

**2010 Initial Bird Assessment of the Dennis Water District
Wind Turbine Project Site**



Pine Warbler – John James Audubon

For Boreal Renewable Energy Development
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1. Scope, Purpose and Project Overview

The goal of the spring bird assessment (“Assessment”) was to evaluate the general characteristics of avian habitat at the proposed turbine location at the Dennis Water District (DWD) (Figure 2). The motivation for the Assessment was in the larger context of the planning for the possible installation of up to two wind turbine generators (WTGs) at DWD. This report represents the spring and fall avian report of 2010.

2. Birds in the Vicinity of the Dennis Water District

This spring and fall avian assessment is based on existing information available in the public domain, upon the best professional judgment of the author, and from a total of 31 hours of bird counting at the site during visits conducted on April 27, May 7 and September 15, 2010.

DWD has the potential to support approximately 80 breeding, wintering, and migratory species of birds (Table 1.) (Sibley 2000). A grand total of 38 species were observed during spring and fall site visits (Table 1 and 3).

Table 1. Avian species that may occur in the vicinity of DWD. Compiled from personal observations and from range maps found in The Sibley Guide to Birds (Sibley 2000). indicates that the species was observed during spring and fall site visits of DWD.

1. American Crow	<input type="checkbox"/>
2. American Goldfinch	<input type="checkbox"/>
3. American Robin	<input type="checkbox"/>
4. Baltimore Oriole	<input type="checkbox"/>
5. Barn Swallow	<input type="checkbox"/>
6. Belted Kingfisher	X
7. Black Throated Green Warbler	X
8. Black-capped Chickadee	<input type="checkbox"/>
9. Blue Jay	<input type="checkbox"/>
10. Blue-Gray Gnatcatcher	X
11. Brown-headed Cowbird	<input type="checkbox"/>
12. Cedar Waxwing	X
13. Chimney Swift	X
14. Chipping Sparrow	<input type="checkbox"/>
15. Common Grackle	X
16. Common Tern	X
17. Common Yellowthroat	<input type="checkbox"/>
18. Cooper's Hawk	X
19. Dark-eyed Junco	<input type="checkbox"/>

20. Double-crested Cormorant	X
21. Downy Woodpecker	<input type="checkbox"/>
22. Eastern Bluebird	<input type="checkbox"/>
23. Eastern Kingbird	<input type="checkbox"/>
24. Eastern Phoebe	<input type="checkbox"/>
25. Eastern Towhee	X
26. Eastern Wood-Pewee	X
27. European Starling	X
28. Field Sparrow	<input type="checkbox"/>
29. Grasshopper Sparrow	X
30. Gray Catbird	<input type="checkbox"/>
31. Great Black-backed Gull	X
32. Great Blue Heron	X
33. Great Crested Flycatcher	X
34. Great Egret	X
35. Great Horned Owl	X
36. Great-crested Flycatcher	<input type="checkbox"/>
37. Greater Yellowlegs	X
38. Hairy Woodpecker	<input type="checkbox"/>
39. Hermit Thrush	<input type="checkbox"/>
40. Herring Gull	<input type="checkbox"/>
41. House Finch	X
42. House Sparrow	<input type="checkbox"/>
43. House Wren	X
44. Least Tern	X
45. Merlin	X
46. Mourning Dove	<input type="checkbox"/>
47. Northern Bobwhite	X
48. Northern Cardinal	<input type="checkbox"/>
49. Northern Flicker	<input type="checkbox"/>
50. Osprey	<input type="checkbox"/>
51. Ovenbird	<input type="checkbox"/>
52. Peregrine Falcon	X
53. Pine Warbler	<input type="checkbox"/>
54. Prairie Warbler	X
55. Red Tailed Hawk	X
56. Red-bellied Woodpecker	X
57. Red-breasted Nuthatch	<input type="checkbox"/>
58. Red-eyed Vireo	X
59. Red-tailed Hawk	<input type="checkbox"/>
60. Red-winged Blackbird	X
61. Rock Dove	X
62. Rose-breasted Grosbeak	<input type="checkbox"/>
63. Ruby-Crowned Kinglet	X
64. Ruby-throated Hummingbird	X

