Stock Synthesis v.3.30 New Available Features

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| Category | Item | Description |
| General | [Generic Fleets](#_bookmark0) | Fleet specification section of data file is much changed and now includes fleet type, so fishery fleets, bycatch fleets, surveys, and someday predators are specified in any order |

[List-oriented](#_bookmark0) [inputs](#_bookmark0)

Rather than specify the number of items to be read, now SS can figure it out on its own with lists terminated by

-9999 in first field of the read vector

[Internal](#_bookmark0) [sub-seasons](#_bookmark0)

SS v3.24 inherently has 2 subseasons each season (begin and middle) at which the age-length-key (ALK) is calculated; now user specifies an even number of sub-seasons to use (2 to 10)

[Observation](#_bookmark0) [Timing](#_bookmark0)

Timing of observations now is input as year, month where month is real; e.g. April 15 is 4.5; age-length-key (ALK) used for each observation is calculated to the nearest sub-season. Old "survey timing" replaced by the month specific inputs. Season is calculated at runtime from the input month and the input season durations.

[Speed](#_bookmark0) Smarter at when to re-calculate the age-length-key (ALK); trims tails of size-at-age so calculations avoid many inconsequential cells of the age-length matrix. ALK tail compression is specified in the starter file.

[Converter](#_bookmark0) Special version of SS, SStrans, will read files in 3.24 format and write .ss\_new files in 3.30 format. This is the advised method for converting previous version files.

[Empirical](#_bookmark0) [Weight-at-Age](#_bookmark0)

Implementing empirical weight-at-age is now specified separately in the control file rather than under the maturity options.

Fishery and Catch

[Prior Type](#_bookmark0) Change in the prior numbering for parameters. Now, 0 indicates no prior, and 6 indicates a normal distribution prior.

[Catch multiplier](#_bookmark0) Each fishing fleet’s catch can now have a "q" that is a parameter in the Mgparm section.

[Catch input](#_bookmark0) Catch input now as list: yr, seas, fleet, amount, se.

[Observations](#_bookmark0) Fishery composition observations can be related to season long catch-at-age, or to a month-specific timing.

[Retention](#_bookmark0) Option for dome-shaped retention function.

Survey [Link functions](#_bookmark0) Q\_power is now one of several, and growing, set of link

functions.

[Catchability](#_bookmark0) [setup](#_bookmark0) [reorganization](#_bookmark0)

Major reorganization of catchability (Q) setup, including the link specification.

[Q as a parameter](#_bookmark0) Each survey now must have a Q parameter and its value still can float (as old option 5).

Recruitment [Stock-Recruitmen](#_bookmark0)t

[Parameter](#_bookmark0) [Section](#_bookmark0)

Setup for the stock-recruitment relationship (SRR) parameter section has been changed to allow for blocking around unfished recruitment (R0) and steepness.

[Shepard SRR](#_bookmark0) A 3-parameter Shepard stock-recruitment curve is now an option.

[Recruitment](#_bookmark0) [timing](#_bookmark0)

Replace "birthseason" with "settlement event" that has explicit timing offset from spawning. Month of spawning and each settlement event must be specified and need not be at beginning of a season.

Benchmark Global MSY Global MSY based on knife edge age selection; also do

calculation with single age selection. The global MSY value will automatically be included in the report file.

Mean recruitment distribution

In multi-area model, can now specify range of years to use for the average recruitment distribution for forecasting. This feature is not yet implemented.

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| Forecast | Process error | Propagate random walk in mgparms, catchability, and selectivity into forecast. Specifying the end year for process error in the forecast period will implement this option. This option has only been partial implemented at this junction and will be completed in later versions. |
| Biology | [Parameter order](#_bookmark0) | Mgparms now have maturity, fecundity, sex ratio, and weight-length by growth pattern. |

[Sex ratio](#_bookmark0) Change sex ratio at birth from a constant to a morph-specific MG parameter.

Statistical [Input variance](#_bookmark0)

[adjuster](#_bookmark0)

Added variance adjustment factor for generalized size comp.

Deviation vectors

Variance of deviation vectors is now specified with

2 parameters for standard error and auto-correlation (rho).

[Dirichlet](#_bookmark0) [multinomial](#_bookmark0)

Dirichlet multinomial now a fleet-specific option; takes one parameter per.

Parameters [Parameter order](#_bookmark0) The prior standard deviation column for all parameter

lines has been moved before the prior type column. This modification improves formatting output between integer and decimal inputs.

Density dependence

Beginning of year summary biomass and the rec\_dev parameter are mapped to the "environmental" matrix so that parameters can be density-dependent.

[Re-order](#_bookmark0) Pay attention to the new order of the time-varying adjustments to parameters.

[Time-varying](#_bookmark0) [parameters](#_bookmark0)

Long parameter lines for spawner-recruit relationship (SRR), catchability (Q), and tag parameters and complete re-vamp of the way that time-varying parameters are implemented for SRR and Q. Now shares same internal code as mortality-growth and selectivity parameters for time-varying capabilities.