

Application of Huynh 2020 Interim Analysis methods to assessed stocks from the US South Atlantic

Nikolai Klibansky

24 September, 2021

Results

Annual mean B^S/B_{MSY}^S

Time series of annual mean B^S/B_{MSY}^S for Black Sea Bass were similar for Annual Assessment, Averaged Index 10, Buffered Index 10, and Fixed TAC MPs, in all scenarios. There was also a tendency for mean B^S/B_{MSY}^S to be lower than 1, especially the Episodic M scenario. Since the $TAC = F_{MSY} * B_{ref}$ where B_{ref} is vulnerable biomass, it seems that all MPs in all scenarios are not quite meeting their objectives. The same was true for Snowy Grouper in most scenarios, with the exception of the Hyper-Deplete scenario where the index MPs tended to underperform compared with the Annual Assessment and Fixed TAC MPs. For Snowy Grouper mean B^S/B_{MSY}^S tended to be even lower than 1. For Vermilion Snapper, we observe much more periodicity in mean B^S/B_{MSY}^S for the Fixed TAC MP, as was observed by Huynh et al (2020) for their Capelin and Vermilion Snapper OMs. However, the index MPs tend to perform similarly to the Annual Assessments. Mean B^S/B_{MSY}^S tended to be near or slightly above 1.

For Red Porgy, annual mean B^S/B_{MSY}^S was similar for all MPs in all scenarios, though in the Hyper-Deplete scenario the index MPs were slightly below the Annual Assessment MP. Results were similar for Golden Tilefish, though the index MPs tended to be slightly below the Annual Assessment MP. Results were also similar for Cobia but with substantial periodicity of the index MPS in the Hyper-deplete scenario.

Annual mean relative yield (C/MSY)

In time series of annual mean relative yield (C/MSY) for Black Sea Bass, the index MPs tend to result in slightly higher yield than Annual Assessments, but with more periodicity around when assessments were conducted. For Snowy Grouper, all MPs performed similarly but all resulted in low yield relative to MSY . For Vermilion Snapper, index MPs perform similarly in most scenarios, although the Averaged Index 10 MP exhibits periodic deviations from the Annual Assessments in the Hyper-Deplete scenario. The Fixed TAC MP shows large periodicity in all scenarios. Yield tends to be fairly close to MSY for all MPs in most scenarios, except for the Episodic M scenario where it yield is relatively low.

Time series of annual mean relative yield (C/MSY) for index MPs were similar to the Annual Assessment MP for Red Porgy, Golden Tilefish, and Cobia for for most scenarios, but exhibited substantially periodicity in the Hyper-deplete scenario. Index MPs also exhibit some more moderate periodicity for Golden Tilefish in the Depleted scenario.