65. Rufous-sided Towhee	<input type="checkbox"/>
66. Savannah Sparrow	X
67. Sharp Shinned Hawk	<input type="checkbox"/>
68. Song Sparrow	X
69. Swamp Sparrow	X
70. Tree Swallow	<input type="checkbox"/>
71. Tufted Titmouse	<input type="checkbox"/>
72. Turkey Vulture	<input type="checkbox"/>
73. White-breasted Nuthatch	<input type="checkbox"/>
74. Wild Turkey	X
75. Wood Thrush	<input type="checkbox"/>
76. Yellow-rumped Warbler	X

3. Massachusetts Audubon Important Bird Areas (IBA)

The Massachusetts Important Bird Area Program (IBA) is carried out cooperatively by staff from Mass Audubon, a volunteer Technical Committee and various partner organizations.

The primary goals of the IBA program are:

- To identify, nominate, and designate key sites that contribute to the preservation of significant bird populations or communities.
- To provide information that will help land managers evaluate areas for habitat management and/or land acquisition.
- To activate public and private participation in bird conservation efforts.
- To provide public education and community outreach opportunities.

An Important Bird Area is a site that provides essential habitat to one or more species of breeding, wintering, or migrating birds. Important Bird Areas generally support high-priority species, large concentrations of birds, exceptional bird habitat, and/or have substantial research or educational value. Criteria for IBA Sites include:

1. Sites regularly holding significant numbers of an endangered, threatened, vulnerable, or declining species. (Category 1)
2. Sites regularly holding significant numbers of species of high conservation priority in Massachusetts. (Category 2)
3. Sites where birds concentrate in significant numbers in the breeding season, in winter, or during migration. (Category 3)
4. Sites containing assemblages of species characteristic of a representative, rare, threatened, or unique habitat within the state or region. (Category 4)
5. Sites important for long-term research and/or monitoring projects that contribute substantially to ornithology, bird conservation, and/or education. (Category 5)

DWD is closest (<5 miles) to these two IBAs (Figure 1):

1. **West Dennis Beach**
2. **Brewster Ponds and Woodlands**

Figure 1. DWD project (approximate location indicated by blue dot) is located near to several

IBA sites indicated by red stars.



Findings: *The size of DWD wind project is too small and the distances to any IBA are too great for there to be a concern that DWD wind project would put the birds using these IBAs at risk.*

4. Site Visit Notes for April 27, May 7, September 15, 2010

Site visits were made to the project vicinity on April 27th (2 biologists each for 6 hours), on May 7th 2010 (1 biologist for 7 hours) and on September 15th (2 biologists each for 6 hours) for a grand total of 31 hours of bird observations. During each of the site visits, the area around the project site was walked and/or driven and notes were kept regarding all birds and other wildlife species that were detected. A total of 38 birds were observed (Table 3) during the spring and fall visits. However, no terns were observed or any other species of “listed” birds. Also, while the conditions were conducive for migrating birds of prey in both the spring and fall surveys, only a few osprey, red-tailed hawks, sharp-shinned hawks and turkey vultures were observed (Table 3).

Other notes taken during the spring and fall 2010 site visits include these:

- **Vegetation/Habitat Type:** Classic southeastern Massachusetts upland pine/oak barrens habitat (see photo-documentation in Appendix A).
- **Forest Ground Cover:** Predominately Teaberry, Wintergreen, Trailing Arbutus, Bracken Fern (Appendix A).
- **Forest Understory:** Predominately Huckleberry, Blueberry sp., Scrub oak.
- **Canopy Trees:** Predominately Pitch Pine, White Oak, Red Oak, oak sp.
- **Powerline Area:** In addition to the above species (trees much smaller) included Bearberry (ground cover), Andropogon and other grass sp. (see photo-documentation in Appendix A).
- **Wildlife Observed:** White-tailed Deer
- **Several Large Ponds/lakes are found east and south of the proposed site:** These water bodies (Figure 2), were not surveyed and may provide habitat for water fowl and wading birds during ice-free months.

