Data quantifying the density (abundance/reef area) of fish species across artificial reefs of different size (4.32m2, 7.68m2) and supporting different densities of transplanted kelp (*Ecklonia radiata*) (zero (0 kelp/m2), low (4.1 kelp/m2), medium (8.3 kelp/m2), high (16.6 kelp/m2) )at three times (early (spring 2015), middle (autumn 2016), late (spring 2016)). Assemblages were assessed using diver-based visual surveys conducted at the three times. At each time, 2 separate surveys were conducted, and the results were averaged. The reef code (column headings) conveys the size of the reef (m2), followed by the density of transplanted kelp, followed by the sampling time. For example: *4.32\_zero\_early* indicates that the reef is 4.32m2, supports zero kelp (0 kelp/m2) and the data is based on surveys during the early stage of the experiment (i.e. spring 2015). The different rows are for the different species of fishes that were observed.