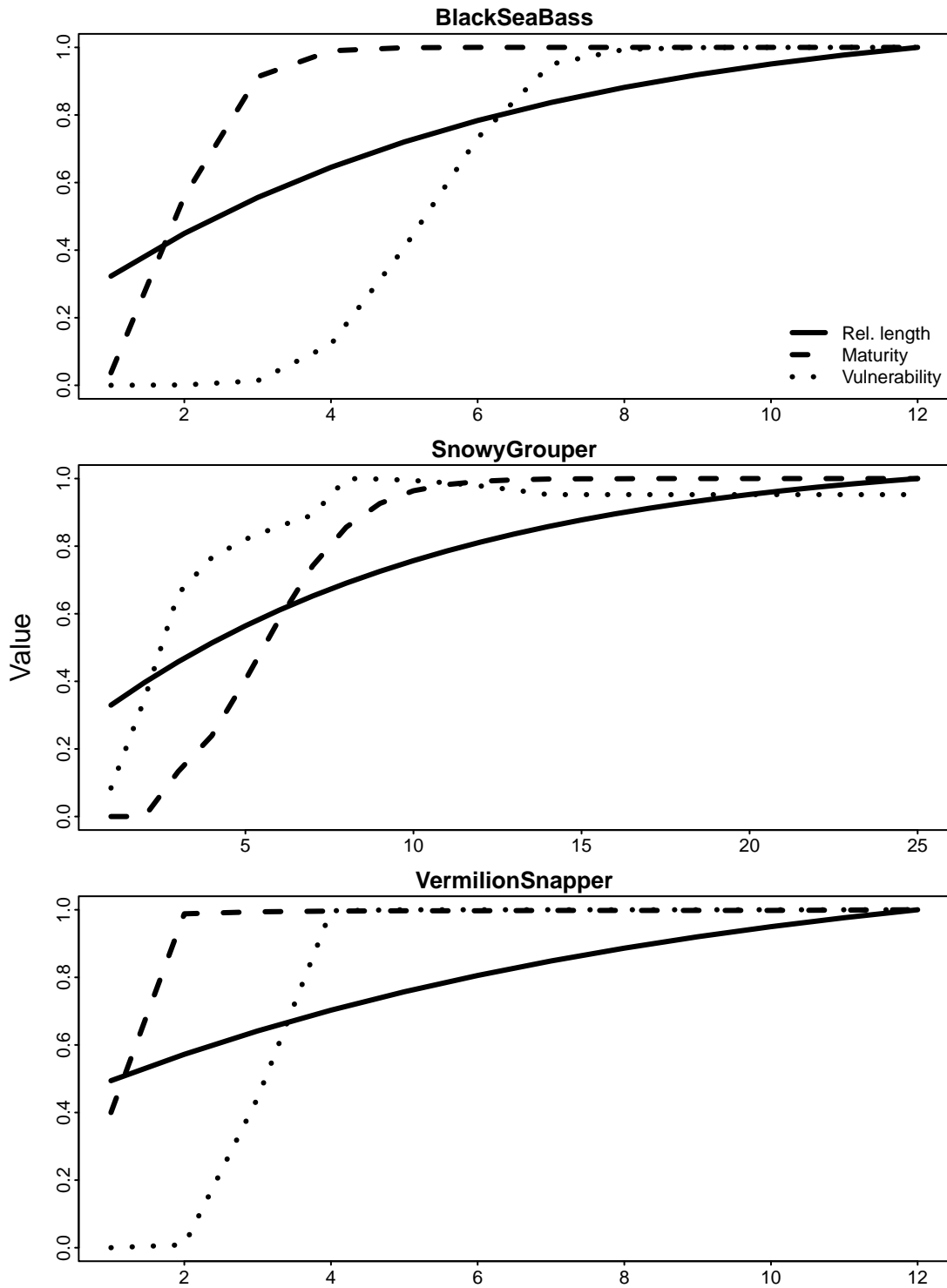


Figure 1: Life history (growth and maturity) and vulnerability schedules at age used in the operating models for BlackSeaBass, SnowyGrouper, and VermilionSnapper. Growth is expressed as mean length-at-age relative to that at the maximum age. Compare with Huynh et al (2020) Figure 1.

