

Introduction

Iberdrola (Deerfield), has petitioned the Bard for a Certificate of Public Good (CPG) for the construction and operation of a 30 megawatt wind facility. The proposed wind facility (the Project) consists of fifteen (15) wind turbines to be located in Wilmington and Searsburg Vermont. This Proposal for Findings of Fact, Conclusions of Law and Order sets forth the recommendations of the Vermont Agency of Natural Resources (Agency or ANR) with respect to certain criteria relating to natural resources in accordance with 30 V.S.A. §248(b)(5). With respect to the natural resources criteria not addressed herein, ANR does not have any recommended findings and will respond to the Deerfield's submission.

II. Findings

The total project area is 79.5 acres, the majority of which will be located on National Forest Service Land. Habig Dec. 1, Tr. Page 56

A. 30 V.S.A. § 248(b)(5) – Aesthetics, Historic Sites, Air and Water Purity, the Natural Environment, and the Public Health and Safety

Findings

1. The proposed Project will have an undue adverse effect on the natural environment with due consideration having been given to the criteria specified in

10 V.S.A. §§ 1424a(d) and 6086(a) (1) through (8) and (9)(K). This finding is supported by the Findings_____, below.

i. Outstanding Resource Waters

ii. [10 V.S.A. § 1424(a)(d), 30 V.S.A. § 248(b)(8)]

2. There are no Outstanding Resource Waters on the Project site or in any adjacent areas, based upon the list published by the Water Resources Board. Michael Lew-Smith pf direct at 7.

i. Water and Air Pollution

ii. [10 V.S.A. § 6086(a)(1)]

3. The Project will not “result in undue air pollution.” The wind turbines will not generate any air pollutants. Accordingly, operation of the Project will not require an air pollution control permit from ANR.

i. Wetlands

ii. [10 V.S.A. § 6086(a)(1)(G)]

4. There are no Class One or Class Two wetlands within the project area. Metz pf. at 2. The applicant will not require a Conditional Use Determination (CUD) for the project. Metz pf at 4.
5. ANR witness Metz does not believe that the proposed project layout will result in
6. an undue adverse impact to wetland resources. Metz surrebuttal pf at 3.

7. If a Certificate of Public Good were issued for the project, ANR recommends a snow fence be placed along the limits of disturbance for Turbine 4E to avoid any impacts to the adjacent wetlands and their buffer zones. ANR also recommends that construction occur during the winter months in order to lessen impacts to any intermittent stream or wet areas that may need to be crossed by construction equipment to gain access to the turbine sites. Metz pf at 5.

Soil Erosion

- i. [10 V.S.A. § 6086(a)(4)]
8. The project requires a State Stormwater Discharge Permit for the post-construction discharge of stormwater runoff from impervious surfaces (General Permit 3-9015). Probasco pf at 4
9. The project will also need a federal, National Pollution Discharge Elimination System (NPDES) Permit for discharges during the construction phase of the project. Due to the nature and scale of the project, it likely to not eligible for coverage under the Construction General Permit, but will need an Individual Permit. An Individual Permit is specifically tailored to the proposed construction project, and typically includes additional protective measures (e.g. the requirement for oversight by an Environmental Specialist and water quality monitoring). Probasco at 4.

10. Although the information provided to ANR has been adequate thus far in the process, the submittal of complete permit applications is the only definitive way to determine whether I could issue an operational and construction phase stormwater discharge permit for this project.
11. At this point, it is the opinion of the ANR expert that the type of information needed to determine whether operational and construction phase stormwater discharge permits could be issued for this project is best evaluated after applications are submitted, specifically during the technical review period of the stormwater permit application process. Probasco surrebuttal pf. at 4
12. If the applicant were issued permits that meet the state's technical standards and requirements for both operational and construction phase stormwater discharge permits, and all permit terms and conditions were met, then this project would comply with the Vermont Water Quality Standards. Probasco pf surrebuttal at 4.
13. The project will need to follow the The Vermont Standards and Specifications for Erosion Prevention and Sediment Control, in addition to all terms and conditions of an Individual Construction Permit. An application for a NPDES Permit for discharges during the construction phase of the project has yet to be submitted by the Applicant. Probasco Tr. 19.

14. ANR recommends that as a condition of the CPG that the Board require that the Applicant receive a NPDES construction permit prior to construction as a condition of the permit. Probasco Tr. 20-21.

15. Until a permit application has been submitted by the Applicant, ANR cannot determine whether the project will comply with the Vermont Water Quality Standards. Probasco Tr. 19.

Rare or irreplaceable natural areas

16. Based on information from the Vermont Agency of Natural Resources and the U.S. Forest Service, and field work performed by the Deerfield consultants, there are no rare or irreplaceable natural areas within the project Area. Micheal Lew Smith pf direct page 6

17. There are no expected impacts to these types of areas from the Project. Michael Lew-Smith pf direct page 6.

Wildlife (including endangered species and necessary habitat)

i. [10 V.S.A. § 6086(a)(8)(A)]

Findings

18. Several elements of the proposed utility-scale wind energy facility present potential impacts to significant wildlife habitat and the wildlife that rely upon them including: (1) the activity and disturbance associated with project construction; (2) the linear nature and extensive scale of the project; (3) the degree of clearing; and (4) the potential and unknown level of human activity associated with operation and maintenance of the facility. Hammond pf direct at 5.

Birds

Raptors

19. The surveys conducted by Petitioner to evaluate raptor migration during the 2004 and 2005 period provide a useful set of baseline data for making some informed judgments regarding potential impacts of the proposed project to migrating raptors. Hammond pf direct at 24.

20. The Agency is concerned, however, with the higher number of raptors over the Western Project Area compared to the Existing Facility--nearly 5 times higher for the Western Project Area--and the fact that the consultants were not able to analyze the percentage of these raptors that were below 125 meters (400 feet) in altitude. Without this analysis, a full risk assessment for the raptors has not been done. Hammond pf direct at 24.

21. Some of the species observed during both the Spring and Fall survey periods, such as Coopers hawk, northern harrier, American kestrel and osprey, are considered "species of greatest conservation need" in the State of Vermont Wildlife Action Plan. A species of greatest conservation need is a species whose populations, in the case of these raptors, may be experiencing certain pressures that merit attention in order to maintain their populations at levels that allow them to persist. Hammond pf direct at 24.
22. The survey data from Fall 2004 is cause for some concern that raptors may collide with turbines in this area under certain conditions that are yet to be defined (e.g., wind, weather, behavioral). However, the Agency recognizes that raptor fatalities, to the extent that we fully understand and appreciate them at other wind energy facilities in the northeast, have been very limited. Petitioner's reports that describe conditions and circumstances that help mitigate raptor collisions with wind turbines are well taken. For instance, the fact that raptors migrate during the day and are thus able to observe and potentially avoid contemporary wind turbines is an important consideration. It is very different than collision risks for birds that migrate at night and are not able to see wind turbines. Daytime visibility and avoidance of wind turbines may be the greatest mitigating factor that has resulted in relatively low raptor fatalities at utility-scale wind facilities in the northeast. Hammond pf direct at 24-25.

Migratory Birds

23. There is no standard protocol for conducting radar investigations of nocturnal bird migration. The Agency remains concerned with the lack of scientific investigation into the most appropriate sampling protocol for radar investigations at proposed utility-scale wind facilities in general. It is important, for instance, to understand the statistical validity of sample sizes related to radar investigations such as that presented by the Petitioner. It is important to also understand the percent of data removed from passage rate analysis based on target speed. However the Agency recognizes that we are learning a great deal about the issues of radar sampling and bird migration data as more wind energy developers conduct these sorts of studies. Hammond pf direct at 26
24. Bird fatality data at wind facilities in the northeastern United States remains limited, and some of the data that has been collected to date has not been made available to state or federal agencies responsible for reviewing these sorts of projects. Hammond pf direct at 24-25
25. Bird fatalities have been documented for many years at wind energy facilities throughout the country as well as in other countries (Erickson et al., 2001; Richardson 2000; U.S. Fish and Wildlife Service 2003; GAO 2005). Many species of passerine birds (songbirds) migrate at night during spring and fall migration periods. While there is still a great deal to learn about the characteristics of night migration for many songbirds, we have an understanding of the variations

in flight height in relation to weather, cloud cover, precipitation and, to some extent, landscape features such as topography and. ridgelines. Some birds that migrate at night fly lower than others and their migration can be influenced by encounters with steep, high topography, such as is found in parts of Vermont. In addition, birds migrating at night that encounter low cloud cover, fog, or precipitation, as is often the case in Vermont during the fall, will fly at lower altitudes. These factors create risk of collision for birds with tall structures such as wind turbines. Most importantly, since very few wind energy facilities exist in Vermont, or the northeastern United States, we have little information to fully understand the degree of risk of collision to nocturnal migrating birds. Hammond pf direct at 27-28

26. Most wind facilities that have examined bird migration and collision fatalities are located in the western and mid-western United States in landscape and habitat conditions that are very different from that of Vermont or northern New England. The Agency's greatest interest in making sure that wind developers in Vermont conduct radar evaluations of nocturnal bird migration is due, in part, to the lack of wind energy infrastructure in similar environments. Hammond pf direct at 28

27. The Agency is concerned with the possible degree of collision risk at the western site. Based on the information provided, and relative to similar information collected at sites in New York and Maine, it appears that the western site had the

largest nightly passage rate of any of the 32 sites for other projects in the Northeast that were presented (Table 3. p. 16 of Pre-filed Direct Testimony of R. Roy and W. Erickson). It also appears from this table that highest nightly passage rate for fall of 2004 and 2005 may be nearly twice that reported for the Eastern project site. It is still not possible to translate these numbers into predicted bird collision fatality rates. Hammond pf direct at 28

28. The tower and the actual rotor of the turbine will kill birds. The height of the tower and the extension of the nacelle are used to determine the potential height of the turbine. Tr. Page 220-221. Tall towers over 300 feet kill more birds than shorter towers. Kerlinger Tr. Page 256 lines 5-13.
29. Forest fragmentation through the erection of a wind turbine can impact interior and nesting birds in an adverse manner. Tr. Page 233 lines 1-11. Some forest interior species were disrupted on the Searsburg site. Kerlinger Tr. Page 228, lines 22-24.
30. To reduce impacts on birds, Mr Kerlinger recommends that construction of the project not commence in May and June of any construction season. To avoid impacts on the birds, bulldozing, blasting, and cutting of trees, should not take place during those months. Even if a road were already installed prior to these months, the use of cranes and other equipment would still have a disturbance on

birds during these months. Tr. Kerlinger, Dec. 2, 2008 page 252-53.

Post construction Monitoring

31. The Agency of Natural Resources recommends the implementation of a post construction monitoring program along with possible operational adjustments. Dec 5, 2008 Hammond page 222.

32. The ability to make operational adjustments if mortality is excessive is essential and any Certificate of Public Good should require an opportunity to make such adjustments. Hammond pf direct 31-32.

33. The Agency recommends that any post construction monitoring protocol must consider assessing collision fatalities for bats in conjunction with birds. In general, the Agency believes the following elements are essential for a suitable post-construction bird/bat mortality monitoring protocol: (1) post-construction bird and bat mortality surveys should be conducted in accordance with a detailed mortality survey protocol that has been developed in coordination with the Agency and that has been reviewed and approved by the Agency; (2) the surveys should be conducted for a minimum of three years in order to capture the potential variability in abundance of migrants, weather, and environmental conditions; (3) all post-construction mortality surveys should be conducted in a fashion that

provides statistically reliable samples and associated estimates of bird and bat mortality; and they must include searcher efficiency tests and scavenger rate tests on a regular basis. Details regarding the number of search days per week and the number of turbines searched per day should be addressed in the detailed post-construction monitoring plan. In order to capture data that will characterize the full scope of bird and bat mortality, sampling should occur during both spring and fall migration periods - mid-April through mid-June and late July through early November. Hammond pf direct at 31-31.

34. The Agency has concerns on how an effective monitoring program for birds and bats can be implemented that would not increase impacts to bears. The monitoring needed to detect dead birds and bats during migration would occur during the time periods that bears are more likely to concentrate in the project area. The addition of dogs which improves the efficiency of searches also increases the displacement of bears. Hammond Tr. Dec. 5, 2008 page 224

35. The accuracy of post-construction monitoring is dependent in part on the ability to locate and count animal carcasses before scavengers remove or destroy the carcasses. To avoid the potential of scavengers removing the carcasses, post construction monitoring should occur as soon as the sun breaks the horizon. Kerlinger Tr. Page 254.

36. The accuracy of any search is also dependent on the efficiency of the searchers looking to discovery carcasses. Searcher efficiency studies are conducted by placing a carcasses or inanimate object out and seeing whether the searchers discover the carcass. If they find 50 or 25% then that becomes the searcher efficiency which is used in evaluated the actual carcasses discovered by the searchers and the numbers are adjusted according to the efficiency rate. Kerlinger Tr. 242-43

37. In the Maple Ridge project, Dr. Kerlinger relied on a statistician who reviewed the searches for different intervals during the first year of monitoring. At the conclusion of the first year and with the benefit of the statistician it was determined that a 7 day interval was sufficient. The seven day interval was used for the following year of monitoring/searches. Tr. 244 page 2-20.

38. Because of the forest area in the Deerfield location, monitors would need to be at each tower for approximately an hour to accurately assess whether for impacts from the turbines to the birds. Tr page 246 lines 14- page 245, lines 7.

39. Scavenger search assessment is a very important portion of a post-construction fatality study and can be done in one of two ways, coincident with or simultaneous to the post-construction study or independent of or preceding the

- post-construction study. Tr. 239 Page 21- Page 240 lines 1-9.
40. On the Maple Ridge project in Maine scavenger searches were done before the actual monitoring took place. Both Kerlinger and ANR recommend that a statistician be involved to assist in recommending the interval. Tr. 243 lines 15- page 244 line 20.
41. Scavenger searches should be done in the spring, summer, and fall, three should take place. Tr. 240 lines 13-23
42. Monitoring would take place in the spring and fall and to a lesser degree in the summer. Tr. 246 lines 2-7.
43. In conducting post construction monitoring on a site like Deerfield with 15 turbines, for a statistically adequate sample size, would require that 66 percent or ten turbines be searched. Tr. Page 256 lines 11- page 257-24.
44. For a project located in the forest like the Deerfield site, searches or monitoring would take longer. The length of the search at each turbine would last an hour. Tr. 246 The recommended search frequency should be once a week. Tr. 224
45. To reduce impacts to birds, it is better for the project to be built in one

construction season rather than two construction seasons. Tr. Paul Kerlinger, p.

