

**RE: APPLICATION OF ANTRIM WIND ENERGY, LLC FOR CERTIFICATE OF
SITE AND FACILITY FOR ANTRIM WIND ENERGY IN ANTRIM, NEW
HAMPSHIRE**

**TESTIMONY OF TREVOR LLOYD-EVANS OF MANOMET CENTER FOR
CONSERVATION SCIENCES ON BEHALF OF COUNSEL FOR THE PUBLIC**

JULY 2012

**I Trevor Lloyd-Evans do hereby state under the pains and penalties of
perjury that the following attached testimony is true.**



_____**Trevor Lloyd-Evans**

Qualifications – Trevor Lloyd-Evans

Please state your name and business address.

Trevor L. Lloyd-Evans. Manomet Center for Conservation Sciences, PO
Box 1770, Manomet, Massachusetts 02345-1770.

Who is your current employer and what position do you hold?

I am currently employed by Manomet Center for Conservation Sciences (MCCS) as Senior Staff Biologist and have held this position since 1972. My specialties are conservation biology, evolution and avian ecology. At various times I have taught these topics both informally to staff and interns, also as courses for credit to undergraduate and graduate students for a consortium of colleges and universities. (Faculty, Field Biology Training Program MCCS 1986-1997).

What is your background and qualifications?

Honours Zoology B.Sc. 1968 from the University of Wales (United Kingdom) and graduate coursework, qualifying exams and oral exams in Ecology at Boston University, Massachusetts. North American (Bird) Banding Council, Committee, Trainer (1998-present). Nuttall Ornithological Club, Cambridge, MA, Council, Vice-President, President (1977-1984). Committee member Partners in Flight NE Region (US), Partners in Flight (Commonwealth of Massachusetts), Massachusetts Avian Records Committee, member and Chair (1996-2003 and 2011-present).

I have headed the Bird Migration Banding Program at Manomet Bird Observatory (MCCS) since 1972 and conducted fieldwork for impact studies, State and Federally funded surveys, contract and in house research in avian conservation biology, ecology, physiology and evolutionary biology in US States

1 and several foreign countries. Refereed publications in professional journals,
2 presentations and contract reports are available on request.
3 This is my third appearance as an expert witness for the Counsel for the Public in
4 New Hampshire.

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7 **Purpose of Testimony**

8 The purpose of this testimony is to present the State of New Hampshire
9 with a summary review of the reports, testimony and literature available to date
10 which address the potential impacts to birds and flying mammals from the Antrim
11 Wind Energy Project, New Hampshire. I provide a review of the techniques used
12 and the opinions and results expressed to date; also recommendations for
13 priorities and mitigation requirements for scenarios resulting from a decision to
14 build this wind energy facility. This review currently lacks any fall migrant raptor
15 data from 2012 which will be important to establish yearly variations at this site.

16
17 **Q. What materials were consulted prior to this revue?**

18 The NHSEC website provided an up-to-date reference to the project. All
19 documents relating to birds and bats in terms of habitat, breeding, migration,
20 impact mitigation and general ecology were reviewed. The relevant links and
21 references provided within these documents were also consulted.

22 Two recent studies of raised cut-in speed in turbines to reduce bat
23 mortality (Arnett et al. 2011 and Baerwald et al. 2009) are summarized and

commented on as a tool for post-construction mortality with a more appropriate time period than proposed by the applicant.

Q. What are the potential effects on Migrating Birds and Bats?

TRC Engineers (Daytime Raptor Migration survey Report for the Antrim Wind Energy Project – Spring and Fall 2011) P 17 correctly note: “Recent studies have shown that there is little correlation between pre-construction risk assessments and actual documented mortality of avian species at wind farms (Ferrer et al. 2011, de Lucas et al. 2008, Sharp et al. 2011).” This point was also raised at the Technical Session 22nd June 2012. Pre-construction surveys and risk assessments determine the bird and bat species at potential risk from the proposed development. They also define times, dates, seasons, weather effect and ecological factors relevant to this risk and suggest mitigation, prior to the decision of the SEC. Post-construction mortality is the best and most relevant test of what actually happens and whether adaptive management changes in operation are required (in co-operation with USFWS and NHFGD), as proposed in the Avian and Bat Protection Plan (24th January 2012 and revisions).

