Sea Duck Joint Venture
Annual Project Summary for Endorsed Projects
FY 2008 – (October 1, 2007 to Sept 30, 2008)

Project Title #102: Delineating Breeding Populations and Tracking Night-time Movements of Long-tailed Ducks Wintering in Nantucket Sound

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Partners: U. S. Geological Survey, Patuxent Wildlife Research Center

Project Description: Nantucket Sound is the winter home of 100,000's of sea ducks, particularly Common Eider, all three North American scoters, and Long-tailed Duck (LTDU). The latter is the most abundant species and land-based Christmas Bird Counts of LTDUs from Nantucket Island have exceeded one-half million individuals.

LTDUs have a circumpolar breeding distribution, but which of the possible breeding populations between arctic Alaska, Canada, Greenland, Iceland, Scandinavia, and Siberia are represented in the hundreds of thousands of ducks overwintering in Nantucket Sound? The question regarding population delineation is of general interest in understanding the ecological impact of changes in the quality of the LTDU wintering habitat of Nantucket Sound. Whether this impact is the direct effect of collision mortality at a proposed wind farm (if constructed), or the indirect effects due to loss of habitat or decline in habitat quality, it is difficult to interpret the ecological significance of these effects without accurate definition of the source breeding populations for LTDUs.

We are conducting a multi-year study of winter sea ducks in Nantucket Sound and are currently focusing on LTDUs. We are using satellite telemetry to track the movements of wintering LTDUs in the waters around Nantucket, and to track the movements of instrumented ducks as they migrate between their wintering grounds and their breeding grounds.

Objectives:

The Sea Duck Monitoring Working Group has presented draft recommendations for priorities for North American Sea Ducks, and delineating breeding populations of our target species, LTDU, ranks near the top in priority (SDJV 2005).

Preliminary Results

1. Ten ducks (seven males and three females) were instrumented and six survived the winter season.
2. Surviving ducks demonstrated the pattern of diurnal migration so often observed for this species in Nantucket Sound, but ducks do not make this journey every night. Some ducks appeared not to migrate but stay in one location both day and night. Other ducks apparently spent the night on Nantucket Shoals, not returning to Nantucket Sound at night.
3. Initial results suggest that instrumented LTDUs used a broad area of Nantucket Sound for nighttime roosting sites, and that the roosting locations changed, i.e., one site was not consistently used, even by individual ducks

4. None of the instrumented ducks were recorded roosting on Horseshoe Shoal, although the ducks could have been on the Shoal on nights when the transmitters were in the "off" portion of the winter season duty cycle
5. It is too early to tell from our limited sample of the four ducks that continued transmitting after migration to return to breeding grounds, but the surviving ducks were located in a large region north of Hudson's Bay in an area encompassing approximately 20,000 sq. miles (Figure 8). Instrumented ducks followed similar paths to their putative breeding locations, spending some weeks in and around the maritime provinces of Canada.
6. We are tracking the surviving ducks to determine whether they will return to Nantucket Sound for this winter or whether they select another wintering ground.

Project Status

We successfully completed the first year of this multi-year study and tracked nocturnal movements of six LTDUs during the winter season, and tracked these ducks through spring migration to their putative breeding grounds. Our primary objectives this winter season (2008-2009) are to add to our sample size, improve survival rates, and obtain more data on nighttime locations of instrumented LTDUs in Nantucket Sound, and to further our understanding of LTDU movements back to their breeding grounds.

We have expanded our study to include DNA analyses on the ducks instrumented and a larger sample of non-instrumented ducks to learn more about the origin and genetics of this unusually large population of LTDUs (see also Footnote 1). Working in partnership with expert staff from the U. S. Geological Survey Patuxent Wildlife Research Center, and the Biology Department of Boston University we will attach satellite transmitters to a minimum of 11 LTDUs and draw blood samples from these 11 ducks and up to a total of 40 ducks for DNA analysis. Our total sample of instrumented ducks will be 17 (six ducks survived the full winter season) for the first two years. Our intention is to continue this project in winter 2009-2010 adding an additional 10-15 ducks to our sample size of instrumented ducks as funds are available.

