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*Features of biologically realistic fishery models frequently used in fish stock assessment.*

A fisheries stock assessment model is a model of the population dynamics of a harvested fish species that integrates information from the fishery with scientifically collected biological and survey data. At a minimum, there needs to be a historical dataset comprised of total removals, age or size information, and a relative index of population abundance. Model parameters include cohort abundance, natural and fishing mortality, and calibration coefficients. A realistic model contains those biological and human factors that play a major role in population dynamics. Current models currently provide for realistic changes in cohort abundance and fishing mortality over time. Some fishery models have thousands of observations and hundreds of parameters, and a variety of software has been developed to meet the demand for efficient and accurate parameter estimation. Recent advances to increase biological realism include: (1) allowing for stochasticity in early life survival to recruitment, (2) including temporal variations in natural mortality, either through covariates (such as disease and environment) or explicit incorporation of multi-species interactions (such as predator-prey), and (3) reconciling and exposing data conflicts among multiple datasets. (Received September 21, 2011)