252lines 11-22.

46. Post construction monitoring that involves people wandering around the project site year after year is going to be an issue for Extending the period of monitoring beyond a year is going to be an issue for impacting other species including bears.

Bats

47. There are nine species of bats found in Vermont. In general, six of the species hibernate in caves or mines during the winter and then emerge in the spring to migrate to their summer range. These species include the little brown bat (*Myotis lucifugus*), big brown bat (*Eptesicus fuscus*), the eastern pipistrelle (*Pipistrellus subflavus*), and the northern long eared bat (*Myotis septentrionalis*). There are also two species that are listed as threatened or endangered: the Indiana bat (*Myotis sodalis*) is federally and stated listed as endangered and the small footed bat (*Myotis leibii*) is listed as threatened by Vermont. The remaining three bat species, the red bat (*Lasiurus borealis*), hoary bat (*Lasiurus cinereus*), and silver haired bat (*Lasionycteris noctivagans*) may be considered long-distance migrants in that they migrate out of the Northeast in late summer and early fall and spend the winter months in the southeastern United States or further south (Fleming and Eby 2003). They return to Vermont and the Northeast in late spring. Darling pf. at 6.

48. Vermont's bat populations are forced to survive at the more northern latitudes of bat range in North America. Vermont's bats are subject to shorter summers, longer hibernation periods, and cooler, more volatile temperatures. As a result, Vermont has lower bat populations relative to other parts of North America. Because bats are less populous at this latitude, bats may, in fact, be more vulnerable to additional mortality factors. Darling pf. at 7.

49. Vermont's bat species all have very low reproductive potential which increases their vulnerability to mortality factors. Vermont's bat species give birth to generally one young (long-distant migrants often give birth to two young) per year. Factors such as cool spring temperatures and poor quality food supplies may further reduce reproduction and/or survival. Darling pf. at 7.

50. It is vital to acknowledge how little we know about Vermont's bat species and populations, particularly the long-distance migrant bats that have been found to be most vulnerable to collisions with utility-scale wind projects. Most of the information on Vermont's bats was limited to surveys of bat hibernacula and periodic fall capture and banding projects at specific hibernacula. More recently, summer mist-netting and acoustical surveys for Indiana bats and general bat surveys on public lands have provided important insights into bat species distribution and relative abundance. However, there are still significant data gaps

regarding the distribution, abundance, and stability of the species' populations in the state, particularly during the summer season. This is particularly true of the species that are more difficult to capture and less abundant in the state, such as the long-distance migrants. Darling pf. at 7.

51. Until we have more information over time across both the United States and particularly the eastern United States that we recognize the level of uncertainty that still exists between data on bat activity prior to construction of a wind energy facility and actual bat fatalities that occur when the project is operating. Darling Tr. Page 266, lines 10-10.

52. Because of this uncertainty, ANR DFW recommends that an adaptive management plan would be necessary should fatality rates for bats exceed thresholds. Darling Tr. 265, lines 20-23. Operating changes can be made to wind turbines to reduce bat fatalities. Tr. 265 - 267.

53. Concerns about the potential effects of the Deerfield wind project are derived from findings initially revealed in 2003 from three new ridge-top wind facilities in the East that suggested that these developments yielded the highest bat collision mortality levels among wind facilities in the nation. Between the spring and fall period of 2003, one site, the Mountaineer Wind Project in West Virginia,

54. observed 475 dead bats, resulting in an total facility estimate of 2092 dead bats

55. (47.5 dead bats/turbine) (Kerns and Kerlinger 2004). Darling pf 8
56. These findings may have been underestimates since mortality searches were conducted no more than once per week. Ensuing research conducted at Mountaineer and Meyersdale windfarm sites between August 1 and September 13, 2004 killed an estimated 38 bats/turbine and 25 bats/turbine, respectively, for the six week study period (Arnett 2005). This comprehensive analysis demonstrated that searcher efficiency, the character of the habitat searched, and scavenging activity were critical components for accurate estimates of the total number of bats killed during this survey period. Darling pf. 8-9.
57. Similar, although not identical, bat fatality surveys conducted at other operating utility-scale wind facilities have shown comparable fatality rates in Alberta (22 bats/turbine) (Baerwald, pers. comm.), New York (25 bats/turbine – daily searches), Tennessee (64 bats/turbine) (Fiedler et al. 2007), and even Germany (12 - 21 bats/turbine) (Brinkman et al. 2006). Furthermore, as turbine and rotor heights have increased to over 400 feet in recent years, there is evidence that the taller turbines may actually be killing a greater number of bats (Barclay et al. 2007). These findings have only heightened bat biologist concerns about the levels of bat mortality experienced at utility-scale wind energy facilities. While as many as eight different bat species have been found dead at wind facilities, the species composition of the mortality is not evenly distributed (Johnson 2002,

Kunz et al. 2007). In fact, the long-distant migrant species (red bat (*Lasiurus borealis*), silver-haired bat (*Lasionycteris noctivagans*), and hoary bat (*Lasiurus cinereus*) comprise the majority (nearly 75%) of the mortality at these sites (Kunz et al. 2007). Darling pf Direct page 9-10.

58. Bats are being killed by the wind turbines in at least two manners. One, bats are actually colliding with the turbine rotors and dying from traumatic bodily injuries. Second, post-construction bat fatality surveys have observed a large proportion of the dead bats with intact bodies showing no external injuries. Recently, autopsies of such bats killed in Alberta showed signs of significant pulmonary trauma. Such symptoms support a hypothesis (i.e. Decompression hypothesis) that many of the bats are actually killed by drastic changes in barometric pressure resulting from quickly being swept up through the rotors and forced down on the leeward side (National Research Council 2007).

Darling pf direct at 10.

59. Currently, there are numerous theories as to why bats are not able to avoid turbines. The Petitioner's bat survey reports note a few of these. Kunz et al. 2007 offers as many as hypotheses to rationalize this phenomenon. These hypotheses range from bats not consistently using their echolocation while migrating at high elevations to bats being attracted to wind turbines for roosting. Some researchers now suggest that migratory bats may even view turbines as superb roost trees

where such bat species may congregate for breeding in the autumn. Darling pf
direct 10-11.

60. The Searsburg studies do not inform us about the relative risks of the project on bat species in Vermont. The initial fatality search conducted by Paul Kerlinger in 1997 focused primarily on birds. More importantly, however, the existing turbines searched in 1997 are an estimated 40 meters in tower height (198 feet to tip of rotor blade), compared to the Petitioner's most recent proposal to construct 15 turbines with a hub height of 78 meters (393 feet to tip of rotor blade). An evaluation of existing utility-scale wind energy facilities in the United States and Canada showed a positive relationship between turbine tower height and bat fatalities (Barclay et al. 2007). Bat fatality research at the Buffalo Mountain wind energy facility in Tennessee, where existing 65 meter (tower height to nacelle) turbines were augmented with 78 meter turbines, resulted in fatality estimates of 35 and 70 dead bats/turbine, respectively (Fiedler et al. 2007). As a result, bat fatality levels from the smaller, existing turbines provide little to no indication of potential bat fatalities that the taller turbines may yield. Darling direct p. 11

61. There are several bats that may be affected by this project, primarily as a result of collisions with the turbines and their rotating blades. The long-distant migrant species include the silver-haired bat (*Lasionycteris noctivagans*), the hoary bat (*Lasiurus cinereus*), and the red bat (*Lasiurus borealis*). These species, along with

the eastern pipistrelle (*Pipistrellus subflavus*) have comprised the significant majority of bat fatalities at existing wind utility-scale wind projects in the East.

62. The summer residential bat species most likely to be affected include the little brown bat (*Myotis lucifugus*) and the big brown bat (*Eptesicus fuscus*). Both of these species are present in the area and have been documented as killed by turbine collisions in the East. The remaining three bat species -the state and federally endangered Indiana (*Myotis sodalis*), northern long-eared bat (*Myotis septentrionalis*), and the state threatened small-footed bat (*Myotis leibii*) are not likely to be impacted by collisions with turbines at this site. Increasingly, the northern long-eared bat has shown not to be vulnerable to such collisions. Both of the listed species – the Indiana bat and the small-footed bat - are not likely present in the immediate project area as a result of the Petitioner's habitat suitability assessment of the project area. Darling pf direct p. 12

63. Given the high levels of bat mortality at other sites in the East, the level of uncertainty regarding realized bat fatality levels from the project requires that adequate measures be taken to monitor and, if necessary, address bat fatalities to reduce project impacts to bat populations by means such as operational protocols. Darling pf. direct p. 15

64. There is general agreement among scientists that preconstruction indices of bat activity (i.e., activity levels derived from acoustic surveys) are not predictive of potential bat fatality levels at a given site. A recent GAO report described the numerous challenges in making projections of the magnitudes of potential wind-power related fatalities (GAO 2005). Darling pf direct p. 15-16
65. The Petitioner's expert on bats admits "[t]he predictability of bat fatalities from pre-construction data is highly speculative, as relationships between bats and wind turbines and potential factors causing bat collisions are largely unknown" (Deerfield's Response to ANR's First Set of Information Requests, Dec 3, 2007). Yet, the Petitioner's conclusion that the project is **not likely** have an undue adverse effect is based upon their analysis of bat mortality and activity levels at five wind energy facilities in the United States. Darling pf direct 16.
66. Although ANR expert Darling concurs with their acknowledgement of the uncertainty of the effects of the project on bats, he disagrees with their reliance on that data alone to conclude that the proposed project, fully operating, will not likely have an undue adverse effect on bats. Darling pf direct at 16
67. Beyond the lack of predictability, the data from each of the five sites in Table 6 vary in survey intensity, duration, and the methods used in estimating fatality levels. For example, some of the bat activity data offered are from studies done

after the turbines were erected and operating. Should turbines act as any attractant to bats (several hypotheses to explain bat fatalities include this element), then bat activity measures taken at existing turbines should not be compared to those taken at sites without turbines. Consequently, such data should not be used to make predictions about the relationship between pre-construction bat activity and post-construction bat fatality rates. In addition, the table excludes other wind energy sites that now provide similar types of data, but offer a different conclusion. For example, pre-construction bat activity levels at the Maple Ridge wind energy facility in New York were relatively low (0.09 bat passes/detector night in the spring 2005) (Reynolds 2006), yet the first year of post-construction bat fatality surveys yielded an estimated 20 dead bats per turbine (Jain et al. 2007). It is noteworthy that the Deerfield's project's spring acoustic surveys resulted in very similar pre-construction bat activity levels of 0.07 and 0.10 bat passes per detector night for spring 2005 and 2006, respectively. As a result, it is inappropriate to predict that such bat - activity levels will yield low fatality rates. Darling pf direct at 16-17

- 68.** Three long distance migratory bat species -the hoary, red, and silver-haired bat - are most vulnerable to collisions with utility-scale wind turbines in this region. These three species comprised 73.4% of the total bat fatalities at the Maple Ridge wind energy facility in New York. This concentration of mortality within these three species has raised significant concerns among scientists as to the potential

long-term cumulative implications on their population sustainability (Kunz et al. 2007). Darling pf direct p 17-18.

69. ANR expert Darling believes that any bat fatalities of threatened and endangered species would be a concern. The Petitioner has adequately evaluated the habitat suitability for both the Indiana and small-footed bats and the likelihood of bat fatalities of either of these species is extremely low.

70. A fully operating project will kill migratory bats. A critical question is what fatality levels are significant enough to warrant concerns about the species in Vermont. This is particularly difficult for a type of project that is being developed throughout the species' range, much of which is outside of the state during certain periods of the year. Darling pf direct at 18.

71. The Agency of Natural Resources has developed bat fatality thresholds fatalities above which would result in an undue adverse impact. Tr. Page 23 lines 18-22 Darling pf. This approach gives more consideration to the effects on a particular species population. Darling pf direct at 18-19.

72. The Agency has adopted bat fatality threshold guidelines similar to other states that establish fatality thresholds at the species or species group level. This approach gives more consideration to the effects on a particular species

population. As a result, it is my opinion that undue adverse impacts to bat populations may be occurring and should be addressed when estimated bat fatalities (per turbine per year) exceed: 3.0 migratory bats (combinations of red bat, hoary bat, and silver-haired bat), or threatened and endangered bat species (Indiana bat or small-footed bat), or 5.0 more common bats (combinations of little brown bat, big brown bat, northern long-eared bat, and eastern pipistrelle) Darling pf 19

73. These thresholds allow for increasing sensitivity from threatened endangered species to uncommon migratory species to the more common resident bat species. Darling pf. 19

74. In order to adequately estimate bat fatalities at an operating wind energy facility, a significant effort must be made to conduct post-construction bat fatality searches of sufficient design and methodology to adequately estimate fatalities at the project site. There is no single scientifically adopted survey methodology/protocol to conduct such surveys. As a result, many of the fatality surveys are conducted using different methods, particularly regarding survey period (e.g., spring, summer, fall, or all seasons), search interval (e.g., 1 day, 3 days, or 14 days), proportion of turbines searched, plot size, and the methodology for searcher efficiency and scavenging rate trials. The latter two items can greatly influence the resulting estimates of total bat fatalities at a given facility. With

specific bat fatality thresholds as triggers for further actions, it becomes very critical that the bat fatality surveys use the best scientific and statistically rigorous methodology to yield reasonable estimates of mortality. Darling pf at 19-20

75. Intensive, multiple-year post-construction research studies will provide more information on the effects of these individual sites as well as the pool of utility-scale wind projects in the East on bats. Darling pf 20-21
76. Deerfield witness Pelletier has acknowledged that we really don't know the extent or the size of the bat population. Pelletier Tr. Page 23 lines 3-11.
77. Deerfield witness Pelletier could not identify a threshold number above which bat fatalities would trigger the need for adaptive management. Page 33, lines 7-18 ; Page 39 lines 23- page 40 line 2.
78. There is no correlation between preconstruction studies and post construction fatalities on bat populations. Pelletier Tr. Page 41 lines 3-22.
79. Deerfield witness Pelletier was unable to provide a number for a condition to be placed in a Certificate of Public Good that would prompt or trigger the need for adaptive management or some other modification. Tr. Page 39-40

80. Deerfield witness Pelletier concedes that the local resource agencies know best about their bat populations and know best whether they are declining. Tr. Page 43 lines 16-25.