Figure Legends

Figure 1: Daytime (red dot) and nighttime (black dot) locations between December 12, 2007 and mid-April 2008 of six instrumented Long-tailed Ducks as interpreted from satellite fixes with respect to Horseshoe Shoal (red outline). The potential error in "true" location of each of the 654 points is a maximum of 1000 m. Map was created on May 19, 2008.

Figure 2: Daytime (red dot) and nighttime (black dot) locations between December 12, 2007 and mid-April 2008 of Long-tailed Ducks #33 as interpreted from satellite fixes with respect to Horseshoe Shoal (red outline). The potential error in "true" location of each of the points is a maximum of 1000 m. "N" equals the number of mapped points. Map was created on May 19, 2008.

Figure 3: Daytime (red dot) and nighttime (black dot) locations between December 12, 2007 and mid-April 2008 of Long-tailed Ducks #35 as interpreted from satellite fixes with respect to Horseshoe Shoal (red outline). The potential error in "true" location of each of the points is a maximum of 1000 m. "N" equals the number of mapped points. Map was created on May 19, 2008.

Figure 4: Daytime (red dot) and nighttime (black dot) locations between December 12, 2007 and mid-April 2008 of Long-tailed Ducks #36 as interpreted from satellite fixes with respect to Horseshoe Shoal (red outline). The potential error in "true" location of each of the points is a maximum of 1000 m. "N" equals the number of mapped points. Map was created on May 19, 2008.

Figure 5: Daytime (red dot) and nighttime (black dot) locations between December 12, 2007 and mid-April 2008 of Long-tailed Ducks #37 as interpreted from satellite fixes with respect to Horseshoe Shoal (red outline). The potential error in "true" location of each of the points is a maximum of 1000 m. "N" equals the number of mapped points. Map was created on May 19, 2008.

Figure 6: Daytime (red dot) and nighttime (black dot) locations between December 12, 2007 and mid-April 2008 of Long-tailed Ducks #38 as interpreted from satellite fixes with respect to Horseshoe Shoal (red outline). The potential error in "true" location of each of the points is a maximum of 1000 m. "N" equals the number of mapped points. Map was created on May 19, 2008.

Figure 7: Daytime (red dot) and nighttime (black dot) locations between December 12, 2007 and mid-April 2008 of Long-tailed Ducks #41 as interpreted from satellite fixes with respect to Horseshoe Shoal (red outline). The potential error in "true" location of each of the points is a maximum of 1000 m. "N" equals the number of mapped points. Map was created on May 19, 2008.

Figure 8: Google Earth screen shot of locations of surviving LTDUs as of September 15, 2008. The lines connect locations recorded at different times during migration, and end points in northern Canada suggest breeding locations of the ducks.

