5: Calculated SO_2 Marginal Emission Rates (Lbs/MWh)

Year	On-Peak Ozone Season	Off-Peak Ozone Season	On-Peak Non-Ozone Season	Off-Peak Non-Ozone Season	Annual Average
1993	10.4	14.0	11.2	14.9	12.6
1994	9.4	8.6	10.9	10.4	9.8
1995	8.0	5.6	8.0	6.5	7.0
1996	9.5	9.0	10.6	9.1	9.6
1997	7.4	10.0	9.4	10.6	9.4
1998	6.6	4.9	6.8	6.6	6.2
1999	7.8	6.5	7.3	7.3	7.2
2000	6.6	6.0	6.3	5.9	6.2
2001	5.3	4.4	5.1	5.0	4.9
2002	3.7	2.0	4.9	3.0	3.3
2003	2.5	0.6	2.3	2.4	2.0

[1] See Appendix Table A.2

Table 5.6: Calculated NO_X Marginal Emission Rates (Lbs/MWh)

Year	On-Peak Ozone Season	Off-Peak Ozone Season	On-Peak Non-Ozone Season	Off-Peak Non-Ozone Season	Annual Average
1993	4.0	4.5	4.1	5.0	4.4
1994	4.5	3.9	4.5	3.9	4.2
1995	3.4	2.8	3.5	3.1	3.2
1996	2.7	2.4	2.9	2.4	2.6
1997	2.6	2.6	2.7	2.6	2.6
1998	2.2	2.0	2.1	2.1	2.1
1999	2.2	2.0	1.9	1.8	2.0
2000	2.0	1.8	1.8	1.8	1.9
2001	1.9	1.5	1.7	1.6	1.7
2002	1.4	0.8	1.5	1.0	1.1
2003	0.8	0.3	0.9	0.9	0.7

Table 5.7: Calculated CO_2 Marginal Emission Rates (Lbs/MWh)

Year	On-Peak Ozone Season	Off-Peak Ozone Season	On-Peak Non-Ozone Season	Off-Peak Non-Ozone Season	Annual Average
1993	1,630.0	1,610.0	1,580.0	1,750.0	1,642.5
1994	1,767.0	1,334.0	1,796.0	1,396.0	1,573.3
1995	1,654.0	1,458.0	1,713.0	1,511.0	1,584.0
1996	1,696.0	1,575.0	1,752.0	1,590.0	1,653.3
1997	1,437.0	1,522.0	1,487.0	1,488.0	1,483.5
1998	1,621.7	1,431.9	1,537.6	1,490.6	1,520.4
1999	1,643.6	1,549.6	1,586.9	1,530.6	1,577.7
2000	1,544.7	1,504.7	1,462.8	1,440.1	1,488.1
2001	1,436.5	1,340.2	1,406.0	1,392.9	1,393.9
2002	1,412.2	1,170.6	1,535.6	1,299.5	1,337.8
2003	1,204.3	974.4	1,258.7	1,236.4	1,179.0

Figure 5.2: Calculated SO_2 Marginal Emission Rates

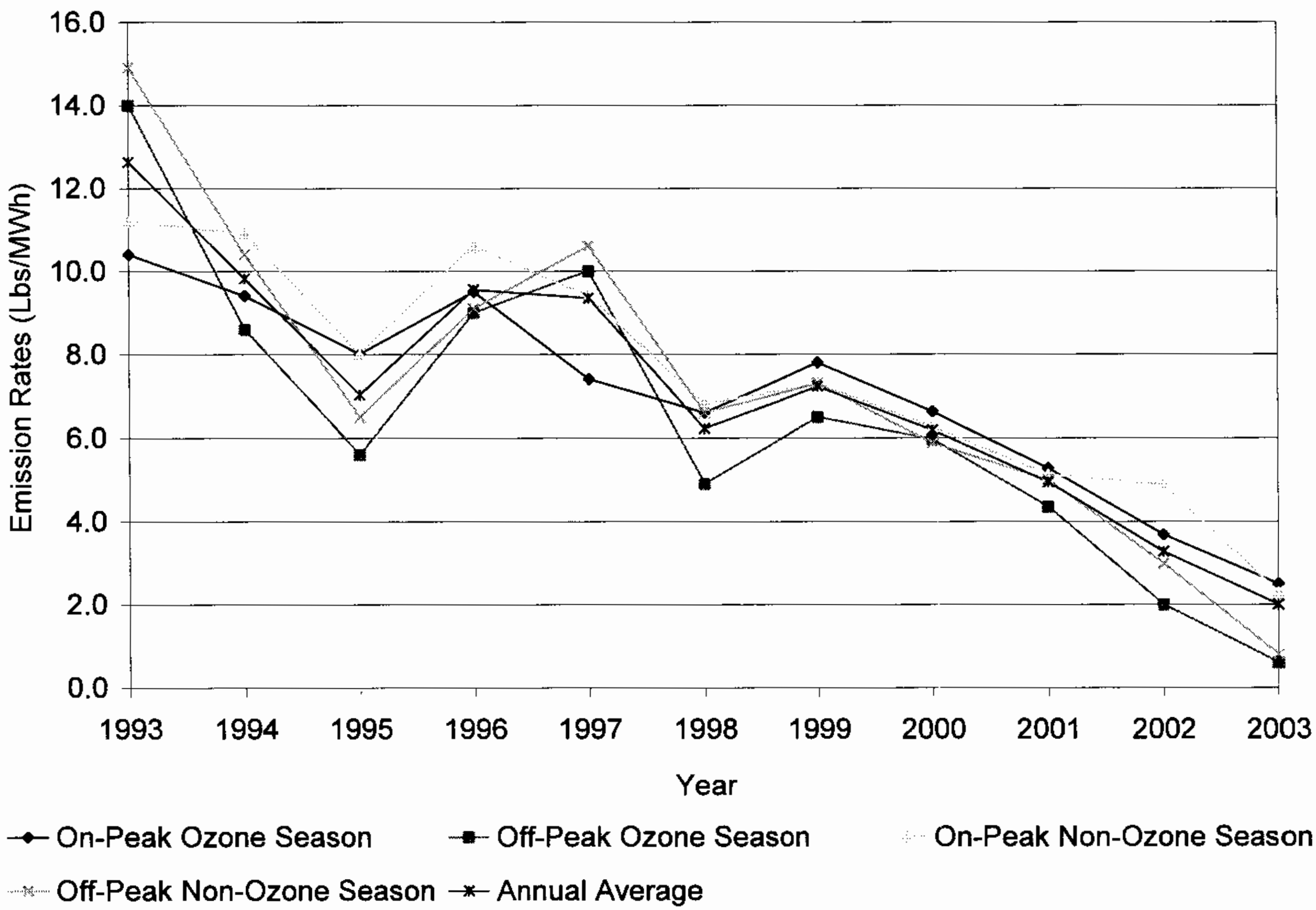


Figure 5.3: Calculated NO_X Marginal Emission Rates

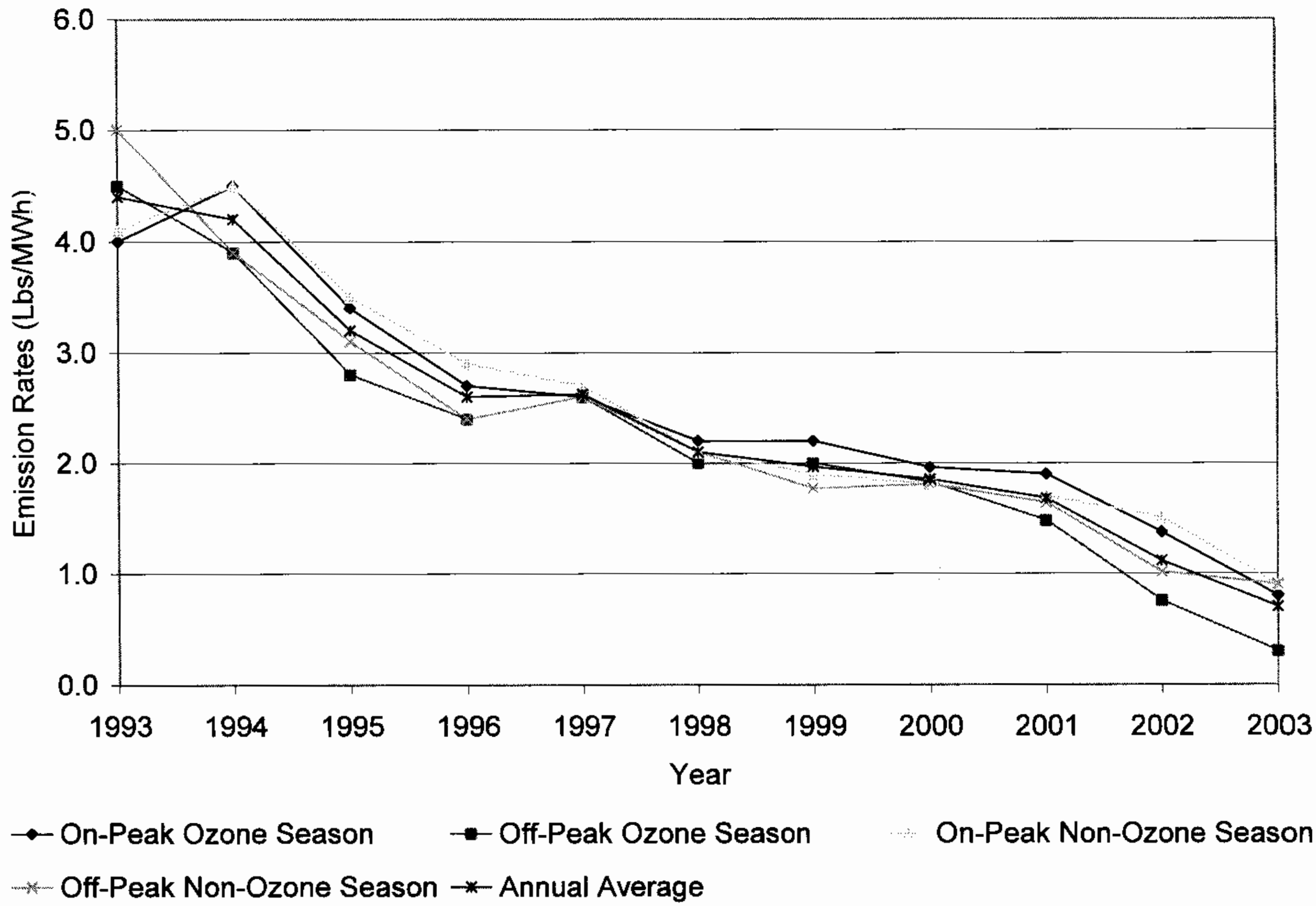
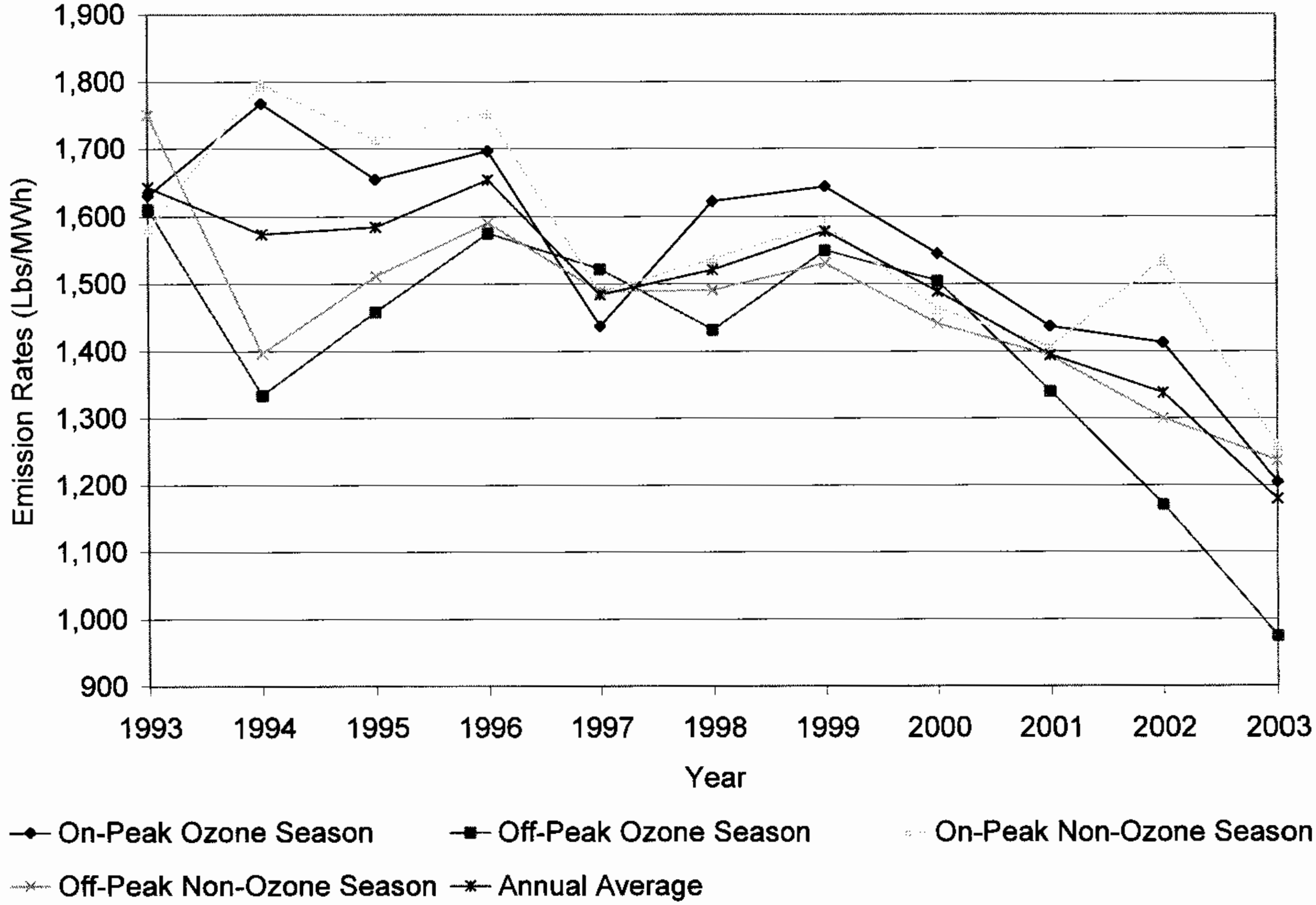


