Are assessed stocks a representative sample of fished species in the US?

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October 25, 2016

1 Introduction

2 Methods

2.1 Management database

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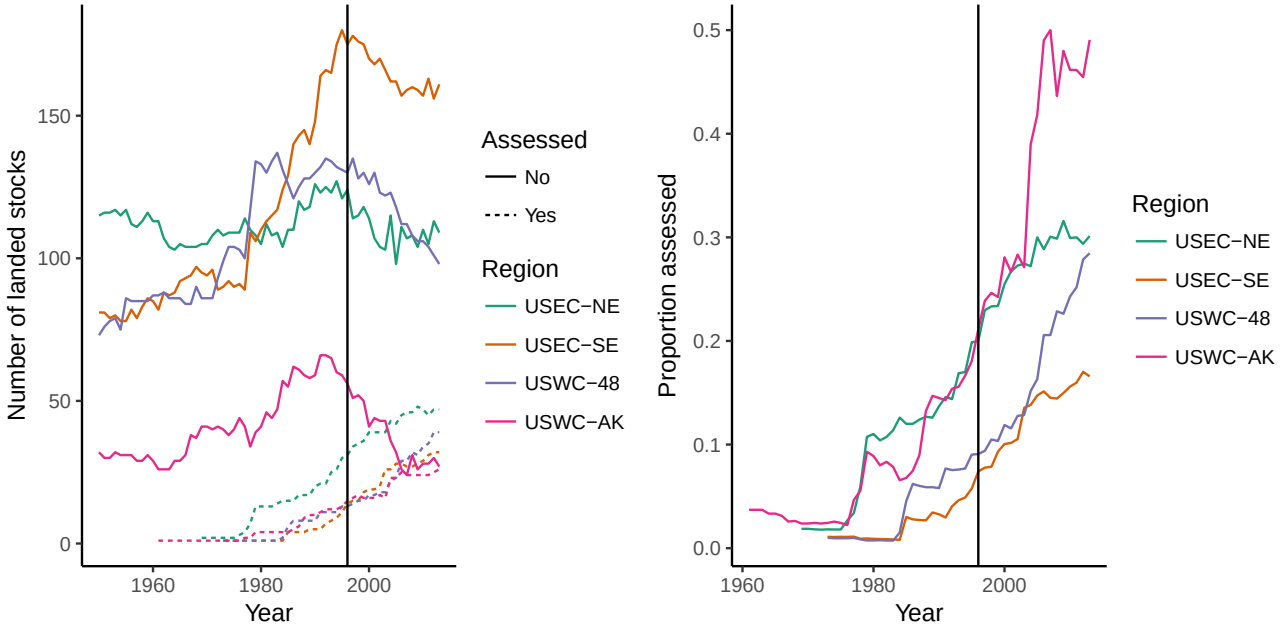


(a) Number of stocks

(b) Proportion of stocks

Figure 1: Timeline of a) the number of stocks landed by region and assessment status and b) proportion of landed stocks that are assessed. The vertical line marks the enactment of the Sustainable Fisheries Act of 1996

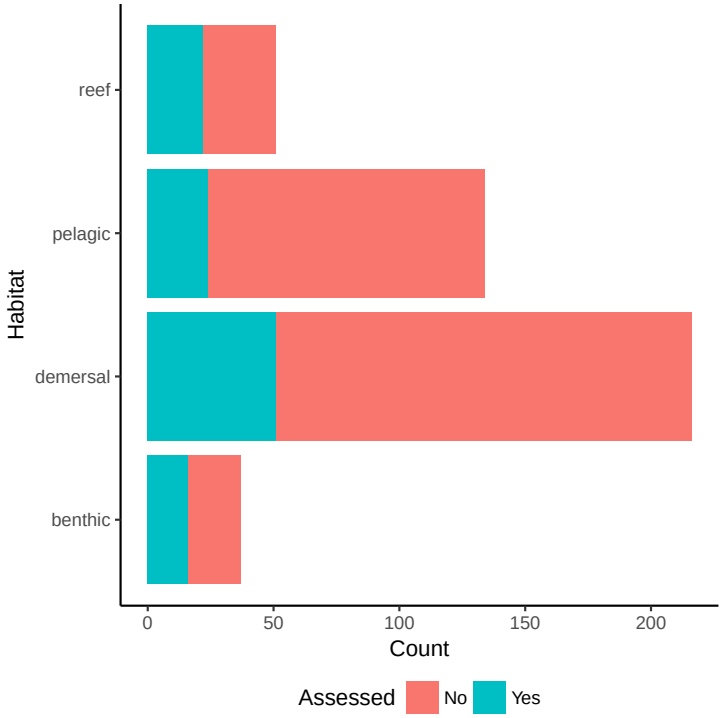


Figure 2: Assessment status at time of last known status (censoring time) by habitat

