Untitled

Name	MSE-class
Description	A Management Strategy Evaluation object that contains information about simulation conditions and performance of data-limited methods
Slots	
Name	Name of the MSE object
nyears	The number of years for the historical simulation
proyears	The number of years for the projections - closed loop simulations
nMPs	Number of management procedures simulation tested
MPs	The names of the MPs that were tested
nsim	Number of simulations
OM	A table of nsim rows with a column for each sampled parameter of the operating model RefY: reference yield, the highest long-term yield (mean over last five years of projection) obtained from a fixed F strategy. This is a useful reference point for framing performance of MPs because it standardizes for starting point and future productivity. M: instantaneous natural mortality rate Depletion: stock depletion (biomass / unfished biomass) in the final historical year (prior to projection) A: abundance (biomass) updated in each management update of projection BMSY_B0: most productive stock size relative to unfished FMSY_M: fishing mortality rate divided by natural mortality rate Mgrad: mean average percentage gradient in natural mortality rate (percentage per time step) Msd: interannual variability in natural mortality rate (lognormal CV) procsd: process error - CV in log-normal recruitment deviations Esd: interannual variability in historical effort (fishing mortality rate) dFfinal: gradient in fishing mortality rate over final five years of the historical simulation MSY: Maximum Sustainable Yield

qinc: mean percentage increase in fishing efficiency (catchability) in projected years (input controls only)

qcv: interannual variability in future fishing efficiency (catchability) in projected years (input controls only)

CALcv: variability in lengths at age around the growth curve (normal CV)

FMSY: Fishing mortality rate at Maximum Sustainable Yield

Linf: maximum length (von Bertalanffy Linf parameter)

K: maximum growth rate (von Bertalanffy K parameter)

t0: theoretical length at age zero (von Bertalanffy t0 parameter)

hs: steepness of the stock recruitment relationship (the fraction of unfished recruitment at a fifth of unfished stock levels)

Linfgrad: mean gradient in maximum length (per cent per time step)

Kgrad: mean gradient in maximum growth rate (per cent per time step)

Linfsd: interannual variability in maximum length (log normal CV)

recgrad: gradient in recruitment strength (age 1 population numbers) over last 10 years of historical simulations

Ksd: interannual variability in maximum growth rate (log normal CV)

ageM: age at 50 per cent maturity

LFS: length at full selection (the shortest length class where fishery selectivity is 100 per cent)

age05: the age at 5 percent selectivity (ascending limb of selectivity curve)

Vmaxage: the selectivity of the oldest age class (controls dome shape of selectivity curve)

LFC: length at first capture, the smallest length that can be caught by the gear

OFLreal: the true simulated Over Fishing Limit (FMSY x biomass) updated in each management update of the projection

Spat_targ: spatial targetting parameter, fishing mortality rate across areas is proportional to vulnerable biomass raised to the power of this number.

Frac_area_1: the fraction of unfished biomass inhabiting area 1 (can be seen as fraction of habitat in area 1 or relative size of area 1)

	Prob_staying: the probability that individuals in area 1 remain there between time-steps
	AC: autocorrelation in recruitment
Obs	A table of nsim rows with a column for each sampled parameter of the observation model
	Cbias: bias in observed catches
	Csd: observation error in observed catches (lognormal CV)
	CAA_nsamp: the number of catch-at-age observations per time step
	CAA_ESS: the effective sample size of multinomial catch-at-age observation model (number of independent draws)
	CAL_nsamp: the number of catch-at-length observations per time step
	CAL_ESS: the effective sample size of multinomial catch-at-length observation model (number of independent draws)
	Isd: observation error in relative abundance index (lognormal CV)
	Dbias: bias in observed stock depletion (also applies to depletion Dt for DCAC)
	Mbias: bias in observed natural mortality rate
	FMSY_Mbias: bias in ratio of FMSY to natural mortality rate
	BMSY_B0bias: bias in ratio of most productive stock size relative to unfished
	AMbias: bias in age at 50 per cent maturity
	LFCbias: bias in length at first capture
	LFSbias: bias in length at full selection
	Abias: bias in observed current absolute stock biomass
	Kbias: bias in maximum growth rate (von Bertalanffy K parameter)
	t0bias: bias in theoretical length at age zero (von Bertalanffy t0 parameter)
	Linfbias: bias in maximum length (von Bertalanffy Linf parameter)
	hbias: bias in observed steepness of the stock recruitment relationship
	Irefbias: bias in abundance index corresponding to BMSY stock levels
	Crefbias: bias in MSY prediction (target or reference catch)
	Brefbias: bias in BMSY stock levels (target or reference biomass levels)
B_BMSY	Stored biomass relative to BMSY over the projection (an array with dimensions nsim, nMPs, proyears)

F_FMSY	Stored fishing mortality rate relative to FMSY over the projection (an array with dimensions nsim, nMPs, proyears)
B	Stored stock biomass over the projection (an array with dimensions nsim, nMPs, proyears)
SSB	Stored spawning stock biomass over the projection (an array with dimensions nsim, nMPs, proyears)
VB	Stored vulnerable biomass over the projection (an array with dimensions nsim, nMPs, proyears)
FM	Stored fishing mortality rate over the projection (an array with dimensions nsim, nMPs, proyears)
C	Stored catches (taken) over the projection (an array with dimensions nsim, nMPs, proyears)
TAC	Stored Total Allowable Catch (prescribed) over the projection (an array with dimensions nsim, nMPs, proyears)(note that this is NA for input controls)
SSB_hist	Stored historical spawning stock biomass (historical simulations - an array with dimensions nsim, nages, nyears, nareas)
CB_hist	Stored historical catches in weight (historical simulations - an array with dimensions nsim, nages, nyears, nareas)
FM_hist	Stored historical fishing mortality rate (historical simulations - an array with dimensions nsim, nages, nyears, nareas)
Effort	Stored relative fishing effort in the projection years
PAA	Population at age in last projection year (an array with dimensions nsim, nMPs, nages)
CAA	Catch at age in last projection year (an array with dimensions nsim, nMPs, nages)
CAL	Catch at length in last projection year (an array with dimensions nsim, nMPs, nCALbins)
CALbins	Mid-points of the catch-at-length bins