Figure 1

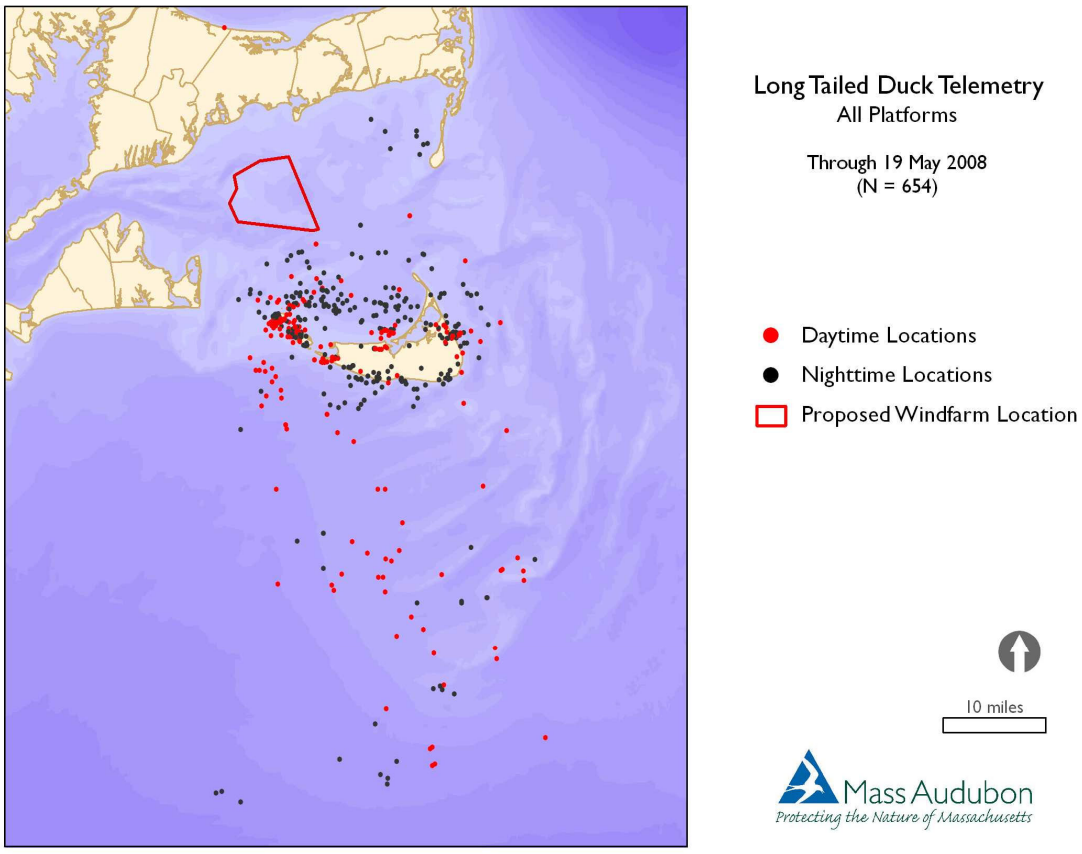
Long Tailed Duck Telemetry
All Platforms
Through 19 May 2008
(N = 654)
Daytime Locations
Nighttime Locations
Proposed Windfarm Location
10 miles
Mass Audubon
Protecting the Nature of Massachusetts

Figure 2

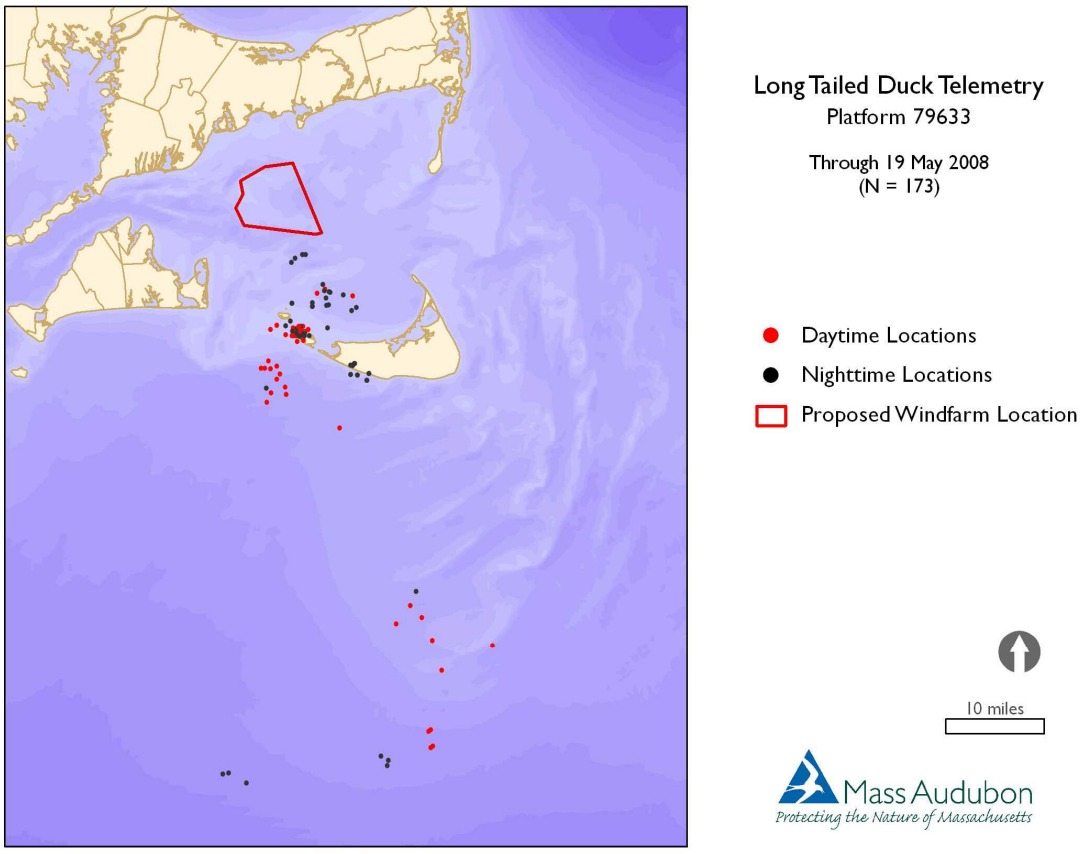
Long Tailed Duck Telemetry
Platform 79633
Through 19 May 2008
(N = 173)
Daytime Locations
Nighttime Locations
Proposed Windfarm Location
10 miles
Mass Audubon
Protecting the Nature of Massachusetts