81. Because they are in the best position to assess the effects on the wind turbine project on the bat population, it is important to defer to these agencies in evaluating the import and significance of the number of bat fatalities resulting from the turbines and whether they constitute a threat to the local bat population. Pelletier Tr. 42 -43.

82. ANR's recommendation to apply bat fatality thresholds will require a more statistically rigorous sampling scheme to yield more precise estimates of bat fatality rates. This may require sampling more of the turbines on a daily basis or sampling a combination of a set number of turbines on a daily basis with a subset of turbines every 3-7 days. These decisions will need to be based on statistical evaluation of a predetermined confidence interval and should be clearly outlined in a monitoring plan. Darling pf surrebuttal at 2-3

83. Deerfield witness Pelletier recognizes the early stage of understanding about the effects of bat mortality from wind turbines on the species. Page 46 lines 6-12.

84. Little is known about the state of health of the bat population in the area around the project as it relates to white nose syndrome. Pelletier page 44 lines 6-13.
85. Pelletier has conducted studies in Maine at Mars Hill where during the first year of post construction mortality studies they have found less than one bat per turbine per year and just about one bird per turbine per year. Page 51 lines 2-16. They are some of the lowest reported yet. Id. at page 51.
86. Pelleteir acknowledges that he anticipates that the bat fatality thresholds set by ANR will be exceeded by the Deerfield project . Pelletier Tr. 23
87. The Mars Hill project is different from the Deerfield project because the Mars Hill is an anomaly because it's a forested ridge surrounded by agricultural areas versus a larger forested area, more homogenous forest conditions here. Page 52 lines 4-16. The studies from the south from more southern latitudes are producing higher bat thresholds. Id.
88. The Agency continues to have concerns regarding the direct and indirect impacts of the proposed project on necessary black bear habitat. The Agency does not believe the Petitioner has taken all feasible and reasonable means to avoid or minimize these impacts. Although the Agency does not believe that the Petitioner

has demonstrated that it qualifies for a CPG, if the PSB were to issue a CPG for this project, ANR's bat expert Scott Darling recommends that the PSB establish a condition requiring the Petitioner to prepare **an** adaptive management plan approved by ANR within 6 months of completion of the final year of post-construction monitoring should the average bat fatality estimates for the period exceed the thresholds. The adaptive management plan must incorporate all reasonable measures necessary to reduce bat fatality rates to the thresholds and include the necessary monitoring to adequately evaluate the efficacy of the adaptive measures. The PSB may wish to require its review and approval of the adaptive management plan. Darling pf surrebuttal at 4-5

89. ANR DFW recommends three years of post construction monitoring. The length of the studies is needed to ensure that ANR is confident that enough surveys are done or the number of years are completed to demonstrate that bat fatalities are actually at or below the thresholds. If for example, one year of post-construction monitoring reveals that fatalities are less than the bat fatality thresholds, Darling would still want to follow up with additional years of surveys. Darling Tr. 275

90. ANR Darling is willing to consider less than three years of surveys if the surveys reveal that bat fatalities are exceeding those thresholds, because in part it is not prudent to continue surveying to demonstrate that we are in fact killing more bats than the threshold level. Tr. 275, lines 7-13.

91. If the studies reveal that the turbines/wind facility are killing more bats than the bat fatality thresholds, Darling would prefer to spend more resources fixing the problem and moving to an adaptive management plan than in proving the problem. Tr. 275-276

92. Once adaptive management was put in place monitoring would need to be conducted to make sure the operational adjustments are achieving their objectives. Page 286 lines 18-20.

93. The length of the monitoring needed would be dependent on the effect the adaptive management had on bat fatalities. If the adaptive management resulted in a reduction of bat fatality to threshold levels additional monitoring would not likely be needed. If the adaptations did not result in reductions to threshold levels additional monitoring would be required to assess the tweaking of the adaptive management measures on bat fatalities. Darling Tr. 286- 287 2.

94. ANR requests approval authority for the adaptive management and monitoring, ANR approval is a more nimble process than litigating before the Public Service Board Tr. Page 289 lines 5-21

95. The purpose of the post construction monitoring would be to understand the

impacts on the local and regional bat population. Pelletier Tr. Page 11, 13-19.

96. Searching with dogs results in greater efficiency or results in actually finding more carcasses than searches without dogs. Tr. 15. One person with a dog would search every turbine once a week. Page 17 lines 13-19. The visits or examination of transects under each turbine would be one to two hours per turbine. Pelletier rebuttal pf 17.

97. The best time of day to accurately assess for bat mortality is as early in the morning as possible. As soon as the sunrise monitors should be out there to avoid the effects of scavenging. Pelletier rebuttal pf 19, lines 1-7.

Discussion

98. Deerfield's own expert testified that bat fatality rates will be at or above the thresholds of concern. If a CPG were issued, ANR recommends that adaptive management with operational adjustments be implemented immediately upon completion of construction to avoid undue adverse impacts to the affect bat population.

Deer

99. Based on the information provided by the petitioner and the VTDFW's own investigations, the project will not present any adverse impacts on deer winter habitat. There is no evidence of deer winter habitat within the project area or the

immediate vicinity. Hammond pf. at 6.

Moose

100. The project site is located within an area of apparently high moose densities as evidenced by the extensive degree of browsed vegetation, moose tracks, trails, pellet piles, reported moose/vehicle collisions in the area, and suitable habitat. Hammond pf. at 6.
101. Moose winter concentration activity and associated habitat is present in softwood stands adjacent to portions of both the east and west expansion areas. Hammond pf. at 6.
102. Suitable moose concentration habitat is important for winter survival of moose as it provides relief from deep snow, cold temperatures and associated wind. Hammond pf. at 6.
103. There is little scientific data to determine the extent to which moose may be influenced by (e.g., disturbed or displaced from significant habitat) the construction and operation of the Project. Hammond pf direct at 7.
104. It is likely that, at least during periods of construction, were construction to occur during the winter period while moose were concentrated, some level of disturbance/displacement would occur. Hammond pf. at 7.
105. Openings created along roadside snow banks during the winter period

would enable moose to move freely within their winter range. Hammond pf. at 7-

8.

Black Bear

Beechnuts

106. Concentrated areas of American beech trees that have a history of bear feeding use ("necessary wildlife habitat" as defined by Act 250), are essential for the long-term survival, well-being, and reproductive success of black bears in Vermont. Hammond pf. at 9

107. Mature stands of American beech that show signs of historic use by black bears are recognized as habitat critical to the survival of black bears. ANR-5; Wallin Dec. 4, 2008 Tr. Page 87.

108. Concentrated, identifiable areas of bear scarred beech constitute necessary wildlife habitat for black bears in Vermont according to the Department of Vermont Fish and Wildlife. Hammond Tr. 163.

109. In Vermont, black bear require large areas of forest habitat conditions with a variety of food resources to serve as core habitat that allows for successful

reproduction and avoidance of human disturbance. Wallin Dec. 4, Page 25-26

110. Black bears rely on concentrated stands of American beech trees as an essential source of high nutrition food. Other essential hard and soft mast food resources in Vermont include oak, cherry, berries, apples, and mountain ash, but these alternative foods are not as important as beech nuts for bear reproduction and cub survivorship. Hammond pf p. 8.
111. The availability of hard mast in the fall affects the minimum reproductive age of bears, productivity rates, as well as cub survival. Only acorns and beech nuts provide the fat and high carbohydrate diet that the bears need for putting on the fat reserves that improve survival and reproduction. Berries are important sources of sugars but are usually available for a shorter duration of time than are hard mast, especially beechnuts. Hammond pf at 8-9.
112. Beechnuts have the added benefit of still being available to the bears for several months in the early spring unlike other fall foods. What makes beech nuts so special and vital to the black bear is that during the years that beech nuts are available to bears they can find them in large amounts, in remote areas, and they are available over a long time period through the fall and early spring months when other foods are in short supply or come at the cost of forcing the bear to feed nearer to people and roads and increasing their chance of being killed by

automobiles, hunters and irate farmers and landowners. During years of good beech nut production fewer bears are killed by humans and cub and juvenile bear survival is increased. Hammond pf surrebuttal at 8

113. Other sources of mast for bears are available for shorter time periods and many involve greater risks for the bears because they occur at lower elevations and closer to concentrations of people. ANR believes that beech nuts are more important to bear populations and decisive to its survival because of observed increases in reproduction and survivorship following years of good beech mast production that cause population surges that allow a long-lived species like the black bear to increase in overall population numbers despite intermittent years of poor food production and lower rates of reproduction success and higher rates of mortality. Hammond pf surrebuttal at 8

114. Beechnuts are more important to bears than other foods in Vermont because of a combination of factors involving their availability, quantity and accessibility. Unlike beech nuts, many of the fall foods that bears like do not occur in very large quantities in the high elevation forests that make up the bulk of bear range in the state. This is true for grapes, hickories, and most cherry producing species. Even oak, whose acorns are readily consumed by bears are found primarily in the lower elevations of their range and often in close proximity

to human development which most wild bears avoid. Hammond surrebuttal pf. at 16-17

115. Other preferred foods such as hazel nuts and cherries occur in relatively small quantities that are quickly consumed by many competing species of wildlife. Beechnuts are highly nutritious and allow the bears to rapidly put on fat and body weight when they are available. They occur throughout bear ranges which allow bears to selectively choose feeding sites in the areas of beech where they are the most secure from danger and where the beech trees are so concentrated that their feeding efforts are the most efficient. Beech nut production is not always consistent on an annual basis but they consistently occur on a roughly biannual basis over time that allows long-lived animals, such as black bears that produces young every two years, to flourish despite intermittent years of relative unavailability. Hammond surrebuttal pf. at 17

116. During beech mast production years the nuts are available in large numbers beginning in August and lasting until the bears enter their dens. Unlike most other bear foods, the nuts are also available during the early spring period when the bears leave their dens and find other foods lacking. Bears will continue to feed on the germinating nuts well into June in the spring following a good year of beech mast production.. Hammond direct pf at 8-9.

117. Only accords and beech nuts provide the fat and high carbohydrate diet that bears need for putting on the fat reserves that improve survival and reproduction. ANR 6 Bear Management Plan Draft issue 2: Bear Habitat Conservation at 9.
118. In Vermont, American beech is the most common source of hard mast (nut) producing tree species within black bear range. Hammond pf at 10.
119. The transition from summer berries to fall hard mast beechnuts or acorns are dramatic and involves physiological behavior and ecological changes in bears. Concentrations of fall foods become vital focal feeding areas for bear. Parsons Dec. 5, 2008 Tr. p 89-90
120. Beechnuts are fat rich foods that help bears survive the long Vermont winters. Perhaps more importantly, the fat rich beechnuts provide a crucial source of food for pregnant black bears entering their winter dens. Parsons, Dec. 3, 2008, page 226-227.
121. Deerfield witness Wallin has reported in connection with the original Searsburg wind project that beechnuts provide a high protein diet that enables the build-up of fat reserves immediately before hibernation. ANR 5, Wallin, Impacts to Critical Wildlife Habitats From a Proposed Wind Turbine Project: Searsburg,

Vermont, at 2. Mr. Wallin has asserted that birth rates and cub survival are directly related to the fat accumulated by the female in the fall, therefore it is not surprising that reproductive success has been tracked to beechnut production. Consequently, mature stands of American beech that show signs of historic use by black bears are recognized as habitat critical to the survival of Black Bears. Id.

Bear scarred beech stands at the project site are necessary wildlife habitat

122. These stands of beech used by black bear are absolutely essential for the survival and reproduction of this species in Vermont. The beech stands surrounding this proposed project contain thousands of beech trees whose scarred bark is testimony to its importance in drawing large numbers of bears to the area in years of good nut production. Hammond pf at 11.

123. Bears in this area are dependent on hard mast as a fall nutritional source and that the mast producing trees therefore are critical to the reproductive success on the bear population in this area. Kilpatrick rebuttal pf 20-23. The beechnuts at the project site are critical to the reproductive success of the bear population in the project area. Hammond pf. surrebuttal at 8

124. The project site, as well as its immediate vicinity, contains a huge amount of concentrated bear-clawed beech trees sufficient to warrant its delineation as

being regionally significant and necessary to the black bear population of southern Vermont. Hammond pf surrebuttal at 13-14.

125. The site exhibits heavy use by the bears. The concentrated stands of beech trees that would be impacted by the turbines are necessary to the survival of the bears in the area. Hammond Tr. 167-68.

126. Beech nuts are important for all of the bears of Vermont, but they may be even more essential to the bears of this area as there are fewer alternative foods available to them than in other areas in Vermont and the rest of New England. Hammond direct pf. at 11.

127. Harvested female bears from southern Vermont tend to be nearly 10% lighter in weight which suggests that availability of alternative highly nutritious foods may be more limited for them than for bears elsewhere. Hammond pf direct at 12.

128. Bears in the project area are dependent on the hard mast producing beech nut trees as a fall nutritional source and that the mast producing trees therefore are critical to the reproductive success on the bear population in this area. Kilpatrick pf surrebuttal at 20.

