

# Southern Resident killer whale pregnancies, 2021/2022

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**Rational.** Photogrammetry measurements from vertical aerial photographs can reveal pregnant cetaceans, based on their increased breadth at midbody when viewed from above (Cheney et al. 2022). We have shown this method to be valuable for identifying pregnant Southern Resident killer whales (SRKW; <https://www.sealifer3.org/news/pregnant-whales-identified-among-the-southern-resident-killer-whales>), and documenting subsequent reproductive loss (Durban et al. 2016; <https://www.sealifer3.org/news/continued-lost-pregnancies-for-the-southern-resident-killer-whales>)

**Sample Data.** We measured the breadth at the anterior insertion of the dorsal fin from vertical aerial photographs of all possible reproductive female SRKWs (33 whales, ages >8 and <50) known to be alive between September 2021 and April 2022. Images were obtained using an octocopter drone to carry a digital camera with full frame sensor (7360 x 4912 pixels) and a 55mm lens long enough to ensure a flat and undistorted image. To control for variability in individual size, breadth in pixels was divided by the pixel measurement between the blowhole and the anterior insertion of the dorsal fin (BHDF) in the same photograph. The breadth of all J pod females and most of L pod were most recently measured in Jan-April 2022; one L pod whale was last measured in November 2021 (L119); three L pod whales (L118, L54, L55) and all of K pod were last measured in September 2021.

**Identifying pregnant whales.** The median of breadth/BHDF in the most recent measurement month for these 33 whales was included in a larger dataset of 172 whale-by month measurements of females from photogrammetry in 2015-2020. This expanded dataset comprised 39 different females, including multiple previous measurements of all the 33 current females. We fit a generalized linear model in a Bayesian formulation to estimate the probability that each female's current measurement was greater than average and at a level similar to female widths measured within six months of known births<sup>1</sup>. We list four females with a high ( $p>0.75$ ) probability of conforming to breadth measurements of known pregnant whales when last measured: K12, K20, K27 and L72. There are other whales that may be in earlier stages of pregnancy when measured, with lower probabilities of support, and some of these may now be in the latter stages of pregnancy. We will try to update our assessment when we measure these whales again.

**Notes** There are videos online of a small calf with K pod in late spring 2022 off the Oregon coast. Based on our data the mother is likely to be K20, K27 or K12. K12 was measured to be pregnant in September 2021, when she was estimated to be 49-50 years old. This is unusually old for a viable pregnancy, and K12 is undoubtedly near the end of her reproductive years. However, pregnancy at similar age is not without precedent: during previous photogrammetry research, we documented a Northern Resident killer whale (I16), estimated to be 47-48 years old, who was accompanied by a newborn calf in 2016. Three whales were previously identified as pregnant in September 2021, based on preliminary analyses of a limited set of images. Of these, J37 measured as heavily pregnant in January and February 2022 and was seen with a calf since March 2022. After being heavily pregnant in September 2021, both J36 and J19 measured to not be pregnant by winter 2022.

## References

- Cheney, B.J., Dale, J., Thompson, P.M. and Quick, N.J., 2022. Spy in the sky: a method to identify pregnant small cetaceans. *Remote Sensing in Ecology and Conservation*.
- Durban, J., Fearnbach, H. and Barrett-Lennard, L., 2016. No Child Left Behind Evidence of a killer whale's miscarriage. *Natural History*, 124(8), pp.14-15

<sup>1</sup>A previous analysis had considered a nine month window, but the assignment at this probability level did not change when we revised the analysis using a six month time window prior to known births.