Figure 5.4: Calculated CO_2 Marginal Emission Rates



5.5. Incremental Emissions by SMD Load Zone and by Ozone & Non-Ozone Season

Table 5.7 through Table 5.9 illustrates the calculated incremental SO_2, NO_X, and CO_2 emissions, by SMD load zone, for the ozone and non-ozone season time-periods, that would have been produced if the total NEPOOL load in all hours was increased by 500 MW. Also shown is the percent of the total increase in emissions that would have correspondingly been produced within each state.

Table 5.8: 2003 Incremental SO_2 Emissions

	Ozone Season		Non-Ozone Season		Annual	
State	**kTons**	**%**	**KTons**	**%**	**kTons**	**%**
Connecticut	0.12	8.7	0.79	26.8	0.91	21.1
Maine	0.02	1.3	0.50	17.0	0.52	12.0
New Hampshire	0.55	39.8	0.02	0.7	0.57	13.1
Rhode Island	0.00	0.1	0.00	0.0	0.00	0.0
Vermont	0.00	0.0	0.00	0.0	0.00	0.0
Massachusetts	0.69	50.2	1.64	55.5	2.33	53.8
Massachusetts (Divided into Load Zones)						
Northern MA & Boston	0.13	9.2	0.77	26.2	0.90	20.8
Southeastern MA	0.43	31.6	0.74	25.1	1.18	27.2
Western & Central MA	0.13	9.4	0.12	4.1	0.25	5.8
New Enlgand Total	1.37	100.0	2.95	100.0	4.32	100.0

Notes:

1)The Incremental Emissions are calculated by increasing the actual 2003 NEPOOL loads by 500 MW in all hours.
2)Annual totals may not equal sum due to rounding.

Table 5.9: 2003 Incremental NO_X Emissions

	Ozone Season		Non-Ozone Season		Annual	
State	**KTons**	**%**	**KTons**	**%**	**kTons**	**%**
Connecticut	0.08	15.5	0.42	37.5	0.49	30.7
Maine	0.04	8.2	0.17	14.9	0.21	12.9
New Hampshire	0.09	17.7	0.01	1.0	0.10	6.1
Rhode Island	0.02	5.1	0.03	2.3	0.05	3.2
Vermont	0.00	0.9	0.00	0.0	0.00	0.3
Massachusetts	0.26	52.6	0.49	44.3	0.75	46.8
Massachusetts (Divided into Load Zones)						
Northern MA & Boston	0.07	14.4	0.24	21.7	0.31	19.5
Southeastern MA	0.13	26.7	0.21	18.6	0.34	21.1
Western & Central MA	0.06	11.5	0.04	3.9	0.10	6.2
New England Total	0.49	35.5	1.11	37.6	1.60	37.0

Table 5.10: 2003 Incremental CO_2 Emissions

	Ozone Season		Non-Ozone Season		Annual	
State	**KTons**	**%**	**KTons**	**%**	**kTons**	**%**
Connecticut	118	11.8	382	24.2	500	19.4
Maine	151	15.2	256	16.2	407	15.8
New Hampshire	116	11.6	94	6.0	210	8.2
Rhode Island	122	12.3	128	8.1	250	9.7
Vermont	6	0.6	0	0.0	6	0.2
Massachusetts	484	48.5	719	45.5	1,202	46.7
Massachusetts (Divided into Load Zones)						
Northern MA & Boston	179	18.0	350	22.2	529	20.5
Southeastern MA	209	21.0	278	17.6	487	18.9
Western & Central MA	96	9.6	91	5.7	186	7.2
New EnglandTotal	996	100.0	1,579	100.0	2,575	100.0

Notes:

1)The Incremental Emissions are calculated by increasing the actual 2003 NEPOOL loads by 500 MW in all hours.
2)Annual totals may not equal sum due to rounding.

APPENDIX A

Table A.1 shows the total NEPOOL capacity claimed for capability during the 2003 calendar year. NEPOOL capacity listed in Table A.1 was obtained from ISO New England's January 2004 Seasonal Claimed Capability (SCC) Report. Table A.2 and Table A.3 identifies new units that went into commercial operation during the 2003 and 2000 – 2002 calendar years, respectively.

Appendix Table A.1: 2003 NEPOOL Capacity by State and Unit Category (MW)

	Connecticut		Maine		Massachusetts		New Hampshire		Rhode Island		Vermont		New England Totals	
Unit Category	**Summer Net**	**Winter Net**	**Summer Net**	**Winter Net**	**Summer Net**	**Winter Net**	**Summer Net**	**Winter Net**	**Summer Net**	**Winter Net**	**Summer Net**	**Winter Net**	**Summer Net**	**Winter Net**
Combined Cycle	1,019	1,177	1,386	1,528	4,967	5,849	1,182	1,327	1,786	2,046	-	-	10,340	11,928
Diesel	5	5	18	20	83	84	-	-	-	-	14	14	121	123
Fossil	3,108	3,177	1,156	1,282	4,960	5,052	1,082	1,088	12	12	73	74	10,391	10,684
Gas Turbine	333	408	194	231	516	622	14	18	-	-	75	99	1,132	1,378
Hydro	149	155	556	587	314	323	552	574	1	1	143	167	1,716	1,807
Pumped Storage	-	-	-	-	1,643	1,665	-	-	-	-	-	-	1,643	1,665
Jet	321	416	-	-	354	506	67	82	-	-	11	18	753	1,021
Nuclear	1,997	2,036	-	-	685	685	1,159	1,161	-	-	506	529	4,347	4,411
Total	6,932	7,374	3,311	3,648	13,522	14,786	4,057	4,250	1,800	2,060	821	900	30,443	33,018

Appendix Table A.2: New Capacity Added to New England During 2003

Unit Name	Unit Category	State	Summer Net MW	Winter Net MW	In-Service Date
AES Granite Ridge	Combined Cycle	NH	678	767	Apr-2003
Mystic Block 8	Combined Cycle	MA	707	850	Apr-2003
Mystic Block 9	Combined Cycle	MA	707	850	Jun-2003
Edgar Fore River	Combined Cycle	MA	700	843	Aug-2003
		Total	**2,792**	**3,310**	

Appendix Table A.3: New Capacity Added to New England During 2000-2002

Unit Name	Unit Category	State	Summer Net MW	Winter Net MW	In-Service Date
Androscoggin Energy Center	Combined Cycle	ME	86	109	Jan-2000
Berkshire Power	Combined Cycle	MA	248	265	May-2000
Maine Independence Station	Combined Cycle	ME	494	547	Jun-2000
Tiverton Power	Combined Cycle	RI	251	286	Aug-2000
Bucksport	Combined Cycle	ME	165	193	Jan-2001
Millenium	Combined Cycle	MA	339	388	Apr-2001
Westbrook	Combined Cycle	ME	512	551	Apr-2001
ANP Blackstone Unit 1	Combined Cycle	MA	209	213	Jun-2001
ANP Blackstone Unit 2	Combined Cycle	MA	214	244	Jul-2001
Wallingford Units 1-5	Gas Turbine	CT	215	251	Jan-2002
Lake Road Units 1-2	Combined Cycle	CT	454	525	Mar-2002
Lake Road Unit 3	Combined Cycle	CT	237	272	May-2002
West Springfield 1 & 2	Gas Turbine	MA	86	100	Jun-2002
Newington Energy	Combined Cycle	NH	528	543	Sep-2002
RISE	Combined Cycle	RI	515	575	Oct-2002
ANP Bellingham Unit 1	Combined Cycle	MA	288	308	Oct-2002
Kendall Repowering	Combined Cycle	MA	172	234	Dec-2002
ANP Bellingham Unit 2	Combined Cycle	MA	288	308	Dec-2002
		Total	**5,301**	**5,912**	

APPENDIX B

Table B.1 illustrates the aggregate SO_2, NO_X, and CO_2 emissions as output from the Reference case production simulation runs and the aggregate emissions as reported to the US EPA on the Preliminary EPA Scorecard 2003. It must be noted that the calculated values are a result of computer simulation limited by certain assumptions and does not precisely match the historical unit commitment and dispatch of generating units. Also, the units that are listed in the Preliminary US EPA Scorecard 2003 account for approximately 65% of the total NEPOOL capacity. This is the primary reason for the difference between the calculated and reported aggregate emissions of SO_2, NO_X, and CO_2 for 2003.

Appendix Table B.1: 2003 Reference Case Calculated Aggregate Emissions of SO_2, NO_X, and CO_2

SMD Load Zone	SO_2 kTons	NO_X kTons	CO_2 kTons
Connecticut	11.16	9.56	10,690
Maine	4.81	3.61	6,441
New Hampshire	55.40	10.58	9,153
Rhode Island	0.19	0.49	2,333
Vermont	0.01	0.51	352
Total Massachusetts	87.85	29.48	27,309
Massachusetts Divided Into SMD Load Zones			
Northern MA & Boston	34.03	10.80	10,734
Southeastern MA	48.02	15.42	13,107
Western & Central MA	5.79	3.26	3,468
Calculated New England Total	159.41	54.23	56,278
Total as Noted in Preliminary 2003 US EPA Scorecard	152.45	40.13	46,942
Difference	6.97	14.10	9,336

Table B.2 and B.3 illustrates the annual average values, as output from the Reference Case production simulation runs, of SO_2, NO_X and CO_2 rates in Lbs/MWh and Lbs/MBtu for the 1999 – 2003 time period. Table B.3 also gives the annual average heat rate for the NEPOOL system spanning the same time frame.

