Southern Resident killer whale pregnancies, 2023/2024

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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 16/32 possible reproductive female SRKWs (ages >8 and <50) known to be alive between June 2023 and May 2024. This comprised 11 females from J pod and five females from L pod. Images were obtained using an octocopter drone to carry a digital camera with full frame sensor (7360 x 4912 pixels) and a 55mm lens 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 was measured in Feb-May 2024 and in June-August 2023 for L pod females.

Identifying pregnant whales. The median of breadth/BHDF in the most recent measurement month for these 16 whales was included in a larger dataset of 219 whale-by month measurements of females from high resolution drone photogrammetry since 2015. This expanded dataset comprised 40 different females, including multiple previous measurements of all the females of current interest. We fit a generalized linear model in a Bayesian formulation to estimate the probability that each female's current measurement was greater than average by an amount consistent with female widths measured within six months of known births. We list one female with a high (p>0.75) probability of conforming to this benchmark of increased breadth: J22. J22's breadth and (subsequent probability of late-stage pregnancy) increased between February and April 2024. J22 was also measured to be in late-stage pregnancy in spring (April) 2023, but had lost this pregnancy (as per her measured breadth) by June 2023. There are other whales with breadths greater than average 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.

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