Figure 3

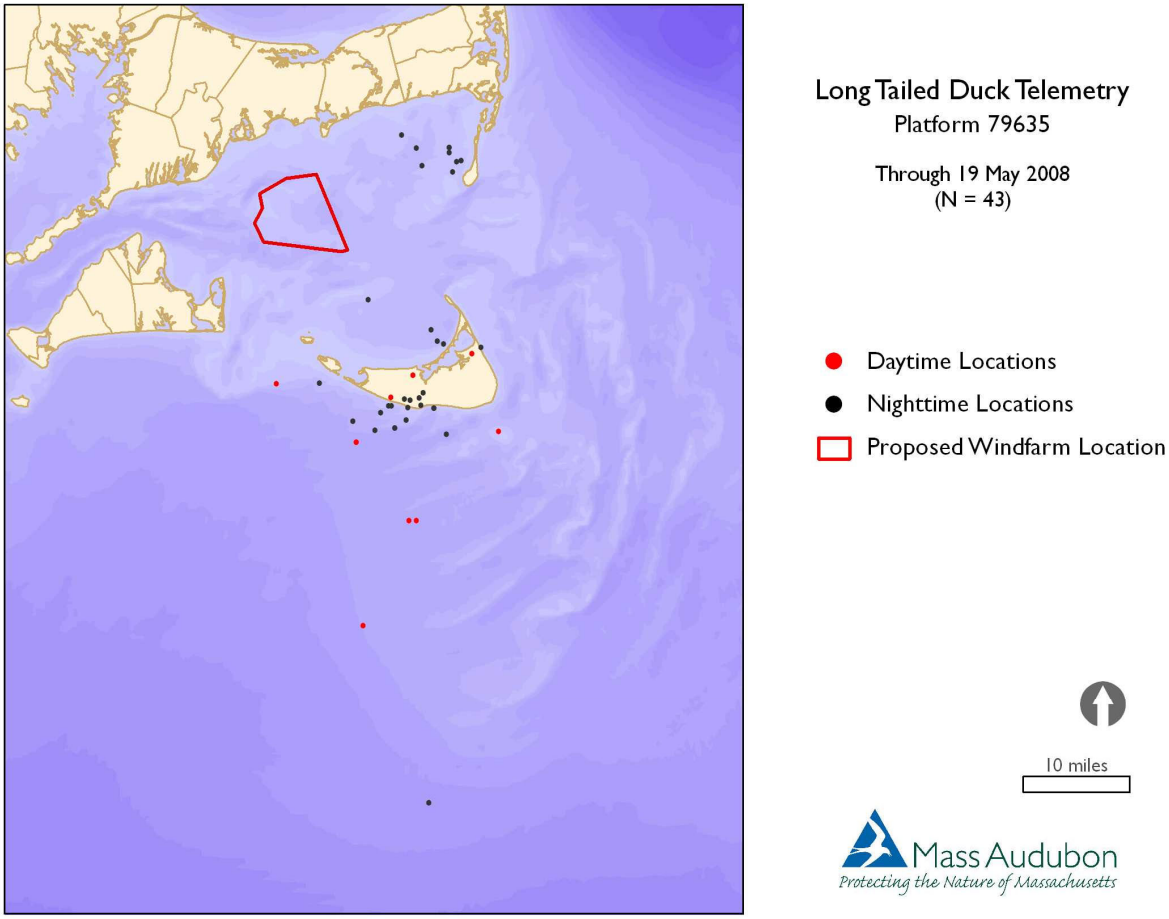
Long Tailed Duck Telemetry
Platform 79635
Through 19 May 2008
(N = 43)
Daytime Locations
Nighttime Locations
Proposed Windfarm Location
10 miles
Mass Audubon
Protecting the Nature of Massachusetts

