**Supplementary Material**

Seasonal gain in body condition of foraging humpback whales along the Western Antarctic Peninsula

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Table S1: Field excursions along the Western Antarctic Peninsula 2017 – 2019. NSF = National Science Foundation, LTER = Palmer Long Term Ecological Research Program, OOE = One Ocean Expeditions (tour operators), LMG = Laurence M. Gould, f.l. = focal length of camera on UAS.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Season** | **Year** | **Month** | **Platform** | **Vessel** | **UAS Aircraft** | **f.l.** |
| 1 | 2017 | Jan | NSF LTER | R/V LM Gould | FreeFly Alta 6 | 50 |
| 1 | 2017 | Nov | OOE | Akademik Ioffe | Mikrokopter LemHex-44 | 50 |
| 2 | 2018 | Jan | NSF LTER | R/V LM Gould | FreeFly Alta 6 | 50 |
| 2 | 2018 | Feb - Mar | OOE | Akademik Ioffe | DJI Inspire 1 | 25 |
| 2 | 2018 | Mar | NSF LMG-03 | R/V LM Gould | Mikrokopter LemHex-44 | 50 |
| 2 | 2018 | June | NSF LMG-05 | R/V LM Gould | Mikrokopter LemHex-44 | 50 |
| 3 | 2018 | Nov - Dec | OOE | RCGS Resolute | DJI Inspire 1 | 25 |
| 3 | 2018 | Dec | OOE | RCGS Resolute | Mikrokopter LemHex-44 | 35 |
| 3 | 2019 | Feb - Mar | Palmer Station | Palmer Station | Mikrokopter LemHex-44 | 35 |
| 3 | 2019 | Feb - Mar | NSF LMG-03 | R/V LM Gould | FreeFly Alta 6 | 35 |
| 3 | 2019 | Mar | OOE | RCGS Resolute | Mikrokopter LemHex-44/FreeFly Alta 6 | 35 |

Table S2. Summary of uncertainty for total length (TL) and Body Area Index (BAI) for each UAS. Uncertainty is described here as the coefficient of variation (CV%) of the posterior predictive distribution for TL and BAI of each individual. *f.l. = focal length*

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **UAS** | **n** | **CV%: TL** | | | | **CV%: BAI** | | | |
| **mean** | **sd** | **min** | **max** | **mean** | **sd** | **min** | **max** |
| FreeFly Alta 6 *w/ 35 mm f.l.* | 42 | 6.31 | 5.08 | 1.25 | 19.7 | 0.5 | 0.31 | 0.1 | 1.59 |
| FreeFly Alta 6 *w/ 50 mm f.l.* | 51 | 3.52 | 2.73 | 1.13 | 14.03 | 0.48 | 0.33 | 0.07 | 1.62 |
| DJI Inspire 1Pro *w/ 25 mm f.l.* | 52 | 3.95 | 2.56 | 1.1 | 11.88 | 0.44 | 0.25 | 0.07 | 1.26 |
| MikroKopter LemHex-44 *w/ 35 mm f.l.* | 49 | 5.03 | 3.93 | 1.54 | 19.43 | 0.63 | 0.27 | 0.15 | 1.4 |
| MikroKopter LemHex-44 *w/ 50 mm f.l.* | 34 | 4.23 | 3.06 | 1.2 | 14.59 | 0.53 | 0.28 | 0.2 | 1.48 |

Table S3. The slope of the Monte Carlo linear model for each reproductive class with 95% Highest Posterior Density (HPD) intervals. Each HPD interval contains 0, indicating the slope is not significantly different than 0 and therefore that total length does not significantly change over the course of the foraging season for each reproductive class.

|  |  |
| --- | --- |
| **Reproductive class** | **Slope [95% HPD]** |
| Calves | 0.00 [-0.01, 0.01] |
| Juvenile Females | -0.01 [-0.03, 0.01] |
| Juvenile Unknown Sex | 0.00 [-0.02, 0.01] |
| Lactating Females | 0.00 [-0.02, 0.02] |
| Mature Unknown Sex | 0.00 [-0.01, 0.02] |
| Non-pregnant Females | 0.00 [-0.01, 0.02] |

Table S4. Number of mother-calf pairs per month, *n = 28*.