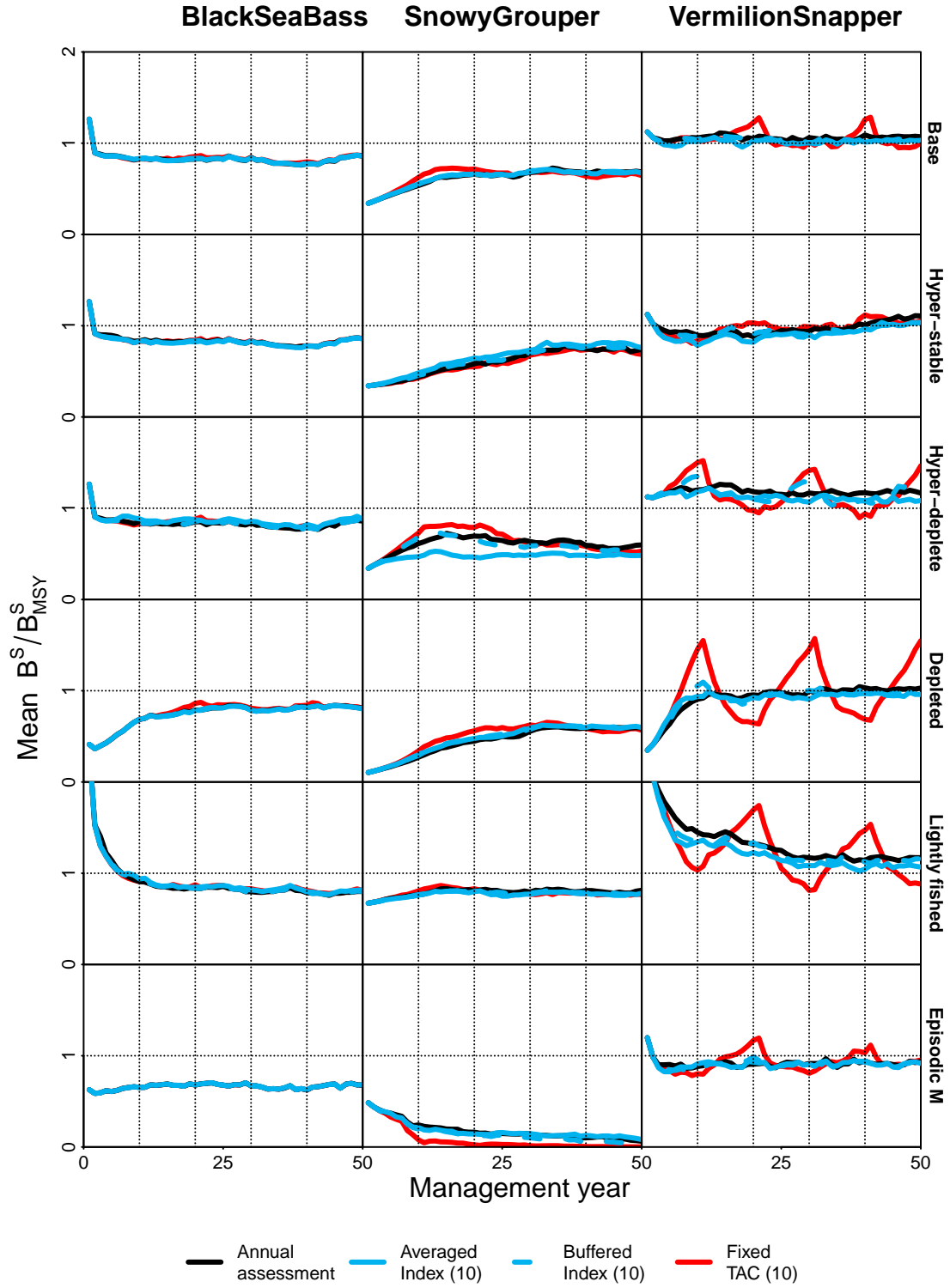


Figure 2: Annual mean B^S/B_{MSY}^S from 250 simulations for each species (columns) and scenario (rows). Coloured lines correspond to the four MPs. Note that $B^S = \text{SSB}$. Compare with Huynh et al (2020) Figure 2.