Figure 4

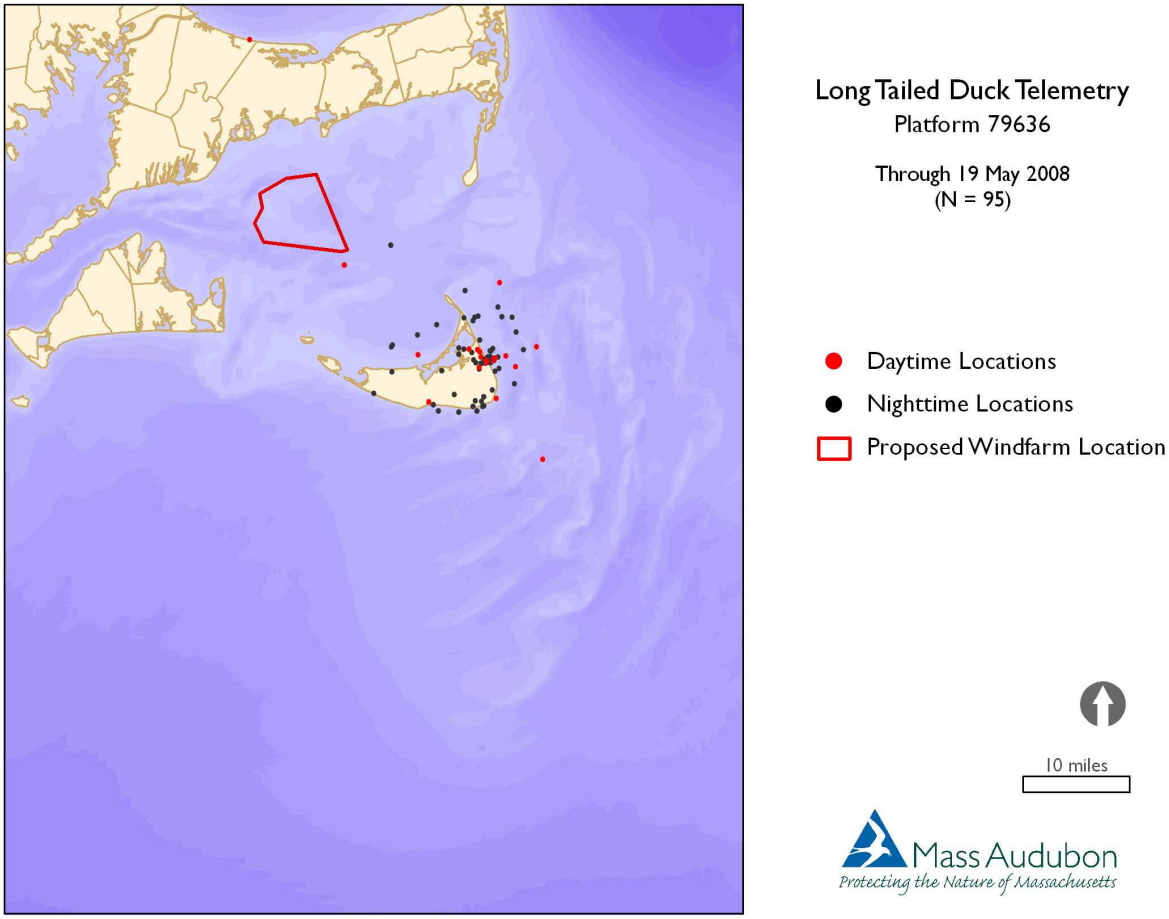
Long Tailed Duck Telemetry
Platform 79636
Through 19 May 2008
(N = 95)
Daytime Locations
Nighttime Locations
Proposed Windfarm Location
10 miles
Mass Audubon
Protecting the Nature of Massachusetts

