

Sensitivity of Horse Mackerel Assessments to Catch Uncertainties

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It has become apparent that the historical catch data for the demersal and mid-water fisheries that was used when fitting the 2007 assessment model (Johnston & Butterworth, 2007) and subsequent updates (Furman and Butterworth, 2011a; Furman & Butterworth 2011b) are in error. Singh (pers. comm) has kindly provided two new, equally likely catch series that are believed to reflect the truth more accurately. The new catch series also differ from the original in that for the former only the combined demersal and mid-water catch is reported, while for the latter separate figures are reported for each fishery. These three catch series are shown in Figure 1.

In order to quantify the impact of these errors on previous work, for the case $h = 0.6$ and $q_{\text{aut}} = 0.5$ the assessment model is fitted using the new catch series and compared to the original model (Fig. 2a & 3a). Furthermore, as it is unclear how to split the combined demersal and mid-water historical catches between fisheries, models are fitted and compared when separately assuming that these new catch series reflect either only demersal or only mid-water catches (Fig. 2b-c & 3b-c).

Reference

Johnston, S.J. and Butterworth, D.S. 2007. The South African horse mackerel assessment for 2007 using an age-structured production model, with future biomass projections. MCM document, 2007:WG-Dem:HM:10

Furman, L.B. and Butterworth, D.S. 2011a. A preliminary evaluation of the potential use of pelagic survey data in setting the horse mackerel PUCL. DAFF Fisheries Branch document, FISHERIES/2011/MAY/SQG-DEM/16

Furman, L.B. and Butterworth, D.S. 2011b. Updated assessments and projections under alternative future catch levels for the horse mackerel resource. DAFF Fisheries Branch document, FISHERIES/2011/OCT/SWG-DEM/49

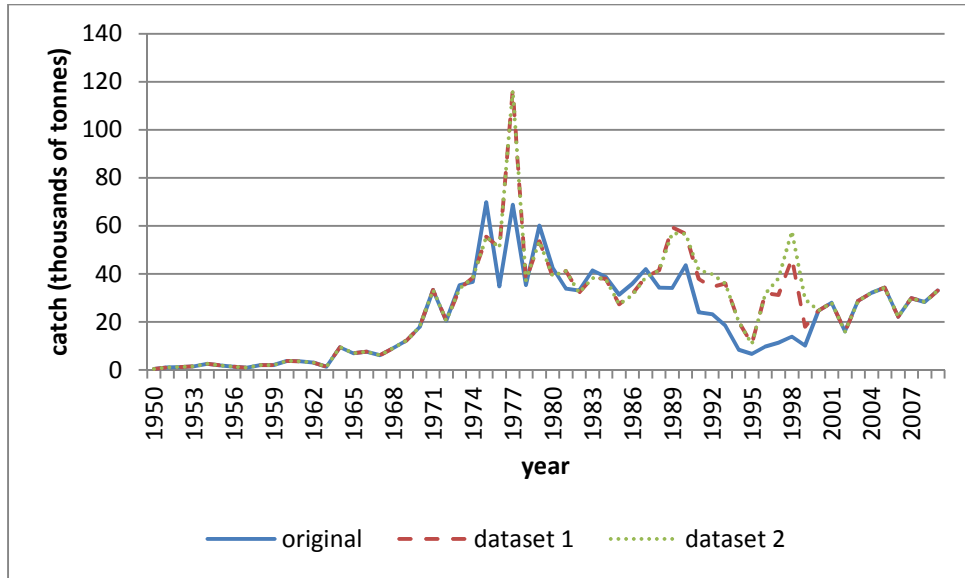


Figure 1: Comparison between combined historical demersal and mid-water catches as reported by the original series and both new series.

