The current definitions for Btrigger and Bbuffer (proposed definition) are as follows:

MSY Btrigger (as used by ICES) is intended to safeguard against an undesirable or unexpected low SSB when fishing at Fmsy and is considered the lower bound of SSB fluctuations around Bmsy. For Nephrops stocks MSY Btrigger has been defined as the lowest stock size from which the abundance has increased.

Bbuffer (for NSAC LTMP) is a precautionary level of abundance above Btrigger that will turn ON a set of management measures designed to avoid further stock decline to below Btrigger.

The values currently used for MSY Btrigger for *Nephrops* are actually equivalent to Blim for whitefish stocks. In future, ICES may need to revise the reference points to be more consistent with the definitions used for whitefish stocks. This would mean the values currently associated with Btrigger would be redefined as Blim and new values would need to be agreed for Btrigger, potentially based on the definition of Bbuffer as described in this document.

The following were taken into account in the proposed definition of Bbuffer:

- The way of calculating Bbuffer should be consistent across all functional units, at least on a regional basis.
- If Bbuffer were to be agreed as a new reference point, then the value should be fixed and only revised at a benchmark meeting when a full revision of the stock is be made.
- There are different possible ways to calculate Bbuffer (Table 1) and each option will have pros and cons.
- This preliminary analysis indicates that using the proportion of the mean inter annual change of the TV surveys would be a reasonable option for the FUs analysed (highlighted in blue in Table 1).
- Once the stock abundance levels go above the Bbuffer levels the management measures will be switch off.

Fus	Btrigger	Btrigger+95%Cl	25th.abundance.	Btrigger+Mean.abs	Btrigger+Mean.abs.change
			percentile	.change (abs value)	(prop)
FU6*	858	881	744*	1013*	999*
FU7	2767	3277	3661	2900	3583
FU8	292	373	448	620	362
FU9	262	317	345	262	262
FU11	541	NA	898	824	663
FU12	1016	1171	1152	1449	1322
FU13	579	755	1233	1525	697

 Table 1 - Bbuffer calculations tested for the North Sea FU which has UWTV surveys.

Bbuffer = Btrigger + 95% CI Btrigger (Btrigger+95%CI)

This method has some consistency with whitefish assessments and the use of lowest observed biomass for Blim and the upper confidence limit of this for Bpa.

However, the confidence intervals for the estimated abundance associated with some FUs (FU6 for example) are very narrow, and based on this approach Bbuff would be relatively close to Btrigger. In such cases, in order to stay away from the Btrigger, it would be desirable to set Bbuff at a higher level.

Bbuffer = 25th.abundance.percentile (25th.abundance.percentile)

This method can fit the Scottish grounds but not the Farn Deeps ground as this limit would be below Btrigger.

Bbuffer = Btrigger + mean inter annual abundance change, using the absolute value (Mean.abs.change (abs value))

This method also fits all grounds. However in cases where there is been a large change in abundance over the time series it would be preferable to estimate that change in relative terms rather than absolute terms.

Bbuffer = Btrigger + mean inter annual abundance change, using the proportion value Mean.abs.change (prop)

This method fits to all FUs analysed and could potentially be a good precautionary reference point to turn ON management measures designed to avoid further stock decline to below Btrigger.

Plots for all FUs analysed:



FU7





