**Tables**

Table 1 (Full Version).

Generalized additive mixed models fit to the acoustic monitoring and visual census records. Potential explanatory variables for the acoustic model included seasonality, temporal lag, inshore receiver effort (“effort (IS)”), offshore receiver effort (“effort (OS)”), animal sex, and animal size. The visual model used seasonality, temporal lag, survey effort (“effort”), animal sex, and animal size. Two of the visual models could not be fit to the data and are listed with “NA” values. The remaining models are ordered from lowest to highest by the Akaike Information Criterion.

Table 1 (top four version).

Generalized additive mixed models fit to the acoustic monitoring and visual census records. Potential explanatory variables included seasonality, temporal lag, animal sex, animal size. In addition, the acoustic model included inshore (IS) receiver effort and offshore (OS) receiver effort; while the visual model included survey effort (“effort”),. For both methods, the four models that were better supported by the data are shown.

Table 2.

Metadata for all receiver stations. Summaries of each station’s raw detection record and Spatial Residence Index (Rspatial) values are included. Asterisks (\*) indicate that male and female values were found to be significantly different.

Table 3.

Metadata for the 38 sharks with both satellite and acoustic transmitters, including six animals which never recorded acoustic detections and seven which never transmitted satellite data. Summaries of each individual’s acoustic, visual census, satellite telemetry, and multimethod tracking histories are included.

**Figures**

Figure 1.

Map of the acoustic array. Top-left inset shows the position of Shib Habil within the Red Sea. Bottom-center inset provides a zoomed in view of the offshore array. Receiver stations are represented by point markers and are colored to show the regional divisions within the array as indicated by the legend in the bottom right.

Figure 2.

Visual and acoustic recapture odds vs (A) seasonality and (B) time lag. The dashed line represents the mean odds of recapture for both methods, putting the visual and acoustic data on the same relative scale. There are clear peaks for both methods in relation to seasonality, though the visual census data is restricted to the spring months when surveys were conducted. Recapture odds are comparatively flat in response to temporal lag, indicating high interannual fidelity in at least a few sharks.

Figure 3.

Visual and acoustic recapture probability over time for the mixed models’ “typical” Shib Habil shark. The acoustic model assumes maximum receiver effort throughout the study and both models assume that the hypothetical shark was tagged/photographed in 2010 and is of average size (4 meters). Annual peaks in recapture probability are clear for both methods and occur at roughly the same time each year but are consistently higher in the acoustic model.

Figure 4.

Map of the array with graduated symbols representing the number of detections per day of monitoring effort at each station (the twelve stations with zero detections are shown in black). Three stations reported significant sexual differences in either detection counts or Rspatial values: one station (shown in blue) recorded higher values for males and two (shown in pink) recorded higher values for females. The remaining 60 stations reported similar values for both sexes.

Figure 5.

Reconstructed multi-method tracks for *R. typus* taggedwith bothsatellite and acoustic transmitters. Recorded behaviors included (A) Emigration from the Red Sea (three tracks shown out of three recorded in the study), (B) migrations away from and returning to Shib Habil (two tracks shown, 17 recorded), (C) Multiple return migrations (one track shown, four recorded), (D) apparent permanent emigration from Shib Habil (one track shown, 11 recorded in the study), and (D, inset) no detected migration away from the study area (one track shown out of three recorded in the study) . Finally (E) shows the monthly latitudinal distribution of tracking data and number of tracked sharks for each month.