



Local-scale physiological condition declines as the canopy ages, showing a commensurate increase in frond loss rate. (A) The non-linear relationship between canopy age and Chl:C across all three image dates in 2015 for the large kelp forest in Fig. 3 (black curve; grey shaded area represents 2x standard error). The proportional frond survivorship (blue curve) and the loss rate of fronds (red curve) across three kelp forests in the SBC. **(B)** Canopy blade chlorophyll *a* content as a function of blade age across five frond cohorts sampled in the Santa Barbara Channel in 2019. Errors bars show standard error. **(C)** The relationship between chlorophyll *a* content, normalized to the maximum of each frond cohort, and blade age for the five frond cohorts shown in B. Points are slightly jittered for visibility and colored to correspond to their respective frond cohort.