

Preliminary Observations

Errors in total or marked escapement estimates as well as errors in total or marked catch estimates are sources of exploitation rate differences when using the “marked” versus the “total” frame of reference. Evaluating the magnitude of error associated with each parameter and resulting impacts on the final exploitation rate calculation will facilitate the selection of an approach.

Model stock proportions vary widely depending on the frame of reference approach used. Again, they represent the proportion of fishery catch accounted for by model stocks. Some stocks are expected to be less than 100% accounted for in the FRAM model, such as SE Alaska Troll, which is expected to have a non-model stocks contribute to the landed catch. However, the differences from expected proportions especially in Puget Sound fisheries, with the assumption that 100% of the stocks are being represented by the model, put into question whether either approach is suitable to estimate this important modeling parameter or whether independent estimates should be pursued. They also illustrate the large variability associated with the fishery expansion factor.

Model stock proportions from the “Marked Calibration” (which used CWT's related to marked catches and escapements) should not be used in a FRAM run, because this parameter is applied to total landed catch in the model. Marked and unmarked stock components in a fishery can have very different model stock proportion; i.e. some Northern fisheries may have very high marked model stock proportions, but low unmarked model stock proportions, because the local non-model stocks are predominantly un-marked. Regardless of these issues, model stock proportions can be a valuable tool for error checking the new base period.

Exploitation rates can be calculated without the use of landed catches or escapements, simply by generating a CWT-based cohort reconstruction. The creators of the original base period calibration system must have found it beneficial to match CWT-based catches to actual observed catches. Perhaps they were seeking to address sampling biases or felt a greater comfort with base period exploitation rates that produce estimated base period catches, or they may have simply needed a method to estimate model stock proportion. However, estimates of escapements as well as catches can be associated with variances that may be larger than any biases the original method was aiming to address. Another source of variance stems from averaging the catches, as well as the escapements, over all base period years and time steps. This is especially problematic when “bookend” fishing years (i.e. those years at the very start or end of the base period time frame), that are only capturing one or two brood years of returning fish, differ significantly from the average.

In line with assessing the precision of total versus marked calibration parameters, the need for fishery expansions should also be evaluated.