Findings: *The proposed site is a large and nice representation of upland pine/oak barrens. This type of upland barrens is itself an interesting and not very common vegetation/habitat type in New England. Therefore, it would be advisable to minimize impact, specifically forest fragmentation, to this habitat. Suggested strategies include using existing roads within the transmission corridor and constructing foundation and crane pads near to the transmission corridor¹. Based on the survey results, the site appears to host many of the bird species that one would expect to find in such habitat. No rare species of special concern were detected during fieldwork. The potential value of the surrounding ponds/lakes was not assessed.*

5. Threatened, Endangered, Species of Special Concern and Regulatory Landscape

The Endangered Species Act (ESA) (16 U.S.C. 1531–1544; ESA): The ESA provides strict protection for any listed species and the ecosystems upon which they depend. Harming a single individual can lead to serious penalties. In the vicinity of DWD, three species of ESA birds are of potential, albeit remote concern: **Bald Eagle**, **Piping Plover** and **Roseate Tern (at Monomoy**

¹ NSTAR has setback requirements that will not allow wind turbine construction within a transmission corridor.

and South Beach National Wildlife Refuge) (Figure 1). Bald Eagles could theoretically be found in the vicinity of DWD during any month of the year, typically along shorelines or perched on rocks or in trees. Piping Plovers are summer residents, as well as spring and fall migrants, at sandy beaches along the Cape Cod coast. Roseate Terns are also summer visitors that nest in low numbers at Monomoy and South Beach National Wildlife Refuge, and they feed at sea and over sandbars in coastal zone of Cape Cod.

Findings: *According to a letter received from MA NHESP(Appendix B), the site in question is not mapped as a Priority or Estimated habitat, and their database not include any records of state listed species in the vicinity of the site. However, they advise that potential impact to birds and bats be considered during the planning process. In a letter from USFWS (Appendix C), Piping Plover (threatened species) and Roseate Tern (endangered species) may fly over the interior of the Cape in the vicinity of DWD but it is unknown to what extent they may do so. As with NHESP, USFWS also advises that potential impacts to species be considered during wind power planning and specifically from pre-construction surveys of species use at the site.*

The Migratory Bird Treaty Act (MBTA) (16 U.S.C. 703–712; MBTA): The MBTA is the cornerstone of bird conservation and makes it unlawful to kill (“take”), by any means, any migratory bird. This category includes almost all species found in the vicinity of DWD except crows and starlings. The MBTA is a strict liability statute, wherein no proof of intent is part of a violation, and there is no provision for allowing an unauthorized take. Bald and Golden Eagles receive additional protection under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 – 668d; BGEPA).

Findings: *In practice, prosecutions arising from violations of the MBTA at wind power sites have been very infrequent and the USFWS has used prosecutorial discretion where good faith efforts have been made to avoid the take of migratory birds by such actions as avoiding constructing towers within high bird-use areas and avoiding construction during migrations and breeding seasons.*

Massachusetts Endangered Species Act: The USFWS mentions several federally listed endangered, threatened and proposed species in the vicinity of DWD (Appendix C) and

recommends pre-construction surveys to assess their use of the site. Similarly, NHESP in a letter (Appendix B) advises *that potential impact to birds and bats be considered during the planning process.*

Findings: *Based on the survey results, it is unlikely installation of up to two wind turbine generators at DWD would impact any of these species due to the rarity of these species in the vicinity of DWD coupled with the small size of the project. A survey of bats was not within the scope of the spring and fall studies.*

The Massachusetts list of Endangered, Threatened and Bird Species of Special Concern:

The Massachusetts list includes those species that are or may become at risk of extirpation as breeders in Massachusetts. It includes 28 bird species of which 10 are also federally listed (either under the Endangered Species Act (ESA) or in Birds of Conservation Concern (BCC 2002) and Bird Conservation Region 30 (BCR30)).

Findings: *It is unlikely the installation of 2 wind turbines at DWD would impact MA endangered species because most of these species are not found in the vicinity of DWD and the few that are (such as least and roseate terns (discussed below), are likely to be in low abundance coupled with the small size of the project (Figure 2).*

Least Tern: The largest populations of least terns in Massachusetts are found on Cape Cod and islands in the Gulf of Maine, Nantucket Sound, Vineyard Sound, and Buzzards Bay. Least Terns typically nest on sand or gravel beaches that are scoured by storm tides, resulting in sparse or no vegetation.

