MovementData

Column headings:

- **TagID** = the ID of each tag deployed; indicates the species, year, and tag number
- **Bin** = consecutively numbered 10-minute time bins per tag
- **NumESB** = number of energetic surface behaviours (ESB) per bin
- **SurfTime** = the amount of time (seconds) spent at the surface per 10-minute time 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
- **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)
- **CourseDev** = 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°

This spreadsheet was used for the non-hierarchical partitioning clustering method 'k-means' to determine behavioural states.

DepthData

Column headings:

- **TagID** = the ID of each tag deployed; indicates the species, year, and tag number
- **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
- **Behaviour** = the behavioural state during which each dive was initiated
- **BehavBinary** = binary coding for use in the model; 0 for 'resting', 1 for 'traveling'

This spreadsheet was used to examine whether fine-scale dive parameters of the adult females were significantly different between behavioural states.

BehaviourModels

Column headings (Behaviour_CallRate tab):

- **TagID** = the ID of each tag deployed; indicates the species, year, and tag number
- **Bin** = consecutively numbered 10-minute time bins per tag
- **Calls** = the number of calls produced per bin
- **Mum** = the number of calls produced per bin per adult female
- **Calf =** the number of calls produced per bin per calf
- **Time =** decimal hour of each 10-minute bin
- **Behaviour** = the behavioural state that was assigned to each 10-minute time bin

The CallRate tab was used to determine if call rate (calls per hour) varied per individual between behavioural states.

Column headings (Behaviour_RLMum tab):

- **TagID** = the ID of each tag deployed; indicates the species, year, and tag number
- **Behaviour** = the behavioural state during which each adult female call was produced
- **RLrms** = the RMS received level (dB *re* 1 µPa) of each adult female call

The RLMum tab was used to determine if adult females modified their received call levels (dB *re* 1 µPa) in response to the behavioural state of the pair.

ActiveSpace

Column headings (Sheet1):

- **TagID** = the ID of each tag deployed; indicates the species, year, and tag number
- **Depth** = the depth (as per the tagged adult female) at which each call was produced
- **Behaviour** = the behavioural state during which each call was produced
- **RL** = the RMS received level (dB *re* 1 µPa) of each call
- **PF** = the peak frequency (Hz) of each call
- **Centre** = the octave centre frequency band that contained each call's peak frequency
- **BBNL** = the wind-dominated broadband noise level (dB *re* 1 µPa) coinciding with each call
- **SignalLoss** = calculated as RL – BBNL
- **Distance** = the detection distance of each call estimated by solving the regression equation $TL = a + b\log(x)$ for x, where TL (transmission loss) was the calculated **SignalLoss**, a was a frequency-dependent constant, b was the slope of the regression line, and x was the distance (in metres) from the source. To determine which TL equation to use (**Sheet2; Appendix Table 1**), we looked for the distance (**columns labelled 50 – 1000 (m)**) at which TL exceeded the calculated **SignalLoss** (highlighted cells) and used that to determine which equation (**TL1 vs TL2**) to use based on the distance cut-off for the centre frequency band containing each given call. See the Methods section in 'Humpback whale adult females and calves balance acoustic contact with vocal crypsis during periods of increased separation' for more detailed information.
- **50 – 1000** = columns representing 50 m distance intervals; TL was calculated for each distance column using the appropriate transmission loss equation from **Sheet 2** (**TL1 vs TL2**) based on the distance cut-off for the octave centre frequency band of each call (e.g., for a call with a PF in the octave centre frequency band of 250 Hz, TL for columns 50-850 was determined using TL1, while TL for columns 900-1000 was determined using TL2, as per the distance cut-off indicated in Sheet 2 and as described below); these values were compared to those in the **SignalLoss** column (as described above) and used to determine which TL equation should be used to calculate each call's **Distance**.

Column headings (Sheet 2):

- **Centre** = the octave centre frequency bands that contained the peak frequency of calls produced by adult female-calf humpback whale pairs (corresponds to **Centre** on **Sheet 1)**
- **Range** = the range of each octave frequency band around the **Centre** frequency; used to determine the **Centre** band corresponding to each call depending on its **PF** (**Sheet 1**).
- **Dist Cutoff** = the distance below which frequency-dependent transmission loss within the study site is most accurately determined using transmission loss equation 1 (**TL1**) and above which it is most accurately determined using transmission loss equation 2 (**TL2**), depending on each call's **Centre** frequency band (see above).
- **TL1** = the appropriate equation to use to calculate the detection distance for calls based on their **Centre** frequency band and total **SignalLoss** that occurs *below* the **Dist Cutoff**; used to solve for **Distance** (see above).
- **TL2** = the appropriate equation to use to calculate the detection distance for calls based on their **Centre** frequency band and total **SignalLoss** that occurs *above* the **Dist Cutoff**; used to solve for **Distance** (see above).

This spreadsheet was used to determine the communication active space of adult female-calf vocal signals and whether these pairs modified this active space in response to their behavioural state.