Figure 5

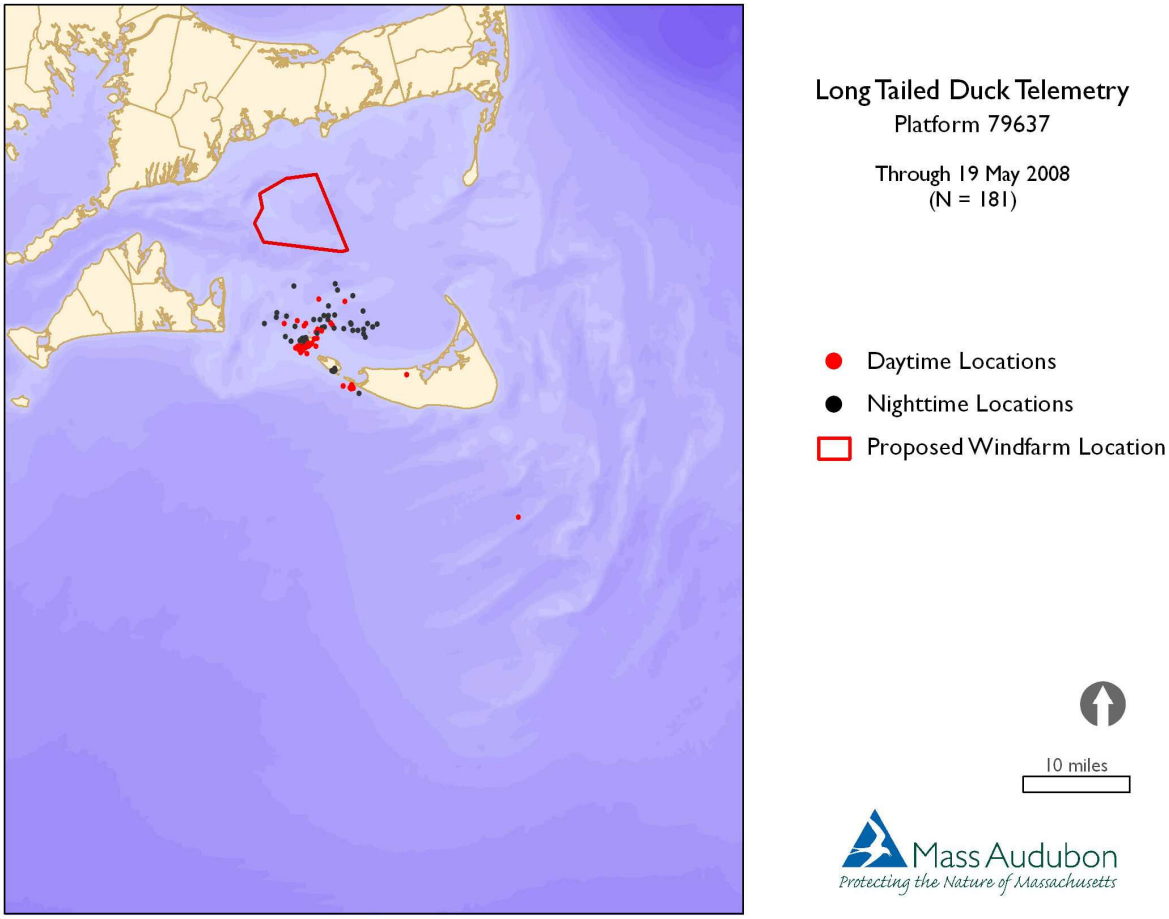
Long Tailed Duck Telemetry
Platform 79637
Through 19 May 2008
(N = 181)
Daytime Locations
Nighttime Locations
Proposed Windfarm Location
10 miles
Mass Audubon
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Figure 6