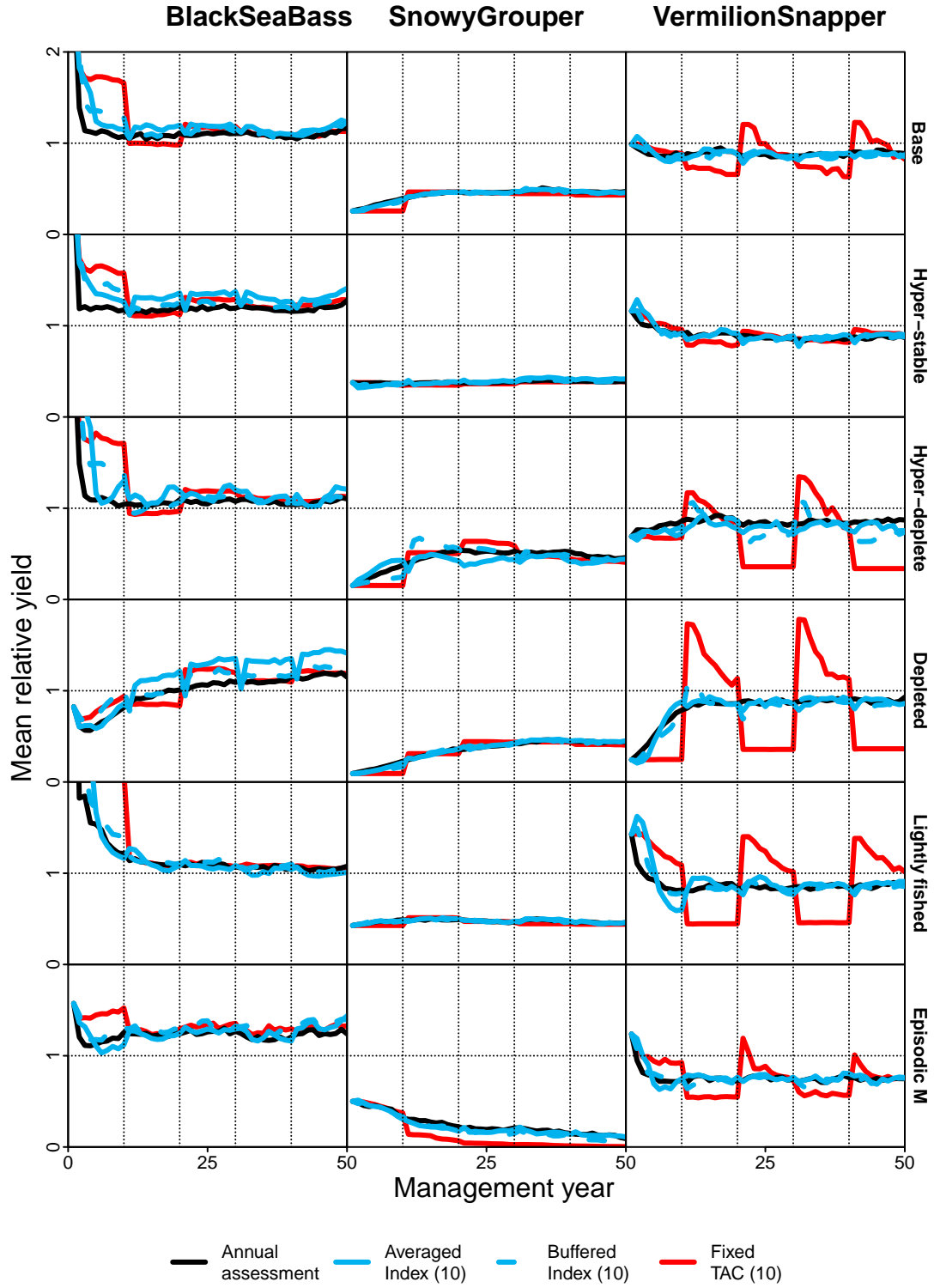


Figure 3: Annual mean relative yield from 250 simulations for each species (columns) and scenario (rows). Coloured lines correspond to the four MPs. Compare with Huynh et al (2020) Figure 3.