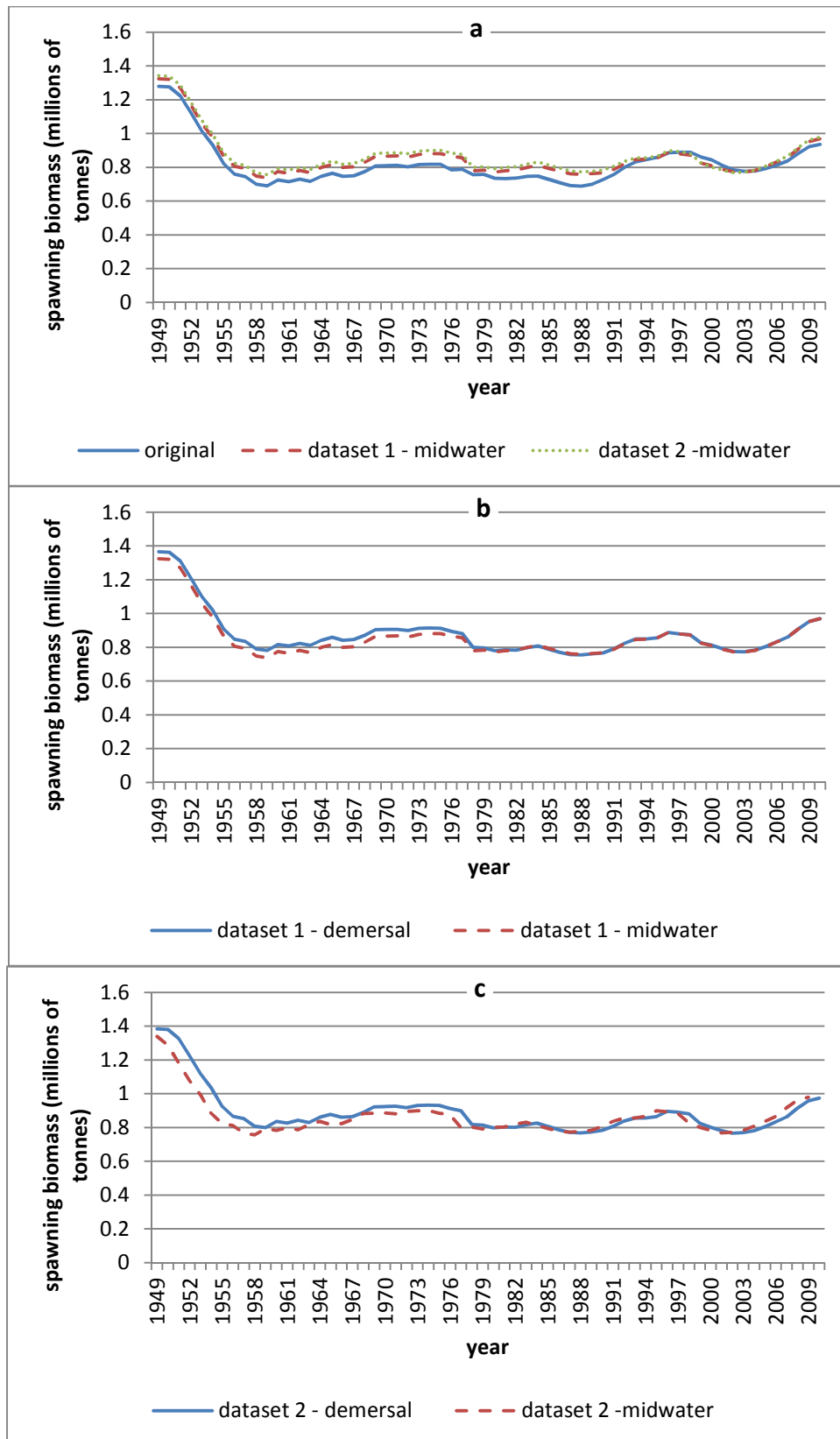


Figure 2: Comparison between estimated spawning biomass trajectories as predicted by models fitted when using: a) the original catch series and both new catch series under the assumption that these new series reflect only mid-water catches; b) a new catch series under the assumption that this series reflects either only mid-water or only demersal catches; and c) the other new catch series under the assumption that this series reflects either only mid-water or only demersal catches.

