

Modeling terminal-year fishing mortality rates in western Atlantic bluefin tuna virtual population analyses



Virtual population analysis requires information on the fishing mortality rate (or abundance) for one age group from each cohort. In many cases available data are insufficient to estimate these rates for every age group and structural assumptions must be imposed to reduce the number of effective parameters. Past assessments of western Atlantic bluefin tuna (*Thunnus thynnus*) have reduced the number of parameters by assuming pre-specified values for the ratios of the fishing mortality rates on adjacent age groups. More recent bluefin tuna assessments have estimated terminal fishing mortality rates (F) on each age with a constraint that restricts change from one year to the next. We explore the implications of these methods of estimating terminal-year F through retrospective analyses of the 2006 bluefin tuna assessment and through stochastic simulations. The use of pre-specified ratios for F created strong retrospective biases and may have led to overly optimistic projections. Constraining annual changes in the terminal-year F appeared to mute retrospective patterns and resulted in abundance projections less prone to spurious initial leaps. Simulation results indicate that the constraint improves estimation, particularly with moderate to low interannual changes in selectivity.

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