129. The comparatively smaller population size of the southern Vermont black bear population combined with other data available for the region including genetic isolation from bear populations to the north, low cub survivorship (Hammond 2002), increased age to first reproduction (Hammond 2002) and female body weights below the critical threshold for cub survival (Hammond 2002) all point to a population that has low reproductive success and is likely in trouble. Kilpatrick rebuttal p. 18
130. The bears in southern Vermont are different than the bears studied in the Elowe and Dodge study. The bears in Massachusetts are larger, reproduce more cubs, and have a better survivorship rate. The Massachusetts bears begin to reproduce several years earlier than do the Vermont black bear. Hammond Dec. 12, Tr. 117.
131. In the area of the proposed project, beechnuts are more important than other food sources to bear survival. Hammond Tr. Dec. 5, 2008 at 186.
132. The importance of this large stand is that even in years of poor beechnut production, there are areas within a stand that are still producing beech and bears can still find and utilize those. Hammond Tr. 188.

133. The strongest attraction to bears to the eastern and western ridgeline in the proposed project is the presence of beech trees and nuts prior to winter dormancy and in the spring for bears. Parsons page 207-208.

134. In the fall, the bear scarred beech habitat is used by many more bears than those that have home ranges there. Kilpatrick page 202. The bears although moving away from the project location are still located within a relatively restricted and limited area. Page 201.

135. The concentration and remoteness of these trees creates a unique setting that the scarring demonstrates have historically drawn generations of bears in large numbers to feed undisturbed on the highly nutritious beech nuts. Surrebuttal Testimony of Forrest Hammond at 2-3.

136. The large concentration of bear scarred beech evinces that a great many bears have used the beech trees in the past and continue to use the area. Hammond Dec 12, Tr. 177

Deerfield has failed to identify alternative food sources for the black bear that utilize the bear habitat at the project site.

137. The best evidence we have today strongly suggests that beechnuts can be very important if not decisive to the reproductive health of bears particularly in

areas where other food resources are very limited in extent and availability to the bear. Parsons Tr. Page 218 lines 5-10. December 3, 2008,

138. Mr. Parsons admits that his experience in assessing bear scarred beech habitat in Southern Vermont is limited to the current project and that Mr. Hammond has more familiarity with the black bear habitat in southern Vermont. Parsons Dec. 3, 2008 Tr. 259-60

139. Not all beech trees provide suitable habitat for black bears in Vermont. There is a distinction between beech trees and bear clawed or scarred beech trees as a habitat for bears. Bear utilize beech trees that are in remote and secure locations. Although beech is located throughout the state, Mr. Hammond estimated that the great majority of beech trees in the state will never be utilized by bears as a food resource. Bear behavior through clawing and scarring demonstrates where they feel secure feeding. Bear clawed beech is important habitat for bears because it is only a small portion of the total beech available in the state and bear feel secure feeding in that habitat. Hammond Tr. 176-77; Hammond surrebuttal at 3.

140. Beech trees do not are not necessarily bear habitat. In his estimates regarding beech tree availability, Mr. Wallin did not break out or distinguish whether or what portion of the beech he identified in southern Vermont was in bear range. Hammond Dec. 5, 2008 Tr.. Wallin Tr. 243.

141. Wallin does not know whether or to what extent the beech stands

suggested in Exhibit 3 are utilized by black bear. Wallin Tr. Page 14 Dec. 5, 2008

142. Eleven percent of all standing trees are dead. JW-14 at 24.
143. Mr. Parsons admits that oak is not common in the proposed project area. Parsons Dec. 5, 2008 at 98. The information on the availability of oak in Southern Vermont and into Massachusetts is based on the aerial photography of Mr. Lew-Smith. Deerfield concedes that the work of Mr. Lew Smith was a remote assessment and did not involve a review of whether the bear were using the habitat. VNRC exhibit. Tr December 3, 2008, page 258. Mr. Parsons concedes that we do not know whether the bear are using the oak. Parsons December 3, 2008, Tr. lines 14 page 259 line 1.
144. Taken together the oak dominated stands and stands where oak is co-dominant appear to occupy approximately five to six percent of the landscape. Tr. Page 229. Mr. Parsons admits that this does not constitute a common occurrence of oak.
145. As depicted on JP-3, much of the oak is located in Massachusetts. Bear migration is asymmetrical, although bears from Massachusetts migrate to Vermont apparently in search of the beechnut; bears from Vermont do not emigrate to Massachusetts. Kilpatrick T. 27
146. There is no oak close to the project area and bears that utilize the project area will be going out of their home range to search for oak. Hammond Dec. 5,

- 212.
147. There are several problems with oak as an alternative food source for black bear, oak is located at lower elevations in areas where there is a higher density of roads and people. This higher density of human activity and infrastructure poses a greater risk to the bears when they are searching for this alternative food source. Hammond Tr. Page 212.
148. Parsons does not know whether bear are using other food sources or whether bear are becoming nuisance bears and relying on bird seeds or human sources of food. Page 108-09.
149. Despite assertions that there are adequate alternative fall mast available, the bears that have been studied in southern Vermont clearly demonstrate that they do
150. not have access to adequate alternative fall mast sources. If bears in southern Vermont had access to adequate alternative fall mast sources, like the bears in the vicinity of Staceyville, Maine; then female bears in southern Vermont would show relatively constant body weights across all years instead of the significant difference in mean body weight seen between years following good beech mast production and years with beech mast failure . Kilpatrick pf rebuttal p. 24-25.
151. Mr. Wallin admits that we do not know what alternative sources are available to the black bear that utilize the bear scarred beech at the project site.

- Wallin Dec. 4, Page 134. Mr. Wallin concedes that that hickory would not be as abundant compared to oak or beech.. Page 135
152. Mr. Wallin does not identify alternative sources of food for the black bear utilizing the habitat to be directly or indirectly impacted by the Deerfield project, but intuitively that alternative foods must exist. Wallin page 105.
153. Mr. Wallin does not know where or upon what the bears who can no longer feed on the bear scarred beech directly impacted by the project or indirectly impacted by the project activity will feed. Tr. Page 83. Wallin does not have any data as to what black bear in southern Vermont feed on when they don't feed on beech. Wallin Dec. 5 2008 page 39.
154. Mr. Wallin has not attempted to quantify the extent to which black bear are utilizing additional sources of food in the project area or elsewhere. Wallin Dec. 4Tr. p. 105-06.
155. Bears prefer beech over oak nuts. Dec. 5, 2008, Parsons page 132-133
156. Vermont bears do not have the alternative food sources that are available to bears in Massachusetts. Hammond, Dec. 5, Tr 188. There is less suitable bear habitat in southern Vermont than in Northern Vermont. Kilpatrick Tr. 69
157. Mr. Hammond does not believe that there is any oak located within the five miles of the project site or within a home range of a bear using the habitat in the project site. Dec. 5, Tr 182.
158. There is no evidence that the wetlands in the area of construction and

operation of the turbine strings are utilized by the black bear. The wetlands around the project site revealed that potential bear food is limited. There is no skunk cabbage present, and only scattered stems of sedges, and little to no spotted touch-me- not. DFLD MLS-3. The wetlands do not provide a quality food resource for the black bear. Id.

Impacts

159. Assessing the degree of impact to black bear habitat such as concentrated areas of bear scarred beech and wetlands is a function of both direct and indirect impacts associated with a project. Direct impacts involve the direct, physical destruction of those habitats (or portions thereof); Indirect impacts involve a measure of disturbance and displacement from those habitats based on a project's close proximity. Hammond pf direct p. 18; Wallin Dec. 4, Page 25-26

160. A permit will not be issued if it is demonstrated by any party opposing he applicant that a development or subdivision will destroy or significantly imperil necessary wildlife habitat. Parsons Tr. Page 205 lines 6-13.

Direct impacts

161. Deerfield consultant Wallin identified the potential direct impacts of the Project, which are primarily associated with the loss of beech trees. Wallin determined that the most feasible approach for evaluating the Project's potential

direct impacts on bear scarred beech was a physical ground search of the 300-foot area surrounding each proposed turbine string (150 feet on either side of the Eastern and Western Project Areas). Wallin pf direct at 4.

162. With respect to direct impacts for Act 250 and 248, the measurement is whether the project will imperil or destroy habitat. Direct impacts are those impacts resulting from the project itself and what amount of the habitat is actually going to be destroyed or imperiled by the project itself. Wallin Tr. Page 54 lines 1-6.

163. Wallin reported that the three hundred foot swath would provide a reference for determining the direct loss of beech tree habitat. DFLD 3 at 1. The width of the study area 300 feet was designed to encompass all direct impacts. Page 50 lines 14-19.

164. The three hundred foot swath was the basis by which Wallin determined the clearing limits and direct impacts of the project. Wallin Dec. 5, 2009 page 50. The three hundred foot swath is the basis of comparison for the direct impact assessment.

165. Wallin identified approximately 1532 bear scarred beech trees within the 300 foot area surrounding each proposed turbine string under the original 24

turbine layout. Wallin prefiled January 8, 2009, page 5 lines 12-17, page 6, lines 20-23. Because of design changes the number of potential bear scarred beech was increased to 1586 trees.

166. The infrastructure clearing limits of the project on the west side is 36 acres. Of those 36 acres, 25 acres of bear scarred beech habitat would be directly impacted or destroyed by construction of the project. JW9a figure 3; Wallin Dec. 4, Tr. 16-17

167. Construction of the eastern side of the project requires the clearing of 32 acres. Of that 9.4 acres of bear scarred beech habitat would be directly impacted or destroyed to construct the project on the east side. JW9b- figure 3; Wallin Dec. 4, Tr. 16-17

168. On the east side of the project, the average density of bear scarred beech is 3 trees per acre. DFLD JW 3 at 2, and JW6a and JW6b.

169. Construction of the project would require the removal or destruction of 366 bear scarred beech trees. Wallin Tr. 17, 54.

170. In assessing direct impacts, the measure of the project impact is evaluated against the potential number of acres that could be impacted by the project.

Evaluating whether the project will result in direct impacts does not entail comparing the number of bear scarred beech trees taken or acres impacted against the estimated number of bear scarred beech in the eight square miles surrounding the project. Hammond Tr. 178

171. The eight square mile concentration studies were done at the direction of the forest service. The eight square mile assessment went far beyond the quarter mile indirect assessment and was not a direct impact assessment. Page 51-52.

172. Mr. Wallin admits that the eight square mile assessment performed for the Forest service cannot be compared to the results of the ¼ mile study performed in connection with the 248 proceeding because the studies were performed for two different audiences and two different concerns. Wallin pf rebuttal page 30-31.

173. Wallin counted the immediate impact area of the construction of the turbine string. Page 14, lines 9-11.

174. The Western segment of the project consists of a higher concentration of bear clawed beech trees. The average concentration of bear scarred beech in the western segment of the project averaged 24 trees per acre with a high of 33 trees per acre in the area between turbine W4 and W5. DFLD-JW2, American Beech Exhibiting Scarring from Black Bear within 150 feet, page 2.

175. The proposed Deerfield project will destroy necessary wildlife habitat as the state has defined necessary wildlife habitat and as necessary wildlife habitat is currently being applied. Wallin Dec. 4, Tr. Page 108 lines 21- page 109 lines 4.

176. The necessary wildlife habitat that will be destroyed or imperiled by this project includes the acreage actually taken or the 366 bear scarred beech destroyed to construct the project and the approximately 570 acres of bear scarred beech within the ¼ mile indirect impact zone. Hammond Dec. 12, 2008 Tr. 122-123.

177. The destruction of the 366 bear scarred beech trees could lead to further reductions in the weights of females in the area of Southern Vermont. Hammond Dec. 12, Tr. 158

178. The beech stands that will be impacted by this project provide a relatively significant contribution of beech mast for the bear population in the habitat subunit. Hammond Tr. 161.

179. The area directly affected by the western array of turbines, access roads, and associated stormwater treatment currently contains dense concentrations of beech trees. The pattern of bear-scarring on these trees demonstrates that bears

have historically used and relied on the mast from these trees. The project seeks to clear these areas of necessary black bear habitat that are decisive to the survival of the species. Hammond pf surrebuttal at 2.

180. The area of habitat that will be directly and indirectly lost as a result of this project is already occupied and utilized by bears as evidenced by the bear scarring. Removal of this habitat will force these bears out and push them into other areas. Hammond Dec. 12, Tr. 125-26.

181. Constructing roads, power lines, 37 wet ponds, and placing a large industrial facility within core bear range and fragmenting remote areas that are considered to be of regional importance for black bears as a mast feeding area would have an undue adverse impact on black bears and their habitat. The project would significantly reduce the area of critical habitat available to them in southern Vermont. During most years black bears select mast from concentrations of beech trees in remote locations. Successful reproduction and survival of young bears is linked to the bears having access to this resource. The removal and permanent conversion of this habitat will be detrimental to the black bear and significantly imperil its habitat. Hammond pf surrebuttal at 19-20

182. The bear-scarred beech stands in the project area are some of the most extensive and important in the state. An industrial project the size of the one

proposed would displace large numbers of bears from this critical habitat and cause long-term harm to the bear population in southern Vermont. Hammond p direct at 11.

183. The direct impacts of roads upon bears can include physical loss of habitat. The direct physical loss of habitat occurs when there is a conversion of usable bear habitat to dirt or paved surfaces during road construction and throughout the life of the road. Parsons Dec. 5 page 71. To construct the roads for the project, there will be a direct impact to bear habitat. Parsons Dec. 5 page 71 .

Indirect impacts

184. In addition to the direct loss of this habitat by the land clearing and construction of this industrial wind project, the displacement effect that the project and associated human activities would have on the region's bears that have historically migrated to the area during spring and fall seasons of mast availability would be significant. This loss of habitat base would threaten the ability of the Fish and Wildlife Department to manage for desired population levels and risks altering both the biological and cultural carrying capacity for black bear in the southern region of the state. The loss of the regionally significant feeding habitat would reduce the number of bears that could survive on the remaining habitat and

thus force additional bears into inferior urban habitat where they would have an increased likelihood of becoming nuisance bears. Hammond pf surrebuttal at 20.