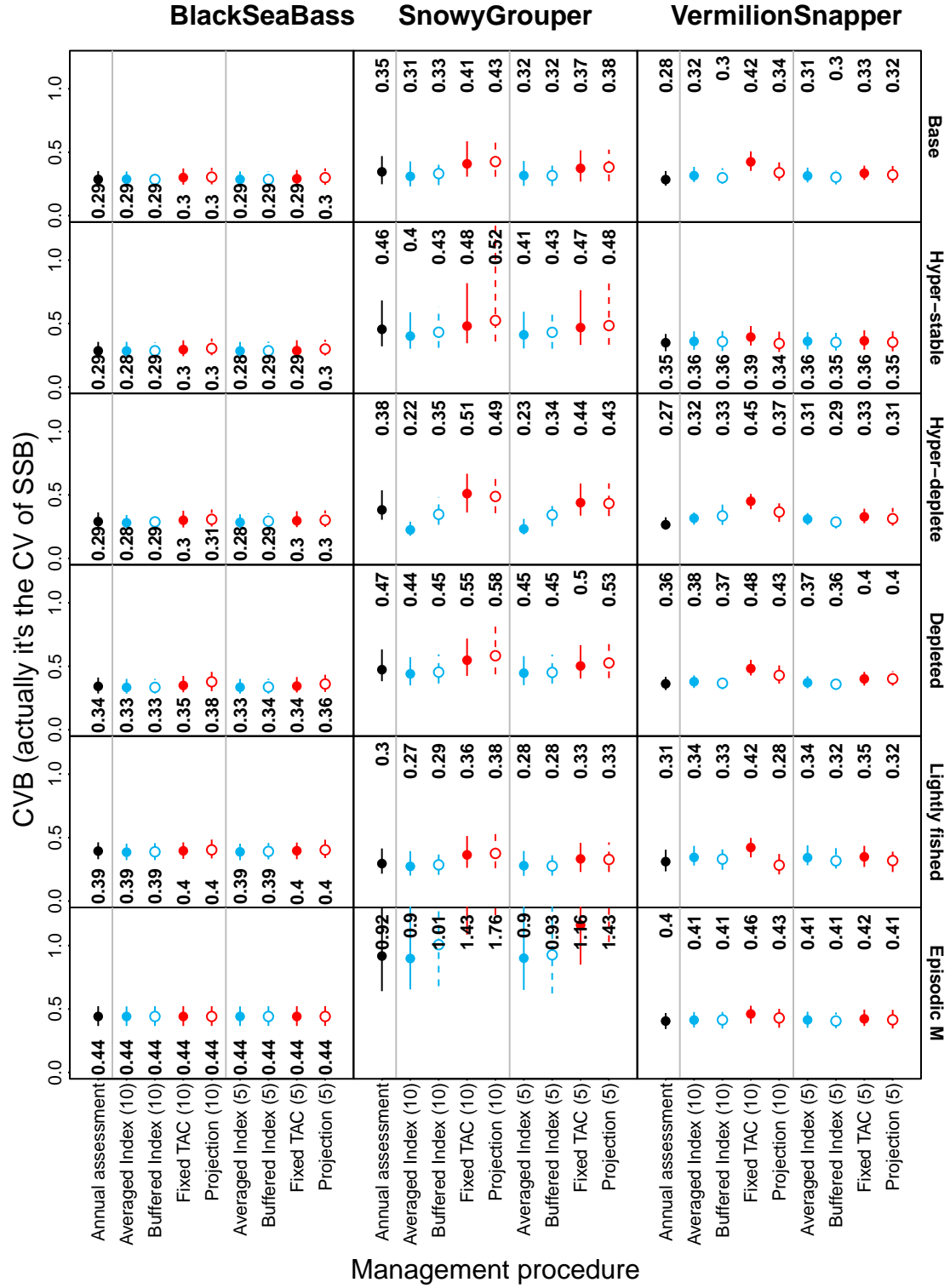


Figure 4: Dot-and-whisker plots of CVB (coefficient of variation in spawning stock biomass) for each species (columns) and scenario (rows). For each MP, dots and numbers indicate the median from 250 simulations, and whiskers span the interquartile range. Compare with Huynh et al (2020) Figure 4.