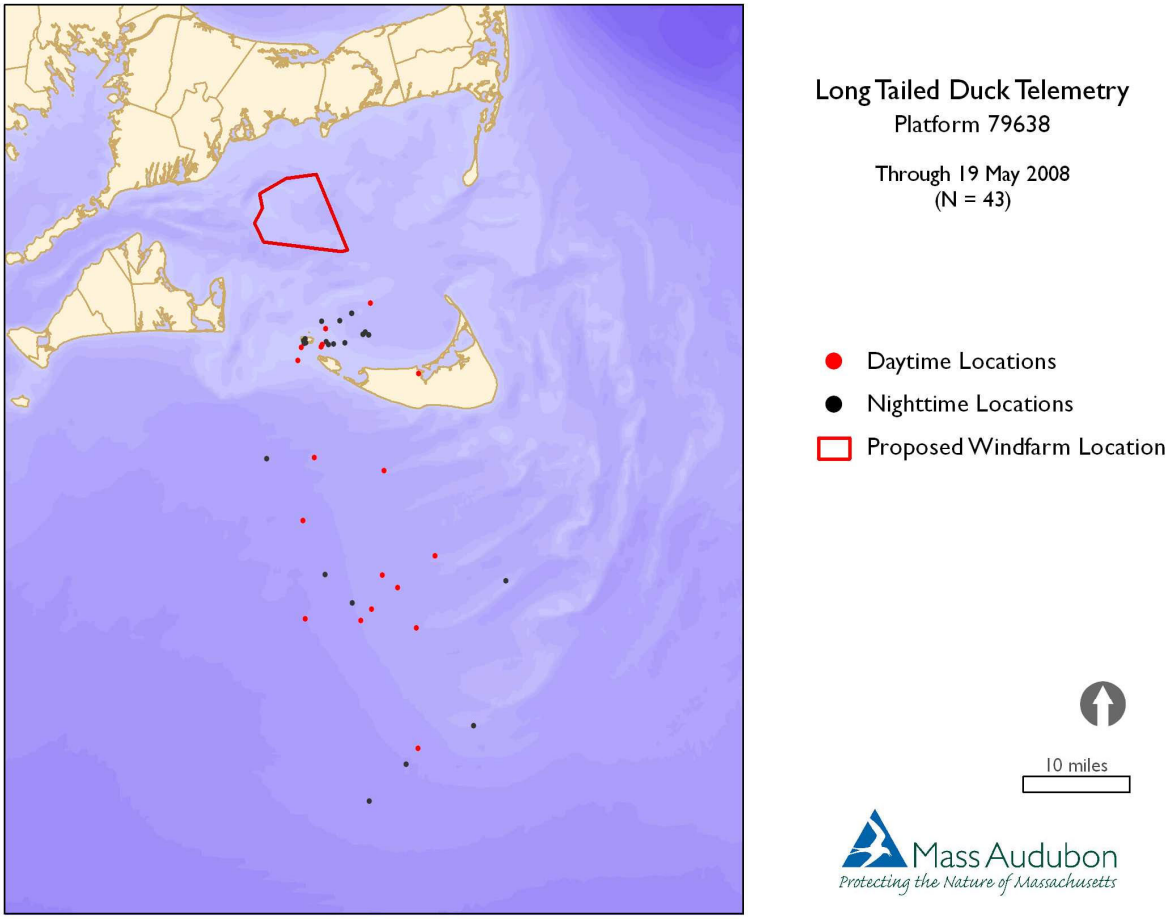
Long Tailed Duck Telemetry
Platform 79638
Through 19 May 2008
(N = 43)
Daytime Locations
Nighttime Locations
Proposed Windfarm Location
10 miles
Mass Audubon
Protecting the Nature of Massachusetts

