

Table A2.2. The proportion of respondents in the desired features and current features surveys that indicated a particular feature was either desired or included, respectively. The highlighted cells indicate where the feature was desired 25 units more than was included in current stock assessment models indicating that this feature would need to be developed for many of the general models before they could be more generally used. The desired features with bold text are those that were desired by more than 50% of the respondents indicating that they are essential features needed in the next generation model. These proportions were arbitrarily chosen simply for illustrative purposes to highlight features. (Table is continued on the next 3 pages.)

Model components	Desired features	Included in current models
Sex structure	0.65	0.60
Multi-species technical interactions	0.17	0.13
Multi-species trophic interactions	0.09	0.07
Growth platoons	0.48	0.27
Tagging	0.57	0.40
Area structure	0.65	0.33
Stock-structure	0.52	0.27
Maximum likelihood	0.87	0.87
Bayesian	0.74	0.60
Random effects/state-space	0.57	0.27
Custom temporal structure	0.48	0.33
Temporal structure varying by fishery	0.43	0.40
Hereditary/Genetics	0.09	0.07
User Interface		
GUI	0.17	0.27
R package	0.74	0.73
Comprehensive output processor and display	0.39	0.47
Estimation in phases	0.78	0.67
Data		
Catch	0.91	0.87
Retained	0.74	0.67
Discarded	0.70	0.60
Missing / effort-based	0.43	0.33
Units: both biomass and numbers	0.70	0.80
<i>Composition data</i>		
Length composition	0.83	0.60
Age composition	0.87	0.73
Weight composition	0.52	0.40
Conditional age-at-length	0.74	0.40
Mean weight at age	0.61	0.40
Mean length at age	0.57	0.27
Sex	0.74	0.53
Morph composition	0.13	0.13
Aging error	0.78	0.33
Custom composition bin size	0.52	0.40
Stock origin	0.17	0.20
<i>Indices</i>		
Index of abundance	0.96	0.87
Index of effort	0.48	0.33
Fishing mortality	0.43	0.27
Absolute estimate of abundance	0.70	0.67
Environmental index (of a parameter random effect)	0.61	0.20
<i>Tagging</i>		
Mark-recapture (to estimate movement and/or F or B)	0.57	0.33
Growth increment	0.39	0.20
Close-kin	0.17	0.00
Gene-tagging (Maybe some special requirements)	0.13	0.00
Likelihood functions		
<i>Index</i>		
Lognormal	0.91	0.87

Model components	Desired features	Included in current models
Normal	0.61	0.40
t-distribution	0.30	0.07
Estimate additive variance	0.52	0.33
Estimate multiplicative variance	0.52	0.27
<i>Composition</i>		
Modified Chi-squared	0.09	0.00
Multinomial	0.87	0.60
Dirichlet-multinomial	0.61	0.13
Estimate sample size	0.52	0.27
Tail compression	0.30	0.27
Survival analysis (hazard functions)	0.17	0.00
<i>Tagging</i>		
Least squares / robust least squares	0.26	0.00
Poisson	0.26	0.07
Negative binomial / with added zeroes	0.48	0.13
Priors		
Normal	0.83	0.47
Beta	0.70	0.40
Lognormal	0.83	0.60
gamma	0.70	0.13
Variance estimation		
Normal approximation	0.83	0.53
Profile likelihood (How automatic)	0.70	0.13
Bootstrap	0.61	0.40
Bayesian		
MCMC		
Metropolis-Hastings	0.65	0.40
NUTS	0.43	0.07
Hamiltonian	0.43	0.00
Importance sampling	0.30	0.00
Sub models		
<i>Fishing mortality</i>		
Solve the catch equation (Known catch, hybrid method)	0.65	0.33
Pope's approximation (Known catch)	0.39	0.40
F as parameters and Fit to catch	0.74	0.47
VPA	0.17	0.07
<i>Natural mortality</i>		
Age specific	0.83	0.73
Size specific	0.52	0.20
Time varying	0.52	0.60
Sex specific	0.57	0.53
Density dependent	0.22	0.13
<i>Growth</i>		
Time varying	0.57	0.33
Seasonal	0.39	0.27
Cohort specific	0.57	0.27
Growth morphs	0.35	0.20
Density dependent	0.43	0.20
Area specific growth	0.57	0.13
Empirical weight-at-age	0.61	0.40
Age-specific deviates	0.30	0.13
<i>Growth Model</i>		
Von Bertalanffy	0.91	0.60
Richards	0.39	0.13
Spline	0.30	0.00
Growth cessation	0.09	0.13
<i>Recruitment</i>		
Log-normal	0.83	0.67