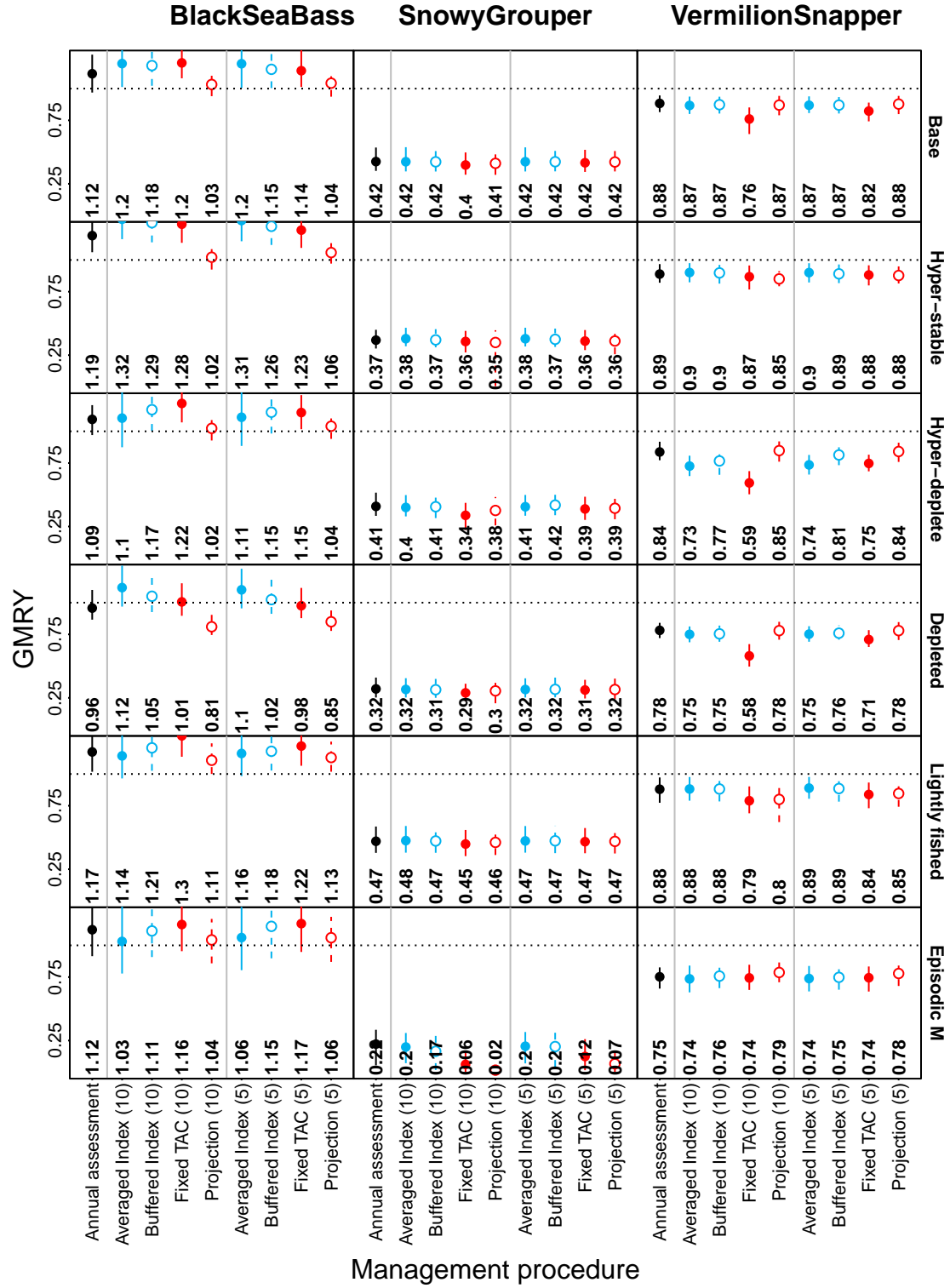


Figure 5: Dot-and-whisker plots of GMRY (geometric mean of relative yield) for each species (columns) and scenario (rows). For each MP, dots and numbers indicate the median from 250 simulations, and whiskers span the interquartile range. Dotted, horizontal lines indicate a value of 1. Compare with Huynh et al (2020) Figure 4.

