#V3.30.11.00-trans;\_2018\_04\_11;\_Stock\_Synthesis\_by\_Richard\_Methot\_(NOAA)\_using\_ADMB\_11.6

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#\_user\_info\_available\_at:https://vlab.ncep.noaa.gov/group/stock-synthesis

#C Sardine in 8c and 9a: ASSESSMENT 2020

#C growth parameters are estimated spawner-recruitment bias adjustment Not tuned For optimality

#\_data\_and\_control\_files: sardine.dat // sardine.ctl

1 # 0 means do not read wtatage.ss; 1 means read and use wtatage.ss and also read and use growth parameters

1 #\_N\_Growth\_Patterns

1 #\_N\_platoons\_Within\_GrowthPattern

#\_Cond 1 #\_Morph\_between/within\_stdev\_ratio (no read if N\_morphs=1)

#\_Cond 1 #vector\_Morphdist\_(-1\_in\_first\_val\_gives\_normal\_approx)

#

4 # recr\_dist\_method for parameters: 2=main effects for GP, Settle timing, Area; 3=each Settle entity; 4=none when N\_GP\*Nsettle\*pop==1

1 # not yet implemented; Future usage: Spawner-Recruitment: 1=global; 2=by area

1 # number of recruitment settlement assignments

0 # unused option

#GPattern month area age (for each settlement assignment)

1 1 1 0

#

#\_Cond 0 # N\_movement\_definitions goes here if Nareas > 1

#\_Cond 1.0 # first age that moves (real age at begin of season, not integer) also cond on do\_migration>0

#\_Cond 1 1 1 2 4 10 # example move definition for seas=1, morph=1, source=1 dest=2, age1=4, age2=10

#

0 #\_Nblock\_Patterns

# 2 1 #\_blocks\_per\_pattern

# begin and end years of blocks

# 1988 2005 2006 2020

# 1977 1977

#

# controls for all timevary parameters

1 #\_env/block/dev\_adjust\_method for all time-vary parms (1=warn relative to base parm bounds; 3=no bound check)

# autogen

1 1 1 1 1 # autogen: 1st element for biology, 2nd for SR, 3rd for Q, 4th reserved, 5th for selex

# where: 0 = autogen all time-varying parms; 1 = read each time-varying parm line; 2 = read then autogen if parm min==-12345

#

#

# setup for M, growth, maturity, fecundity, recruitment distibution, movement

#

3 #\_natM\_type:\_0=1Parm; 1=N\_breakpoints;\_2=Lorenzen;\_3=agespecific;\_4=agespec\_withseasinterpolate

#\_Age\_natmort\_by sex x growthpattern

0.98 0.61 0.47 0.4 0.36 0.35 0.32

1 # GrowthModel: 1=vonBert with L1&L2; 2=Richards with L1&L2; 3=age\_specific\_K; 4=not implemented

0 #\_Age(post-settlement)\_for\_L1;linear growth below this

6 #\_Growth\_Age\_for\_L2 (999 to use as Linf)

-999 #\_exponential decay for growth above maxage (fixed at 0.2 in 3.24; value should approx initial Z; -999 replicates 3.24)

0 #\_placeholder for future growth feature

0 #\_SD\_add\_to\_LAA (set to 0.1 for SS2 V1.x compatibility)

0 #\_CV\_Growth\_Pattern: 0 CV=f(LAA); 1 CV=F(A); 2 SD=F(LAA); 3 SD=F(A); 4 logSD=F(A)

5 #\_maturity\_option: 1=length logistic; 2=age logistic; 3=read age-maturity matrix by growth\_pattern; 4=read age-fecundity; 5=disabled; 6=read length-maturity

#\_Age\_Fecundity by growth pattern from wt-at-age.ss now invoked by read bodywt flag

1 #\_First\_Mature\_Age

1 #\_fecundity option:(1)eggs=Wt\*(a+b\*Wt);(2)eggs=a\*L^b;(3)eggs=a\*Wt^b; (4)eggs=a+b\*L; (5)eggs=a+b\*W