Figure 7

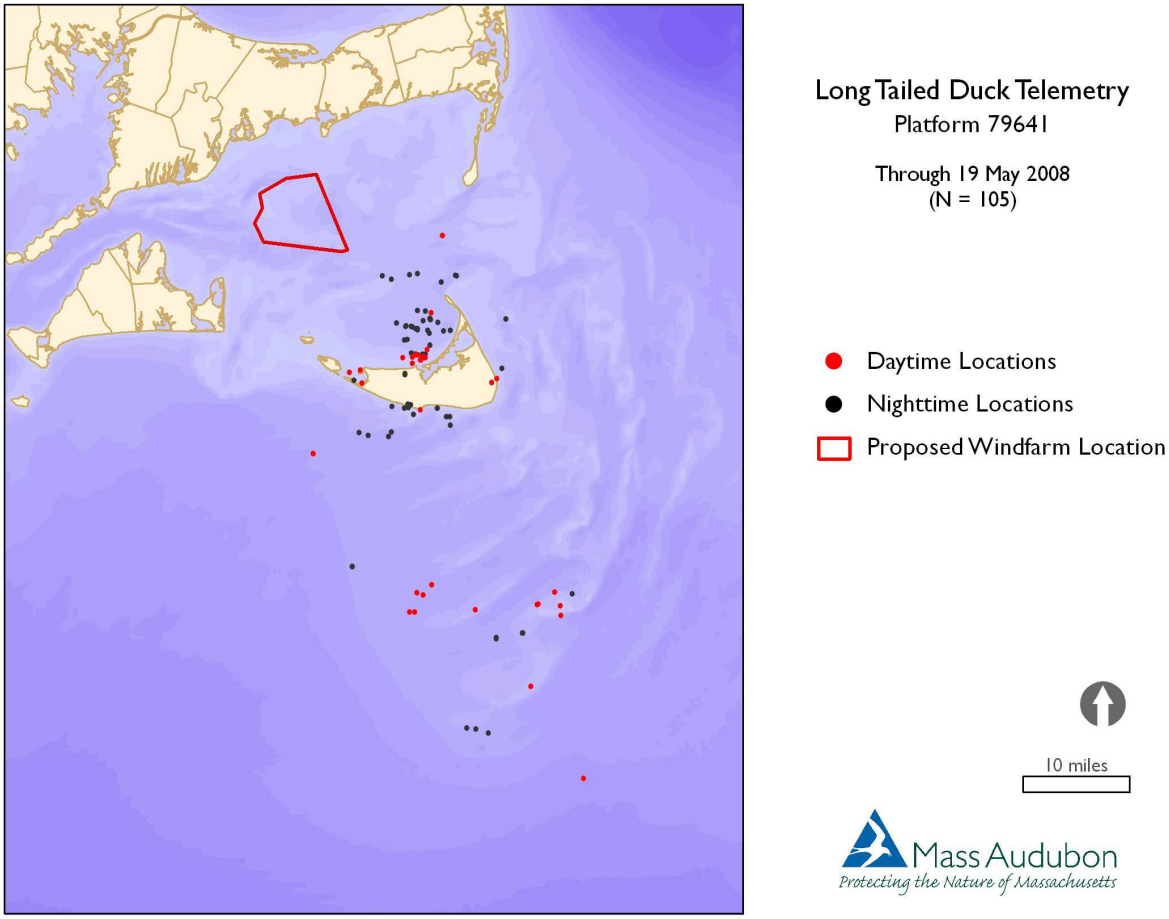
Long Tailed Duck Telemetry
Platform 79641
Through 19 May 2008
(N = 105)
Daytime Locations
Nighttime Locations
Proposed Windfarm Location
10 miles
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Figure 8


Dec 13, 2007
Dec 24, 2007
Mount Saint Helens, US
CN Tower, Canada
Manhattan Island, US
Google Campus, US
Grand Canyon, US
RMS Queen Mary
Image NASA
Image © 2008 TerraMetrics
Image © 2008 DigitalGlobe
Dallas - Fort Worth International
Disney World, Florida, USA
55°12'53.34" N 84°49'56.82" W
Eye alt 2828.51 mi
Google