Title: Same data different story: guidelines for data weighting in a multispecies statistical catch-at-age stock assessment framework

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Abstract: Multispecies stock assessment frameworks that use standard statistical tools and are fit to the same data as their single-species counterparts are rapidly developing and may signify the path of least resistance towards an ecosystem approach to fisheries management. Nevertheless, the transition from a single-species to a multispecies framework faces many obstacles including but not limited to: (a) increased data requirements, (b) increased uncertainty, (c) decreased transparency, and (d) the inability to generate traditional management reference points. Monte Carlo simulations were used to quantify the effect of changing pre-specified weightings of compositional data on parameter estimates within a multispecies statistical catch-at-age stock assessment framework. The multispecies model was fit to diet-compositions, which are often numerous and highly variable, as well as traditional length- and age-compositions. Weighting of diet-compositions, used to calculate relationships between predators and their prey, can magnify changes in parameter estimates compared to outcomes from weighting traditional length- and age-compositions. Adjusting weights had the largest impact on estimates of recruitment. Results should be of interest to both stock assessment scientists and fisheries managers given that biased estimates of recruitment can lead to ill-informed management reference points.