

recover this endangered population of killer whales. SRKW are suffering significant reproductive loss due to lack of Chinook prey and associated effects (e.g., release of lipophilic toxins into circulation). The FRC run is a major prey source for the SRKW population during summer and early fall, and appears to be key to providing the needed reserves to carry the whales through the subsequent winter [6]. The early spring CRC runs likely serve to replenish energetic reserves expended during the previous winter as well as help sustain the whales until the occurrence of the subsequent late summer peak in the FRC runs. The relative importance of the early spring Columbia River Chinook run likely became all the more critical to the SRKWs as historic FRC runs that peaked earlier in summer became depleted from overfishing and habitat destruction [6]. Other species, including people, also appear to be impacted by these conditions.

Without steps taken to remedy the situation, we risk losing the endangered SRKW, an extraordinarily important and iconic species to the Pacific Northwest. Since strengthening relevant Chinook runs should significantly decrease physiological stress and increase pregnancy success rates in SRKW during the same year that fish runs increase, the physiological indices used in this study could also provide rapid assessment tools for guiding adaptive management of SRKW populations. Historical and modern dependence on fish as an essential food source for coastal communities with limited resources, in conjunction with growing food shortages and increased risk of toxicant exposure, has international implications.

## Supporting information

**S1 Fig. Timing and abundance of Columbia River (orange) and Fraser River (blue) Chinook runs based on DART (2015) and Albion Test fisheries (Catch Per Unit Effort, Albion 2015), respectively (see also Lundin 2015).**  
(TIFF)

**S1 Appendix. Raw data.**  
(XLSX)

## Acknowledgments

The research was made possible thanks to collaborations at NOAA NWFSC. Special thanks to E Ward, M Ford, B Hanson and L Park, K Koski, T Wilson, K Balcomb-Bartok, D Ellifrit, C Emmons, R Baird, F Felleman, Conservation Canines, Center for Whale Research, and The Whale Museum's Soundwatch Boater Education Program.

## Author Contributions

**Conceptualization:** SKW JIL.

**Data curation:** SKW JIL ES RB KB KP JH.

**Formal analysis:** SKW JIL.

**Funding acquisition:** SKW JIL.

**Investigation:** SKW ES DG RB.

**Methodology:** SKW JIL KA ES DG RB.

**Project administration:** SKW JIL ES RB.

**Resources:** SKW RB JIL.