0 #\_hermaphroditism option: 0=none; 1=female-to-male age-specific fxn; -1=male-to-female age-specific fxn

1 #\_parameter\_offset\_approach (1=none, 2= M, G, CV\_G as offset from female-GP1, 3=like SS2 V1.x)

#

#\_growth\_parms

#\_ LO HI INIT PRIOR PR\_SD PR\_type PHASE env\_var&link dev\_link dev\_minyr dev\_maxyr dev\_PH Block Block\_Fxn

8 18 14 0 0 0 -2 0 0 0 0 0 0 0 # L\_at\_Amin\_Fem\_GP\_1

20 25 23 0 0 0 -4 0 0 0 0 0 0 0 # L\_at\_Amax\_Fem\_GP\_1

0.2 0.8 0.4 0 0 0 -4 0 0 0 0 0 0 0 # VonBert\_K\_Fem\_GP\_1

0.05 0.25 0.1 0 0 0 -3 0 0 0 0 0 0 0 # CV\_young\_Fem\_GP\_1

0.05 0.25 0.1 0 0 0 -3 0 0 0 0 0 0 0 # CV\_old\_Fem\_GP\_1

-3 3 2 0 0 0 -3 0 0 0 0 0 0 0 # Wtlen\_1\_Fem

-3 4 3 0 0 0 -3 0 0 0 0 0 0 0 # Wtlen\_2\_Fem

50 60 55 0 0 0 -3 0 0 0 0 0 0 0 # Mat50%\_Fem

-3 3 -0.25 0 0 0 -3 0 0 0 0 0 0 0 # Mat\_slope\_Fem

-3 3 1 0 0 0 -3 0 0 0 0 0 0 0 # Eggs/kg\_inter\_Fem

-3 3 0 0 0 0 -3 0 0 0 0 0 0 0 # Eggs/kg\_slope\_wt\_Fem

# 0 0 0 0 0 0 -4 0 0 0 0 0 0 0 # RecrDist\_GP\_1

# 0 0 0 0 0 0 -4 0 0 0 0 0 0 0 # RecrDist\_Area\_1

# 0 0 0 0 0 0 -4 0 0 0 0 0 0 0 # RecrDist\_timing\_1

1 1 1 1 1 0 -1 0 0 0 0 0 0 0 # CohortGrowDev

0.000001 0.999999 0.5 0.5 0.5 0 -99 0 0 0 0 0 0 0 # FracFemale\_GP\_1

#

#\_no timevary MG parameters

#

#\_seasonal\_effects\_on\_biology\_parms

0 0 0 0 0 0 0 0 0 0 #\_femwtlen1,femwtlen2,mat1,mat2,fec1,fec2,Malewtlen1,malewtlen2,L1,K

#\_ LO HI INIT PRIOR PR\_SD PR\_type PHASE

#\_Cond -2 2 0 0 -1 99 -2 #\_placeholder when no seasonal MG parameters

#

3 #\_Spawner-Recruitment; Options: 2=Ricker; 3=std\_B-H; 4=SCAA; 5=Hockey; 6=B-H\_flattop; 7=survival\_3Parm; 8=Shepherd\_3Parm; 9=RickerPower\_3parm

0 # 0/1 to use steepness in initial equ recruitment calculation

0 # future feature: 0/1 to make realized sigmaR a function of SR curvature

#\_ LO HI INIT PRIOR PR\_SD PR\_type PHASE env-var use\_dev dev\_mnyr dev\_mxyr dev\_PH Block Blk\_Fxn # parm\_name

1 20 16 4.5 5 0 1 0 0 0 0 0 0 0 # SR\_LN(R0)