|  |  |
| --- | --- |
| **Month** | **n mother-calf pairs** |
| 11 | 0 |
| 12 | 2 |
| 1 | 1 |
| 2 | 11 |
| 3 | 14 |
| 6 | 0 |

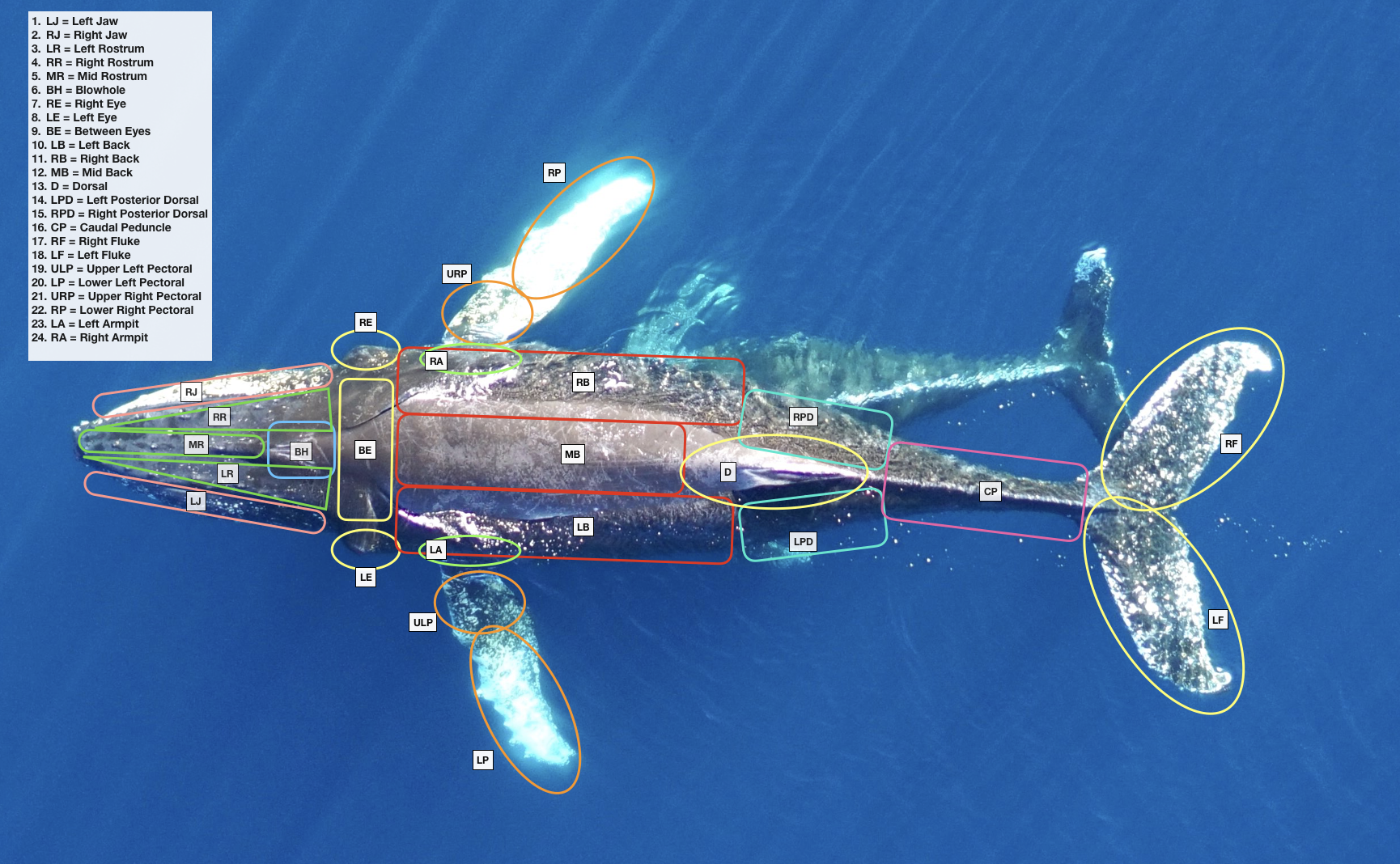
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Figure S1: An example of a humpback whale along the Western Antarctic Peninsula segmented into 24 different regions of the body to identify and record unique scarring, markings, and coloration patterns.

