MASTS/WHOI Bridge Programme Report

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Thanks to the MASTS-WHOI bridge fund I was able to spend two months at Woods Hole Oceanographic Institute working with Dr. Laela Sayigh. This experience was invaluable as it offered me access to a rich dataset of recordings of bottlenose dolphins in Sarasota Bay, Florida during brief capture release events. A network of researchers has been studying this population for forty years creating a large database of acoustic recordings and demographic (e.g., age, sex, relationships) information for this population. Recordings were made by attaching hydrophones to each dolphin's melon via a suction cup to allow for localization of vocalizations to each animal.

During my time at Woods Hole I was able to locate events within this database in which two male bottlenose dolphins were captured and recorded together. Bottlenose dolphins use signature whistles, which are tonal sounds that change in frequency over time and are specific to each animal. While previous studies have shown that these contours are stable over many years, there seems to be a unique exception to this rule. Male alliance pairs spend the majority of their lives together, cooperatively traveling, hunting, and courting females. Some evidence suggests that these males change their signature whistle contours to become more similar to each other over time. This is interesting as it suggests that dolphins have vocal flexibility throughout the lifespan, and that they participate in convergence, or the process of making one's acoustic output more similar to another's over time.

Five allied male pairs were included in the final analysis as they had been captured together more than once, and therefore allowed for a longitudinal study of the convergence process. While the next step of my analyses will compare the overall whistle contours of the animals over time using SIGNAL 5.0 and a custom script for cross correlating whistle contours (created by Prof V. Janik), we have completed preliminary analyses on whistle parameter convergence. Our findings suggest that two whistle parameters are the first to convergence; maximum frequency, and frequency range. This may suggest that these parameters carry information about group membership. Our data also suggests that the longer the alliance lasts, the more whistle parameters converge. For example, one pair that has been allied for at least 8 years had converged on all six of the whistle parameters that we examined.

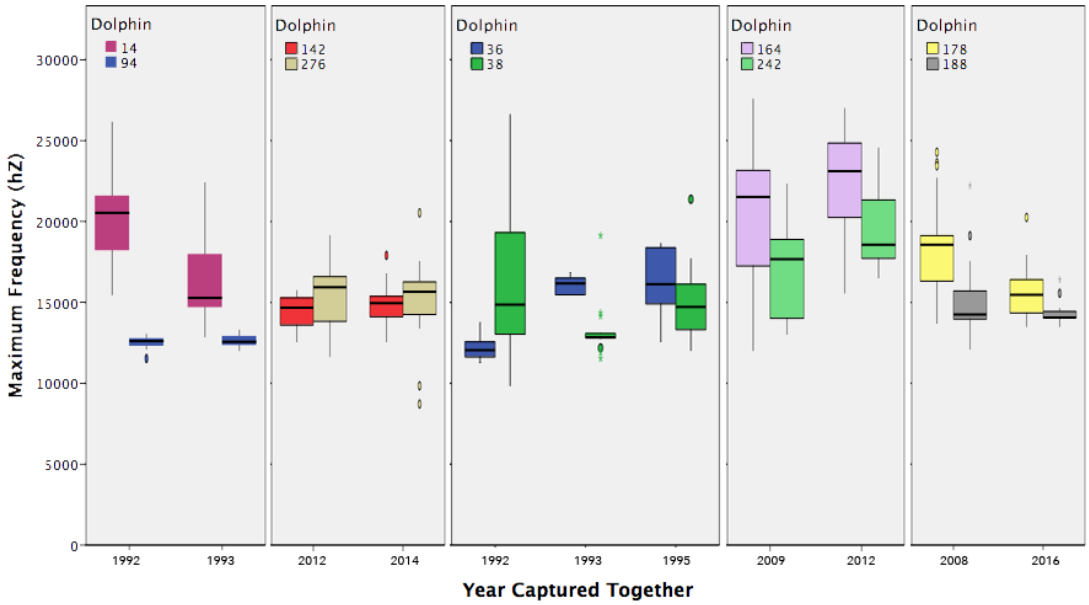

Figure 1: Boxplot of the maximum frequency for 5 pairs of allied males over multiple years. Maximum frequency is said to have converged if the two dolphin's signature whistle maximum frequency became significantly more similar over time.

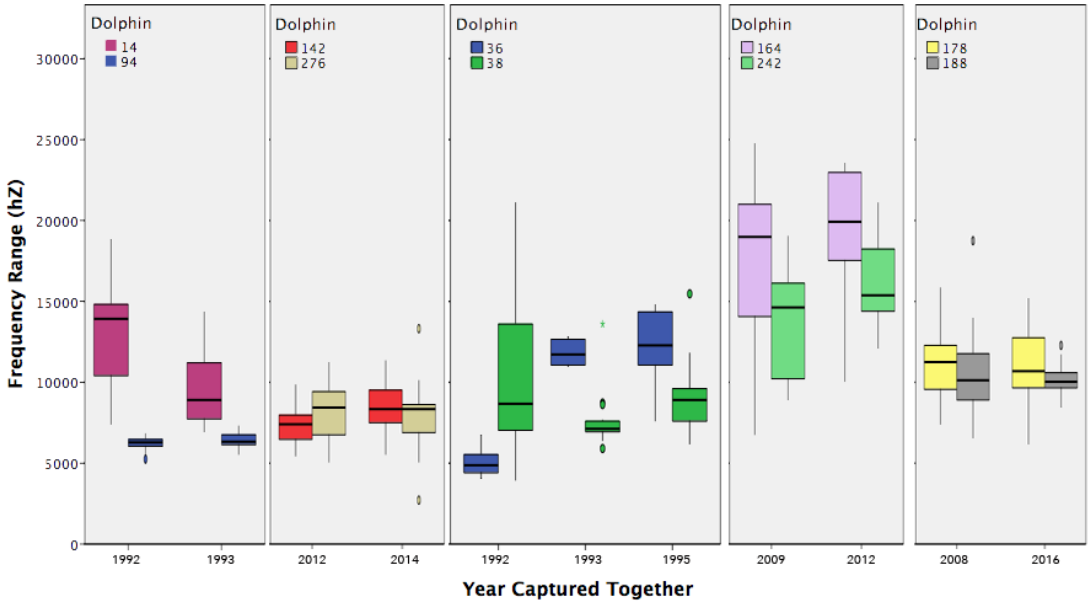

Figure 2: Boxplot of the frequency range for 5 pairs of allied males over multiple years. Frequency range is said to have converged if the two dolphin's signature whistle maximum frequency became significantly more similar over time.

It is important to understand what aspects of the dolphin communication system are important for communication, and which are flexible in order to better predict the potential effects anthropogenic noise pollution may be having on bottlenose dolphins' ability to successfully communicate. I am grateful to MASTS for

offering me this opportunity to further my education, knowledge, and network throughout this experience. I look forward to continued analyses of this rich dataset, and continued collaboration with Woods Hole in the future.