0 2 0.71 0.7 0.05 0 -1 0 0 0 0 0 0 0 # SR\_BH\_steep

0 4 0.7 0.6 0.8 0 -4 0 0 0 0 0 0 0 # SR\_sigmaR

-5 5 0 0 1 0 -2 0 0 0 0 0 0 0 # SR\_regime

0 0 0 0 0 0 -99 0 0 0 0 0 0 0 # SR\_autocorr

1 #do\_recdev: 0=none; 1=devvector; 2=simple deviations

1978 # first year of main recr\_devs; early devs can preceed this era

2020 # last year of main recr\_devs; forecast devs start in following year

3 #\_recdev phase

1 # (0/1) to read 13 advanced options

-5 #\_recdev\_early\_start (0=none; neg value makes relative to recdev\_start)

4 #\_recdev\_early\_phase

-1 #\_forecast\_recruitment phase (incl. late recr) (0 value resets to maxphase+1)

1 #\_lambda for Fcast\_recr\_like occurring before endyr+1

1971.7 #\_last\_yr\_nobias\_adj\_in\_MPD; begin of ramp

1976.5 #\_first\_yr\_fullbias\_adj\_in\_MPD; begin of plateau

2019.3 #\_last\_yr\_fullbias\_adj\_in\_MPD

2028.7 #\_end\_yr\_for\_ramp\_in\_MPD (can be in forecast to shape ramp, but SS sets bias\_adj to 0.0 for fcast yrs)

0.9557 #\_max\_bias\_adj\_in\_MPD (-1 to override ramp and set biasadj=1.0 for all estimated recdevs)

0 #\_period of cycles in recruitment (N parms read below)

-5 #min rec\_dev

5 #max rec\_dev

0 #\_read\_recdevs

#\_end of advanced SR options

#

#\_placeholder for full parameter lines for recruitment cycles

# read specified recr devs

#\_Yr Input\_value

#

# all recruitment deviations

# 1974E 1975E 1976E 1977E 1978R 1979R 1980R 1981R 1982R 1983R 1984R 1985R 1986R 1987R 1988R 1989R 1990R 1991R 1992R 1993R 1994R 1995R 1996R 1997R 1998R 1999R 2000R 2001R 2002R 2003R 2004R 2005R 2006R 2007R 2008R 2009R 2010R 2011R 2012R 2013R 2014R 2015R 2016R 2017F 2018F 2019F

# 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

# implementation error by year in forecast: 0

#

#Fishing Mortality info

0.3 # F ballpark

-2001 # F ballpark year (neg value to disable)

3 # F\_Method: 1=Pope; 2=instan. F; 3=hybrid (hybrid is recommended)

7 # max F or harvest rate, depends on F\_Method

# no additional F input needed for Fmethod 1

# if Fmethod=2; read overall start F value; overall phase; N detailed inputs to read

# if Fmethod=3; read N iterations for tuning for Fmethod 3

7 # N iterations for tuning F in hybrid method (recommend 3 to 7)

#

# if Fmethod=2; read overall start F value; overall phase; N detailed inputs to read

#0.2 2 0

#\_initial\_F\_parms; count = 1

#\_ LO HI INIT PRIOR PR\_SD PR\_type PHASE

-1 2 0.3 0.3 0.2 0 1 # InitF\_seas\_1\_flt\_1purse\_seine

#2019 2038

# F rates by fleet

# Yr: 1978 1979 1980 1981 1982 1983 1984 1985 1986 1987 1988 1989 1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019

# seas: 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1

# purse\_seine 0.946533 1.81208 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 1.92086 0.933049 0.565168 0.274869 0.136794 0.13563 0.118369 0.118369

#

#\_Q\_setup for fleets with cpue or survey data

#\_1: link type: (1=simple q, 1 parm; 2=mirror simple q, 1 mirrored parm; 3=q and power, 2 parm)

#\_2: extra input for link, i.e. mirror fleet

#\_3: 0/1 to select extra sd parameter

#\_4: 0/1 for biasadj or not

#\_5: 0/1 to float

#\_ fleet link link\_info extra\_se biasadj float # fleetname

2 1 0 1 0 1 # Acoustic\_survey

3 1 0 1 0 1 # DEPM\_survey

4 1 0 0 0 0 # Rec\_survey

-9999 0 0 0 0 0

#

#\_Q\_parms(if\_any);Qunits\_are\_ln(q)