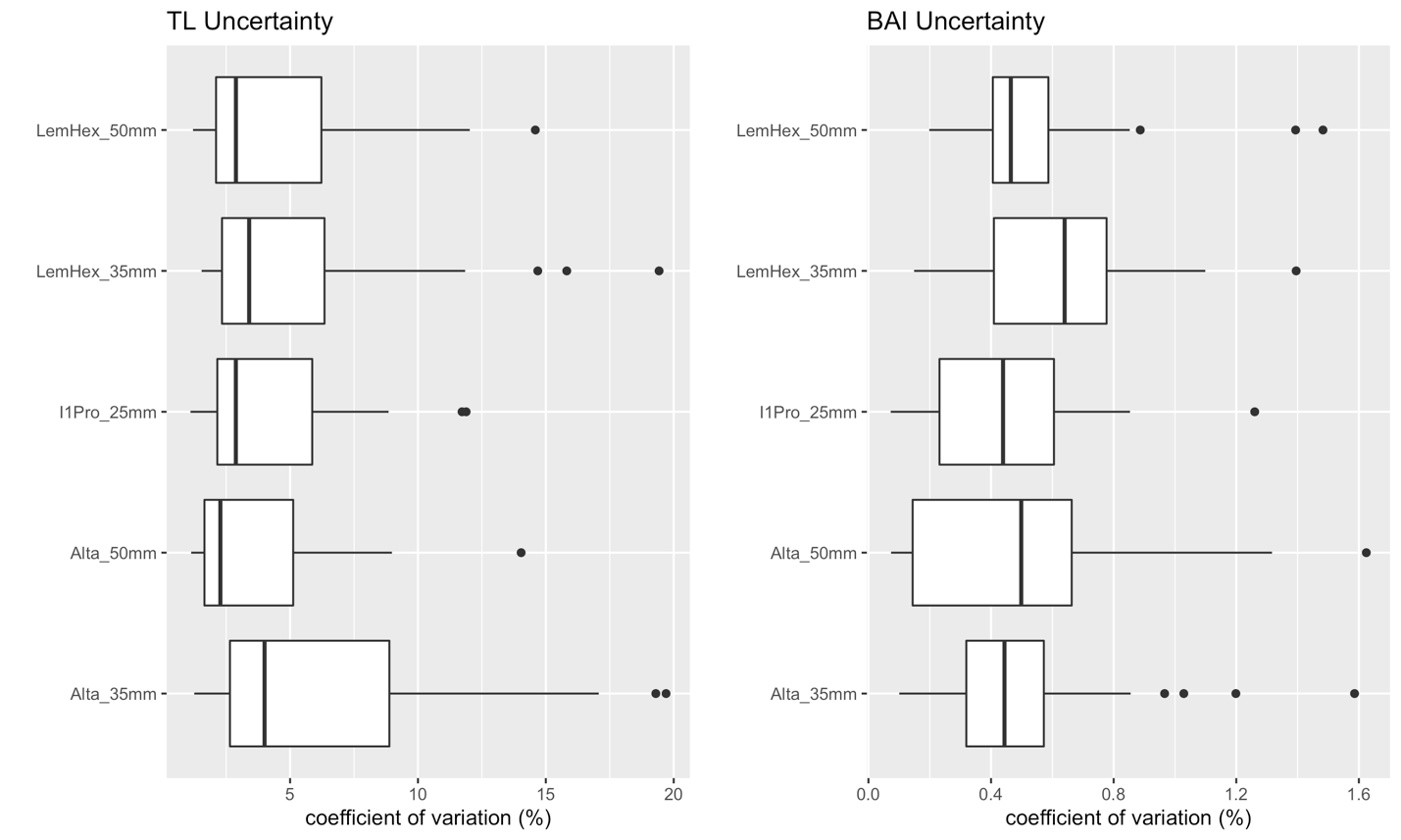
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Figure S2. Uncertainty for total length (TL) and Body Area Index (BAI) for each UAS. Uncertainty is described here as the coefficient of variation (CV%) of the posterior predictive distribution for TL and BAI of each individual. *I1Pro = DJI Inspire 1 Pro, LemHex = Mikrokopter LemHex-44, Alta = FreeFly Alta 6. Each UAS displayed with the focal length of the camera.*