Findings: *It is a very remote possibility that wind turbines at DWD would impact the least tern since this project is not located the center of Cape Cod and not on or near a beach where terns are more likely to be encountered.*

Roseate Tern: Approximately 2,300 or fifty percent of North America's breeding pairs of the endangered roseate terns (*Sterna dougallii*) can be found on two islands in Buzzards Bay; Ram Island and Bird Island which are over 25 miles west of DWD, hosts approximately 800 roseate

terns. Monomoy and South Beach National Wildlife Refuge (which is approximately 15 nm SSE of DWD) hosted approximately 55 pair of Roseate Terns in 2007. The USFWS classifies the species as endangered and both islands are protected under the Buzzards Bay Colonial Bird Nesting and Feeding Areas. Hence, these two colonies are highly critical seabird habitat. Over the past two decades, considerable effort has been put into the management of these two key Buzzards Bay populations to prevent the local extinction of this tern (Buzzards Bay National Estuary Program: Roseate Tern Recovery in Buzzards Bay. 2006). However, because these islands are over 20 miles from DWD, it is unlikely that two DWD wind turbines will have an impact on these populations.

Findings: *It is a very remote possibility that wind turbines at DWD would impact the roseate tern since this project is not located the center of Cape Cod and not on or near a beach where terns are more likely to be encountered.*

6. Bird Mortality from Human Activities Including Wind Turbines

Research has shown that annual human-induced avian mortality (Corcoran 1999), may total between 100 million and 1 billion birds per year in the United States alone (Erickson et. al. 2001). Leading the list of causes are birds colliding with both high and low-rise buildings, especially those with highly reflective mirror or glass facades that can disorient birds (Klem 1990 a, b), followed by telecommunications towers (particularly those supported by guy wires), (Manville, 2000; National Park Service, 2003; Evans 1998), structures such as light houses that employ intense artificial lighting (Hill, 1992; Ogden, 1996) and high-traffic roads (Forman et. al. 2002) (Table 2.). Similarly, exposure to toxins can also take a toll on birds and lead to reproductive failure and in extreme cases mortality (Durell and Lizotte 1998).

Table 2. Estimated Annual Bird Deaths in the USA from Various Human Activities.

Human Activity:	Annual Bird Mortality
Vehicles:	60 million - 80 million
Buildings and Windows:	98 million - 980 million
Powerlines:	174 million
Communication Towers:	4 million - 50 million
Wind Generation Facilities:	10,000 - 40,000

Risks to Birds from Wind Turbines

Regarding birds and wind turbines, both direct and indirect effects are summarized in June 2010 document by the National Wind Coordinating Collaborative (NWCC) entitled: Wind Turbine Interactions with Birds, Bats, and their Habitats: A Summary of Research Results and Priority Questions. This document, generally referred to as the “avian fact sheet”, reports that some impacts of wind turbines to birds and bats have been demonstrated, but that these impacts are overall very low and are not biologically significant at the population level. While impacts vary from wind plant to wind plant, the fact sheet reports that the average number of birds that die from collision with wind turbines is between 2-5 bird deaths per turbine per year.

A summary of other significant findings in the avian fact sheet are as follows:

- Two types of local impacts to birds have been demonstrated at existing wind plants: 1) direct mortality from collisions, and 2) indirect impacts from avoidance, habitat disruption and displacement.
- There have been no documented large fatality events of nocturnal migrant songbirds at wind projects. The two largest events reported include 14 spring migrant passerines found at two adjacent turbines in Minnesota on one night and approximately 30 spring migrants in West Virginia on one night.
- Songbirds (and in some locations bats) appear to be exposed to heightened risk at wind projects as well as at communication towers during inclement weather because birds are known to be attracted to nearby artificial lighting.
- While bat mortality at most wind parks is lower than bird mortality, two wind parks located in the ridge-and-valley region of Pennsylvania and West Virginia have documented annual mortality of between 2,000 – 4,000 bats per wind park for the last two years. Efforts are underway to try and determine the cause of these unique events at the two sites.
- Both migrating and resident birds and bats sometimes die in wind farms as a result of collisions with wind turbines and meteorological towers (and their supporting guy wires). For birds, the national average is between 2-4 bird deaths per turbine per year (National

Wind Coordinating Committee).

- Several studies have been published or are on-going on the displacement and avoidance impacts of wind turbines and associated infrastructure/activities on grassland breeding songbirds and other open country birds (prairie grouse, shorebirds, waterfowl, etc.). Some of these studies have documented decreased densities of and avoidance by grassland song and other birds as a function of distance to wind turbines and roads. The level of impact varies by species, and on-going research is quantifying the distance of avoidance caused by the presence of infrastructure and human activity.

