

SocialEnv_Movement

Column headings (Movement Behavior tab):

- ✚ **BinNum** = consecutively numbered 10-minute time bins per tag
- ✚ **SI** = surface interval duration (s) per bin
- ✚ **SIProp** = the proportion of each 10-minute time bin spent in a surface interval
- ✚ **DiveFreq** = the number of deep dives (> 10 m & 75 s) initiated per bin
- ✚ **Time** = decimal hour of each 10-minute bin
- ✚ **Speed** = calculated using the start and end locations of each bin (km/h)
- ✚ **Course** = calculated using the start and end locations of each bin (degrees)
- ✚ **CoursDev** = course deviation (degrees) calculated as the absolute value of the difference in course from the previous to the current bin
- ✚ **SpeedS** = speed south (km/h) calculated by considering only the latitudinal movements (i.e., southward displacement) of the group during each time bin
- ✚ **CourseS** = course south (degrees) calculated as the extent to which a group's direction of travel differed from a direct, geographically southerly course of 180°
- ✚ **Singer.10** = the number of singing whales within 10 km of the adult female-calf pair
- ✚ **Singer.Dist** = distance to the nearest singer within 10 km of the adult female-calf pair
 - S.1 = 0 – 2.5 km
 - S.2 = 2.5 – 5 km
 - S.3 = beyond 5 km
- ✚ **Groups.10** = the number of non-singing whale groups within 10 km of the adult female-calf pair
- ✚ **NN.Dist** = distance to the nearest non-singing group within 10 km of the adult female-calf pair
 - NN.1 = 0 – 2.5 km
 - NN.2 = 2.5 – 5 km
 - NN.3 = beyond 5 km
- ✚ **NN.Comp** = Nearest neighbor composition
 - AD (groups containing a single adult)
 - 2AD (groups containing two adults only)
 - FC (a calf and a single adult, presumed to be a female)
 - FCE (a calf and two adults; a female and an escort)
 - FCME (a calf and three or more adults; a female and multiple escorts)

The Movement Behavior tab was used for the models analyzing proportion of time at the surface, speed, speed south, course south, course deviation, and deep dive frequency.

Column headings (Dives tab):

- ✚ **DiveNum** = consecutively numbered deep dives (> 10 m & 75 s) per tag
- ✚ **DiveTime** = the length of each dive in hh:mm:ss
- ✚ **DiveDur** = the decimal hour of each dive
- ✚ **MaxDepth** = the maximum depth (m) recorded for each dive
- ✚ **MeanDepth** = the average depth (m) recorded for each dive
- ✚ All social variables are coded the same as above

The Dives tab was used for the models analyzing dive duration and mean dive depth.

Column headings (Surface Intervals tab):

- ✚ **SINum** = consecutively numbered surface intervals per tag
- ✚ **SITime** = the length of each surface interval in hh:mm:ss
- ✚ **SIDur** = the decimal hour of each surface interval
- ✚ **DistShore** = the average distance from shore per surface interval (km)
- ✚ All social variables are coded the same as above

The Surface Intervals tab was used for the models analyzing surface interval duration and distance from shore.

SocialEnv_VocalActivity

Column headings (CallRate tab):

- ✚ **Bin** = consecutively numbered 10-minute time bins per tag
- ✚ **Calls** = the number of calls produced per bin
- ✚ **Time** = decimal hour of each 10-minute bin
- ✚ **NumCallType** = the number of different call types produced per bin per adult female-calf pair
- ✚ All social variables are coded the same as above

The CallRate tab was used for the models analyzing adult female-calf call rate and the number of call types used per 10 minutes. This included *all* calls produced (including uncommon call types).

Column headings (CallType tab):

- ✚ **CallType** = includes only commonly produced adult female-calf call types (Indeck *et al.* 2020)
- ✚ **Depth** = the depth of the tagged adult female when each call was produced
- ✚ **Position** = the binary position of the tagged adult female when each call was produced
- ✚ **PositionCat** = the position category (shallow, < 10 m, or deep, > 10 m) of the tagged adult female when each call was produced
- ✚ All social variables are coded the same as above

The CallType tab was used for the model analyzing call depth.

Column headings (CTMum_All tab):

- ✚ **CallType** = includes all commonly produced adult female call types (Indeck *et al.* 2020)
- ✚ **RLrms** = the RMS received level (dB *re* 1 μ Pa) of each adult female call

- ✚ **NLrms** = the RMS ambient noise level (dB *re* 1 μ Pa) that coincided with each adult female call
- ✚ All social variables are coded the same as above

The CTMum_All tab was used for the model analyzing adult female received level.

Column headings (CTMum_Common tab):

- ✚ **CallType** = includes only the two most commonly produced adult female call types ('snorts' and 'grumbles'; see Indeck *et al.* 2020)
- ✚ **DUR** = the duration (s) of each adult female call
- ✚ **PF** = the peak frequency (Hz) of each adult female call
- ✚ **MinF** = the minimum frequency (Hz) of each adult female call
- ✚ All social variables are coded the same as above

The CTMum_Common tab was used for the models analyzing adult female call duration, minimum frequency, peak frequency, and call type usage.

Column headings (CTCalf_Common tab):

- ✚ **CallType** = includes only the two most commonly produced calf call types ('bops' and 'squawks'; see Indeck *et al.* 2020)
- ✚ **DUR** = the duration (s) of each calf call
- ✚ **PF** = the peak frequency (Hz) of each calf call
- ✚ **MinF** = the minimum frequency (Hz) of each calf call
- ✚ All social variables are coded the same as above

The CTCalf_Common tab was used for the models analyzing calf call duration, minimum frequency, peak frequency, and call type usage.

Indeck, K.L., Girola, E., Torterotot, M., Noad, M.J. & Dunlop, R.A. (2020) Adult female-calf acoustic communication signals in migrating east Australian humpback whales. *Bioacoustics*, 1-25.