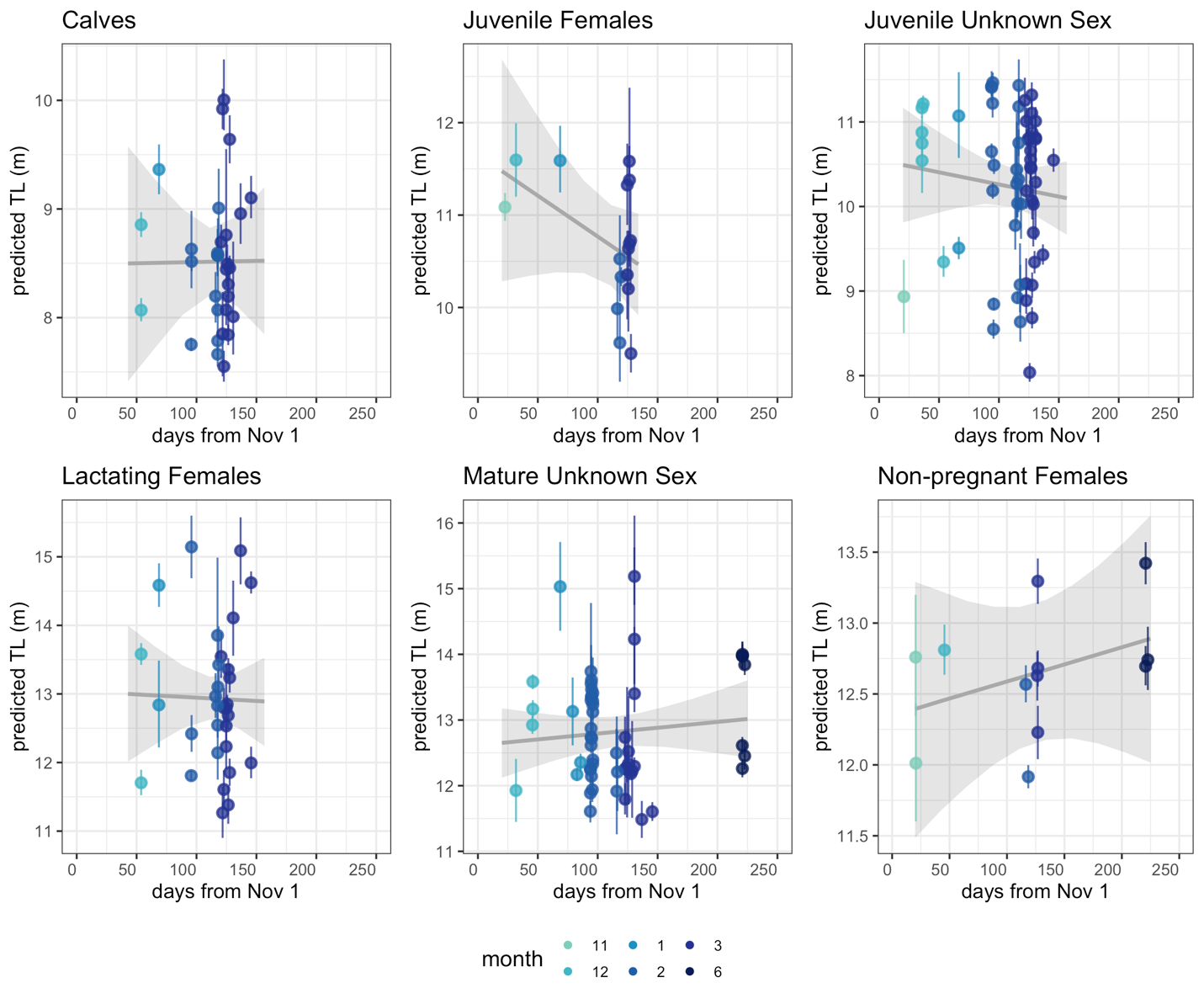


Figure S3. Change in total length (TL) over the course of the austral foraging season for each reproductive class. The slope for each reproductive class was not significantly different than 0 (Table S3), indicating TL does not significantly change over the course of the foraging season for each reproductive class.