#\_ LO HI INIT PRIOR PR\_SD PR\_type PHASE env-var use\_dev dev\_mnyr dev\_mxyr dev\_PH Block Blk\_Fxn # parm\_name

-3 3 0.75 0 1 0 -1 0 0 0 0 0 0 0 # LnQ\_base\_Acoustic\_survey(2)

0 1 0.3 0.1 0.1 0 3 0 0 0 0 0 0 0 # Q\_extraSD\_Acoustic(2)

-3 3 0.26 0 1 0 -1 0 0 0 0 0 0 0 # LnQ\_base\_DEPM\_survey(3)

0 1 0.3 0.1 0.1 0 3 0 0 0 0 0 0 0 # Q\_extraSD\_Acoustic(2)

-3 3 0 0 1 0 1 0 0 0 0 0 0 0 # LnQ\_base\_Rec\_survey(4)

#\_no timevary Q parameters

#

#\_size\_selex\_patterns

#Pattern:\_0; parm=0; selex=1.0 for all sizes

#Pattern:\_1; parm=2; logistic; with 95% width specification

#Pattern:\_5; parm=2; mirror another size selex; PARMS pick the min-max bin to mirror

#Pattern:\_15; parm=0; mirror another age or length seller

#Pattern:\_6; parm=2+special; non-parm len selex

#Pattern:\_43; parm=2+special+2; like 6, with 2 additional param for scaling (average over bin range)

#Pattern:\_8; parm=8; New doublelogistic with smooth transitions and constant above Linf option

#Pattern:\_9; parm=6; simple 4-parm double logistic with starting length; parm 5 is first length; parm 6=1 does desc as offset

#Pattern:\_21; parm=2+special; non-parm len selex, read as pairs of size, then selex

#Pattern:\_22; parm=4; double\_normal as in CASAL

#Pattern:\_23; parm=6; double\_normal where final value is directly equal to sp(6) so can be >1.0

#Pattern:\_24; parm=6; double\_normal with sel(minL) and sel(maxL), using joiners

#Pattern:\_25; parm=3; exponential-logistic in size

#Pattern:\_27; parm=3+special; cubic spline

#Pattern:\_42; parm=2+special+3; // like 27, with 2 additional param for scaling (average over bin range)

#\_discard\_options:\_0=none;\_1=define\_retention;\_2=retention&mortality;\_3=all\_discarded\_dead;\_4=define\_dome-shaped\_retention

#\_Pattern Discard Male Special

0 0 0 0 # 1 purse\_seine

0 0 0 0 # 2 Acoustic\_survey

0 0 0 0 # 3 DEPM\_survey

0 0 0 0 # 4 Rec\_survey

#

#\_age\_selex\_types

#Pattern:\_0; parm=0; selex=1.0 for ages 0 to maxage

#Pattern:\_10; parm=0; selex=1.0 for ages 1 to maxage

#Pattern:\_11; parm=2; selex=1.0 for specified min-max age

#Pattern:\_12; parm=2; age logistic

#Pattern:\_13; parm=8; age double logistic

#Pattern:\_14; parm=nages+1; age empirical

#Pattern:\_15; parm=0; mirror another age or length selex

#Pattern:\_16; parm=2; Coleraine - Gaussian

#Pattern:\_17; parm=nages+1; empirical as random walk N parameters to read can be overridden by setting special to non-zero

#Pattern:\_41; parm=2+nages+1; // like 17, with 2 additional param for scaling (average over bin range)

#Pattern:\_18; parm=8; double logistic - smooth transition

#Pattern:\_19; parm=6; simple 4-parm double logistic with starting age

#Pattern:\_20; parm=6; double\_normal,using joiners

#Pattern:\_26; parm=3; exponential-logistic in age

#Pattern:\_27; parm=3+special; cubic spline in age

#Pattern:\_42; parm=2+nages+1; // cubic spline; with 2 additional param for scaling (average over bin range)

