

Improving catch estimation methods in sparsely sampled mixed stock fisheries using Bayesian hierarchical models.

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In order to effectively manage exploited populations, accurate estimates of commercial fisheries catches are necessary to inform monitoring and assessment efforts. In California, the high degree of heterogeneity in the species composition of many groundfish fisheries, particularly those targeting rockfish (*Sebastes*), leads to challenges in sampling all market categories, or species, adequately. Limited resources and increasingly complex stratification of the sampling system inevitably leads to gaps in sample data. In the presence of sampling gaps, ad-hoc point estimation is currently obtained according to historically derived “data borrowing” protocols which do not allow for tractable uncertainty estimation. In order to move from the current, but admittedly rigid sampling design, we have continued previous exploratory efforts to develop, and apply, Bayesian hierarchical models of the landing data to estimate species compositions. Furthermore, we introduce a formalized method for discovering consistent “borrowing” strategies across overstratified data. Our results indicate that this approach is likely to be more robust than the current system, particularly in the face of sparse sampling. Additionally, our method should also help inform, and prioritize, future sampling efforts. Perhaps more significantly, this approach provides estimates of uncertainty around species-specific catch estimates.