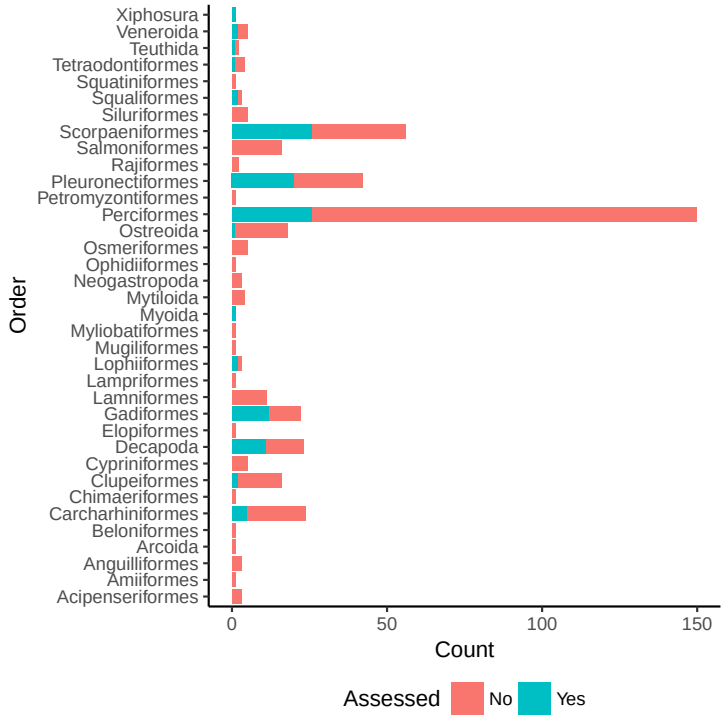


Figure 3: Assessment status at time of last known status (censoring time) by phylum

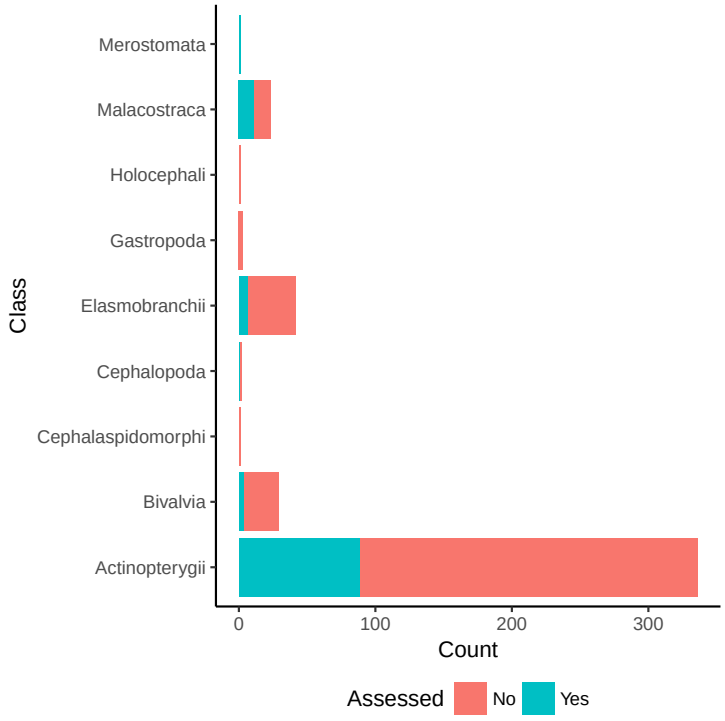


Figure 4: Assessment status at time of last known status (censoring time) by Class

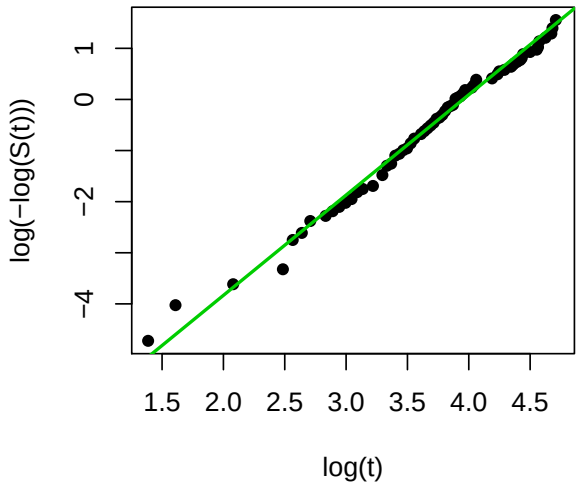


Figure 5: Appropriateness of the Weibull event-time model for the time-to-assessment dataset. If the Weibull applies, the time from fishery development to assessment should fall on a line with slope p (the Weibull shape parameter) between $log(-log(\hat{S}(t)))$, where $\hat{S}(t)$ is the non-parametric Kaplan-Meyer estimate of survival at time t, and the log of t. Here, p evaluates to 1.96, suggesting an increasing assessment rate with increasing time t.

