

Optimizing otoliths sampling design in fishery-independent surveys for stock assessments

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How to allocate sampling resources in the most efficient way is a great challenge in fisheries research. When it comes to fish stock assessment, the sampling design of age composition can have a major impact on our perception of the stock status and the estimated reference points for management. Here we explore and quantify trade-offs between otoliths sampling strategy, i.e. collection design and numbers read, and species life history in age-structured stock assessment models. We use roundfish, flatfish and rockfish species-types. Our focus is on simple random sampling vs two-stage sampling and we discuss the implications in terms of fieldwork logistics. We explore the implications of removing age data in data rich stock assessments and conduct simulation work using Stock Synthesis and developments from the R package *ss3sim*. The simulations are based on realistic scenarios obtained from a review of stock assessments conducted in the US. The objective of the review was to understand the use of age data in assessment models in relation to other sources of information and create a set of representative operating models for simulation purposes and future incorporation in a management strategy evaluation framework. In the simulations, we further attempted to account for the correlated nature of survey data, as it affects effective sample size and subsequent weighting in model fits, and explored the effects of ageing error on sample size.

Keywords: ageing error, age composition, fishery-independent data collection, length-stratified sampling, otoliths, simple random sampling, stock assessment

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