185. The area within $\frac{1}{4}$ mile of the turbine project would be indirectly impacted by the proposed project. Kilpatrick Page 35.

186. Wallin also estimated the acreage of bear scarred beech trees within $\frac{1}{4}$ mile of the project site. Wallin did not count every bear scarred beech within $\frac{1}{4}$ mile of the turbine string. JW9a, Fig 3; JW 9b Figure 3. Wallin identified transect segments containing up to eight or more bear scarred beech per acre. Wallin admits that there are areas that contain more than eight bear scarred beech within $\frac{1}{4}$ mile of the turbine string. Wallin Tr. Dec 4. at 17. Wallin admits that areas on the western side of the project had concentrations of bear scarred beech as high at 33 trees per acre or an average of 24 trees per acre. Wallin. Tr. 18.

187. Wallin has not provided the number of bear scarred beech trees that are contained within acreage. Wallin, Dec. 4, Tr. 17-18

188. A quarter mile distance is the accepted isolation or buffer distance between development and bear scarred beech. Parsons page 236 page 24- page 237 lines 2.

189. On the western segment of the project, Wallin estimates approximately 338 acres of bear scarred beech are located within ¼ mile of the turbine string. JW9a, Figure 3.
190. On the eastern segment of the project, Wallin estimates approximately 231 acres of bear scarred beech located within ¼ mile of the turbine string. JW9b, Figure 3.
191. The bear scarred beech cluster map JW9a does not contain or include the bear scarred beech clusters located within ¼ mile of Route 8. Wallin Tr. 20.
192. There is likely to be some degree of indirect effect from the construction, operation, and maintenance of the project that may influence the extent of impact to the habitat beyond the direct loss of habitat associated with the footprint of the project. It is unclear the extent to which operation of a utility-scale wind facility may disturb or displace black bears from accessing and utilizing concentrated bear-scarred beech habitat. Hammond pf direct p. 18
193. This type of information can only be obtained by conducting a long-term behavioral study involving a large number of marked bears interacting to a wind

facility. This type of study has been done for ski areas and bears, but not for wind generation projects. Hammond pf direct p. 18

194. No data are available that fully assesses to what extent the operation of a commercial scale wind facility would discourage bears from accessing and utilizing suitable habitat in the area. Parsons Dec. 5, Tr. p. 70. Lacking more specific information the Agency typically applies an area of indirect impact of one quarter-mile beyond the footprint of the project. Hammond pf direct p. 18

195. Human activity generated by development that is within sight, sound or scent of the habitat may result in an avoidance of the habitat, thus having an indirect impact. ANR 5 at 3. The activity associated with construction will displace black bears. Parsons at 12.

196. Increased human activity increases the displacement effect of bears.
Hammond 216.

197. The noise from the turbines could discourage non local bears from feeding in the area around the turbine site. Hammond Dec. 5, Tr. 218. During the fall, bears seek secluded feeding sites or areas where they feel safe feeding. The noise from the turbines could discourage or displace non local bears from feeding in the area near the turbines. Hammond Tr. 219.

198. The noise studies conducted do not measure the impact of the project on wildlife. Animals hear at a higher frequency than do humans. Kaliski Tr. 170-71. The sound levels within 600 feet of the turbines will approximate human speech and beyond 660 feet will approximate the sound of an idling car. Parsons pf rebuttal at 11; Tr. Dec. 5, Page 74. Under existing conditions, there are no continuous sounds of idling cares or human speech in and around the turbine project site. Parsons p. 75.
199. Despite the lack of specific studies or scientific information about the effects of wind turbines on bear habitat use, the potential impacts of roads and increased human use on bear habitat are not disputed. Parsons Dec. 5 page 70.
200. If we cut a substantial amount of beech trees from ridgelines, bear will be forced to become valley bears and feed in lower elevations closer to residential areas. Wallin Dec. 5, page 26. Bears are more likely to move into residential areas if there are fewer sources of beech or acorn. Wallin Dec. 5, Tr. 28 .
201. The greater distance a bear has to travel for food the greater the increase their risk of survival. Parsons Dec. 5, page 100.
202. Increasing the human disturbance on the site will increase the potential to impact the bears on the site. Including dogs on the site to assist in conducting

post-construction monitoring for bats will increase the potential for impacts to bears on the site. Parsons Dec. 5 Tr. p. 77.

203. As bears become more exposed to humans their aversion to humans lessens. Page 82.

204. Bears raiding cabins feeding on bird feeders and beehives is not the type of behavior we want from our wild bear population in Vermont. Parson Dec 5, page 82

205. Constructing a road in an area that was previously undeveloped provides access to hunters to pick up bear strikes and expanded hunting activity as well as other forms of human activity. Kilpatrick page 132-33.

206. Forest Service measures to close the access road will not solve the problem of increasing access created by the construction of the road. The Forest service would need to rigorously enforce road closure. Kilpatrick Page 134-35.

207. Gating does not always deter snowmobilers or ATVs from using or accessing forest roads. Parsons p. 93.

208. The road may create a narrow displacement within the adjacent forest

where black bear use could be diminished. Parsons pf direct at 12.

209. The daily activity on the site has been estimated to include up to one to nine trips a day. In addition, activity at the project site would include regularly scheduled maintenance of the turbines, maintenance of the stormwater system, emergency and unscheduled maintenance, and monitoring.
210. In addition, security personnel would be used to enforce the administrative closure of the roads. Parsons at 93. Monitoring at the turbine site would increase the potential for impacts on the bears. Parsons page 77.
211. Tours should not take place at the project site during periods of feeding by bears. Tours should not take place From April through June 15, and September through November. Wallin Tr. P 75-76.
212. Bears are more sensitive to human disturbance than deers. Parsons page 95
213. Increasing the construction phase of the project will increase the years of displacement to the bears. Dec. 5 page 73
214. This issue of indirect impacts was one of the primary reasons for the Stratton Bear Study and is addressed in detail in the final report (Hammond

2002). Hammond direct p. 18. The study found that southern Vermont bears avoid concentrations of development and roads and are seldom found within 200 meters of them and some bears avoid developments by as much as 200 meters. Stratton study at 81.

215. The study results are consistent with and support the Vermont Fish and Wildlife Department's mitigation guidelines for indirect impacts which are intended to protect a buffer zone of one-quarter to one-half mile from essential black bear habitat. Stratton study at 81.

216. Today, the largest populations of black bears exist in the most remote and expansive tracts of forests, such as those in Maine and in the northern and higher elevations of parts of New Hampshire and Vermont, which are relatively unbroken by paved roads and housing developments. Many other states, with large metropolitan areas along the eastern seaboard, have reduced populations of black bears. Habitat fragmentation is a serious concern for black bears across their range and especially problematic in areas experiencing rapid increases in human population growth such as in the southeastern United States. Hammond pf direct at 19

217. Highways and roads have several direct and indirect negative impacts on black bear populations. Habitat fragmentation, the hardest indirect impact to

define, occurs when highways and other developments create a partial "barrier effect" which limits black bear population movements and distribution by isolating sub-populations, restricting access to seasonally important foods, reducing rates of immigration and emigration, limiting breeding opportunities (gene flow), and ultimately causing local extinctions. Hammond direct p. 19-20.

218. The impacts of a logging operation on bear habitat are less than the construction and operation of a development project. After a logging operation is completed, there is no added human activity and the area can develop early successional habitat for a short period of time and eventually beech will be allowed to regenerate. There are no indirect impacts. For an infrastructure project like Deerfield, after the project is constructed, infrastructure remains at the project and the human activity associated with the project causes indirect impacts to the bears. Hammond Tr. 180-81.

219. The great majority of the bears migrating to the Deerfield Project area in search of beech nuts will not be habituated to the project's structures and human activities and will be displaced from the area for a distance of from one-quarter to one half mile. Hammond pf direct at 13-14

220. The Agency agrees that bears living in close association to some human activities can sometimes habituate to different activities over time. This behavior

is typical of "nuisance" bears that visit bird feeders and trash containers in backyards in some communities in Vermont and elsewhere. In some urban areas with bear populations, such as in New Jersey and Connecticut, most bears frequent back yards and are habituated to people to the point that bears in these areas are considered pests. Hammond pf direct at 13

221. In Vermont, although we have some nuisance bears, the Department manages for wild, free-ranging bears that are wary of people and, that for the most part, avoid areas where people are found. Vermont's greatest concentrations of bears are found in their "core" habitats that tend to be remote from roads, human developments and people. During years of good beech nut or "mast" production, large numbers of these wild bears migrate to areas of concentrated beech trees where generations have fed undisturbed on this critical resource. Hammond pf direct at 13

Bear management

222. It is part of the foundation of the Department's bear management philosophy that if we protect the core habitat critical to the bears then bears are not forced into becoming nuisance bears and we can continue to manage them as wild animals that are not dependent on human foods. Hammond pf direct at 13-14.

223. The state is able to manage bears because it has the amount of habitat necessary for the bears. The bear management strategy of protecting habitat is effective and ensures a healthy bear population in the state. Hammond Dec. 5 page 183. Tr. 1

224. In years of food shortage the state managers have recognized that there is an increase in the harvest population because bears travel more widely looking for foods during that time period and are more susceptible to hunting, as well as to being hit on the roads, and nuisance complaints. Dec. 5, Tr. 185.

225. When a bear has a good abundance of beech mast of food within its home range where it knows the sources of risk already and won't venture beyond that area a bear will feed in remote areas. Tr. 185.

226. Management approach is not primarily based on harvest levels, Management approach is based on protecting habitat. Dec 5., 2008, Page 238

227. The project design in relation to habitat is very important. In reviewing a project, the Agency works with an applicant in an attempt to avoid any impacts. To minimize any impacts, the Agency recognizes that the fewest impacts would occur if it were developed outside the habitat and outside the buffer to that habitat. Proceeding from there in terms of increasing impacts, a project that just

impacts a buffer may be allowed. From there, if necessary if the project absolutely has to be within an area, then the Agency might allow some impacts on the edge of the habitat. The worst scenario is the development of a project in the middles of the polygon of critical habitat. In this case, the Deerfield project is in the worst scenario for developing a project in terms of its impact on necessary bear habitat. Hammond Page 208.

228. The turbine development, infrastructure, roads are being built through the center of this highly concentrated bear scarred beech which the Agency considers to be regionally significant. Hammond Page 208-09.

229. The management and protection of black bear habitat provides black bear with core habitat so that they can avoid becoming nuisance bears. Tr. 184-85, ANR 6.

230. In contrast, our neighboring states like New Hampshire as well as Massachusetts and New York, especially Connecticut and New Jersey have stand-by teams just to deal with nuisance bears and handle and shuffle them around. Vermont has not had to deal with that problem. The Vermont Department of Fish and Wildlife has been able to manage for wild bears. Tr. 185.

231. The loss of the bear scarred beech habitat would result in a negative impact to the population of hunters in Vermont. Hunting is a strong legacy in the

State of Vermont. It brings in 191 million dollars to the state each year.

Hammond Dec. 1, Tr. Dec.12, 2008, page 126-27.

232. A majority of Vermonters feel that black bear habitat protection is necessary. According to the results of the Responsive Management Survey, 80% of the Vermont public supports the Department's role in Act 250. ANR Bear Management Plan.

The bear scarred beech habitat at the project site is unique and should be afforded the highest form of protection

233. The ANR Department of Fish and Wildlife relies on its Mitigation Guidelines for Black Bear habitat in Vermont when evaluating development projects. The Department uses the guidelines once the department has made a determination that critical bear habitat is threatened by development of land. Tr. Dec. 5, 2008, Page 157

234. Beech stands that provide a relatively significant contribution of hard mast for the bear population within the habitat unit are unique and irreplaceable on a regional basis and are designated as RC2. Hammond page 158-159. RC 2 is the highest category of protection for mast stands. VNRC 3; Hammond Tr. P. 159.

235. The concentration of beech stands on the western ridge of the Deerfield project constitutes a significant contribution of hard mast. The concentration is significant enough to warrant an RC 2 designation. Hammond tr. 159.

236. Craig McLaughlin, while Director of Wildlife at the Vermont Department of Fish and Wildlife concurred in the Department determination regarding the regional importance of the habitat. In the August 13, 2004 letter to John Zimmerman, VNRC 8, Decker as Director concurred in the Department review of habitat inventories and studies in connection with the Searsburg Wind Farm Expansion. The Department summarized that “[t]he issue of potential impacts to black bears is of special concern. This project is within, and adjacent to, perhaps the largest contiguous block of regionally significant black bear habitat associated with any project reviewed by our Department.” VNRC 8 at 3. McLaughlin and the Department identified the western expansion area as especially challenging because “the site is currently unroaded and its development would necessitate an unprecedented loss of critical fall feeding habitat for black bears.”

237. The mitigation guidelines provide that no direct or indirect impacts should be allowed in an RC 2 habitat. VNRC 3 at 2. For projects in critical habitat not considered unique or RC2, the mitigation guidelines provide that for every acre of critical beech habitat directly and/or indirectly impacted by the project, four acres

of beech must be protected and managed in perpetuity. VNRC 3.

238. The factors contributing to the Department's determination that the beech stand on the western ridge warrants an RC2 designation is that the stand contains a large amount of bear scarred beech. Within one quarter acre of the project site there are several hundred acres of bear scarred beech. The concentration of bear scarred beech along the project site or turbine string is some of the highest in the state. As high as 33 bear-scarred beech per acre within the project site itself. Page 160.

239. The location of the stand is also very remote and there are few existing impacts around it. Under existing conditions, the population of bears can go to this area and feed in security. This remoteness and security in feeding makes this habitat a source habitat for bears. Source habitat produces excess bears where the bears can live in relative safety regardless of the hunting situation or anything else. There are more cubs produced over time than need to just reproduce the population. Bears can move out of this area into other areas of bear habitat around the state where there's a higher source of mortality. Tr. 161.

240. The concentration, the setting, and the amount of bear scarred beech makes this area unique. On the eastern side, there is also a large amount of bear scarred beech. The eastern side is on the headwaters of the Lamb Brook drainage

area. Tr. 162.