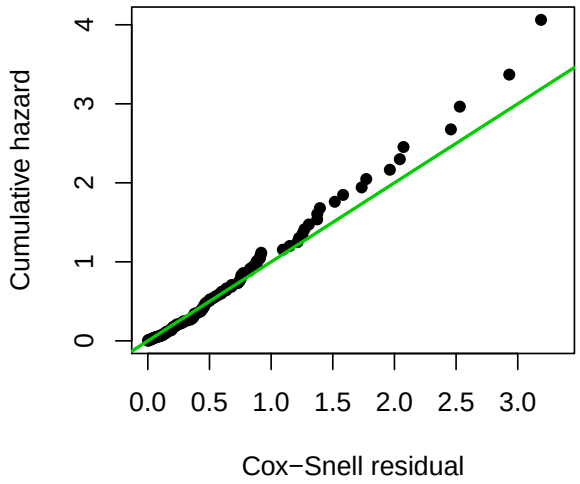


Figure 6: Model fit of the Weibull survival model, based on Cox-Snell residuals calculated at the posterior mean of the linear predictor. For a perfect fit all data points (solid points) would lie on the y=x line.

Table 1: Posterior mean and $P(\beta > 1)$ for model parameters. Parameters can be interpreted as multiplicative acceleration factors (i.e., β=2 suggests a stock is assessed twice as fast as a stock with $\beta = 1$).

Parameter	Posterior Mean	Bayesian P
Length	0.63	0.07
Cumulative landings	1.57	0.89
Mean price per kg	2.60	1.00

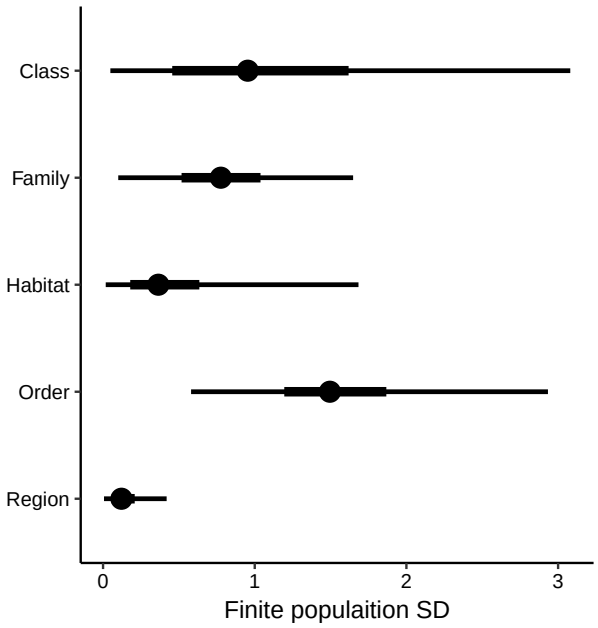


Figure 7: Comparison of finite population standard deviation for random effects in the Weibull survival model. The circle shows the posterior median, with thick bars showing the inter-quartile range of the posterior and the thin line is the 95% confidence interval