Appendix Table B.2: 1999 – 2003 Calculated Annual Averages of SO_2, NO_X, CO_2 in Lbs/MWh

Year	SO_2 (Lbs/MWh)	NO_X (Lbs/MWh)	CO_2 (Lbs/MWh)
1999	4.52	1.36	1009
2000	3.88	1.12	913
2001	3.51	1.05	930
2002	2.69	0.94	909
2003	2.75	0.93	970

Appendix Table B.3: 1999 – 2003 Calculated Annual Averages of SO_2, NO_X, CO_2 in Lbs/MBtu, and Heat Rates

Year	SO_2 (Lbs/MBtu)	NO_X (Lbs/MBtu)	CO_2 (Lbs/MBtu)	Heat Rate (MBtu/MWh)
1999	0.49	0.15	110	9.14
2000	0.43	0.12	100	9.03
2001	0.39	0.12	104	8.96
2002	0.31	0.11	105	8.66
2003	0.30	0.10	106	9.12

APPENDIX C

Inter Regional Electric Market Model (IREMM)

IREMM is a computer model that provides a chronological simulation of energy market behavior based on both game theory and the traditional, engineering-based production simulation model. The basic logic inside IREMM is a chronological and deterministic production cost model. In the beginning of the simulation procedure, IREMM calculates the hourly load data for each area, based on the input hourly load shape, or load forecast profile. Conventional hydro and pump storage units are modeled as load modifiers. For each hour, initially, IREMM dispatches generating units to meet the demand, starting with the least expensive unit. For any area short of energy, a very expensive proxy emergency unit is dispatched to provide the necessary energy. Once the demand is served from available resources, the amount of surplus energy available for sale and the amount of economically displaceable energy may be calculated for various price levels. If demand in an area cannot be satisfied, a price spike of $500/MWh is assigned. The program then proceeds to the next hour, and repeats the same process until the last hour of the study period.

While the IREMM simulation does not focus on the detailed unit-level model necessary when performing engineering design studies, it does provide a suitable representation of physical generator characteristics.

Prepared for

NEPOOL

by

ISO New England Inc.

Customer Service: (413) 540-4220

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EIS Manager Karen K. Adamst
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Re: File Number NAE-2004-338-1 February 24, 2004

Dear Ms. Adams:

The Association to Preserve Cape Cod (APCC), a 5,700 member non-profit environmental organization, submits the following comments on the Cape Wind Associates LLC Draft Environmental Impact Statement/Draft Environmental Review/Development of Regional Impact (DEIS/DEIR/DRI, afterwards termed DEIS).

APCC would like to acknowledge the very significant effort undertaken by the U.S. Army Corps of Engineers (USACE), the other involved regulatory agencies and the proponent in creating this extensive document. Nonetheless, APCC has some very fundamental concerns about underlying assumptions in the DEIS and the lack of some important data, in particular incomplete studies on avian impacts. These issues and some more specific comments will be described in this letter. Because of our significant concerns and questions, APCC strongly urges the USACE to issue a Supplemental Draft Environmental Impact Statement to address outstanding important issues.

APCC has not taken a position on the Cape Wind proposal. Our comments are presented in the spirit of assisting in the development of a balanced comprehensive review process for wind energy. We are concerned that the public discussion about this proposal is largely taking place on the extremes with catch phrases, such as "it's all about clean energy" or "it's all about money" seeming to dominate the discussion. In truth, the proposal is about both. As will become clear, APCC fears that some of the procedures the USACE uses to review proposals exacerbate this problem.

With a stated mission to protect the natural resources of Cape Cod, APCC supports the responsible development of renewable energy, recognizing the severe damage that fossil fuel emissions have caused to human and ecosystem health and the necessity of moving swiftly to the use of cleaner sources of fuel. As a low-lying region, Cape Cod may well be among the first land areas to be affected by rising sea levels from fossil fuel-induced climate change. Mercury in our freshwater ponds, excessive delivery of nitrogen containing compounds to our lands and water and diminished air quality from emissions already afflict our peninsula.

As a supporter of clean energy, APCC would like to support the right renewable energy project in the right place with the right regulatory process. Regrettably, the Cape Wind DEIS suffers from being conducted outside the arena of a comprehensive national energy policy that includes well-defined guidelines and regulations for renewable energy projects. In the absence of national policies, the improbability that such policies will be soon forthcoming, and the real need to provide energy from renewable sources, it is imperative that the Cape Wind DEIS provide a thorough and balanced analysis of the proposed project and put forth reasonable and responsible alternatives. The Corps must be ever vigilant, as an absence of a clear national energy policy may easily lead to market-driven solutions that may not be in the best interests of the public.

APCC is concerned that the standard procedures used by the USACE to evaluate proposed projects may not be appropriate for newer technologies such as offshore wind farms, and instead of enhancing the future use of renewable energy, may in fact, have the opposite effect.

In particular, APCC questions the USACE determination of the Purpose and Need and the resultant Alternatives Analysis in the DEIS. APCC also believes that the DEIS process as undertaken by the USACE provides only for acceptance or rejection of a specific proposal and does not allow for multiple or compromise solutions, which may be more beneficial to the public in the short and long term. Finally, because the USACE is not an energy policy agency, the alternatives selected for analysis were not chosen based on an in-depth analysis of available sites as should be the case, but rather were only those brought forward by the proponent, the cooperating agencies or the public.

The Purpose and Need is the most important part of the DEIS as it drives the range of alternatives selected to be considered in the Alternatives Analysis. In the Cape Wind DEIS, the USACE declares: "The purpose and need as independently determined by the USACE is: to provide a utility-scale renewable energy facility providing power to the New England grid." While APCC believes it is imperative that significant renewable energy sources be connected to the grid, it is not clear to us that a single large project is the best way to accomplish the goal.

In the DEIS, the USACE explained that a range of 200-1500 MW was selected for the Alternatives Analysis based on a review of data that showed "the energy generating capacity of new utility-scale and regionally significant energy facility projects that have been permitted or are presently being studied for interconnection with the regional power grid have generating capacities that range between 200 and 1500 MW." APCC points out that all but one member of the independent Peer Review Committee (Appendix 3E) appointed by the USACE rejected the contention that 200 MW was the appropriate lower limit for utility scale wind energy.

The USACE's decision that the range would be 200-1500 MW overwhelmingly constrained the thresholds of the preliminary screening criteria developed by the USACE for the Alternatives Analysis. To site a facility capable of generating 200-1500 MW, the screening criteria called for the availability of vast amounts of land or watersheet area as well as considerable excess transmission capacity in the existing grid.

The result of the USACE statement of Purpose and Need and the consequent Alternatives Analysis is the apparent conclusion of the DEIS that Nantucket Sound area is the only viable place for a wind farm.

If this is so, then there is little future in wind energy, a concept that APCC rejects out of hand.

APCC believes that conventional thinking about the size and siting of power plants can not be translated to renewable energy proposals, and in particular to wind energy proposals. Because renewable energy, in general, is relatively new technology, the facilities are small compared to conventional fossil fuel or nuclear power plants. It would seem reasonable that multiple smaller power plants could be used to achieve a renewable energy goal and should be implicit in the Statement of Purpose and Need.

In the particular case of wind power, the range of 200 – 1500 MW does not seem practical. The likelihood of identifying any area large enough to site a 1500 MW wind farm is remote at best. And, although a 200 MW plant may not be considered large in comparison to output from a traditional fossil fuel plant, an offshore wind farm producing 200 MW is a very large producer by today's standards, and requires a very large amount of space. At present Horns Rev in Denmark is the largest offshore wind farm in operation and it is a 160 MW project.

Although wind power appears to be the most mature of the renewable energy technologies, it presents especially complex siting problems. In addition to concerns about site-specific environmental impacts, the selected area must have ample wind, and if offshore, water depths and extreme wave heights must not pose inordinate difficulties. And, most significantly, wind energy requires vast amounts of space. As we have seen in this proposal and in the USACE response to the proposal, the size of the proposed project dictated the selection of the site.

Throughout the DEIS is language stating that potential sites must be reasonable, practical, and economically feasible. But, although there are tables with information on construction and maintenance costs for different scenarios, there are no data in the DEIS on return on investment. So, the reader has no way to evaluate the Applicant's expected return on investment on a large site versus a small site.

As APCC believes that there are many options for increasing wind energy development in the northeast, we call on the USACE to develop a SDEIS in which smaller developments, mixed-site development and developments with different arrangements and spacings of turbines are fully evaluated.

APCC also believes that any offshore wind energy project should be phased in over time, similar to the Arklow Bank wind farm offshore of Ireland. There private developers have erected seven turbines, which will be monitored prior to installation of additional units.

Finally, it is not clear to APCC that the question of a private developer having the necessary property rights to seabed development has been settled. APCC believes that any private developer utilizing a public resource for private gain should pay some fair amount for use of the public lands.

Following are APCC's specific comments about the proposal.

Section 2
As noted in our introductory comments, the decisions by USACE that 1. the purpose and need of the proposal is to provide a utility-scale renewable energy facility providing power to the New England grid and 2. that the lower limit of "utility scale" is 200 MW effectively eliminated any sites other than Nantucket Sound from consideration. APCC also suggests that the purpose from the Applicant's perspective presumably goes beyond providing clean energy to providing a considerable rate of return to the Applicant.

Section 3 Alternatives Analysis
This section would be more useful if data on the various technologies was presented in a format that allowed the reader to compare information. Tabular data would be most helpful. Currently, data are presented in a hodge-podge fashion: Appendix table 3.1 shows emissions from a gas-fired plant, but not from an oil-fired or coal-fired plant (but a table on pollutants from biofuels is inserted right into the text of section 3 rather than in the appendix); table 3.2 shows the state of photovoltaic research but not of tidal or wave energy research.

Data on each energy source that should be presented in a table(s) for purposes of comparison should include air emissions, water use, effects on fish and birds, aesthetics, construction effects, status of the technology, reliability, costs, amount of land/sea needed for installation. Other data that should be in table form include the amount of installed capacity, capacity factor and efficiency of each type of power source in New England.

Section 3.2.1 Impact Assessment of Fossil Fuel Fired Plants
Since the purpose of this proposal is to provide a source of clean energy, APCC is surprised at the lack of detail on pollution emanating from traditional fossil fuel plants. There is no information about the total amount of pollutants coming from energy plants in the ISO-NE area to provide context for the percent of total New England emissions that would be reduced. There is no specific information about air quality on Cape Cod.

3.2.1.1.1 Natural gas-fired plants
Although APCC understands the rationale for highlighting emissions from a natural gas power project, natural gas plants comprise somewhere between 30% and 37% of the generators in the ISO-NE region. As noted earlier, information on emissions from all types of energy generating facilities would be useful.

By extrapolation from data available from a gas-fired 290 MW plant, Table 3-1 shows that a 454

MW plant would emit 433.8 tons of pollutants each year. APCC does not understand the rationale for using the maximum generating capacity of 454 MW, instead of the average 170 MW the Cape Wind proposal would generate, to estimate air emissions that would be eliminated by the proposed Cape Wind proposal. APCC believes the table should instead show by extrapolation that a 170 MW plant would emit 162.4 tons of pollutants each year. The DEIS should include clear and accurate statements of the amount of pollutants that a wind energy plant would offset.

The text states that a gas-fired plant would emit hundreds of tons of pollutants each year (and later in the text "several hundred tons of pollutants"), but does not identify quantities from different pollutants, except for particulate matter. This uneven treatment makes for difficult reading. Later, the text identifies carbon dioxide and several Hazardous Air Pollutants as being emitted by a modern gas-fired plant, but gives not data about the amounts.