241. The western side of the project contains a greater concentration of bear scarred beech over a smaller area and it would occur in continuous concentrated beech. On the east side, a conifer zone across the top of the ridge which would result in fewer direct impacts on the eastern side. The eastern side, however, because of the large amount of bear-scarred beech in the area would constitute an RC 2 rating. 162.

242. The habitat provides a relatively significant contribution to the welfare of the habitat unit's bear population. TR. 166.

243. Satisfying the habitat requirements of black bears concomitantly maintains the ecological systems necessary for a multitude of fish, animal, invertebrate, and plant species. As a result, the black bear also serves as the foundation for a natural resource base providing maximum biological diversity. VNRC 3 Mitigation Guidelines for Black Bear habitat in Vermont at 1.

Undue adverse effect

244. Constructing roads, power lines, 37 wet ponds, and placing a large industrial facility within core bear range and fragmenting remote areas that are

considered to be of regional importance for black bears as a mast feeding area would have an undue adverse impact on black bears and their habitat. The project would significantly reduce the area of critical habitat available to them in southern Vermont. During most years black bears select mast from concentrations of beech trees in remote locations. Successful reproduction and survival of young bears is linked to the bears having access to this resource. The removal and permanent conversion of this habitat will be detrimental to the black bear and significantly imperil its habitat. Hammond pf surrebuttal at 19-20

245. If this project is constructed on the ridgetops within the project area then they will no longer be preferred feeding sites and this project will have had an undue adverse impact on the bears. Hammond surrebuttal at 12.

246. The project will result in an undue adverse impact on black bears and black bear habitat. Hammond surrebuttal at 2. The direct loss of the concentrated bear-scarred beech within the project site and indirect impacts of 569 acres of bear-scarred beech within one-quarter mile of the project results in an undue adverse effect to the black bear habitat. Kilpatrick page 35.

247. An impact to the entire amount of a small habitat that's not of regional importance does not have the same effect as impacting a portion of the habitat that is of regional importance. Page 68 Tr. Kilpatrick

248. Although some bears may acclimate to the industrial wind project, they may become non-reproductive parts of the population because of the increased stress level of the noise associated with the turbine. Kilpatrick page 154-54.

249. In evaluating the effects of the project on the habitat, the long term needs of the bear need to be considered. A female bear has to live ten years to replace herself on average. If they do not live that long they are falling short of their replacement. Kilpatrick page 203. Kilpatrick is concerned about this population because of the overall low cub survivorship, low bodyweights of females, and genetic study demonstrates that the population is genetically isolated and that it is relatively smaller in size than the bears in other parts of the state. Kilpatrick page 197.

250. The removal of the bear scarred beech from the ridgeline forces the black bear to move further down the mountain in elevation. There is greater competition with other species for the bear scarred beech within the lower elevations and there are fewer bear scarred beech available. Hammond Dec. 12, 2008 Tr. 148

251. Although bird feeders provide a food source that is rich in fat and attractive to bears, feeding on these feeders requires a bear to incur a great deal of

risk . It requires that the bears leave a secure habitat and encounter houses and roads. Bears are at risk of being hit on roads. People may shoot bears at bird feeders. The Agency has encountered instances where people shoot bears at bird feeders. Hammond Dec. 5 2008 Page 207.

252. As a result of the loss of critical habitat, bears will be displaced from the area. Because bear society is built on size, the larger the habitat lost, the larger the displacement effect on bears. More bears will be displaced as smaller bears will have a harder time finding replacement habitat. Smaller bears will continue to get displaced or kicked out of habitats by other bears. These bears will have difficulty finding natural habitat resulting in their seeking bird seed or other human sources of food and becoming nuisance bears. Tr. Hammond pf 157-58

253. The effect of habituation of bears to human activity is that it decreases the annual survivorship rate of bears. Moving into areas where they come in closer contact with humans, the survivorship declines. Page 49

254. Although some bears may acclimate to wind turbines they may not be a reproductive part of the population because of the impacts of chronic stress hormones as it affects the immune response, sexual drive, resistance to diseases, and cognitive functions. Page 226-27.

255. Once displaced from one habitat, because other habitat locations are occupied by other bears, the displaced bears have a difficult time finding replacement habitat. Tr. 158 Bears cannot simply go to another area and make use of other beech trees.

256. The loss of bear habitat will result in the loss or reduction of the bear population in part because the ability to manage for larger amounts of bear is reduced when habitat is lost. The state manages habitat because although the population may vacillate, maintaining the habitat allows the state to maintain the population or adjust its size. If the habitat is lost or diminished the number of bears that can be maintained on that habitat is also diminished. Tr. 179-80.

257. The project will result in an adverse impact to black bears. (Parsons Dec. 5, Tr. 104). If this project were to be built in central or Northern Vermont, Mr. Parsons would opine that it would result in an undue adverse effect to bear habitat. Parsons Dec. 5 Tr. 68-69.

258. The monitoring that would provide the best information regarding the adverse effects on birds and bats would have a more adverse effect on the bear population. Using dogs to search for bats impacted by the project would have a more adverse effect on the bears. Dec. 5, 2008 page 145-146.

259. It is not good for the species to get to the edge of the biological carrying

capacity. Kilpatrick 220.

260. Beechnuts are important to the survivorship of individual bears. More importantly, however, the studies suggest that beechnuts are important to the survivorship to the population because of the important role it plays in successful reproduction. Kilpatrick page 220-21.

261. Based on the experience of the Department biologists the density and number of scarred beech trees in the area is unique for the state and is unmatched by any other forested area of southern Vermont. The loss of these trees represents far more than the comparative value of beech trees found elsewhere in the state as their removal will impact far more bears. The bears will be forced to utilize less desired habitat which in turn will reduce the overall fitness of the regional population. Hammond surrebuttal at 3.

262. The loss of the 366 trees which are located in the middle of a massive stand will have a broader impact. Kilpatrick Page 207-09

263. To determine the cumulative effects of the project would need to also consider the effects of the Searsburg project on the bear population. Wallin Tr. Dec. 4 page 7-16.

The Board should not rely on the opinions of the Deerfield witnesses

264. Mr. Parsons' experience in Southern Vermont has been fairly limited, mostly focused on this project. Parsons Tr. Dec. 3, 2008 page 205 lines 24-page 206 line 1. Forrest Hammond has more experience and exposure to the bear habitat in southern Vermont than does Mr. Parsons. Tr. Page 259-60.

265. Mr. Parsons has promoted the fact that beech have been decisive in cases he has been involved in central and Northern Vermont. December 3, 2008 Tr page 218, lines 16-19.

266. Mr. Parsons admits that he had read the Elowe and Dodge study, the recent interpretation of which causes him to question the importance of bear scarred beech habitat to black bear, when he offered his opinion in connection with the East Haven and other cases in Northern and Central Vermont. In those cases he did opine that concentrated areas of bear scarred beech constitute necessary wildlife habitat. Mr. Parsons admits that he has not always been careful in offering his opinion. Tr. Page 257-258.

267. Mr. Wallin had looked at the Elowe and Dodge study before he filed his testimony and before he answered questions under oath during his deposition in April 10, 2008. Page 27-28. During his deposition in April 2007, Mr. Wallin

testified under oath that he agreed with the statement that “[t]he beech stands surrounding this project contain thousands of beech trees whose scarred bark is testimony to its importance in drawing large numbers of bears to the area in years of good nut production.” Page 26 lines 16-page 27 line 3.

268. When working with other development clients Mr. Wallin has worked with development clients and has advised them to avoid areas of bear scarred beech habitat so that they can advance the project through the permitting projects. Wallin Dec. 4, 2008 page 97. Mr. Wallin acknowledges and has advised clients that bear scarred beech are typically protected through the permit process. Page 97. In connection with the Crean subdivision, Wallin advised the client that his development in close proximity to two stands of bear scarred beech one containing 60 to 70 bear scarred beech and one containing 28 to 30 would be difficult to get the necessary approvals. Wallin advised client that the project would not be approved because of the protection afforded to bear scarred beech through the regulatory process. Page 103-104.

269. Mr. Parsons admits that he is not likely to alter his opinion regarding the necessity of bear scarred beech for his municipal clients in the Mad River, because what he has offered “Is as good as you are going to get for \$10,000 a town.” Parsons Dec. 5, 2008 Tr. 129.

Searsburg studies

270. The ANR Department of Fish and Wildlife, including former Director McLaughlin, has critiqued and questioned the use of the hair snag studies. McLaughlin and Hammond opined that “[w]e do not believe the proposed study is robust enough to provide a meaningful analysis of current bear use of the site.” To assess the impact of the proposed expansion on the black bears, McLaughlin and Hammond recommended that the developer conduct a field study to assess the potential impacts resulting from the proposed wind farm expansion into an area that is critical habitat and considered of regional importance to black bears.” McLaughlin and Hammond recommended that multi-year population studies including several years of abundant beechnut production be conducted using telemetry to monitor individual study animal behavior, habitat use and movement in relation to human activities and developments.” VNRC 8 at 2

271. The DNA analysis of the Searsburg snag studies demonstrate that only two bears were identified as accessing the area by the turbines because only two showed multiple use, demonstrating traversing up and down the fence. Kilpatrick Tr. 161-162

272. There is no certainty that the bears are crossing the ridgeline at Searsburg. When he testified in the UPC matter Mr. Wallin admitted that criticism of the hair snag study was valid because there was no information whether the bears were

actually crossing the ridgeline. Page 48.

273. Construction of the Searsburg project did not require the taking or removal of any concentrated stands of bear –scarred beech. Wallin Dec. 4, 2008, page 13. The Searsburg studies also do not provide any information on the use by bear of bear scarred beech before the project commenced. Without the before conditions, it is impossible to assess whether or how the project has affected this use. Kilpatrick.

There are alternative locations for the project

274. Deerfield performed a suitability assessment for the wind projects in the Green Mountain National Forest. The report concluded that nine percent of the area in the Green Mountain National Forest was suitable under these factors for Wind Projects in the Green mountain National Forest. Similarly, in the DEIS, the Forrest Service Conducted Nine percent or 36,000 acres of the green Mountain National Forest are suitable for wind projects. Zimmerman TR. Page 34-35.
275. Deerfield did not consider black bear habitat in potential wind project sites. Instead it conducted a “very coarse” assessment of environmental issues. Zimmerman Tr. 37-39

276. At no time while he was project manager for the project did Mr. Zimmerman consider a project that would take place only on the eastern side of route 8. Zimmerman TR. Page 128 lines 2-6.

277. There will be no cutting of bear scarred beech trees to accommodate the transmission line running from route 8 to the end of the turbine string. Wallin, Dec. 4, Page 90

278. If the east only alternative were built but had to access a substation at the northern end of the western string, Mr. Wallin opined that the a line could be run all the way up the proposed turbine string without impacting any bear-scarred beech . Page 136.

279. The United States Environmental Protection Agency (EPA) has offered comments to the United States Forest Service's Draft Environmental Impact Statement for the Deerfield Wind Project in accordance with its responsibilities under the National Environmental Policy Act (NEPA) and Section 309 of the Clean Air Act. ANR-9

280. The United States EPA articulated its concern that the applicant's proposed alternative has the potential to cause significant adverse impacts to important black bear habitat in the project area and that the range of alternatives considered in the EIS is too narrow. ANR-9.

281. EPA advised that “elimination of alternatives can only occur after a determination is made that it either does not meet the purpose and need or will be too environmentally damaging. In our opinion, the DEIS does not demonstrate that either of these conditions has occurred.” VANR- 9 at 6
282. EPA recommended that the EIS be supplemented to include a more rigorous alternatives analysis that evaluates wind project sites to be located within and outside the GMNF. “This step will provide a more complete range of alternatives and will help to explain whether a project can be constructed with less impacts than those associated with the alternatives already considered.” EPA recommended that the FS use information available through the GMNF land and screening for compatible wind sites. “That work screened for compatible GMNF management areas, the availability of wind, and proximity to transmission line. Based on those screening factors, the DEIS (DEIS) page 37) notes that 28,700 acres of the GMNF offer the estimated wind resources required for commercial wind facility development. ANR 9 at 6
283. EPA advised that resolution of the issue regarding the narrow range of alternatives and impacts to black bear habitat would require consideration of a scaled back or potentially phased project with significant mitigation and consideration of alternative wind power development sites at another location(s)

within or outside the Green Mountain National Forest should be considered.

ANR- 9

284. EPA also recommended that the Forest service extend or reopen its comment period until after the Public Service Board proceedings are complete to allow the Forest service and others to consider the input of the State of Vermont and then apply that information to the alternatives provided in the DEIS. EPA cautioned that “this step is especially critical given the significant level of objections expressed on the record by the VTANR regarding the potential for impacts to black bear habitat for all of the build alternatives under consideration.” ANR -9 at 2.

285. EPA commented that absent a hard look at additional alternatives on and off the Green Mountain National Forest, it does not believe the range of alternatives in the DEIS is complete. Of the alternatives studied in the DEIS, EPA recommends the Eastern project site only (identified as Alternative 3 in the DEIS) as the preferred alternative due to a reduced potential to impact regionally significant bear habitat. ANR 9 at 6.

286. EPA noted that if Alternative 3 were pursued it would require the development of a comprehensive mitigation and monitoring program to address

concerns of the state and federal experts regarding bear habitat impacts. ANR 9
at 3.