Model components	Desired features	Included in current models
Variable birth dates (influences growth)	0.30	0.13
Area specific stock-recruitment	0.39	0.13
Hermaphroditism	0.22	0.20
<i>Recruitment Model</i>		
Beverton-Holt	0.83	0.87
Ricker	0.52	0.27
Hockey stick	0.30	0.40
Low-fecundity	0.09	0.07
<i>Maturity / Spawning potential</i>		
Both age and size-dependent	0.52	0.47
Flexible length-weight relationship (season, time)	0.70	0.47
<i>Selectivity</i>		
Age based	0.83	0.73
Length based	0.78	0.53
Sex based	0.57	0.47
Seasonal	0.43	0.27
Multiple simultaneous selectivities	0.22	0.27
Retention curve	0.39	0.40
Time varying	0.78	0.67
Mirroring	0.35	0.40
<i>Selectivity models</i>		
Logistic	0.91	0.73
Double normal	0.78	0.53
Spline	0.48	0.27
Parameter for each age/nonparametric	0.65	0.53
<i>Catchability</i>		
Density dependent	0.48	0.40
Seasonal	0.43	0.20
Function of effort	0.43	0.13
Mirroring	0.22	0.27
<i>Initial conditions</i>		
Fit to equilibrium catch	0.61	0.20
Recruitment deviates	0.70	0.27
Offset	0.17	0.07
Fishing mortality	0.65	0.40
<i>Movement</i>		
Age or size	0.65	0.27
Implicit to Non-adjacent areas	0.35	0.20
Movement functions		
Piecewise linear	0.22	0.07
Tagging		
Release/sampling age assignment from length	0.35	0.13
Reporting rate structure	0.48	0.13
Reporting rate priors	0.35	0.13
Reporting rate mirroring	0.13	0.13
Mixing period	0.26	0.13
Temporal variation and Covariates		
Random	0.43	0.27
Random walk	0.70	0.47
Time blocks	0.70	0.53
Time trends	0.57	0.20
Covariates	0.57	0.27
As data covariates	0.22	0.13
As structure covariates	0.13	0.07
Multiple covariates, complex relationships	0.22	0.13
Design matrix	0.26	0.20
Diagnostics		
Package for creating stats	0.78	0.60

Model components	Desired features	Included in current models
Jittering	0.70	0.27
Age structured production model	0.43	0.13
Catch curve diagnostic	0.43	0.20
R0 profile	0.70	0.27
Retrospective analysis	0.83	0.67
Projections and reference point calculation		
MSY calculations		
MSY	0.78	0.87
Spawning biomass per recruit	0.78	0.60
Biomass target	0.65	0.60
Dynamic B0	0.57	0.27
Projections		0.00
Random deviates	0.52	0.67
Normal approximation	0.52	0.20
Parameter uncertainty	0.74	0.53
Fishery impact plots	0.52	0.27
Simulations		
Data generation	0.70	0.67
Contamination	0.30	0.13
Process error	0.70	0.60
MSE (closed loop)	0.52	0.40
Project management		
Project management software	0.17	0.40
More than one developer	0.57	0.87
Model testing	0.57	0.67
Steering committee	0.48	0.20