In the section on gas-fired plants, the paragraphs on water use are not specific to gas-fired plants. Data on water use in gas-fired facilities producing 170 M W would be helpful.

3.2.1.1.2 –3.2.1.2.3
As stated earlier, a comprehensive table comparing pollutants from all types of fossil fuel plants is necessary in order to evaluate benefits of this proposal for Cape Cod and the region.

3.2.2 Renewable Technologies

3.2.2.1 Photovoltaic.
A table showing reliability, efficiency, land consumption, and cost of photovoltaics would be useful.

3.2.2.3 Biomass
The information in this section is very unclear. The text states that "direct-fired biopower plants have matured and employ complex multi-component pollution control systems to reduce emissions from combustion." Yet the table in the text has very high rates of emission and total emissions.

3.2.2.6 Wind
APCC has two concerns about this section of the DEIS. One is that although there are several paragraphs discussing the viability of wind projects over a large range of sizes, the decision of the USACE was to look for a location to site one large project.

For example:

> 3.2.2.6.2 Page 3-23: In a discussion of the current technology status, the DEIS states "Available WTGs are being developed over a range of power outputs from kilowatt to multi-megawatt units. Large-scale generation of electricity requires a number of large machines to be grouped together in Wind Parks for economy and ease of operation. The machines are usually spaced five to ten rotor diameters apart … As a result a wind park of 20 machines may extend over a large area…"

> 3.2.2.6.3 Page 3-24: In a discussion of ability to serve regional needs, the DEIS states "Wind power is relatively flexible and may be adapted to the situation at hand. Since individual units may be relatively small (500 kW or less) and can be installed in a very short time…land-based Wind Parks can be sized to fit any amount of demand, and in general, are limited only by the amount of land available, the wind resource, and available transmission infrastructure."

These statements clearly indicate that there are a variety of sizes of wind power installations that are "commercially" viable.

The second concern is the change in terminology from "commercial" scale in the Environmental Impact Statement (EIS) Scope of Work to "utility scale" in the DEIS.

The EIS Scope of Work described the purpose of the proposed project as "to develop a commercial scale renewable energy facility providing power to the New England grid." The scoping document further said the range of sizes to be considered was 200–1500 MW.

In an APCC comment letter on the scoping document (May, 2003), APCC noted that commercial scale renewable energy projects were often less than 200 MW and gave as examples, Hull's single-turbine installation, Glebe Mountain (30.6 MW), Equinox Wind Farm (9 MW), Redington Wind Farm (50 MW) and The Long Island Power Authority (100 MW), all of which are considered to be "commercial scale."

When asked at the Massachusetts Technology Collaborative forum on January 8, 2004 about the replacement of the term commercial scale with utility scale, Karen Adams of the USACE said that the team had gone back and forth about the words and in the end used them synonymously. But, as the passage below shows, the DEIS made a clear distinction between commercial scale and utility scale.

3.2.3 Page 3-26: The text reads: "Wind power is a proven technology, widely used for commercial scale facilities…The wind resources in New England are generally favorable for commercial wind power development, and although finding adequate amounts of land area for a utility-scale development is challenging, recent technological advances in the wind power industry have made offshore development an economically viable option. Therefore, wind power appears to present the best utility-scale option for meeting New England's growing regional power demand. As discussed above due to limitations in technical feasibility and environmental concerns solar, biomass, hydro, and tidal generation are not considered reasonable alternatives at this scale of power generation."

APCC is not comfortable with the substitution of utility scale in the DEIS for commercial scale in the scope of work. This change in language seems to contribute to the decision that a single large project, rather than multiple small projects would be considered.

3.3 No-Action Alternative/ Permit Denial
APCC believes that this section on the No-Action Alternative would be improved by the addition of substantive information about what difference the Cape Wind proposal would make on the

mix of energy used (coal, gas, oil, etc.) in New England in the near future and over time, and the percentage reduction in harmful emissions from if a wind farm were built and delivered on average 1500 GW Hours annually. As written the text seems to suggest that the Cape Wind proposal will have a highly significant impact on future supplies of energy, on the mix of energy sources and on the cost of energy, but there are very little supporting data.

For example, text in the DEIS states that it is estimated that electricity demand will increase 1.9% a year or 46% overall during the next 20 years—the projected life of the project. If Cape Wind meets about 2% of the regional electricity requirements today, what effect will the Cape Wind project have on these projected annual increases in need over time? Where else will we locate large wind energy projects other than the Nantucket Sound area?

The text states that "under the No-Action Alternative, the New England regional fuel supply is likely to remain heavily dependent on natural gas and foreign oil availability, and not likely to experience any marked change in diversity of fuel supply or self sufficiency, which would be experienced with the addition of a utility scale renewable energy facility powered by an abundant local resource." APCC believes this text is misleading as New England will remain very heavily dependent on fossil fuels even if Cape Wind is built.

The DEIS states that "under the No-Action Alternative, or if the permit is denied, it is likely that commercial development of offshore wind power in the United States at a comparable size and scale of that proposed by the Applicant, will not advance significantly." It is difficult to believe that the USACE, and not the applicant, wrote this sentence, implying as it does that the Cape Wind proposal is absolutely the only road forward.

As APCC noted about information presented in an earlier section of the DEIS, reference to the amount of carbon dioxide (and indeed other pollutants) offset by the Cape Wind proposal should be presented as a percentage of the total amount of pollutants from other power plants in the New England region.

The last sentence in this section reads: "Although attempts will continue to reduce the amount of emissions such as NO_x, SO_x, CO_2 and other particulates known to contribute to health related impacts, the generation of electrical power will continue to produce air emissions in the absence of any emission-free utility scale power development." This sentence seems disingenuous. Even in the presence of an emission-free utility scale power development, the vast majority electricity generation will involve the production of emissions.

Section 3.4 Wind Park Alternative Site Analysis
APCC repeats its earlier observation that the site analysis was not based on a comprehensive evaluation of all potential sites in New England, but only on those brought forth by the applicant, the cooperating agencies and the public.

It is well worth noting that the independent Peer Review Committee appointed by the USACE raised many questions about the proposed range of sizes and sites for the project. For example, the following statements appear in the Committee's report (Appendix 3E):

"There was some concern expressed about the 200 MW minimum size, with reviewers noting that most wind projects were significantly smaller than that and still 'utility scale.'" (One reviewer did think 200 MW was practical.)

"One reviewer strongly recommended that USACE include multiple smaller land-based projects as an alternative." The reviewer noted that "advantages of multiple land based projects may include potentially easier integration into the existing transmission grid, geographic dispersion smoothing energy delivery to the grid, and dispersed environmental impacts."

" This analysis is used to imply that the scale of the project must be greater than 200 MW to connect onto the ISO system. While all the reviewers were not familiar with ISO-NE, they noted that it seems unlikely that no projects smaller than 200 MW have been interconnected in the past 15 years. This also implies that projects need to be 200 MW or larger to be "utility scale." Many wind power plants with capacities under 100 MW are installed in the U.S., and continue to be installed in the U.S., and utilities purchase energy from wind power plants rated less than 100 MW. There is no question that, everything else being equal, a large project (onshore or offshore) will have better economics than a small project, but most reviewers felt that it is a stretch to imply that a project needs to be over 200 MW to be utility-scale or to interconnect to the ISO-NE."

"There may be locations where a 50-100 MW project would be reasonable, particularly for land-based projects. There simply needs to be enough … land…to place the planned. Project. While it is clear that a larger project could have better economic viability, that consideration would seem to fall under a different criterion."

Although APCC was very pleased that the USACE appointed an independent committee to evaluate site selection criteria for the Alternatives Analysis, it seems that the USACE disregarded important points brought up by the committee.

3.4.1 Preliminary Screening Analysis

Wind Power Classification of 4 or greater.
APCC thinks it would have been more beneficial to identify all sites with adequate wind and then develop screening criteria to further evaluate them. Since adequate wind is the primary reason a site could be considered for a wind energy facility, APCC wonders why sites with inadequate wind resources were even included in the screening process.

Sufficient surplus electric transmission capacity to transport 200-1500 MW to load centers throughout the ISO-NE transmission system.
The lack of transmission capacity in different areas has been identified as a large impediment to the development of additional energy generating plants. The DEIS identifies areas of Maine as having excellent wind resources but Appendix 3-D of the DEIS states that it unlikely that the Maine New Hampshire interface constraints will be relieved "within the timelines of the proposed Cape Wind project."

APCC is interested to find out what the timeline is for the applicant, having not found this information anywhere in the DEIS. This is important, as it may be used to drive siting decisions, in the above case due to transmission constraints, and in the final decision on the Horseshoe Shoal site that it is the only viable site right now due to technological impediments of moving farther offshore.

APCC points out again that multiple small projects, which perhaps would not be constrained by transmission capacity problems, should have been considered as part of the Alternatives Analysis. Also, as the cost of wind energy installation on land is less than offshore, an evaluation of the cost of minor upgrades to transmission capacity would be a useful addition to the analyses.

Commercially available land or permissible use of offshore watersheet area sufficient to accommodate a 200-1500 MW project

APCC reiterates its earlier comment in the last paragraph about the potential of multiple smaller projects. Of greater interest to APCC, however, is how much land and or water area was used in the Alternatives Analysis to accept or reject a potential site for inclusion in the analysis. The text states that "for land based sites with a wind power class of four or greater, 20 acres of open space is necessary to generate one MW…the equivalent land to water area ration for wind energy generation is approximately 1.2:1 for equivalent MW capacity."

For 1 MW if:
$\frac{\text{20 acres of land} = 1.2}{\text{x acres of watersheet} = 1}$

Then:

x = 16.67 acres of watersheet is the necessary area for production of 1 MW.

Then:

$$\frac{16.67\text{acres}}{1\text{ MW}} * 450\text{ MW} * \frac{1\text{square mile}}{640\text{ acres}} = 11.72 \text{ square miles}$$

$$\frac{16.67\text{acres}}{1\text{ MW}} * 200\text{ MW} * \frac{1\text{square mile}}{640\text{ acres}} = 5.21 \text{ square miles}$$

These areas are by far smaller than the Applicant's proposal for use of 24 acres on Horseshoe Shoals.

The criterion states that there must be "permissible use" of a site. It is not at all clear to APCC that Cape Wind has secured the appropriate rights to utilize the seabed in federal waters. APCC believes the USACE should discuss this issue in a Supplemental DEIS and include a discussion of how the role the USACE is playing with the Cape Wind proposal interfaces with other proposed uses of Outer Continental Shelf Lands (OCSL) for large scale aquaculture, liquid natural gas terminals, etc. In other words, what are the ramifications for other claims to use the OCSL of the USACE's oversight of this proposal?

Engineering and Design Limitations

APCC believes there should be more information describing the "practical limitations and constraints to over the road or rail transportation during construction" and the limits on "practical construction and maintenance of overland and submarine electric transmission line connections." APCC raises these questions because there are so few data in this lengthy document about the economics of wind power from the point of view of the Applicant that one cannot determine whether what is termed feasible is truly economically feasible or fits the business plan of an Applicant.

3.4.2 Screening Analysis Process

3.4.2.1 Upland

APCC reiterates its concern that the USACE's decisions to consider energy projects in the range of 200-1500 MW and to evaluate only sites brought forth during the public process may have eliminated many viable sites from consideration. Although APCC understands that the USACE is not responsible for selecting a site for a project, a poor process for the Alternatives Analysis can result in a pointless exercise.

APCC wonders how many upland sites were recommended in all and what standards were used to determine that eight of them were "reasonable" and worthy of evaluation by the preliminary screening criteria as noted in the DEIS. It seems straight forward to APCC that 4 of the sites had inadequate wind resources and that 5 of the sites were by far too small to accommodate a 200 MW project. Given that the USACE knew what the screening criteria were prior to development of this list of sites, APCC wonders why they were considered "reasonable" and recommended for preliminary analysis.