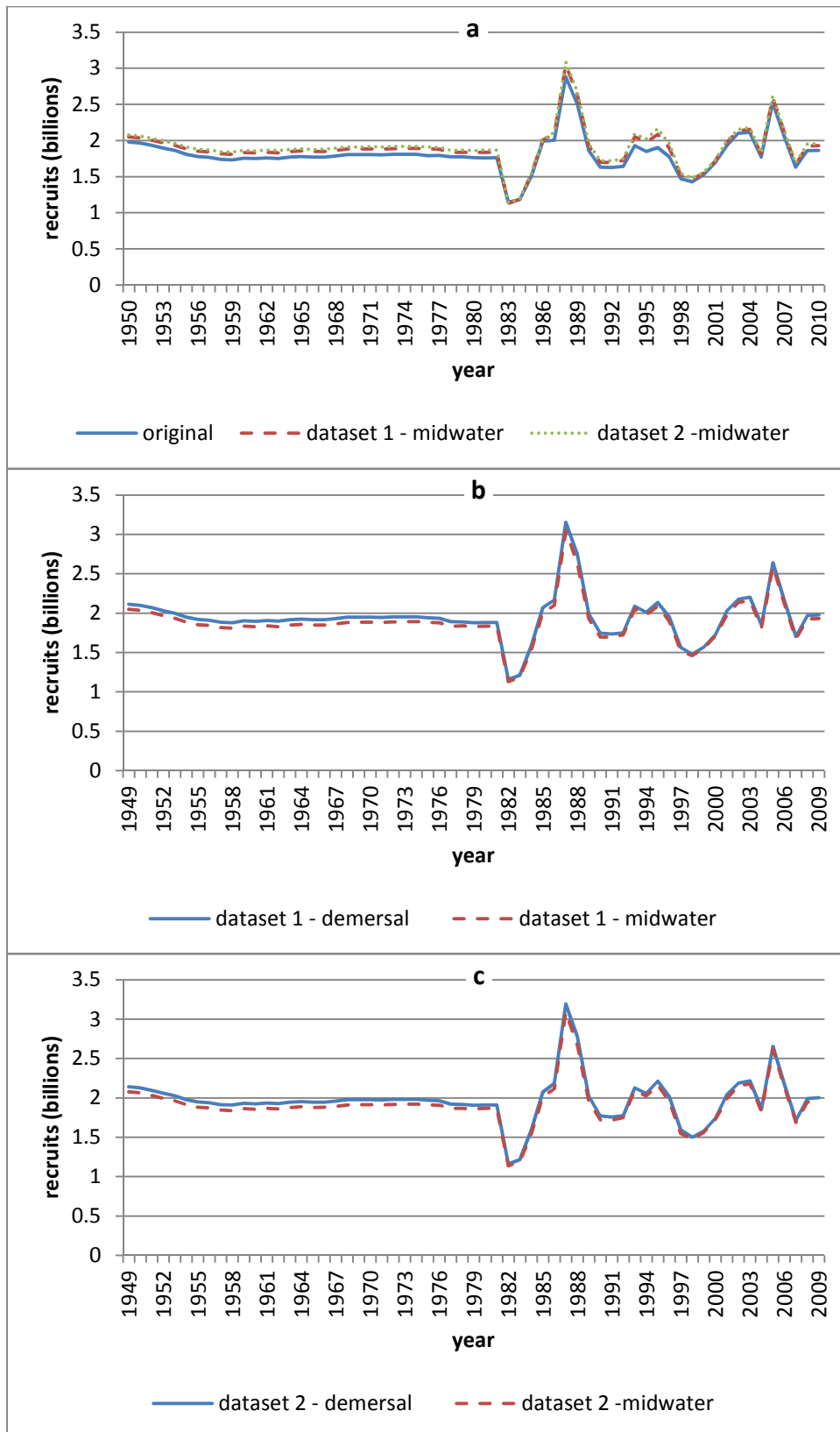


Figure 3: Comparison between estimated recruits as predicted by models fitted when using: a) the original catch series and both new catch series under the assumption these new series reflect only mid-water catches; b) a new catch series under the assumption that this series reflects either only mid-water or only demersal catches; and c) the other new catch series under the assumption this series reflects either only mid-water or only demersal catches.