



Figure S4. The chlorophyll *a* to carbon ratio (Chl:C) from each hyperspectral pixel versus the minimum canopy emergence age estimate across all three image dates. Solid black curve represents the mean non-linear relationship for across image dates, grey shaded area represents 2x standard error. The red curve shows the smoothed loss rate of giant kelp frond cohorts across three kelp forests in the Santa Barbara Channel calculated from Rodriguez et al. 2013.