Findings: *Fatalities of birds and bats can occur and have been documented at wind farms worldwide, including in Australia (Hall and Richards 1972), North America (Erickson et al. 2002, Johnson et al. 2003, 2005, Fiedler 2004, Kerns and Kerlinger 2004, Arnett 2005), and northern Europe (Ahlen 2003). However, in all cases mortality level is generally considered to be low relative to the other sources of human-induced mortality of birds and bats. It is considered improbable that DWD wind project would have any direct or any indirect impacts on any bird species.*

7. Conclusions and Next Steps

Based upon spring and fall site visits and what is known about wind power and birds, it is concluded that the Dennis Water District Wind Turbine Project would *not impact any threatened or endangered birds or any species or habitats of any birds of special concern.*

This is because of the following:

1. The project itself is too small to pose a significant risk to the listed species.
2. The proposed site does not contain high value bird habitat and does not appear to host high numbers of migrating birds of prey.

Regarding next steps, the following is recommended prior to the installation of a wind turbine generator at DWD:

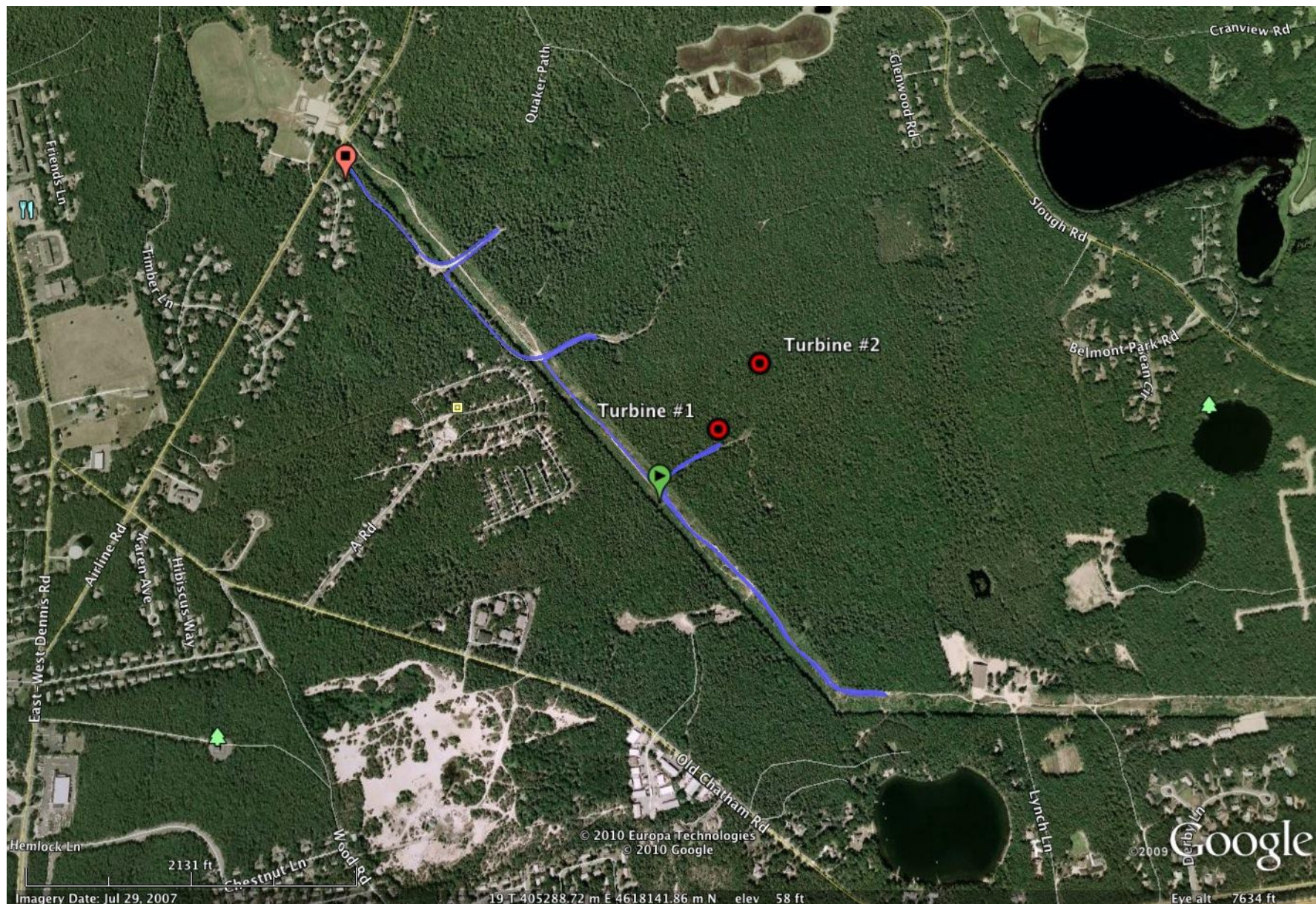
- Continue to keep in touch with USFWS, MA NHESP and other relevant regional and local regulatory officers and stakeholders (such as MA Audubon), informing them of the project and requesting any information and/or concerns they may have regarding the project.
- As per the written request of both MA NHESP and USFWS, continue to consider the potential impact to birds and bats during the planning process. This may include the need to conduct additional spring and fall field surveys for birds and possibly bats at the proposed project site and at the nearby by ponds/lakes which were not surveyed. As a first step, we suggest engaging the MA NHESP and USFWS in a consultative meeting after they have reviewed this report.
- Should the project go forward, consider conducting post-construction mortality surveys as is recommended by both USFWS and the MA Natural Heritage Program and Endangered Species Program (MA NHESP).