3.4.2.1.9 Summary of Findings and Comparisons of Upland Sites

Although the text made clear that the screening criteria were not applied in a pass/fail formula, APCC found it difficult to follow the decision-making process from the information presented.

According to the text, some sites were eliminated because they were too small for consideration—failing the criteria of adequate land to emplace a 200 MW project, the lower size limit for consideration in the DEIS. But, it is important to note that two of the upland sites eliminated in the DEIS are under development by others who apparently were undeterred by the screening criteria (available land area, transmission constraints, engineering design and legal regulatory constraints) in use by the USACE (table 3-4). <u>That these sites are going forward as commercial ventures demonstrates that smaller land based wind energy projects are viable.</u>

Equally perplexing is the decision to include the Massachusetts Military Reservation (MMR) as a final site for the Alternatives Analysis. MMR has adequate land area and transmission capacity, but inadequate wind resources, serious design constraints (potential of unexploded ordinance, airspace incompatibilities) and clearly insurmountable legal and regulatory constraints. APCC does not understand how a site that is not available and that has such constraints on its use could have been considered a "reasonable" alternative. By contrast, in the section of the DEIS where screening criteria are applied to an area south of Martha's Vineyard, the DEIS cautions that "the potential presence of unexploded military ordinance near Nomans Land provides an unacceptable risk to construction, operation and maintenance of a Wind Park."

3.4.2.2 Offshore

Although it is widely held that there are significant wind resources off the northeast coast, this Alternatives Analysis did not lead to identification of sites other than the general area proposed by the Applicant.

3.4.3 Detailed Discussion of Alternatives
APCC repeats its earlier question of the value of a lengthy evaluation of the MMR as an alternative site when its efficacy is reduced by the lack of adequate wind, regulatory constraints and the possibility of unexploded ordinance.

APCC also seeks additional information about the combined Horseshoe Shoal –New Bedford site. Better maps of the area and detail on placement of turbines would be useful. APCC also wonders about the number of turbines in each area. The text says the Horseshoe Shoal array is reduced by the approximate number of turbines that could be placed at the New Bedford sub-site. Yet, Table 3-47 shows an installed capacity of 500 MW for the combined site, which seems to indicate additional turbines. Concerns about viewsheds, which have been raised repeatedly for this proposal, could be reduced by a smaller multiple site project.

In the Environmental Impact Statement Scope of Work it is stated that "onsite modification of, or siting of individual turbines within, the final site(s) will be discussed as minimization of impacts after final site selection." APCC is confused by the USACE's decision to delay consideration of site modification until final site selection. First, modification of the spacing of turbines could potentially lead to the viability of more sites. Second, the placement of turbines impacts their visibility from shore, a major concern of many Cape Codders. As the proposed spacing between turbines on Horseshoe Shoal is considerably greater than the general placement as described in section 3.4.1 and far greater than the spacing between the Arklow Bank GE turbines (which are the exact same model as those proposed for Horseshoe Shoals), it would seem that altering the spacing of turbines would be a very useful part of the alternatives analysis.

The DEIS is unclear about whether the spacing is to optimize wind recovery between turbines as stated in one section or to ensure that recreational uses would not be impeded as noted in another section of the DEIS, or to reduce mortality of avian species.

5.0 Environmental Resources and Consequences for the Applicant's Preferred Alternative.
This section of the DEIS is of necessity very long and very complex. It is often very difficult to follow because of the way the subsections are divided. For example analyses of impacts for a particular issue might be subdivided into impacts in federal waters, impacts within Massachusetts waters, impacts outside of Massachusetts waters. Then each section is subdivided into direct impacts, indirect impacts, secondary impacts, cumulative impacts, potential direct impacts, potential indirect impacts, etc. APCC believes this section would benefit tremendously from its own summary section. There seemed to be no clear path to an assessment of overall benefits and overall detriments.

5.4.5.3. Potential Impacts to Commercial and Recreational Fishing Activities and Interaction with Commercial Fishing Gear
Numerous fishing groups have expressed concern about continuing traditional fishing practices if the Horseshoe Shoal site is developed. The DEIS acknowledges that commercial fishers may

have to make "slight course corrections." Additional information on this subject would be useful.

5.7. Avian Resources
Since the beginning of the Cape Wind review process, APCC has supported the United States Fish and Wildlife Service and Massachusetts Audubon's call for 3 years of seasonal studies of avian species (terns, ducks and passerines) utilizing this area. A Supplemental Draft Environmental Impact Statement is critical as there is only one year of passerine data collected to date and two years of tern and duck data.

5.16.4.5 Housing and Coastal Property Values
There has been much discussion and concern over the effects a large and visible wind farm might have on property values and tourism on Cape Cod. The DEIS reported that a study of property values in the area of other existing wind farms showed no diminution of property values. APCC would like to know how tall the turbines were at these sites and how far away or close they were to residences. The 80 turbines at Horns Rev in Denmark have apparently had no effect on tourism, but they are 2 miles further out to sea and 80 feet shorter than those proposed for Horseshoe Shoals. The Horns Rev turbines are also arranged in such a way that there are ample open vistas to either side of the installation.

Thank you for the opportunity to comment and APCC looks forward to reviewing a Supplemental Draft Environmental Impact Statement.

Sincerely,

Maggie Geist

Maggie Geist
Executive Director

SIERRA CLUB
FOUNDED 1892
Massachusetts Chapter

002991

February 24, 2005

Ms. Karen Kirk Adams
Cape Wind Energy Project Manager
Corps of Engineers, New England District
696 Virginia Road
Concord, MA 01742-2751

Secretary Ellen Roy Herzfelder
Attn: MEPA Office, EOEA File # 12643
100 Cambridge Street, Suite 900
Boston MA 02114

RE: Army Corps file number NEA-2004-338-1,
Attention: Regulatory Division
EOEA File # 12643

Dear Ms. Adams and Secretary Herzfelder:

On behalf of the Sierra Club (the "Club"), we formally submit our comments on the Cape Cod offshore wind energy development proposal, *COE File Number NEA-2004-338-1* and *MEPA File Number 12643*. The Sierra Club supports renewable energy to reduce our dependency on fossil fuels as well as the resultant negative environmental impacts caused by fossil fuel energy production. However, we have some concerns about the particular environmental impacts of a project on this site. These impacts require a more detailed analysis before the project can progress to the next stage of permitting.

We therefore formally request a Supplemental Draft Environmental Statement (SDEIS) to address many of the concerns outlined in our comments. We are confident that a thorough SDEIS analysis will help provide a more comprehensive framework necessary for any regulatory entity to make a final and credible disposition of the permit applications for the Cape Wind project.

Furthermore, an SDEIS will provide sufficient information to allow the Sierra Club and other interested parties to make an informed recommendation - based on the merits of the proponent's proposal - on whether the project, including scale and location, is appropriate for this site, and in the best public interest.

The Sierra Club recognizes the dilemma presented with balancing our needs for clean renewable energy sources against the preservation of the natural environment. Given the twin threats of climate change and depletion of finite fossil fuel supplies, we must move expeditiously

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towards the exploration and adoption of appropriately sited renewable energy sources combined with rigorous energy conservation programs.[1]

We would also like to make it clear that the Sierra Club is asking for additional information in the SDEIS to address deficiencies in the DEIR analysis, as part of the ongoing permitting process and project review, which we have supported since the project's inception. Finally, it is important to recognize the precedent setting nature that any approvals or permitting of this project will have on future offshore wind farm proposals in the coastal waters of America.

Specifically, the SDEIS should include a more thorough analysis of:

- The immediate development of a process on ocean governance, enabled by new federal legislation and regulations and in response to the US Ocean Commission and Pew recommendations, to plan and lease federally continental shelf waters for wind energy.
- An improved alternatives analysis, including the consideration of several important alternatives to the project as proposed, including a phased implementation, a distribution over several site locations, and a reduced project level.
- A more complete evaluation of avian and marine wildlife risk, based on more extensive data than currently collected.
- The economic and social equity/fairness impacts of the project.

1. COMMENTS ON THE PROCESS

1.1 Need for a Rigorous and Comprehensive Process including Ocean Zoning

The Club believes that the Army Corps of Engineers has done a reasonable job in pursuing a rigorous and comprehensive process for a project area that lacks federal and state guidelines. However, because of this lack of guidelines, the regulatory framework the Corps currently has available for siting and permitting offshore wind facilities is nowhere near a full-fledged and adequate process.

The Club therefore supports the immediate development of a process, implemented by new federal legislation to plan and lease federal continental shelf waters for wind energy or other uses. This process should be transparent and it should provide for substantial public input. It should include evaluations in both state and federal waters. The process should identify where development of wind energy is economically feasible and it should determine where environmental impacts are minimal. The process should outline pre-project and post-project monitoring for wind energy projects. This monitoring should include evaluation of impacts on marine habitat, birds and marine animals.

[1] Please see the appendix to these comments for a more complete description of the Massachusetts Sierra Club's views on **Global Warming, Renewable Energy, and the Preservation of the Natural Environment,** including **Potential for Wind Development in New England (attached, 2 pages)**

This process should address the following elements:

- Leasing conditions
- Jurisdiction for lease and permit conditions
- Maintenance
- Liability
- Environmental impact
- Problem reporting
- Decommissioning

This process should be structured to provide for the following elements:

- Substantial public input in a transparent fashion.
- Evaluation of projects in both state and federal waters.
- Identification of where development of wind energy is economically feasible and where environmental impacts are minimal.
- Outline pre- and post-project monitoring for wind energy projects. This monitoring includes evaluation of impacts on marine habitat, birds and marine animals.
- Support coordinated planning and assessment of wind energy projects among federal, state and local regulators. An important element of this and one the Club supports is the creation of the Ocean Zoning Task Force.

Monies from leasing of public offshore lands for wind energy should be used to create a fund to be used for coastal and near-shore habitat protection and conservation in a manner similar to the original intent of assignment of funds derived from offshore oil and gas leasing into the Land and Water Conservation Fund. The Cape Wind project should be subjected retroactively to lease payments and arrangements called for by any new legislation.

1.2 Need for an Improved Alternatives Analysis

The DEIS does not carry out a sufficient analysis of alternatives to the proposed project. Several possible alternatives to the development of this first, precedent-setting offshore wind energy project need to be considered and evaluated by the Corps of Engineers. These alternatives could potentially significantly improve the public good, and include:

1) a phased-in approach to project construction contingent on satisfactorily meeting specified design and impact thresholds,
2) consideration of additional locations that could accommodate smaller, more distributed turbine placement for the total of 130 wind turbines,
3) consideration of a smaller overall project size,
4) inclusion of thresholds, exceeding of which would trigger additional mitigation and/or more prolonged monitoring.

A sound evaluation of these options, particularly for projects like Cape Wind that have been proposed in the absence of a more comprehensive ocean zoning process, could significantly increase the public good derived form offshore wind energy development. Such an evaluation would likely improve public acceptance of offshore wind energy and accelerate appropriate development during the next decade.

2. PROJECT IMPACTS

2.1 Socio/Economic Impacts

The DEIS also lacks a rigorous thorough analysis of the economics of the energy situation (including local job creation and tax revenues, impact on energy prices, health impacts, etc.). Some major concerns are the potential industrialization of Vineyard Sound, compatible uses with other commercial and recreational activities on the shoals, consideration of the area impacted in contrast to other energy options or to greater energy-use efficiencies, and how well this project meets the needs of the Commonwealth's renewable-energy-production strategy. Also, approval of this project should not open the floodgates for other industrialized uses such as sand and gravel mining, oil and gas exploration, aquaculture, or other industrial pursuits.

Some offshore wind power, likely in Massachusetts, will be necessary in any conceivably effective energy scenario. A process needs to be created that all sides will buy into to rank sites and projects, with a part of that process being that the rankings are decided by processes that are deemed fair by the various sides and that all sides commit to the idea that some offshore wind power will take place.