#\_Pattern Discard Male Special

17 0 0 0 # 1 purse\_seine

17 0 0 0 # 2 Acoustic\_survey

11 0 0 0 # 3 DEPM\_survey

11 0 0 0 # 4 Rec\_survey

#

#\_ LO HI INIT PRIOR PR\_SD PR\_type PHASE env-var use\_dev dev\_mnyr dev\_mxyr dev\_PH Block Blk\_Fxn # parm\_name

-4 4 0 0 0.01 0 -2 0 0 0 0 0 0 0 # AgeSel\_P1\_purse\_seine(1)

-3 3 0.9 0.5 0.01 0 5 0 23 1978 2020 5 0 0 # AgeSel\_P2\_purse\_seine(1)

-4 4 0.4 0.5 0.01 0 5 0 23 1978 2020 5 0 0 # AgeSel\_P3\_purse\_seine(1)

-4 4 0.1 0.3 0.01 0 4 0 0 0 0 0 0 0 # AgeSel\_P4\_purse\_seine(1)

-4 4 0 0.1 0.01 0 -4 0 0 0 0 0 0 0 # AgeSel\_P5\_purse\_seine(1)

-4 4 0 0.1 0.01 0 -4 0 0 0 0 0 0 0 # AgeSel\_P6\_purse\_seine(1)

-4 4 0 0.5 0.01 0 -4 0 0 0 0 0 0 0 # AgeSel\_P7\_purse\_seine(1)

-1000 -4 -1000 -6 0.01 0 -2 0 0 0 0 0 0 0 # AgeSel\_P1\_Acoustic\_survey(2)

-4 4 0 0.5 0.01 0 -4 0 0 0 0 0 0 0 # AgeSel\_P2\_Acoustic\_survey(2)

-4 4 0 0 0.01 0 4 0 0 0 0 0 0 0 # AgeSel\_P3\_Acoustic\_survey(2)

-4 4 0 0 0.01 0 4 0 0 0 0 0 0 0 # AgeSel\_P4\_Acoustic\_survey(2)

-4 4 0 0 0.01 0 -4 0 0 0 0 0 0 0 # AgeSel\_P5\_Acoustic\_survey(2)

-4 4 0 0 0.01 0 -4 0 0 0 0 0 0 0 # AgeSel\_P6\_Acoustic\_survey(2)

-4 4 0 -1 0.01 0 -4 0 0 0 0 0 0 0 # AgeSel\_P7\_Acoustic\_survey(2)

#DEPM

0 12 1 -2 0.01 0 -3 0 0 0 0 0 0 0 # AgeSel\_P1\_Active(3)

0 12 6 0 0.01 0 -3 0 0 0 0 0 0 0 # AgeSel\_P2\_Active(3)

#Rec\_survey

0 12 0 -2 0.01 0 -3 0 0 0 0 0 0 0 # AgeSel\_P1\_Active(3)

0 12 0 0 0.01 0 -3 0 0 0 0 0 0 0 # AgeSel\_P2\_Active(3)