Table 3. Bird Species Observed by Date and Location (☐=observed, X=not observed):

Bird Species Detected	4/27/2010 (12 hours)	5/7/2010 Forest (5 hours)	5/7/2010 Transmission Line (2 hours)	9/15/2010 Forest (6 hours)	9/15/2010 Transmission Line (6 hours)
1. American Crow	☐	☐	☐	7	☐
2. American Goldfinch	☐	X	☐	X	X
3. American Robin	☐	☐	☐	X	X
4. Baltimore Oriole	X	☐	X	X	X
5. Barn Swallow	X	X	☐	X	X
6. Black-capped Chickadee	☐	☐	☐	31	☐
7. Blue Jay	☐	☐	☐	16	☐
8. Brown-headed Cowbird	X	X	☐	X	X
9. Chipping Sparrow	X	☐	X	X	X
10. Common Yellowthroat	X	☐	X	X	X
11. Dark-eyed Junco	☐	X	X	X	X
12. Downy Woodpecker	X	☐	X	X	X
13. Eastern Bluebird	☐	X	☐	X	X
14. Eastern Kingbird	X	X	☐	X	X
15. Eastern Phoebe	X	X	X	1	X
16. Field Sparrow	☐	X	☐	X	X
17. Gray Catbird	X	☐	X	X	X
18. Great-crested Flycatcher	X	☐	X	X	X
19. Hairy Woodpecker	X	☐	☐	3	☐
20. Hermit Thrush	X	☐	X	X	X
21. Herring Gull	☐	X	X	X	6
22. House Sparrow	X	X	☐	X	X
23. Mourning Dove	☐	☐	☐	X	4
24. Northern Cardinal	☐	☐	☐	X	X
25. Northern Flicker	☐	☐	☐	X	1
26. Osprey	☐	☐	X	X	X
27. Ovenbird	X	☐	X	X	X

28. Pine Warbler	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	3	<input type="checkbox"/>
29. Red-breasted Nuthatch	X	<input type="checkbox"/>	X	15	<input type="checkbox"/>
30. Red-tailed Hawk	<input type="checkbox"/>	X	<input type="checkbox"/>	X	2
31. Rose-breasted Grosbeak	X	X	<input type="checkbox"/>	X	X
32. Rufous-sided Towhee	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	X	1
33. Sharp-shinned Hawk	X	X	X	1	3
34. Tree Swallow	<input type="checkbox"/>	X	<input type="checkbox"/>	X	49
35. Tufted Titmouse	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1	X
36. Turkey Vulture	<input type="checkbox"/>	X	X	X	2
37. White-breasted Nuthatch	X	X	X	2	X
38. Wood Thrush	<input type="checkbox"/>	X	X	X	X
Species Detected=	20	21	21	10	13

Figure 2. Color ortho-photograph of DWD Wind Turbine Project Site. Red dot shows the approximate location of the two proposed wind turbine locations which were both visited on foot. Purple line is a track capture of the areas that were visited by 4X4 vehicle on April 27, and on September 15, 2010.