The analysis is misleading on the issue of comparing the wind farm project to the Canal Electric Plant (in terms of both "greener" energy and Cape Wind's cost/benefit analysis in which most of the health benefits accrue from reduced health outlays accompanying closure of Canal Electric or one of the other filthy five power plants). Many social scientists feel that such comparisons are only permissible if the fossil fuel plants are actually closed and the energy from wind actually replaces the energy formerly generated from the fossil fuel plants. Since many view this as a unlikely scenario, the Cape Wind cost/benefit is inaccurate. The economic benefits are overestimated based on reduced health costs to society from the burning of fossil fuels to generate electricity, while the environmental costs to ecosystem goods, services, and natural capital are underestimated- since there is no valuation of these in the DEIS. Either non-market evaluation of ecosystem goods and services using classical natural resource economics techniques or ecological economics approaches should be used to address the cost component.

Finally, any comparative analysis of energy projects should be valid and evaluate projects of similar energy production. This project will produce 170 MW. In the DEIR it is compared with renewable and nonrenewable projects at 200-1500 MW, with most analyses compared with a 454 MW plant. This is simply not a valid comparison and should be adjusted in the SDEIS

2.2 Avian impact

We acknowledge the effort that has been made in the project design to be bird-friendly, as well as the effort made to appraise the bird population in the Nantucket Sound area and to assess the avian-related experience of other similar wind projects (see Appendix 5.7a in the DEIS). However, the Club continues to be concerned with the lack of definitive knowledge of bird/bat impacts. Not enough is known yet to reliably ascertain the overall impact, especially for long-tailed ducks and nocturnal passerines. These impacts must be evaluated and weighed in relationship to the current impacts from fossil fuel generation through air pollution, greenhouse-gas generation, and fuel spills on land and water, all of which appear to have a more deleterious effect on bird species. The Club would like to see ongoing appropriate data gathering and analysis on this issue, possibly phasing in the project so that it could be redesigned if found to be unduly injurious to birds or bats.

In particular, the Club would like to endorse the Massachusetts Audubon Society's request for three years worth of seasonal avian information as a necessary component of the NEPA review. Data on three groups of birds are needed: terns, winter waterfowl, and migrating passerines (songbirds). The DEIS contains two years of data on terns and winter waterfowl, and one incomplete year of information on migrating passerines, falling short of the three years for each as requested by the Massachusetts Audubon Society.

The nocturnal movements of passerines over Nantucket Sound during spring and fall are a concern. Continental populations of the majority of these species are declining and the threats to passerines caused by their use of the project area should be evaluated over two years in addition to the data for 2002 included in the DEIR.

The estimate of one bird death daily (364 per year) from the Cape Wind project needs better support and clearer explanation. Estimates of seabird mortality should incorporate literature from European wind farms, many of which report higher mortalities. The DEIS/SDEIS should contain an evaluation of the potential effects of lights on sea ducks and passerines. It should also contain an evaluation of the wind towers as a barrier to bird movement and of potential effects of displacement of birds from the project area.

Due to the high degree of uncertainty associated with this project, a range of figures should be presented rather than a single number of estimated bird collision deaths per year. Additionally, more data is needed before supporting a conclusion that there is a minimal risk to bats.

Other wildlife threats have also been addressed and are described in section 5.7.3.4 (Potential Impacts to Endangered/Threatened/Other Listed Species). This section needs to be expanded because certain species have been omitted, notably long-tailed ducks and nocturnal passerines, as well as bats.

2.3 Marine wildlife

The DEIS's conclusion that any impacts of the Cape Wind project on the benthic, finfish, and protected resources would be localized, transitory in nature and minimal in impact, with no cumulative impacts, is based upon the small area of Nantucket Sound effected by the construction of the wind farm and laying of the two electricity cables under the seafloor. For the finfish and marine mammal stocks the Nantucket Sound populations are components of populations spread over larger regions and thus localized, transitory effects in the sound are unlikely to have significant impacts at large spatial, longer temporal scales. Since natural trust biological resources respond to smaller scale, shorter-term processes, the question is whether the wind farm will affect the emergent properties of the system at these temporal/spatial scales. The DEIS does not address this type of issue.

Additional marine wildlife aspects include:

- The sandy sediments and relatively shallow depths result in a benthic macrofaunal community that is adapted to periodic disturbance and confined to the upper 5 cm of the sediment surface. It is not clear that simply examining the community composition based upon relative abundance and diversity is an adequate basis for examining potential impacts on the macrofauna, since it ignores dynamic components related to productivity and ecosystem functioning.

- The Massachusetts Division of Marine Fisheries bottom trawl survey is not an adequate fishery independent method for estimating the abundance of shellfish resources. A benthic monitoring program before and after the Cape Wind project construction will be necessary using appropriate methodologies (scallop dredges, hydraulic dredges, epibenthic sleds or box cores).

- The finfish abundance/distribution is assessed using the catch per unit effort (CPUE) from the Ma. DMF spring and fall bottom trawl surveys (BTS). Given long term changes in the relative abundance of pelagic and demersal fish species on the Northeast Continental Shelf and the catch efficiency differences between pelagic and demersal fish species to trawl gear, the BTS database should be augmented by hydroacoustic surveys (sea truthed with mid-water trawls) to better characterize the pelagic finfish community. In addition, one should examine some dynamic components of the fish community to see if the wind farm exerts effects at the smaller-spatial shorter-time scales.

- The use of the NMFS Marine Recreational Fisheries Statistical Survey (MRFSS) and the project proponent's phone intercept survey of local charter and head boat captains does not suffice to characterize the recreational fisheries effort and catch in Nantucket Sound. At a minimum one should conduct as well a pilot project or phased construction approach for the wind farm to evaluate the potential impacts on coupling between pelagic and demersal fish community at small spatial, short temporal scales, and use an adaptive management approach to make necessary adjustments if it proves problematic.

- The essential fish habitat (EFH) designations focus on bottom habitats, temperature, salinity and depth, and ignore predator-prey interactions and competition for common prey which are important biological components of EFH. Changes in the balance between pelagic and demersal fish species could change these biological EFH components. The functional value of EFH is a component of the newly emerging ecosystems approach to managing marine resources (emphasized in Ocean Commission reports and Massachusetts Ocean Task Force), with which the Club is involved.

2.4 Visual Impacts

Despite protestations to the contrary, the Club feels that the visual impact is minimal. Respected computer simulations of the wind turbines viewed from the closest point on the Cape show widely-spaced objects each of which have the height of a small ship on the horizon, but with a very thin width. The turbines are barely visible and on a hazy day would not be visible at all. Also, visibility does not necessarily imply desecration. After all, lighthouses represent a much stronger intrusion of man-made structures on the coastline view, and they are now regarded as not only not a desecration to visibility, but moreover a definite and major enhancement. In addition, our research has been unable to uncover a single instance in which the presence of wind farms resulted in a decline in property values.

3. Final Recommendations to include in the SDEIS and FEIS

- Create a process for ocean governance in response to the US Ocean Commission and Pew recommendations. The commercial use of our last public trust lands (i.e., the ocean) should be managed by a public agency that has a stewardship charge for marine ecosystems, probably the National Oceanographic and Atmospheric Administration (NOAA). There must be provisions for specific leasing conditions, royalty payments, clear jurisdiction for setting lease and permit conditions, including requirement for responsibility for maintenance, liability, avoidance/minimization/mitigation of environmental impacts, monitoring requirements with clear reporting and response in case of problems, decommissioning, and more. This is a regulatory framework that currently does not exist. The Cape Wind project should not be "grandfathered" but be subject to the process as the process evolves, i.e., on project approval stakeholders such as ourselves should nonetheless be able to revisit the project later on as results come in and the process improves.

- Carry out a phased implementation, with a first phase large enough to be economically feasible and small enough to have a limited impact relative to the full project. During this first phase, continue data gathering and analysis on concerns such as avian hazards, visual effects, economic and social effects, and effectiveness of energy generation and delivery. Within a reasonable span of time for the project developers, develop a governance process and come to a decision on whether and how, including design and impact thresholds, to implement the remainder of the proposed project. The results from the phased implementation itself will supply important information for this subsequent decision.

- Consider additional locations that could accommodate smaller, more distributed turbine placements.

- Create a process that all sides will buy into to rank sites and projects; and have all sides commit to the idea that some offshore wind power, likely in Massachusetts, is necessary and will be accepted if the locations were decided by processes are deemed fair.

- Fund and carry out evaluations at other likely sites for offshore wind power so as to be ready for future proposal.

- Develop the evaluation process along the lines of the Club's concerns, particularly with respect to economic and equity issues and comprehensiveness and fairness.

Thank you for this opportunity to comment.

Sincerely yours,

James Bryan McCaffrey
Director, Sierra Club, Massachusetts Chapter

Mary Ann Nelson
Chapter Chair

Attached: Appendix - Global Warming, Renewable Energy, and the Preservation of the Natural Environment

Appendix to Sierra Club Comments on Cape Wind Energy Proposal

Army Corps File number NEA-2004-338-1
Attention: Regulatory Division
MEPA File # 12643

Global Warming, Renewable Energy, and the Preservation of the Natural Environment

The Sierra Club recognizes the dilemma presented with balancing our needs for clean renewable energy sources against the preservation of the natural environment. Given the twin threats of climate change and depletion of finite fossil fuel supplies, we must move expeditiously towards the exploration and adoption of appropriately sited renewable energy sources combined with rigorous energy conservation programs. The Club is strongly committed to renewable energy and energy efficiency and supports the approach taken in Massachusetts and many other states to establish Renewal Portfolio Standards (RPS) that promote the increasing generation and use of renewable energy sources.

However, it is important to recognize that wind energy itself – whether it be offshore or on mountain tops and ridge-lines – requires the large-scale industrialization of both private and public natural resources. Renewable energy projects uniquely create the potential to both benefit and harm the natural environment. There is, however, a fundamental difference between renewable versus fossil fuel energy production. The primary impacts from fossil fuel energy production are both short and long term, and potentially irreversible. These impacts include the extraction, processing, and delivery to market of oil, gas, and coal resources combined with the air quality and global warming impacts created by the burning of fossil fuels. Renewable energy resources such as wind, aside from the immediate construction impacts, have the potential to be relatively benign, both from an operational standpoint, or if it is deemed necessary at a later time to dismantle a facility.

In particular, this proposal has the potential to establish a precedent by which all other offshore and large scale wind energy proposals are evaluated, and to that extent the framework for the review should be as thorough and as transparent as possible.

The Cape Wind project is controversial for a variety of reasons. In spite of recent lead articles in Business Week and Fortune Magazine and concern by the re-insurance industry and the Pentagon, many people are still not aware, or perhaps are in denial, regarding the urgency of our energy and global-warming situation. Every delay in taking action increases the necessary reduction in emissions and decreases the time available to accomplish such a reduction. When truly serious climate disruptions come into play – and they are already beginning to surface -- objections to the wind farm that presently loom large may become trivial by comparison.

Wind Power Potential in New England

The Club is aware that unlike most other significant energy sources, wind power is one that New England possesses in reasonably significant quantity. For the Cape, a comparison can be made between the Cape Wind Project and the existing Canal Power Station that serves much of the Cape with traditional fossil-fuel energy, to determine what proportion of existing generating capacity the Cape Wind project can provide.

The Cape Wind Project attributes are given in Section 4.1 of the subject DEIS. The estimated annual energy generated is approximately1,500,000 MWH (assuming an average wind velocity of 19 mph), which translates to an average annual output of 170 MW. It emits no pollutants into the atmosphere and requires no supply chain.

The Canal Electric Power Plant attributes can be found at the Cape Cod Center for Sustainability web site: www.sustaincapecod.org/SIR03/EnvEnergy.htm. It is an oil-fired station located in Sandwich Massachusetts, on 53 acres along the banks of the Cape Cod Canal. It has two generating units. Unit 1, a base load unit, has a yearly net generation of about 3,200,000 MWh while Unit 2, a cycling unit, has a net yearly generation of about 2,400,000 MWh . The total net generation is therefore about 5,600,000 MWh. The power plant emits annually some 5,300,000 tons of carbon dioxide, 30,000 tons of sulfur dioxide, and 8000 tons of nitrogen oxides. It requires an oil supply chain consisting of oil barges that continually threaten the shores of Buzzards Bay with black, viscous #6 residual oil.

