

## **MS Thesis Defense**

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**Title:** Mitochondrial Control Region Diversity And Phylogeographic Patters Of The Atlantic White-Sided Dolphin (*Lagenorhynchus Acutus*) Along The East Coast Of The United States

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### **ABSTRACT**

*Lagenorhynchus acutus*, the Atlantic white-sided dolphin, is a highly mobile marine species occupying temperate and sub-polar pelagic waters across the entire North Atlantic Ocean. Currently managed as a single population, three stocks have been proposed in the western North Atlantic waters off of New England and Canada. However, over the past few years their distribution seems to be changing in this region with increasing numbers of the species found in waters as far south as North Carolina in the United States. The species greatest threats are derived from anthropogenic sources and it is important to know if any division is forming in the newly expanded region for proper management. This study had two main objectives: to assess genetic diversity of Atlantic white-sided dolphins found along the east coast of the United States in the western North Atlantic, and to identify geographic patterns of haplotype frequency to serve as a basis of comparison by which to identify the origin of individual dolphins found in the southern part of the range. This was in order to see if this species, which is adapted to the pelagic habitat, will show panmixia across a broad geographic range or display finer scale north/south geographic isolations.

The evolutionary history and population structure of *L. acutus* was assessed using a fragment of the control region of the mitochondrial DNA (d-loop). This marker is hypervariable and was selected due to its relatively fast mutation rate, the availability of primers, and for easy

comparison to previous published sequences for this species in other parts of their range. This region was successfully amplified and sequenced from 110 total samples for *L. acutus* in two geographic areas along the east coast (North, N = 89; South, N = 21). The species displayed moderate haplotypic diversity (0.896) but very low nucleotide diversity (0.00706). These findings suggest that this species was affected by historical bottleneck events that reduced their population size in the past and that the population is currently in expansion. The star-like shape of the haplotype phylogeny, which may be indicative of recent population expansion, provided further support for the bottleneck hypothesis. When addressing the population division, the  $F_{ST}$  value (-0.00697) suggests the existence of one continuous population of *L. acutus* along the east coast of the United States. These results correspond with other studies on the species throughout its entire geographic range.