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9.0 Appendix A: Photo documentation from DWD site taken on April 27, 2010.



Image 1. DWD site showing mixed pine and oak woodland.



Image 2. DWD proposed turbine location #1.



Image 3. DWD proposed turbine location #2.



Image 4. Transmission corridor adjacent to DWD turbine site.



Commonwealth of Massachusetts

Division of Fisheries & Wildlife

Wayne F. MacCallum, *Director*

June 16, 2010

Alex Weck
Boreal Renewable Energy Development
41 Margaret Street
Arlington MA 02474

RE: Project Location: Dennis Wellfield - Water District Site
Town: DENNIS
NHESP Tracking No.: 10-28280

To Whom It May Concern:

Thank you for contacting the Natural Heritage and Endangered Species Program ("NHESP") of the MA Division of Fisheries & Wildlife for information regarding state-listed rare species in the vicinity of the above referenced site.

Based on the information provided, the NHESP has determined that at this time the site is not mapped as Priority or Estimated Habitat. The NHESP database does not contain any state-listed species records in the immediate vicinity of this site. We advise that potential impacts to birds and bats be considered during the design and permitting process for all wind turbines.

This evaluation is based on the most recent information available in the NHESP database, which is constantly being expanded and updated through ongoing research and inventory. If you have any questions regarding this letter please contact Amy Coman, Endangered Species Review Assistant, at (508) 389-6364.

Sincerely,

Thomas W. French, Ph.D.
Assistant Director

www.masswildlife.org

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An Agency of the Department of Fish and Game



United States Department of the Interior



FISH AND WILDLIFE SERVICE

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<http://www.fws.gov/newengland>

June 21, 2010

Mr. Tom Michelman
Boreal Renewable Energy Development
43 Margaret St.
Arlington, Massachusetts 02474

Dear Mr. Michelman:

This responds to your May 19, 2010 letter requesting our review of the proposed installation of two 1.5-megawatt (MW) wind turbines in Dennis, Massachusetts. Your request asks for information on significant wildlife resources that might be associated with the project location. Accordingly, we have reviewed the project with respect to the potential presence of federally-listed endangered or threatened species, candidate species, and other significant wildlife resources. Our comments relative to endangered and threatened species are provided in accordance with the Endangered Species Act (87 Stat. 884, as amended; 16 U.S.C. 1531, *et seq.*) and the Migratory Bird Treaty Act (16 U.S.C. 703-712).

Federally-listed and Candidate Species

The proposed Dennis project, located east of the Dennis Water District pumping station, is approximately 3.5 miles south of Cape Cod Bay and 4 miles north of Nantucket Sound. Freshwater ponds occur approximately one-half mile east of the site. Based on information currently available to us, federally-threatened piping plovers (*Charadrius melodus*) are known to breed on coastal beaches to the north and south; the closest nesting area is approximately five miles northeast of the proposed turbines. Currently, there is little information regarding the seasonal migratory pathways used by piping plovers as they move along the coast to their breeding habitat, specifically whether they fly over land or follow the shoreline. Similarly, the flight paths used by plovers in late summer/fall, when they move southward out of the Northeast to winter along the southeast Atlantic Coast, are also poorly known.

Research indicates that there is little movement by piping plovers once they are on their breeding beaches, either to new sites after a nest failure or between breeding and feeding habitat. Piping plovers rarely move great distances from one nest site to another after a nest failure (MacIvor 1990).¹ With respect to movements between breeding and feeding habitats, MacIvor *et al.* (1985)² observed a single plover breeding at one beach and feeding at another site 23 miles (37 kilometers) away. Moreover, studies of banded piping plovers indicate limited occasional overland flights. MacIvor (1990) reported a few piping plovers making overland crossings of the Cape. Overland flights between beaches north and south of the proposed wind turbine locations could make plovers vulnerable to collision mortality if the turbines are constructed in their flight paths. However, the likelihood of overland flights is difficult to assess based on the information currently available.