# timevary selex parameters

#\_ LO HI INIT PRIOR PR\_SD PR\_type PHASE # parm\_name

5 100 1 5 99 0 -4 #FL1(1)\_dev\_se

-0.99 0.99 0 0 0.5 6 -5 # FL1(1)\_dev\_autocorr

5 100 1 5 99 0 -4 #FL1(1)\_dev\_se

-0.99 0.99 0 0 0.5 6 -5 # FL1(1)\_dev\_autocorr

# timevary selex parameters

#\_ LO HI INIT PRIOR PR\_SD PR\_type PHASE # parm\_name

# -4 4 0.9 1 0.01 0 4 # AgeSel\_P2\_purse\_seine(1)\_BLK1delta\_1988

# -4 4 0.9 1 0.01 0 4 # AgeSel\_P2\_purse\_seine(1)\_BLK1delta\_2006

# -4 4 0.4 1 0.01 0 4 # AgeSel\_P3\_purse\_seine(1)\_BLK1delta\_1988

# -4 4 0.4 1 0.01 0 4 # AgeSel\_P3\_purse\_seine(1)\_BLK1delta\_2006

# -4 4 0.1 1 0.01 0 4 # AgeSel\_P4\_purse\_seine(1)\_BLK1delta\_1988

# -4 4 0.1 1 0.01 0 4 # AgeSel\_P4\_purse\_seine(1)\_BLK1delta\_2006

# -4 4 -0.5 1 0.01 0 4 # AgeSel\_P7\_purse\_seine(1)\_BLK1delta\_1988

# -4 4 -0.5 1 0.01 0 4 # AgeSel\_P7\_purse\_seine(1)\_BLK1delta\_2006

# info on dev vectors created for selex parms are reported with other devs after tag parameter section

#

0 # use 2D\_AR1 selectivity(0/1): experimental feature

#\_no 2D\_AR1 selex offset used

#

# Tag loss and Tag reporting parameters go next

0 # TG\_custom: 0=no read; 1=read if tags exist

#\_Cond -6 6 1 1 2 0.01 -4 0 0 0 0 0 0 0 #\_placeholder if no parameters

#

# deviation vectors for timevary parameters

# base base first block block env env dev dev dev dev dev

# type index parm trend pattern link var vectr link \_mnyr mxyr phase dev\_vector

# 5 2 1 1 3 2 0 0 0 0 0 0

# 5 3 3 1 3 2 0 0 0 0 0 0

# 5 4 5 1 3 2 0 0 0 0 0 0

# 5 7 7 1 3 2 0 0 0 0 0 0

#

# Input variance adjustments factors:

#\_1=add\_to\_survey\_CV

#\_2=add\_to\_discard\_stddev

#\_3=add\_to\_bodywt\_CV

#\_4=mult\_by\_lencomp\_N

#\_5=mult\_by\_agecomp\_N

#\_6=mult\_by\_size-at-age\_N

#\_7=mult\_by\_generalized\_sizecomp

#\_Factor Fleet Value

5 1 1

5 2 1

4 3 1

5 4 1

-9999 1 0 # terminator

#

4 #\_maxlambdaphase

1 #\_sd\_offset; must be 1 if any growthCV, sigmaR, or survey extraSD is an estimated parameter

# read 3 changes to default Lambdas (default value is 1.0)

# Like\_comp codes: 1=surv; 2=disc; 3=mnwt; 4=length; 5=age; 6=SizeFreq; 7=sizeage; 8=catch; 9=init\_equ\_catch;

# 10=recrdev; 11=parm\_prior; 12=parm\_dev; 13=CrashPen; 14=Morphcomp; 15=Tag-comp; 16=Tag-negbin; 17=F\_ballpark

#like\_comp fleet phase value sizefreq\_method

9 1 1 1 1

4 2 2 1 1

4 2 3 1 1

4 2 4 1 1

-9999 1 1 1 1 # terminator

#

# lambdas (for info only; columns are phases)

# 0 0 0 0 #\_CPUE/survey:\_1

# 1 1 1 1 #\_CPUE/survey:\_2

# 1 1 1 1 #\_CPUE/survey:\_3

# 1 1 1 1 #\_agecomp:\_1

# 1 1 1 1 #\_agecomp:\_2

# 0 0 0 0 #\_agecomp:\_3

# 1 1 1 1 #\_init\_equ\_catch

# 1 1 1 1 #\_recruitments

# 1 1 1 1 #\_parameter-priors

# 1 1 1 1 #\_parameter-dev-vectors

# 1 1 1 1 #\_crashPenLambda

# 0 0 0 0 # F\_ballpark\_lambda

1 # (0/1) read specs for more stddev reporting

0 2 -1 7 0 0 -1 2020 6 # selex type, len/age, year, N selex bins, Growth pattern, N growth ages, NatAge\_area(-1 for all), NatAge\_yr, N Natages

1 2 3 4 5 6 # vector with NatAge std bin picks (-1 in first bin to self-generate)

999