The ratio of power deliverable to the grid from the wind farm compared to that of the Canal plant over a year is:1,500,000 MWh / 5,600,000 MWh = approximately 0.26.

At full capacity, therefore, the Cape Wind project can supplement or replace over one-quarter (26%) of the energy from the fossil-fuel plant on the Cape Cod Canal (specifically it can supplement or replace Unit 2, the cycling generator, which is closer to the variable-yield pattern that the wind farm would produce), in turn saving approximately 1.3 million tons of carbon dioxide annually, as well as around 7500 tons of sulfur dioxide and 2000 tons of nitrogen oxides. This represents a potentially significant step towards less greenhouse gases, less air pollution, and less dependence on foreign oil supplies for New England's energy needs.

It should be noted that the above represents a brief analysis. In particular, it is unlikely that the power produced by the Cape Wind project would actually reduce the power produced by the Cape Cod Canal project, and while the wind farm may preclude other fossil-fuel generation, that might not necessarily take place in Massachusetts. However, there is definite potential for significant renewable energy production with clear resulting effect on overall fossil-fuel usage. The subject should be addressed by a full analysis in the DEIS or SDEIS that considers all economic and environmental impacts and making sure that all benefits and costs are properly estimated.

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NOBLE & WICKERSHAM LLP
CONSTRUCTION, ENVIRONMENTAL & LAND USE LAW

JAY WICKERSHAM
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February 24, 2005 004992

Ms. Karen Kirk-Adams
Cape Wind Energy Project EIS Project Manager
U.S. Army Corps of Engineers, New England District
696 Virginia Road
Concord, MA 01742-2751

Re: Cape Wind Project (EOEA #12643)

Dear Ms. Kirk-Adams:

I am pleased to submit the following comments on the Draft Environmental Impact Statement / Environmental Impact Report (DEIS/EIR) for the Cape Wind project, currently under review by the U.S. Army Corps of Engineers (the Corps) pursuant to the National Environmental Policy Act (NEPA), 42 U.S.C. §§ 4321 – 4347.

I write as a private citizen with an interest in sound environmental law and policy. From 1998 to 2002 I served as Assistant Secretary of Environmental Affairs for the Commonwealth of Massachusetts and Director of the Massachusetts Environmental Policy Act (MEPA) Office. In that capacity I oversaw the environmental impact review of over 2,000 projects statewide, including the review of the initial Environmental Notification Form (ENF) for the Cape Wind Project and the issuance of the MEPA scope. As a lifelong sailor and birdwatcher, I am intimately familiar with Nantucket Sound and its shorelines, from Nobska Light to Monomoy. I am currently on the faculty of the Harvard Graduate School of Design, where I teach environmental and planning law, and I am a founding partner of a small law firm that concentrates in environmental and construction law. Our law firm has no connection with the project proponent. We do represent a proposed wind power facility in western Massachusetts. I provide legal representation to responsible wind power developers because of my conviction that the development of renewable energy is the best way to stem and reverse the most serious environmental impact caused by our society: the devastation to wildlife habitats, coastal areas, and other natural resources caused by fossil-fuel energy use. My comments in this letter draw upon a paper that I delivered at a symposium on off-shore wind development held at Boston College Law School in September 2003, a copy of which I have attached.

Based on my review of the DEIS/EIR document, I strongly urge the Corps to find that the DEIS/EIR complies with the requirements of NEPA and its implementing regulations. My comments focus on the following three issues:

1) The adequacy of the public review process;
2) The consistency of the project with significant public policy goals; and
3) The environmental benefits of the project, which outweigh its adverse environmental impacts.

My letter primarily addresses the responsibilities of the Corps under NEPA, because the element of the project with the greatest potential for environmental impacts, the array of 130 off-shore wind turbine generators (WTGs), is located solely in federal waters. The elements of the project that are subject to state-level review under the Massachusetts Environmental Policy Act (MEPA), M.G.L. ch. 30, §§ 61 – 62H, and to regional review by the Cape Cod Commission pursuant to its enabling act, Chapter 716 of the Massachusetts Acts of 1989, as amended, are limited to the submarine transmission cables located within the three-mile limit of state waters, and the on-land transmission lines within the Town of Yarmouth. As required in the MEPA scope, the DEIS/EIR has disaggregated those limited project impacts that are subject to state and regional jurisdiction from the project-wide impacts that are subject solely to federal jurisdiction under NEPA. The impacts of the transmission cables, considered alone, are consistent with those of several other recent projects that have undergone MEPA review, such the Nantucket Cable Project (EOEA #13172), for which an ENF was found adequate in 2004, and the level of analysis and mitigation proposed by the Cape Wind Project for its transmission lines equals or exceeds what has been provided for comparable projects. (See the comment letter of former MEPA analyst Arthur Pugsley, dated January 17, 2005.)

Adequacy of the Public Review Process

A central purpose of NEPA is ensuring full and adequate public input into the governmental decision-making process.

> "[Compliance with NEPA] ensures that the agency, in reaching its decision, will have available, and will carefully consider, detailed information concerning significant environmental impacts; it also guarantees that the relevant information will be made available to the larger public audience." *Robertson v. Methow Valley Citizens Council*, 490 U.S. 332, 349 (1989).

> "NEPA's dual mission is . . . to generate federal attention to environmental concerns and to reveal that federal consideration for public scrutiny." *Found. on Econ. Trends v. Heckler*, 756 F.2d 143, 147 (D.C. Cir. 1985).

The public review process for the Cape Wind Project conducted by the Corps, working together with the state MEPA Office, has been exemplary. The NEPA/MEPA scoping process lasted seven months, from the filing of the ENF to the issuance of the Corps' NEPA scope. During that time, the federal and state agencies jointly hosted six public hearings and held two oceanic site visits. Hundreds of people spoke at the public hearings, and the agencies received thousands of written comments. Over a dozen federal, state, and regional agencies participated in developing the scope for the DEIS/EIR. An equally extensive public review process has accompanied the DEIS/EIR. There have been four public hearings, during which hundreds of people spoke, and thousands of written comments have been submitted during the three and one-half month comment period.

In my experience, the review process for the Cape Wind project is the best recent example in Massachusetts of a NEPA/MEPA review that has fulfilled its core functions of public input and informed agency decision-making. The process has drawn broad public attention to the project, extending well beyond those who commented directly. The *Cape Cod Times* maintains a website devoted solely to the project. On that website are key government documents, including the NEPA and MEPA scopes, an archive of the paper's articles going back over the past several years, and links to many other sites, including those of the proponent and of opposition groups. The project has attracted national and international press coverage, and it has sparked a variety of proposals for legislative and executive action at both the state and federal level.

The Corps' Cape Wind process shows how the reviews of an individual project under NEPA can help crystallize policy in this new and important arena. It is a settled principle of administrative law that an agency may make policy through individual decisions, as well as through the adoption of plans or regulations.[1] The Cape Wind review is teaching us as much or more about the scientific, economic, legal, and political questions raised by offshore wind power than any expert commission could have done. The NEPA/MEPA process has served its desired role of opening up government decision-making to public scrutiny and of ensuring the consideration of environmental issues in those decisions. I am confident that the Corps' review will guide us to an outcome that establishes valuable precedent and policy for future offshore wind power development in New England and nationwide.

Consistency of the Project with Public Policy Goals for Renewable Energy, Air Quality, and Climate Change

The Cape Wind Project will be a significant step toward helping Massachusetts reach its public policy goals for producing renewable energy, eliminating air pollution, and reducing the greenhouse gases that cause global climate change. The project will produce approximately 1.49 million Megawatt hours per year of electricity. In so doing, the project is predicted to reduce regional air pollution and emissions of greenhouse gases, by displacing an estimated 4,000 tons of sulfur dioxide (a major component of acid rain), 1,180 tons of nitrogen oxides (a major component of smog), and 949,000 tons of carbon dioxide (a major greenhouse gas), compared with the emissions produced each year by a conventional fossil-fueled power plant generating the same amount of electricity.

In 1997, as part of the deregulation of its electrical industry, Massachusetts introduced a requirement that all electric providers must incorporate renewable sources of power into their portfolios.[2] The renewable energy portfolio standard must reach 5% by 2010, and it must increase 1% each year thereafter. Given the Commonwealth's relatively flat topography, cloudy

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[1] *SEC v. Chenery Corp.*, 332 U.S. 194, 202 (1947).

[2] Mass. Gen. Laws ch. 25A, § 11F.

weather, and windy coastline, wind power is currently the only feasible internal source of large-scale renewable power generation.

Renewable energy development will help Massachusetts meet its commitments for reduction of greenhouses gases made in the Massachusetts Climate Change Action Plan, issued by Governor Romney (Spring 2004), and Resolution 27-7 of the Annual Conference of New England Governors and Eastern Canadian Premiers (August 2002). In these documents, the Commonwealth has adopted climate change goals to reduce emissions of greenhouse gases to 1990 levels by 2010; to reduce greenhouse gas emissions to 10% below 1990 levels by 2020; and ultimately to reduce greenhouse gas emissions by 75% - 85% to achieve sustainability and climate stability.

The Corps' two-step analysis of project alternatives for Cape Wind – a screening analysis of potential land and water sites throughout Massachusetts and New England, followed by full-blown analysis of a limited number of sites – provides assurance that the project will be consistent with large-scale regional planning concerns. The screening criteria used by the Corps, based on a report by an independent Peer Review Committee, included minimum project capacity, wind speeds, wave heights, available land or water area, and access to transmission lines. These are the same criteria that would be used in any broad planning process. In response to that report, the DEIS/EIR contains a full alternatives analysis for five water-based and one land-based site. I support the conclusion of the alternatives analysis: that the proposed Horseshoe Shoal site has been found superior on technical, economic, and environmental grounds.

The Corps' decision to rely upon the alternatives analysis process within the NEPA review of the Cape Wind Project, rather than conducting a programmatic EIS for offshore wind power generally, is supported by U.S. Supreme Court precedents and sound policy.[3] First, the Corps itself has not undertaken any broad plan or program of seeking to permit wind farms in the coastal zone; the agency is responding to a private proposal that require a federal permit. Second, the agency is not facing multiple proposed projects within the same region that might pose cumulative impacts. The fears of a "gold rush" of private wind power developments in offshore waters have proved greatly overstated; four years after the Cape Wind review began, the project remains the only viable proposal in all of New England.

Finally, the alternatives analysis contained in the DEIS/EIR should <u>not</u> be understood as identifying Horseshoe Shoals as the only acceptable location for wind power generation in Massachusetts, or in New England. To satisfy federal and state public policy goals for renewable energy, air pollution, and climate change will likely require multiple offshore wind farms at different sites within both federal and state waters. We cannot permit local desires for exclusion to zone wind power and other environmentally beneficial uses out of the ocean, the way we have zoned affordable housing and other needed public facilities out of the land. (See the comment letter of Susan Tierney, Chair of the Massachusetts Ocean Management Task Force, dated December 16, 2004.)

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[3] *Kleppe v. Sierra Club,* 427 U.S. 390, 399 (1976).

The Environmental Benefits of the Project Outweigh Its Adverse Impacts

Conventionally, NEPA review focuses solely on the potential adverse impacts of projects. Yet the overall intent of the statute, and sound environmental policy, require an agency to take into account the environmental benefits of a project into account, as well its adverse impacts.[4] Based on the DEIS/EIR, it is clear that on balance the environmental benefits of the Cape Wind Project significantly outweigh its adverse impacts, and that any potential impacts can be fully avoided, minimized, or mitigated.