287. EPA found that the proponent's alternative and the reduced alternative (reduced turbines in the Western project or 14 turbine project) are both more damaging to bear habitat than Alternative 3. If the State's objections related to bear impacts are not satisfactorily addressed, EPA concluded that it would likely object to the Proposed Action and alternative 2, the reduced turbines in the Western project site only). ANR 9

288. The United States Department of the Interior (DOI) also reviewed the DEIS and offered comments to the United States Forest Service. DOI found that the alternatives analysis was constrained by the siting criteria used and by the lack of a rigorous evaluation of alternatives; particularly, representative sites for wind power development on and off Forest Service land. ANR 10

289. DOI identified concerns with the FS screening analysis for alternatives and found that its reliance on the on the proponent's site specific proposal as a means to eliminate other alternatives including wind projects on or off the forest service land results in a very constrained alternatives analysis. ANR 10 at 2

290. The DOI advised that it was particularly concerned with the “ripe for consideration” concept in reviewing alternatives. The DOI found that the DEIS for the Green Mountain National Forest Management Plan 2006 identified 37 sites on the forest service with a wind resource rating of four or higher as having potential for wind energy development. During the scoping process for the project DEIS, the FS identified four significant issues that would drive the analysis and development of the range of alternatives. Two of the issues involved wildlife, mortality to birds and bats, and impacts to bears. ANR 10 at 6.
291. The DOI concluded that the DEIS does not appear to comply with the NEPA mandate to rigorously explore and objectively evaluate all reasonable alternatives. Representative wind energy sites from the forest service and private lands should be carefully evaluated by the Forest Service so as to provide the analysis necessary to indicate if development of representative sights might result in the avoidance of mortality impacts to birds and bats and/or result in avoidance of impacts to important bear habitat. ANR 10 at 3.
292. The DOI outlined the habitat fragmentation effects of the proposed project on the black bear habitat located on both the eastern and western expansion areas of the project and that VT ANR considers the western expansion area as unacceptable and subject to Act 250 protection.

293. DOI concluded that given the outstanding issue of ANR concern about impacts to black bear habitat that the western expansion area does not appear to be a practicable alternative. The DOI also concluded that the lack of a rigorous analysis in the DEIS of the 37 sites on forest Service lands that have been identified as being potentially suitable for wind development to determine if one of more of these sites if developed would avoid or minimize impacts to black bear habitat and other resources. The DOI recommended that if such sites are available on or off the forest that this information should be made known to decision makers at all levels. Under this rigorous analysis that should be completed, the DOI recommended that the screening analysis for reasonable alternatives be modified to include the bear scarred beech and other Act 250 protection criteria to filter out sites that would likely be deemed unacceptable under state environmental criteria. ANR 10

294. The Agency queried whether the applicant looked at the other 36 potential areas on National Forest Service land. Those areas have not been evaluated for potential natural resource concerns or impacts. Tr. 177

Mitigation

295. The Forest Service has not outlined any mitigation for bear habitat generally or bear scarred beech taken directly or indirectly by the project. The

DEIS distinguishes between “design criteria” and “mitigation measures.”

“Design criteria represent standard, routinely implemented management practices which have been designed into the construction and operation of the proposed activity. . . . Proposed design criteria are listed by resource area in Appendix A.

DEIS Page 2

296. “In contrast, mitigation measures refer to additional measures designed to minimize unintended or adverse impacts to resources areas. Often, mitigation measures are implemented in response to sit-specific characteristics such as unique populations of sensitive species or habitats. Examples of mitigation measures include post-construction monitoring and operational restrictions.”

DEIS pages 2-3

297. The DEIS does not include any mitigation measures to compensate for the black bear habitat directly or indirectly impacted by the project. Page 3

298. The DEIS includes design criteria. None of the design criteria listed in appendix A of the DEIS include the proposed mitigation measures suggested by the Applicant in its prefiled testimony of the Habin, Goland panel.

299. Instead the design criteria incorporate some of the measures to minimize impacts rather than mitigate for those impacts. DEIS Appendix A pages 5-6.

300. The applicant does not have any control over the mitigation plan to take place on Forest Service Land. Tr. Page 57
301. There is no agreement with any party on a mitigation plan or proposal for impacts to black bear habitat. Tr Dec 1, page 69 lines 12-21. Page 6
302. If a Certificate of Public Good were to be issued and the proposed project or a portion thereof were constructed, ANR would request that a bear behavior study be conducted that tracks bear movements with GPS satellite receivers. The study would provide information on the bear movements to help determine whether and from which areas bears were being displaced. Hammond Dec. 11 Tr. p. 59
303. Dr. Kilpatrick's first priority for mitigation is to get some concrete information about the effect of wind turbines on bears. The studies should provide some valid preconstruction studies, valid post construction studies to provide information on the long term survival of bears. Kilpatrick 214.
304. Dr. Kilpatrick recommends that the study include two to three years of preconstruction work given the variation in food productivity. Kilpatrick 215.

Discussion

Based on the testimony and evidence presented in this matter and the findings above, the Public Service Board cannot issue a Certificate of Public Good for this project because it cannot make the requisite finding that the Project will not result in an undue adverse effect on the natural environment and the public health and safety. See 30 V.S.A. § 248(b)(5).

Under Section 248(b)(5), the Public Service Board cannot issue a Certificate of Public Good unless it finds that the project will not result in an undue adverse effect on aesthetics, historic sites, air and water purity, the natural environment and public health and safety. The statute incorporates many of the Act 250 criteria by reference, including necessary wildlife habitat and endangered species under 10 V.S.A. § 6086(a)(8)(A). The Board's inquiry, however, is broad in scope. The Board recently held:

Although in Section 248(b)(5) the General Assembly has provided the Board with guidance as to what specific environmental impacts to examine in reviewing a proposed project, it did not limit the scope of the Board's review to only the incorporated Act 250 criteria.¹ The statute specifically provides that the Board must find that a proposed project will not have an "undue adverse effect on . . . the natural environment." A project such as this has the potential of multiple and substantial impacts on wildlife. To consider fully whether those impacts constitute an "undue adverse effect on . . . the natural environment," this review should not be constrained to only the effects on "endangered species" and "necessary wildlife habitat" as those are considered under Act 250.²

1. See, for example, Docket 6860, Order of 1/28/04 (reviewing the potential health impact of electromagnetic fields emanating from a proposed transmission line).
2. Docket 6911, Order of 7/17/06 at 66.

- I. The bear scarred beech at the project site and within ¼ miles of the project is necessary wildlife habitat for the black bear that utilize that food resource

The Act 250 criteria relevant to wildlife habitat provides that a permit will not be granted if it will destroy or significantly imperil necessary wildlife habitat. 10 V.S.A. § 6086 (a)(8)A). The Act 250 statute defines “necessary wildlife habitat” as “concentrated habitat which is identifiable and is demonstrated as being decisive to the survival of a species of wildlife at any period in its life including breeding and migratory periods.” 10 V.S.A. § 6001(12). To be necessary, habitat need not be decisive to the survival of the species’ entire population. Instead, the habitat need only be decisive or critical to that population of the species that depends on the habitat. See *In re Killington, Ltd.*, 159 Vt. 206, 216 (1992); *In re Southview Associates*, 153 Vt. 171 (1989).

In the present matter, Forrest Hammond, a Wildlife Biologist who has served the state of Vermont for over 19 years as a large animal biologist managing black bear habitat and reviewing regulatory projects has testified that bear scarred beech at the project site constitutes necessary wildlife habitat for the black bear. Both Forrest Hammond and Craig McLaughlin concluded that the bear scarred beech habitat is critical to the regional bear population. The record is replete with testimony from both Forrest Hammond and Dr. William Kilpatrick, on the importance of the bear scarred beech habitat and the dependence of local and regional bear on that habitat. The beechnuts in the area provide the necessary nutritional resource in the fall to prepare bears for the long hibernation and allow female bears to reproduce and support their young.

A finding that the concentrated identifiable area of bear scarred beech at the project site and the surrounding area constitutes necessary wildlife habitat population is consistent with and compelled by the Board's recent decision in the UPC matter. Less than one year ago in another wind project, the Board was asked to determine whether a proposed wind project would result in an undue adverse impact to black bear habitat. In reaching its decision, the Board made findings similar to the ones presented here to conclude that bear scarred beech is necessary wildlife habitat for black bear:

Black bear rely on concentrated stands of American beech trees as an essential source of high nutrition food. Production of hard mast (beech nuts, acorns) is important to reproductive success and cub survival for black bear. Concentrated areas of American beech trees that have a history of use by black bears are essential for the long-term survival, well-being, and reproductive success of black bears in Vermont, and constitute "necessary wildlife habitat" under Act 250. Austin pf. at 7, 9–10.

See Amended Petition of UPC Vermont Wind, LLC, Docket No. 7156 (Aug. 8, 2007) Finding 249, at 85..

In the earlier East Haven case, the Board discussed the importance of bear scarred beech and found that Black bears require large areas of remote forest and a variety of food resources in order to achieve successful reproduction and avoidance of humans. Forested wetlands and beech stands are important feeding habitat for black bears and directly affect bear survival and cub production. East Haven, Docket No. 6911, Order of 7/17/06 , at 62 finding 195.

In addition to the Public Service Board, the District Commissions and the Vermont Supreme Court have also concluded that bear scarred beech is necessary

wildlife habitat decisive to the survival of the black bear that depend upon it in Vermont.

See In re Killington, Ltd., 159 Vt. 206, 216 (1992) (“Bear habitat is often found in the higher mountainous areas, because of the lower level of human disturbance in such locations. In Vermont, the best bear habitat is found along the spine of the Green Mountains and in the Northeast Kingdom”); *In re Southview Associates*, 153 Vt. 171 (1989); Sugarbush Resort Holdings, Inc., 5W1045-8, (June 30, 1995) (finding that the Slide Brook area beech stand constitutes “necessary wildlife habitat,” as that term is defined in 10 V.S.A. 6001 (12) and used in criterion 8(A).).

Mr. Parsons has advised clients and offered sworn testimony opining that bear scarred beech is necessary wildlife habitat for black bears. See Tr. 218, Dec. 3, 2008 Parsons has also testified here that the project will result in an adverse effect to black bear and that it would destroy or imperil bear habitat. Parsons page 238-239. Parsons also admits that if this project were located in central or northeastern Vermont, he would agree that the project would result in an undue adverse impact to necessary black bear habitat. Although this is the first project he has reviewed in southern Vermont, Mr. Parsons speculates that beechnuts are not as important to black bear in southern Vermont as they are to black bears in central and northern Vermont. The basis for his belief is his suspicion that alternative food sources are available to black bear in southern Vermont which renders beechnuts less important to the bears. Mr. Wallin likewise adheres to this theory in suggesting that bear scarred beech is not necessary wildlife habitat for black bears in the project area.

The Board should not be swayed by the Deerfield witnesses unfulfilled search for

alternative food sources as supplanting or undermining the necessity of beechnuts to black bears in the project area. Mr. Parsons admits that oak is not common in the proposed project area. Parsons Dec. 5, 2008 at 98. The information on the availability of oak is based on the aerial photography of Mr. Lew-Smith. Deerfield concedes that this work was limited to a remote assessment and did not involve a review of whether the bear were using the habitat. Tr December 3, 2008, page 258. Mr. Parsons admits that taken together the oak dominated stands and stands where oak is co-dominant appear to occupy only five to six percent of the landscape depicted on JP-3. Tr. Page 229. Mr. Parsons also concedes that we do not know whether black bear are actually utilizing the oak he suggests is available. Tr. December3, 2008, page 258-59.

Although not common, the majority of the oak that is suggested in JP-3 is located in Massachusetts. Bear movement to Massachusetts is asymmetrical. Although Massachusetts bears travel to Vermont, Vermont bears are less likely to travel to Massachusetts for food. There is no oak very close to the project area and bears that utilize the project area would need to travel outside of their home range to search for oak. Hammond Dec. 5, 212. Oak as an alternative food source presents problems and risks to black bear. Oak is located at lower elevations in areas where there is a higher density of roads and people. This higher density of human activity and infrastructure poses a greater risk to the bears when they are searching for this alternative food source. Hammond Tr. Page 212.

Although Deerfield witnesses Parsons and Wallin claim that the presence of alternatives to beechnuts diminish the necessity or importance of beechnuts to black bear

in southern Vermont, they have failed to identify those alternative food sources. They have also failed to offer any certainty regarding the availability or use or reliance on these alternative food sources by the black bear that utilize the bear scarred beech habitat to be destroyed or imperiled by the project. Mr. Wallin was repeatedly asked to identify the nutritional food sources that serve as an alternative to beech nuts. In responding to Chairman Volz, Mr. Wallin admitted “I believe I’ve already stated that we don’t know what those are.” Dec. 4 Tr. at 134. Mr. Wallin has not attempted to quantify the extent to which black bear are utilizing additional sources of food in the project area or elsewhere. Page 105-06. Mr. Parsons also concedes that he does not know whether black bear are using other food sources or whether bear are becoming nuisance bears and relying on bird seeds or human sources of food. Page 108-09.

The importance of beechnuts as a nutritional source for the black bear that feed on the bear scarred beech within the project area is further enhanced by the absence of a quality food resource in the nearby wetlands. There is no evidence that the wetlands in the area of construction and operation of the turbine strings are utilized by the black bear. The wetlands around the project site revealed that potential bear food is limited. There are no skunk cabbage present, and only scattered stems of sedges, and little to no spotted touch-me-not. MLS-3

Rather than speculate or cast an even wider net in search of alternative food sources, the Board should defer to the expertise of Forrest Hammond and his opinion informed by years of experience working with, studying, and managing black bear in Vermont. Mr. Parsons himself has acknowledged that Mr. Hammond has more

experience and familiarity with the bear habitat in southern Vermont. Mr. Hammond is the ANR expert on black bear habitat in southern Vermont. ANR is the state agency with primary responsibility and expertise in wildlife issues. See UPC page 5. The Board should defer to the expertise of the Agency witness and adhere to its own precedent and conclude that the bear scarred beech that will be destroyed or imperiled at the project site is necessary wildlife habitat.

- II The proposed project will result in direct and indirect impacts and constitutes and undue adverse effect on black bear and black bear habitat.

The evidence and findings support a conclusion that the project will result in direct and indirect impacts to black bear habitat. Constructing roads, power lines, 37 wet ponds, and placing a large industrial facility within core bear range and fragmenting remote areas that are considered to be of regional importance for black bears as a mast feeding area would have an undue adverse impact on black bears and their habitat. The project would significantly reduce the area of critical habitat available to them in southern Vermont. During most years black bears select mast from concentrations of beech trees in remote locations. Successful reproduction and survival of young bears is linked to the bears having access to this resource. The removal and permanent conversion of this habitat will be detrimental to the black bear and significantly imperil its habitat. Hammond pf surrebuttal at 19-20.