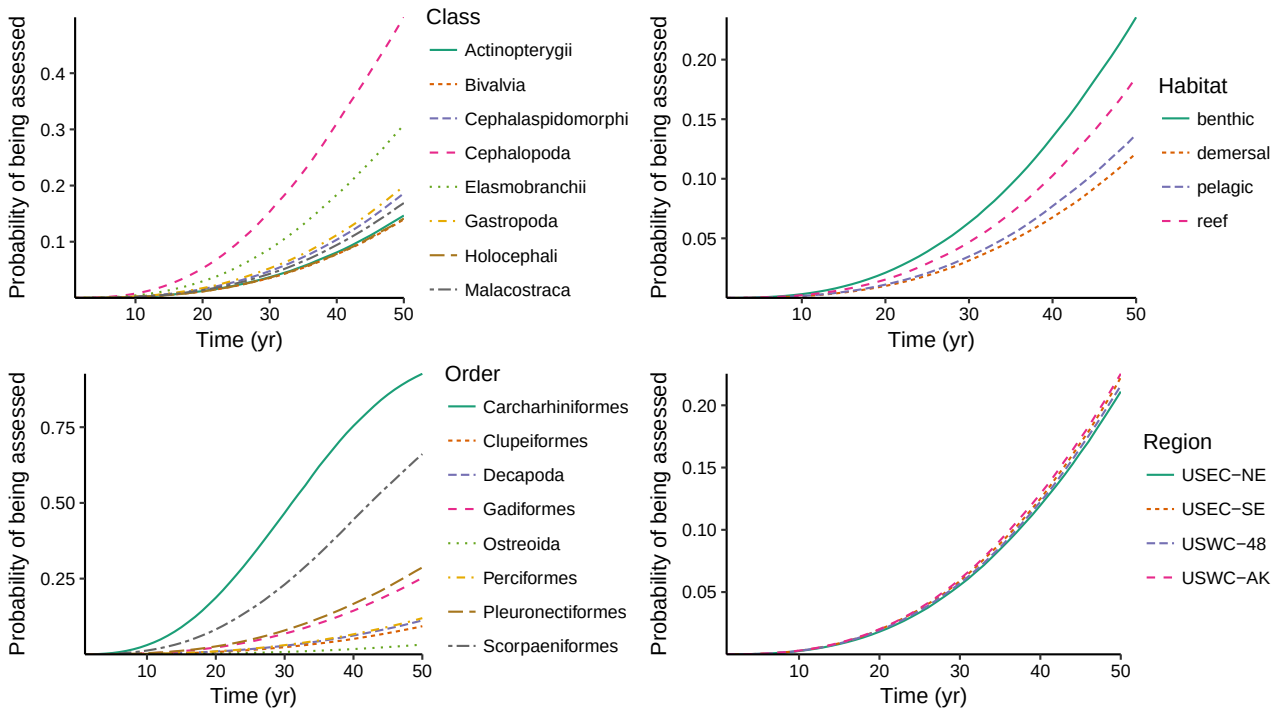
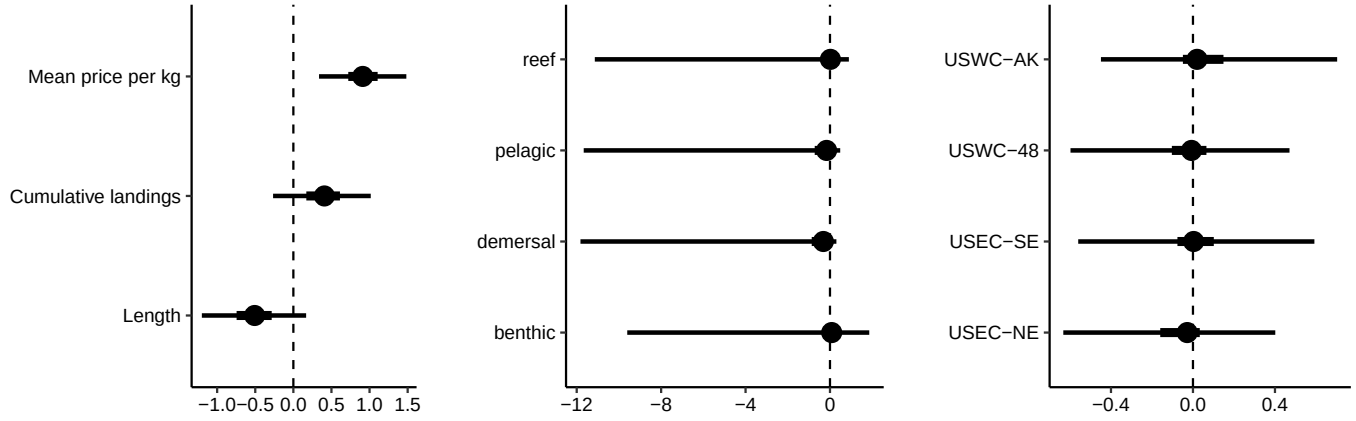


Figure 8: Marginal probability of a stock being assessed as a function of time, for stocks of various taxonomic orders, class, regions and habitats. For taxonomic variables, only the eight levels with the most stocks represented in our dataset are shown. Marginal probabilities were evaluated at the mean of continuous covariates.



(a) Covariates (b) Habitat (c) Region

Figure 9: Summaries of estimated posterior distributions for a) continous covariates in the model, b) habitat random effects, and c) regional random effects. The circle shows the posterior median, with thick bars showing the inter-quartile range of the posterior and the thin line is the 95% confidence interval.