Endangered roseate terns (*Sterna dougallii*) are not known to nest near the proposed turbine locations in Dennis. However, roseate terns could occur over the mainland of the Cape during the post-breeding period, when the entire North Atlantic breeding population converges on outer Cape Cod to feed in preparation for their southward migration to coastal Brazil (Trull *et al.* 1999).³ These fall staging flocks of terns move frequently throughout the Cape Cod-Nantucket Sound area, seeking areas of preferred foraging and resting. To what extent these flocks that sometimes number in the thousands of birds fly over the mainland of the Cape in the vicinity of Dennis is unknown. No other federally-listed threatened or endangered species are known to occur in the vicinity of the project area.

The New England cottontail (*Sylvilagus transitionalis*) and the red knot (*Calidris canutus rufa*) are candidates for federal listing as a threatened or endangered species (FR vol. 71, no. 176: 53757-53758). The cottontail is a thicket- or shrubland-dependent species. We have no information on the occurrence of this species in the project location, but it may be present if shrublands or dense understory vegetation occur at the site. The red knot is an arctic nesting species that seasonally migrates along the Atlantic Coast. It is documented as occurring at many coastal locations on Cape Cod, but we are unaware of any studies examining the potential for overland movements across the Cape.

Other Migratory Birds and Bats

The presence of natural waterbodies in the area may attract gulls and waterfowl to the locations. Whether gulls or ducks will be at risk from colliding with the turbines can be evaluated by a better understanding of the use of the airspace at the projects' locations before and after construction.

¹ MacIvor, L.H. 1990. Population dynamics, breeding ecology, and management of Piping Plovers on Outer Cape Cod, Massachusetts. M.S. Thesis. University of Massachusetts, Amherst, Massachusetts. 100 pp.

² MacIvor, L.H., C.R. Griffin and S. Melvin. 1985. Management, habitat selection and population dynamics of piping plovers on Outer Cape, Massachusetts. Progress Report. University of Massachusetts, Amherst, Massachusetts. 15 pp.

³ Trull, P., S. Hecker, M.J. Watson and I. C. T. Nisbet. 1999. Staging of Roseate Terns *Sterna dougallii* in the post-breeding period around Cape Cod, Massachusetts, USA. *Atlantic Seabirds* 1(4):145-158.

Mr. Tom Michelman
June 21, 2010

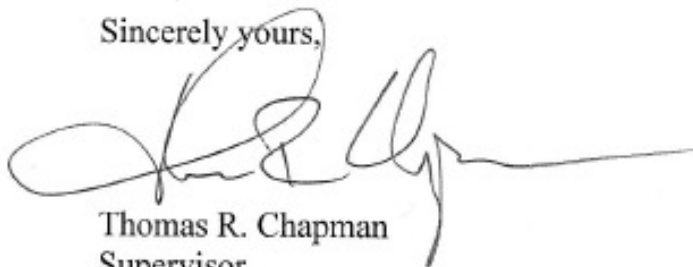
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In some locations, operation of wind turbines can adversely affect a variety of wildlife species, including migratory birds and bats. In order to assess the level of risk and the scope of species potentially present in a wind turbine project area, the U.S. Fish and Wildlife Service (Service) recommends that the spatial and temporal uses of the rotor-swept zone by wildlife be identified and evaluated, e.g., by a qualified observer, or perhaps through the use of radar and other remote-sensing techniques.

Pre-construction surveys will inform the project proponent, as well as the Service, of potential wildlife conflicts during the site selection and planning stages. With this information, risks can be assessed, and methods to avoid, minimize and mitigate impacts to wildlife may be accommodated. Without pre-construction surveys, unexpected mortality of birds or bats may warrant operational adjustments to reduce or avoid further impacts to wildlife. Absent adequate pre-construction surveys and careful analysis of subsequent data, the siting, construction and operation of a wind project may result in the mortality of wildlife in violation of federal laws, such as the Migratory Bird Treaty Act or the Endangered Species Act. We are available for technical assistance in the development of pre- and post-construction surveys in order to ensure that impacts to birds and bats will be avoided and/or minimized.

For further information regarding endangered species, please contact Susi von Oettingen, and for further assistance relative to migratory birds, contact Maria Tur at the contact information provided above. You may also visit the Wind Energy page on the New England Field Office's website for useful links, including guidance documents for avoiding and minimizing impacts to wildlife: <http://www.fws.gov/newengland>.

Sincerely yours,

A handwritten signature in black ink, appearing to read 'Tom Chapman', with a long horizontal line extending to the right.

Thomas R. Chapman
Supervisor
New England Field Office