Without conditions from the SEC mandating thorough post-construction monitoring, the poor correlation pre- and post-construction gives a weak basis to conclude that there will be no local population level effects. This might be

1 particularly true of, for example, migrant bat species that are already of concern
2 to NHFGD as a result of white-nose syndrome.

3

4 **What are the potential effects on Migrating Raptors?**

5 The 2011 Fall Raptor Survey observed 460 raptors (47%) within the
6 potential area of development, and of those 296 (30%) flew within the 50 – 500'
7 above ground range. The proponent's data show that fall migration is the most
8 likely period for potential migrant raptor mortality. The natural variations in
9 populations and migratory activity require multiple-year studies to adequately
10 document this risk. Three years of biologist staffed post-construction mortality
11 surveys as noted above could be combined with the three years of controlled cut-
12 in and acoustic monitoring studies. A search for dead bats proposed in the fall
13 period under the Avian and Bat Protection Plan could be effectively combined
14 with searches for dead birds, especially raptors during fall migration. Because of
15 the general NE – SW orientation of the ridge, the fall migration is of similar
16 importance to migrating New England raptors to the turbine development at
17 Groton, New Hampshire. Because the SEC ordered three years of biologist
18 staffed post-construction study at Groton, a similar period would seem adequate
19 to detect yearly variation at Antrim.

20 **Q. What studies are needed to detect methods of reducing bat mortality**
21 **after construction?**

Reducing bat mortality was particularly noted in discussions with USFWS and NHFGD because of the number of protected species presumed present and recent population losses attributed largely to White Nose Syndrome. Most bat activity and thus potential mortality occurs at low wind speeds below 6 ms^{-1} (Reynolds 2001, Horn et al. 2008). The proponent references these studies and also Arnett et al. (2011) where a raised cut-in speed experiment with adequate controls in Somerset Co. PA reduced bat mortality by 44%-93% over a two-year study. On low wind days from 27th July to 9th October experimental cut-in speeds were raised from 3.5 ms^{-1} to 5.0 and 6.5 ms^{-1} . Thus mortality at fully operational speeds was, on average, 5.4 and 3.6 times greater than mortality at curtailed turbines in 2008 and 2009 respectively. Raising the cut-in speed to 5.0 ms^{-1} during 75 days per year was calculated to reduce annual power generated by only 0.3%. See also a published 60% reduction of bat mortality by Baerwald et al. (2009) when cut-in speeds were raised to 5.5 ms^{-1} .

The proponents Avian and Bat Protection Plan (sections 7, 8 & 9) suggest a one year controlled cut-in and acoustic monitoring study followed by adaptive management in co-operation with USFWS and NHFGD. Because of the variations in populations, weather and migratory activity referenced above, a three-year study post-construction would provide much more rigorous data for the adaptive management to follow. The two years of the Arnett et al. (2011) showed considerable variation.

1 **Q. Is mitigation required at this site post-construction?**

2 The proponent's studies to date have documented the presence of
3 breeding birds, nocturnal migrant birds, presumed breeding and certainly migrant
4 bats. The adaptive management and close co-operation with NHFGD and
5 USFWS at the end of each year is the best method of measuring any mortality.
6 All mortality caused by AWE turbines, if the proponents proposal is granted by
7 the SEC, is additive. Thus many birds are killed each year by lighted buildings
8 and other structures, towers, gas flares, traffic, cats and other anthropogenic
9 causes. It is important to remember that we are discussing additional potential
10 mortality if this project is approved. The additional lengths of time suggested as
11 conditions on the permit would allow the State of New Hampshire to much more
12 effectively consider adaptive management during these three years post-
13 construction and co-operatively manage any problems for the life of the project
14 with the participation of USFWS and NHFGD. In all years post construction,
15 annual reports should be submitted to and discussed with USFWS and NHFGD.
16 Without a rigorous, multiple-year post-construction mortality survey, it is
17 unreasonable to assume we have adequately addressed real impacts of this
18 proposed development.