Both the ANR expert on black bear and black bear habitat and Dr. William Kilpatrick have testified that the project will result in an undue adverse effect to the black

bear and black bear habitat. The project will permanently remove 366 bear scarred beech on 35 acres of core bear habitat along two remote ridgelines. Bear will be unable to return to these trees to feed because they will be forever destroyed. Moreover, the project will indirectly impact almost 600 acres of bear scarred beech with concentrations greater than that observed in any other part of the region by ANR biologists including former wildlife Director McLaughlin. The record and findings demonstrate that the project will result in the displacement of bears from the habitat, the loss of fitness to the bear population, and increased exposure to human encounters. As Mr. Hammond has testified the project presents the worst case scenario for impacts to the necessary wildlife habitat for black bear.

In evaluating whether the project will result in an undue adverse effect, the Board should be guided by its recent ruling in another wind farm case with far fewer impacts. See Amended Petition of UPC Vermont Wind, LLC, Docket No. 7156 (Aug. 8, 2007). In the UPC case, the Board found that the “project, without appropriate mitigation, would result in significant, undue adverse impacts to black bear behavior, survival, reproductive success and relationships to specific habitat conditions.” UPC at 85, finding 254. The number of bear scarred beech trees removed in the UPC matter was only 20, which represented approximately 1.3% of the bear-scarred beech at the project site. The Board concluded that the impacts of the project extended beyond the cutting of individual trees. “The construction, operation, and maintenance of the Project can have indirect impacts on bears’ use of their habitat.” UPC at 87. The Board concluded that all of these impacts on black bear need to be mitigated.

In the present action, the project will result in the permanent removal of 366 trees. In addition, the construction, operation, and maintenance of the project will indirectly impact at least 569 acres of necessary wildlife habitat. Application of the UPC ruling, should compel the Board to conclude that the project will result in an undue adverse impact to black bear and black bear habitat.

Deerfield's efforts to expand the area against which the impacts of the project should be evaluated are unavailing. Deerfield stretches the area of evaluation to include the eight square miles the forest service has included in its NEPA review. Deerfield argues that the 366 trees represents 1.3% of the estimated 28000 bear scarred beech in the surrounding eight square miles. Consideration of the eight square miles surrounding the project, however, is not the basis for comparison when measuring a project's impact in Act 250 or Act 248. Indeed, Mr. Wallin admits that evaluation of the eight square miles was part of the Forest Service NEPA process and not as part of the State review of the project. one at the direction of the forest service. Wallin Tr. Page 112. The eight square mile review was not part of Wallin's direct impact analysis.

In evaluating the direct impacts of the UPC project, Mr. Wallin did not consider the area outside the project site.³ Instead, Mr. Wallin compared the direct impacts of the project against the potential direct impacts associated with the search perimeter around

³ Similarly, in the original Searsburg project, Mr. Wallin did not consider the eight square miles of Green Mountain National Forest land surrounding the project. Instead, he evaluated the potential area to be impacted by the construction of the project to determine direct impacts. He considered the indirect impact zone, which at the time was ½ mile of the project string to assess indirect impacts. ANR 5, Searsburg finding 146.

the proposed turbine string. The Board in the UPC matter adopted this method of evaluating the direct impacts of the project. Referencing Mr. Wallin's testimony, the Board made the following finding:

Within a 600-foot radius of the Project, more than 1,460 bear-scarred beech trees were identified through intensive field surveys. With the January 2007 project layout, an estimated 20 bear-scarred beech would be removed, which represents approximately 1.3% of the bear-scarred beech on the project site.

UPC, finding 252, page 85.

Mr. Wallin adopted this methodology when conducting his habitat assessment in the present action. He conducted a survey of the 300 feet surrounding the project to determine the potential direct impacts of the project. Application of the methodology applied in UPC to the present action results in the following finding:

Within a 300 foot radius of the Project, 1586 bear scarred beech trees were identified. With the July 2008 layout, an estimated 366 bear scarred beech trees would be removed, which represents approximately 22.6% of the bear scarred beech at the project site.

Deerfield witnesses rely on Wallin's Searsburg studies in opining that the Deerfield project will not have an indirect impact on the bear population that utilizes the habitat destroyed or imperiled by the project. The results of the Searsburg study are not instructive or indicative of what effect an industrial wind project which will directly destroy or remove 366 bear scarred beech from core habitat will have on the bear population. Construction of the Deerfield project will destroy 366 bear scarred beech. Within ¼ mile of the turbine string are 569 acres of bear scarred beech trees. The Searsburg project, in contrast, did not require the taking or destruction of any bear scarred beech to construct the project. ANR 5 Impacts to Critical Wildlife Habitats From a

Proposed Wind Turbine Project: Searsburg Vermont.at 7. The Searsburg site did not have mapped bear scarred beech within ¼ mile of the project. There were no clusters of bear scarred beech in the densities that exist around the turbine site at the Searsburg project. Wallin Page 37. There were no bear scarred beech in very close proximity to the turbine site. Wallin Tr. at 42. According to Wallin's habitat assessment, the closest stand containing a substantial beech component is situated between ¼ mile and ½ mile from the existing turbines. Wallin pf direct at 4. The Searsburg site, therefore, does not present the same model of what exists on the Deerefield site. Wallin Tr. p. 42 lines 18-20.

The Searsburg studies do not provide any information on what effect the project will have on the bear population's use of the 569 acres of densely concentrated bear scarred beech surrounding ¼ mile of the Deerfield project. Wallin and Parsons claim that based on the Searsburg studies, the bears will return to this habitat. According to Wallin, however, there were no dense concentrations of bear scarred beech within ¼ mile of the Searsburg site. In his initial assessment in the Deerfield matter, Wallin admits that indirect impacts are still in question. Because there exists no significant blocks of beech habitat any closer than ¼ mile of the existing Searsburg site, "[t]his has prevented investigation of bear use of habitat in close proximity of the operating turbines." DFLD-JW-3, page 3. Mr. Wallin admits that the Searsburg studies do not show whether the level of activity by bears at the Searsburg site after construction of the project is the same as the level of activity before construction. Wallin Tr. Dec. 4, 2008. page 60-61.

Mr. Wallin distinguished the Searsburg studies from projects that involve direct

impacts while testifying in the UPC. Like here, the UPC project involved a direct taking of bear scarred beech. Mr. Wallin noted that the Searsburg project was not constructed within what is referred to as necessary wildlife habitat. Page 46 lines 7- page 47 line 2. Mr. Wallin's hair snag studies are not population studies and do not describe or detail preconstruction use. There is no way to compare the preconstruction activity of the bears with the post-construction activity. The studies are not population studies. Wallin Dec. 4, 2009, page 89

The ANR Department of Fish and Wildlife, including former Director McLaughlin, has critiqued and questioned the use of the hair snag studies. McLaughlin and Hammond opined that "[w]e do not believe the proposed study is robust enough to provide a meaningful analysis of current bear use of the site." To assess the impact of the proposed expansion on the black bears, McLaughlin and Hammond recommended that the developer conduct a field study to assess the potential impacts resulting from the proposed wind farm expansion into an area that is critical habitat and considered of regional importance to black bears." McLaughlin and Hammond recommended that multi-year population studies including several years of abundant beechnut production be conducted using telemetry to monitor individual study animal behavior, habitat use and movement in relation to human activities and developments." VNRC 8 at 2 The developer failed to heed this request and did not conduct these studies.

Although the Searsburg studies cannot predict whether bears will return to the 569 acres of bear scarred beech, studies are not required to concluded that no bear will be able

to utilize the 566 bear scarred beech trees or 35 acres of core habitat along these two remote ridgelines. The prime bear habitat that all witnesses have agreed bear are currently utilizing will be permanently lost and replaced with the project infrastructure.

Parsons and Wallin's suggestion that the Searsburg studies are reliable predictors of bear behavior at the Deerfield project is belied by the admission of the Deerfield panel. In describing the eleventh hour mitigation proposal, Ms. Goland testified that the outstanding research does not provide much information on the impacts of wind farms. Dec. 12, 2008 Tr. Page 207 lines 9-14.

The bear scarred beech mapping Mr. Wallin presents in JWA10 is unreliable and does not establish that bears will make use of the area within ¼ mile of the Deerfield project. The closest cluster of bear scarred beech at the Searsburg site is located within ¼ mile to ½ mile outside of the turbine string. Mr. Wallin mapped the bear scarred beech depicted in JW10A in 2005 or 2006. This mapping was done nine to ten years after the project was constructed. Assessing the age of bear scarring is subjective and it becomes more subjective the older the scarring becomes. Wallin Tr. Page 56-57. This is the first project where Mr. Wallin had actually been asked to age scarring of beech trees. Page 59-60. Mr. Wallin did not age the scarring of trees while with the Department of Fish and Wildlife where his principal function involved the restoration of wild turkeys.

Mr. Hammond who developed the aging methodology testified that most of the trees that Wallin claimed were scarred since the Searsburg project was constructed evinced scarring that was so old it would be impossible to tell the age of the scarring or to accurately opine that the scarring occurred since the construction of the project.

Hammond Tr. 190-91. Mr. Forrest Hammond and his colleagues at the Vermont Department of Fish and Wildlife have more experience in aging the scarring of beech trees. His testimony and findings regarding the age of the scarring with respect to the trees identified on JW-10A are more reliable than that of Mr. Wallin.

As outlined above, there is no evidence or information from the Searsburg project that shows that bears will make us of the almost 600 acres of bear scarred beech within ¼ mile of the Deerfield project.

III. Application of the three sub criteria should compel the Board to deny the CPG

The project will destroy approximately 35 acres of bear scarred beech and imperil or indirectly impact 569 acres of bear scarred beech. Because any of the three subcriteria of Act 250 are satisfied in the present action, the Board must deny the Petitioner's request for a Certificate of Public Good.

A. The loss of bear habitat is not outweighed by any economic or public interest.

Maintaining the southern Vermont bear population provides economic, environmental and recreational benefits to the public. 10 VSA 6086(a)(8)(A)(i). The economic experts testifying on behalf of Deerfield and other project proponents did not offer any testimony comparing the potential benefit of the project to the environmental and recreational losses associated with the project. See Kavit Tr. at 43; High Tr. at 157. Mr. Hammond has testified in great detail about the effect of the lost habitat on the bear population and the ability of the Department to manage for wild bear. The loss of this

critically important regionally significant habitat will displace bears from the area and cause, undermine their fitness, and bring them into closer contact with humans. This human interaction is detrimental to both the bear and human population. Mr. Hammond cautioned that the loss in habitat can affect the cultural carrying capacity which is the human tolerance for bears. Mr. Hammond testified about the importance of the hunting tradition and the role hunting plays in contributing millions of dollars to the state each year.

In addition to Mr. Hammond's testimony, the Board should adopt the conclusion of the *Killington* decision to hold that the potential benefits of the project are not outweighed by the recreational, economic, and environmental loss to the public. In *Killington*, the Environmental Board concluded that although the benefits of the black bear may be intangible, "the protection provided for this value by Criterion 8(A) reflects a broad public desire to maintain for the future the balance existing between man and his works and the natural world, and that sub criterion allows this balance to be disturbed only when the benefits to the public clearly outweigh the loss. *Re: Killington, Ltd. And International Paper Realty Corp.*, No 1R0584-EB-1, Findings of Fact, Conclusions of Law, and Order (Vt. Env't Bd., Sept. 21, 1990) at 23.

B. The applicant has not applied all reasonable mitigation

In the UPC matter, the Board found that the project without mitigation would result in an undue adverse impact. As outlined above, the present project results in greater impacts to the bear scarred beech habitat. The present project, therefore, without mitigation, will result in an undue adverse impact.

Deerfield has not offered any mitigation that would offset the destruction or imperilment of this significant habitat loss. The expectation or hope that the Forest Service will alter its management area is too speculative to allow the Board to issue a permit. See Killington, at 25-26. The eleventh hour offer for a 4 to 1 mitigation of the direct impacts only is also too speculative and more importantly inadequate. The mitigation proposal ignores the indirect impacts. Indeed it was the indirect impacts that the Agency was most concerned about in the UPC matter. The applicant had reduced the project impacts to the taking of an estimated 20 bear scarred beech trees. John Austin testified that “the direct impacts are modest. It’s the indirect impacts that we’re most concerned about here.” DFLD cross 5 at 199-200. As John Austin testified and the Board found although there would likely be some indirect effects from the project, that extend beyond the direct loss of habitat associated with the project footprint, the extent of such impacts was unknown. UPC Finding 253. The proposed mitigation addressed the potential bear avoidance. DFLD cross 5, page 163 lines 20, page 164 line 3. John Austin testified that although indirect impacts from a wind project may be different, the degree of difference is unknown. DFLD cross page 168, lines 1-2, page 177, lines 5-6. To answer this question and to address this uncertainty, ANR stipulated and the Board ordered the conservation of 2700 acres which was found to be an outstanding mitigation proposal. FH- page 177 Tr. 177.

There are alternative sites available

The United States Department of Interior and the Environmental Protection Agency have both advised that there has been an insufficient assessment of alternatives to

the project. There are approximately 36 other potential wind sites available, and approximately 28700 acres of management area suitable for wind development. Deerfield has not assessed whether these alternative sites will meet its needs without incurring less environmental havoc. Deerfield is not limited to any particular location and can seek a special use permit in another location of the Green Mountain National Forest.

As recommended by the EPA, the east only alternative is a preferred alternative that would result in less impact to the necessary black bear habitat.

CONCLUSION

Based on the findings and discussion outlined above, the Vermont Public Service Board is unable to make the requisite finding that the project will not result in an undue adverse impact to the natural habitat. Accordingly, the Board cannot issue a Certificate of Public Good to the Petitioner Deerfield.

Dated at Waterbury Vermont this 21 day of January 2009.

VERMONT AGENCY OF
NATURAL RESOURCES

BY: Judith L. Dillon
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