As noted above, the DEIS/EIR shows that the project will yield significant public benefits in the areas of renewable energy production, air quality, and climate change. The environmental impact of the greatest concern is the continuing use of coal, oil, gas, and other fossil fuels for energy generation. The environmental impact of fossil fuel power has already occurred, and it continues today. Even if we were to reduce carbon emissions dramatically, atmospheric concentrations and global temperatures would continue to increase for decades.[5] To use the terminology of NEPA, the Cape Wind Project should properly be viewed as a "mitigation measure" that will offset and help reverse the otherwise unavoidable adverse environmental impacts of carbon emissions from fossil-fuel power production.

In addition to the environmental benefits of the Cape Wind Project in the areas of renewable energy, air quality, and climate change, the DEIS/EIR comprehensively reviews other areas of potential project impact. The document demonstrates that the project will have no significant impact in many areas of concern, including the waters and sea floor of Nantucket Sound, or upon its finfish, shellfish, and marine mammals. I have focused on two particular areas: potential visual impacts and impacts on birds.

Visual Impacts

Much of the opposition to the Cape Wind Project derives from the strongly held opinions of some that the turbine towers will be ugly to look at and that introducing these elements into Nantucket Sound will harm the visual experience of that place. In response, the NEPA analysis must acknowledge that all perceptions of visual impacts are cultural constructs, in a way that physical impacts on birds, or fish, or wave patterns, are not. Viewpoints regarding what is beautiful and what is ugly are subjective and highly changeable: one generation's eyesore can become the next generation's treasured icon.

In the late nineteenth century, a committee of three hundred concerned citizens organized themselves to try to protect a particularly well-beloved landscape from a large-scale industrial intrusion. A landscape "without rival in the world" would be "profaned" and subject to "dishonor" due to the construction of a "ridiculously tall tower," which they characterized as

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[4] See Dorothy Bisbee, *NEPA Review of Offshore Wind Farms*, 31 B.C. Envtl. L.Rev. 349 (2004).

[5] IPCC Working Group I, Intergovernmental Panel on Climate Change, Climate Change 2001: The Scientific Basis, Summary for Policymakers 12–17 (2001), http://www.ipcc.ch/index.htm.

"the grotesque, mercantile imaginings of a constructor of machines."[6] The unrivalled landscape was the city of Paris; the eyesore was the Eiffel Tower.

Will the Cape Wind turbines someday become an equally well-loved icon of Cape Cod? We don't know—although if press reports are accurate, the Danish public has embraced the Horns Rev wind farm, off Denmark's western coast, and the Middelgrunden wind farm at the mouth of Copenhagen Harbor.[7] But it's clear that different people see very different things when they look at wind turbines. Where some see an industrial blight, others see a graceful piece of sculpture: in the words of environmentalist Bill McKibben, author of *The End of Nature*, "the breeze made visible."[8] In the arena of beauty, as in the arena of free speech, regulators must be very careful not to impose restrictions that will fetter innovation and freedom.

Avian Impacts

One of the most serious concerns raised by the Cape Wind Project, and the subject of detailed analysis in the DEIS/EIR, is the potential for impacts to birds. This has become an increasingly fierce subject of debate for windpower projects around the country. Yes, birds can be killed when they fly into wind turbines – just as they can be killed when they fly into a skyscraper, a factory smokestack, a living room picture window, or the path of a moving automobile. The DEIS/EIR predicts that approximately 364 birds will be killed each year by collisions with the WTGs. This finding is consistent with the most recent and comprehensive review of data from wind turbine facilities nationwide, conducted by the National Wind Coordinating Committee. According to that study, the average mortality rate nationwide is 2.3 birds per turbine per year[9] – slightly lower than Cape Wind's predicted rate of 2.8 birds per turbine per year.

These statistics need to be placed in context. According to the United States Fish and Wildlife Service, approximately 30,000 birds are killed each year by collisions with wind turbine facilities around the country. By contrast, it has been conservatively estimated that from 97 million up to 976 million birds are killed each year by collisions with buildings, 4 to 5 million or more by collisions with cell towers, 60 million by collisions with cars, and hundreds of millions by domestic and feral cats.[10] On a single night in May 1968, approximately 700 birds of 21 different species were killed by flying into the Prudential Tower in Boston.[11]

Moreover, unlike any of these other sources of risks, wind power has the unique potential to reverse the greatest potential adverse impact on birds and other wildlife: the destruction of habitat caused by global climate change. A recent study predicts that global warming could

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[6] Norma Evenson, *Paris: A Century of Change, 1878-1978* (New Haven: 1979), p. 131.

[7] Charles Sennott, *Denmark's Windmills Flourish as Cape Cod Project Stalls,* Boston Globe, Sept. 27, 2003, p. A1.

[8] Bill McKibben, *Enough: Staying Human in an Engineered Age* (2003), p. 115.

[9] NWCC, Wind Turbine Interactions with Birds and Bats: A Summary of Research and Remaining Questions (2nd ed., Nov. 2004).

[10] U.S. Fish & Wildlife Service, Migratory Bird Mortality (Jan. 2002).

[11] *Where to Find Birds In Eastern Massachusetts*, Robinson & Stymeist, eds. (Belmont: 1968), p. 43.

cause the extinction of between 15% and 37% of all species worldwide.[12] The New England Regional Assessment describes a wide range of future impacts due to climate change, from coastal flooding and salt-water intrusions into drinking water aquifers, to the disappearance of the region's spruce-fir and maple-beech-birch forests.[13] The wildlife and industries that depend on these ecosystems—from tourism to maple sugaring—will disappear, too. In the area of avian and other wildlife impacts, the balancing of environmental benefits and harms weighs strongly in favor of the Cape Wind Project.

Conclusion

Sound environmental policy is founded on the principal of sustainability: living within the capacity of our environment to sustain current uses, without compromising the ability of future generations to meet their needs. The development of renewable energy sources is at the core of this goal. It is increasingly clear that the only way to achieve sustainability, and restore the environmental damage we have already done, will be to carry out a sweeping and wrenching shift from our reliance on fossil fuels to a reliance on wind power and other renewable energy sources.

Sustainability requires stewardship – for all of us, from regulators to citizens, to act as wise stewards of our environment. This mandate is at the heart of NEPA. The statute requires federal agencies to use all practicable means to "fulfill the responsibilities of each generation as trustee of the environment for future generations." 42 U.S.C. §4331(b)(1).

For ourselves and our children, I am confident that development of the Cape Wind Project supports these principles of sustainability and stewardship. I urge the Corps to approve the DEIS/EIR, so that this important project can proceed.

Sincerely,

Jay Wickersham
Partner, Noble & Wickersham LLP
Lecturer, Harvard Graduate School of Design

cc: Secretary Ellen Roy Herzfelder, EOEA
Margot Fenn, Cape Cod Commission
Secretary Doug Foy, OCD

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[12] James Gorman, *Scientists Predict Widespread Extinction by Global Warming*, N.Y. Times, Jan. 8, 2004, p. A4.

[13] U.S. Global Change Research Project, The New England Regional Assessment of The Potential Consequences of Climate Variability and Change (March 2002).

Sonia Hamel, OCD
Commissioner Robert Golledge, DEP
Robert Pratt, Massachusetts Technology Collaborative
Robert Varney, EPA Region 1
Senator Edward Kennedy
Senator Robert Kerrey
Representative William Delahunt
Jim Gordon, Cape Wind LLC

Cape Wind comment ltr.doc

Adams, Karen K NAE

From: Teresa [freter19@davisp.com]

Sent: Tuesday, March 01, 2005 9:30 PM

To: Energy, Wind NAE

Subject: Re: Comments on Cape Wind Energy Project DEIS

0049993

Following are my comments originally sent in a file you could not open.

This is to identify my concerns regarding the Cape Wind Energy Project Draft Environmnetal Impact Statement (DEIS).

The project purpose and need defines the selected range of 200-1500 MW. This limits the consideration of other renewable energy technologies because only Cape Wind's proposal is within this range. It also seves to eliminate alternative sites. The range should be appropriate and in scale with current renewable energy projects.

The DEIS is not adequate in the areas of impacts to birds, bats, marine mammals and other wildlife; pollution threats from the oil on the transformer substation; boat navigation safety; air navigation safety; economic and tourism impacts. It does not adequately and accurately identify the projected impacts of the proposed project. The entire study including the analysis and methodology used to reach conclusions and subsequently the validity of conclusions is questionable.

The analysis does not asppear to be objective. All sources of information are not referenced. Most of the information was provided by Cape Wind Associates. It is unclear if independent analyses was conducted. In many instances, projected benefits and detriments are not directly related to this project. Potential detriments are consistently downplayed. The methodology includes inappropriate comparisons. This prevents meaningful comparisons between alternatives.

The length of study time is inadequate in the case of birds. There is not enough quantitative information on the relative impacts to birds and wildlife. Statements that birds, bats, and marine mammals will simply avoid the project area and therefore not be negatively impacted is not an objective conclusion based upon sound science.

Pollution threats from the oil in the transformer substation are not addressed. Possible worst case scenario pollution threats from collision with oil carrying vessels with the wind turbines has not been addressed. The DEIS is inadequate and incomplete without this information.

It is not an appropriate conclusion that boat navigation and safety will not be affected with the presence of 130 wind turbines. The Nantucket Steamship Authority, the lifeline to the island, which operates numerous trips each day, and the US Coast Guard disagree with the conclusion that the wind farm would not be a navigational hazard.

There is no basis to conclude that tourism will not be detrimentally impacted. The effect of the presence of 130 turbines which will be visible to varying degrees during periods of clear weather, overcast conditions and nighttime illumination in an area frequented for its unspoiled marine vistas should not be dismissed. Likewise the impact of these turbines on the tourist engaging in recreational boating and their navigational experiences in the area should not be dismissed as negligible.

Nantucket Sound is a public entity, twice recommended as a national estuarine sanctuary and is surrounded by a state ocean sanctuary, a national estuarine research reserve and a national wildlife refuge. It is an area which suports rich and diverse marine mammal, fish and bird life, while serving to provide essential economic support to the fishing and tourism industries. The DEIS does not adequately consider the projects impacts on this public entity.

The alternatives analysis does not provide all reasonable alternatives. It does not include: smaller facilities, placing some of the turbines futher offshore, spacing the turbines closer together, a phased installation typically employed in new technology implementation, or a distribution of smaller wind farms. All of these alternatives are likely to reduce the detrimental impacts, and should not be dismissed as alternatives because they would be more costly or result in less profit to the applicant.

The reasoning for not identifying a phased installation is unclear in that it would provide site specific data concerning potential benefits and detriments. The proposed project is the first of its kind in the US. Therefore, a project of this size should not be approved until it is proven, not concluded as unlikely, that it will not cause detrimental effects that should prohibit its construction.

It is essential that the specific benefits and detrimental attributes of the proposed project be fully and accurately identified and understood. Permitting of this project should not be based on data which overwhelmingly makes assumptions that detrimental effects are unlikely, based on extrapolation from land based data, data from wind energy projects of entirely different scale and scope, other inappropriate data, and lack of data. The current DEIS does not adequately accomplish this goal of an objective environmental impact statement based upon sound science. The DEIS should not be accepted as a final Environmental Impact Statement

Fred Kozak

> ----- Original Message -----
> **From:** Energy, Wind NAE
> **To:** Fred Kozak
> **Sent:** Tuesday, March 01, 2005 4:20 PM
> **Subject:** RE: Comments on Cape Wind Energy Project DEIS
>
> I was not able to open your attachment. My computer apparently didn't recognize the file type.
>
> -----Original Message-----
> **From:** Fred Kozak [mailto:freter19@davisp.com]
> **Sent:** Tuesday, February 22, 2005 7:50 PM
> **To:** Energy, Wind NAE
> **Subject:** Comments on Cape Wind Energy Project DEIS
>
> Your files are attached and ready to send with this message.