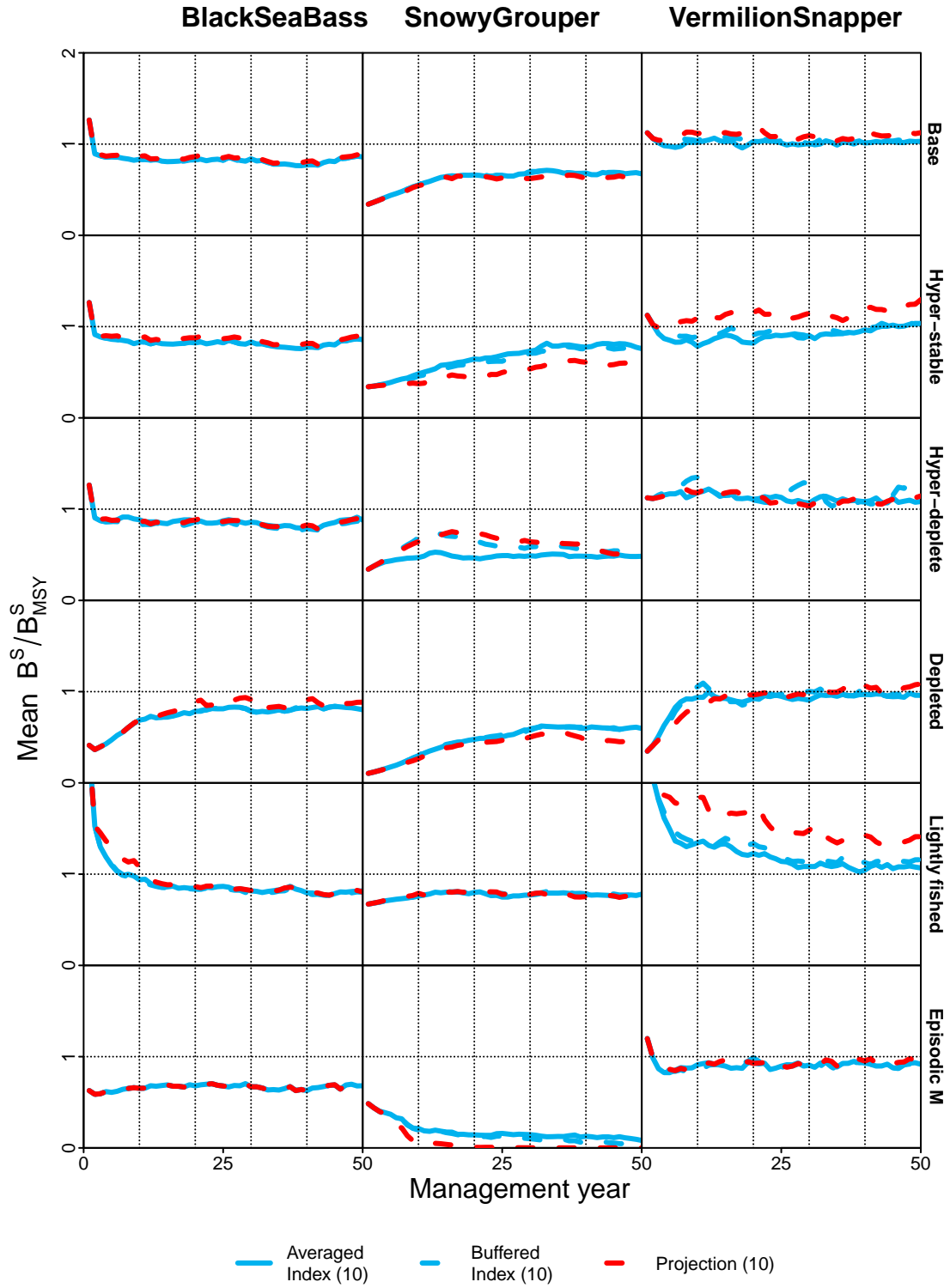


Figure 6: Annual mean B^S/B_{MSY}^S from 250 simulations for each species (columns) and scenario (rows) comparing the Averaged Index, Buffered Index and Projection MPs. Coloured lines correspond to the three MPs. Compare with Huynh et al (2020) Figure 6.

