Impacts of fisheries-dependent spatial sampling patterns on index standardization: A simulation study and fishery application

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Abstract

Blah blah blah...
Keywords: Spatial sampling, spatiotemporal models, CPUE, fisheries dependent data

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1. Introduction

Abundance indices derived from fisheries dependent data remain a common and informative input to stock assessment models despite the known potential for bias. These biases can arise from gear effects (saturation of the gear,Deriso & Parma (1987)), systemic and structural changes to the fishing fleet over time (effort creep, Bishop et al. (2004); Ye & Dennis (2009)), and/or

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from non-random sampling relative to the spatiotemporal distribution of the underlying fish population (Clark & Mangel, 1979; Rose & Leggett, 1991; Rose & Kulka, 1999; Swain & Sinclair, 1994).

Differences in gear configuration and fishing power Nominal fisheries catch-per-unit-effort (CPUE) trends can deviate

Hyperstability/depletion... Cost and lack of availability of fisheries independent surveys mean that they are still used.

Given their common use, a lot of research has been done to develop increasingly sophisticated standardization methods. appropriately standardize these indices to remove the effects of gear, vessel, and spatial sampling. Overview of methods involved.

Focus on spatiotemporal models and comparisons with existing methods...

While fisheries independent data come from statistically designed surveys that ensure the random distribution of samples across the spatial domain and temporal strata, the same assumption of appropriate spatiotemporal coverage cannot be made for fisheries dependent data. Holes in the spatiotemporal coverage from fisheries dependent data can arise from sampling preferentially with respect to abundance, changes in spatial targeting due to economic or management factors, as well as restricted access to fishing grounds due to regulatory or competitive forces. These anomalies in spatiotemporal sampling could lead to a disconnect between the underlying species abundance trend and the trend estimated from catch rate data, thus producing a biased index. Beyond the fisheries dependent simulation testing already conducted (Grüss et al., 2019; Zhou et al., 2019), there exists a need to test these spatiotemporal methods in the case where fisheries spatial sampling coverage changes over time.

2. Methods

3. Results

4. Discussion

5. Acknowledgments

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