

**Title:** Residency and movement patterns of Blainville's beaked whales at the US Navy's Atlantic Undersea test and Evaluation Center (AUTEK): Response to sonar use?

**Abstract:**

Atypical mass strandings of beaked whales have been correlated with naval sonar exercises in the Bahamas. For this reason, beaked whale populations at the US Navy's Atlantic Undersea Test and Evaluation Center (AUTEK) off Andros Island are being monitored using photo-identification techniques and satellite telemetry. Photo-identifications of Blainville's beaked whales (*Mesoplodon densirostris*) were collected during 4 years (2005-2008) on AUTEK's Weapons Range, a 1500-km<sup>2</sup> area used for fleet readiness training, involving the regular use of mid-frequency active sonars. Thirty-six distinctively-marked whales were identified from high-quality photographs, with 12 whales seen in multiple years (median=1, maximum=4 years), suggesting residency of some individuals on the range. However, when open- and closed-population mark-recapture models were fit to the photo-identification data, we found little support for a resident population at AUTEK. Instead, the models showed evidence of *turnover*, or movement of "known" whales out of the Weapons Range and "new" whales in. To explore whether turnover is in response to military activities, we deployed "dart-tags" comprising a satellite transmitter on a Blainville's beaked whale at AUTEK and used satellite telemetry to track the whale's movement for 25 days before, during and after a sonar exercise that took place 14-17 May 2009. Movement patterns were compared to baseline data from three additional beaked whales: two Blainville's tagged off Abaco and one Cuvier's beaked whale (*Ziphius cavirostris*) tagged off Eleuthera. The AUTEK whale swam several tens of kilometers away during the sonar exercise and returned several days after sonar transmissions ceased, seemingly in response to the sonar exercise. However, caution must be used in interpreting these data from a single whale, highlighting the need for further data. Combined, these projects are increasing our understanding of the spatial and temporal habitat use at AUTEK and will help to mitigate the effects of naval activities on these populations.