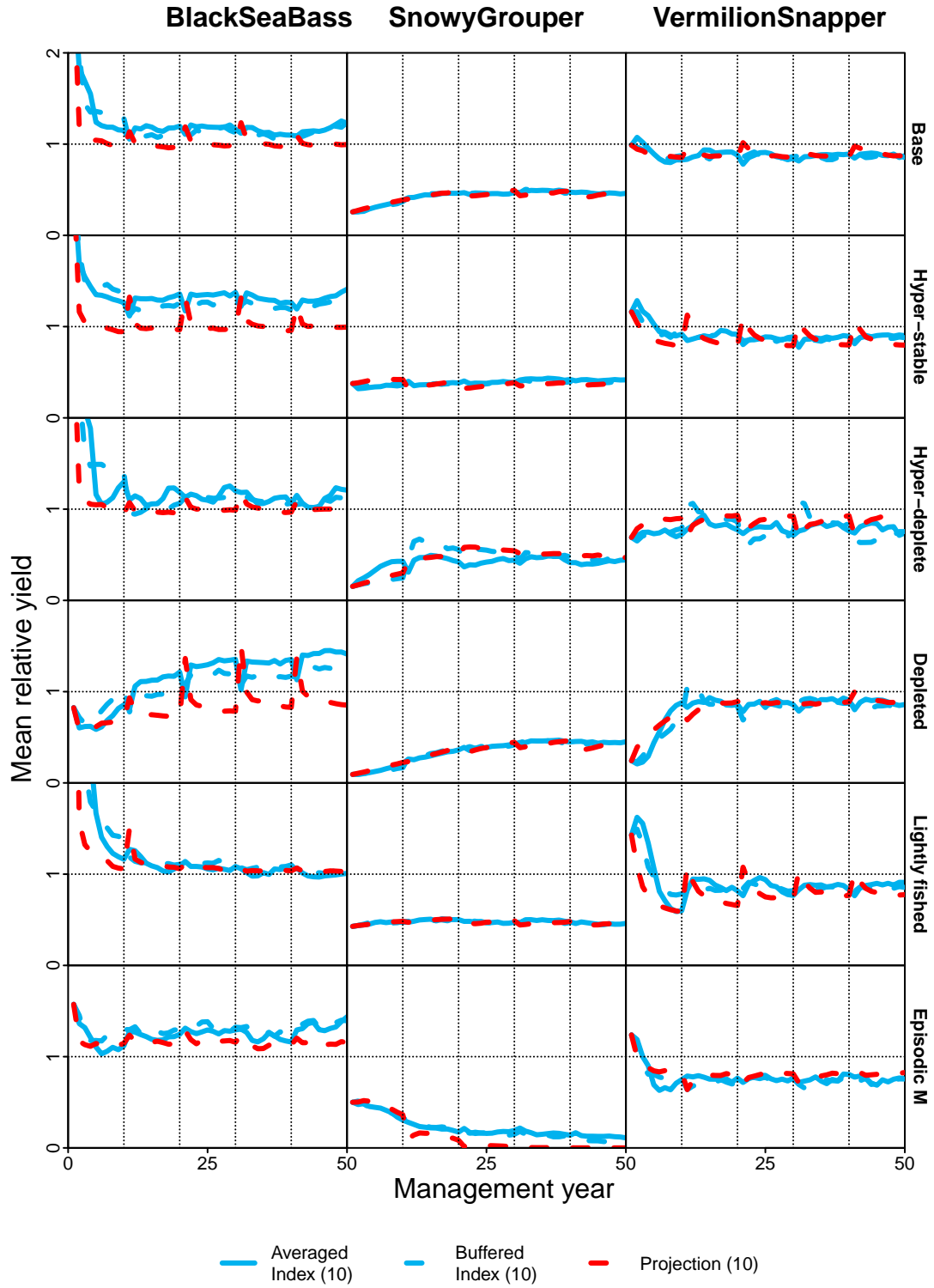


Figure 7: Annual mean relative yield from 250 simulations for each species (columns) and scenario (rows) comparing the Averaged Index, Buffered Index and Projection MPs. Coloured lines correspond to the three MPs. Compare with Huynh et al (2020) Figure 7.