Catch-only control rule idea

Let's say we have a time-series of catch and are trying to estimate an ABC. One way to do it would be to just take a certain percentage of the catch averaged over the past few years (e.g., 75% of the average over the past 5 years). This, however, has some hidden assumptions as to what the underlying OFL might be, the uncertainty about that OFL, and buffer being applied. For this approach, we have to choose a time period over which to average, a percent reduction to take, and figure out how (or if) we want to account for stocks having different PSA values.

Another way to do it would be to assume the average catch over the past few years (or some other time period) equals the OFL, assume a specific parametric distribution about that OFL (with uncertainty), and then run this through our tiered ABC control rule. This parametric distribution could be based on the distributions we see for the OLFs of the fully-assessed stocks.

For now, let's just assume it's log-normally distributed with a CV of 0.40. If the average catch over the past X years equals 1000 tons, then our distribution for OFL would be log-normally distributed with mean = 1000, standard deviation = 400 (e.g. exp(Normal(mean=ln(1000), st. dev = 0.4).

We can now treat this just as we do with our OFL distributions from assessed stocks and run it through our ABC control rule.

Assessment info: Catch history, -7.5
Uncertainty Characterization: None, -10
Stock Status: Unknown, -10
PSA: Moderate, -5 (or whatever it is for that species)

Total buffer: -32.5
P* = 50-32.5 = 17.5

To find the ABC, we just look for the value from the OFL distribution that gives us a cumulative probably of 17.5%. In EXCEL, this is calculated as exp(norminv(0.175,ln(1000),0.4)) and equals 688 tons.

While assuming a parametric distribution about the OFL is a huge assumption, this approach will ensure the ABC will differ between stocks with different PSAs in a manner that is consistent with our assessed stocks and that the buffer will decrease in a consistent manner with decreasing uncertainty.