Model runs report for Spatial BRP MS

Bosley et al. SPASAM

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HAKE

The following plot and tables show model specifications and results for hake model runs

Parameter values for mat/selectivity

Table 1: Table continues below

Age	init.N	M	wt.age.pop	wt.age.catch	mat.1
1	3125000	0.226	0.101	0.101	0.32
2	2492869	0.226	0.273	0.273	0.79
3	1988607	0.226	0.377	0.377	0.88
4	1586348	0.226	0.473	0.473	0.94
5	1265458	0.226	0.545	0.545	0.98
6	1009479	0.226	0.622	0.622	1
7	805280	0.226	0.674	0.674	1
8	642386	0.226	0.754	0.754	1
9	512443	0.226	0.805	0.805	1
10	408785	0.226	0.833	0.833	1
11	326095	0.226	0.909	0.909	1
12	260132	0.226	0.952	0.952	1
13	207512	0.226	0.938	0.938	1
14	165536	0.226	0.918	0.918	1
15	132051	0.226	0.982	0.982	1

Table 2: Table continues below

mat.2	mat.pan	mat.GB	fish.sel	sur.sel	fish.sel_GB
0	0.1067	0	0	0	0
0.41	0.5367	0.12	0.12	0.35	0.12
0.69	0.7533	0.54	0.54	0.61	0.54
0.84	0.8733	0.71	0.66	0.64	0.71
0.98	0.98	0.87	0.81	0.66	0.87
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
1	1	1	1	1	1
1	1	1	1	1	1
1	1	1	1	1	1

fish.caa.err	sur.caa.err
0.3292	0.3292
0.3292	0.3292
0.3469	0.3469
0.3686	0.3686
0.3953	0.3953
0.4281	0.4281
0.4684	0.4684
0.5178	0.5178
0.5786	0.5786
0.6533	0.6533
0.7451	0.7451
0.8578	0.8578
0.9963	0.9963
1.167	1.167
1.376	1.376

Parameter values apportionment

Primary Movement

X	X.1	FROM.AREA	X.2	X.3	X.4
		1		2	
TO AREA	Age	1	2	1	2
	1	0.95	0.05	0.05	0.95
	2	0.95	0.05	0.05	0.95
	3	0.8	0.2	0.05	0.95
	4	0.8	0.2	0.05	0.95
	5	0.5	0.5	0.05	0.95
	6	0.2	0.8	0.05	0.95
	7	0.2	0.8	0.05	0.95
	8	0.1	0.9	0.05	0.95
	9	0.1	0.9	0.05	0.95
	10	0.1	0.9	0.05	0.95
	11	0.1	0.9	0.05	0.95
	12	0.1	0.9	0.05	0.95
	13	0.1	0.9	0.05	0.95
	14	0.1	0.9	0.05	0.95
	15	0.1	0.9	0.05	0.95

Alternate Movement

X	X.1	FROM.AREA	X.2	X.3	X.4
		1		2	
TO AREA	Age	1	2	1	2
	1	0.7	0.3	0.2	0.8
	2	0.7	0.3	0.2	0.8
	3	0.6	0.4	0.2	0.8
	4	0.6	0.4	0.2	0.8
	5	0.5	0.5	0.2	0.8
	6	0.5	0.5	0.2	0.8
	7	0.4	0.6	0.2	0.8
	8	0.4	0.6	0.2	0.8
	9	0.4	0.6	0.2	0.8
	10	0.4	0.6	0.2	0.8
	11	0.2	0.8	0.2	0.8
	12	0.2	0.8	0.2	0.8
	13	0.2	0.8	0.2	0.8
	14	0.2	0.8	0.2	0.8
	15	0.2	0.8	0.2	0.8

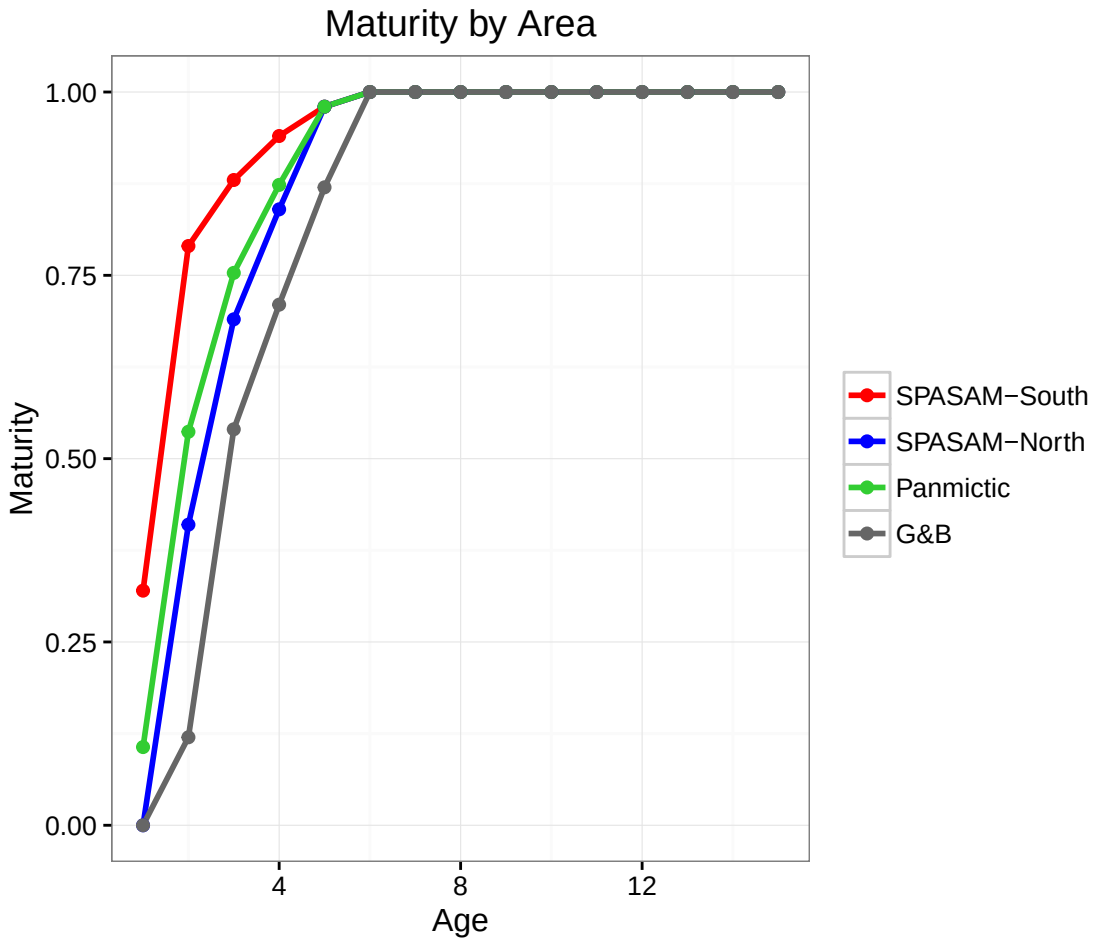
X	X.1	FROM.AREA	X.2	X.3	X.4

Parameter values apportionment

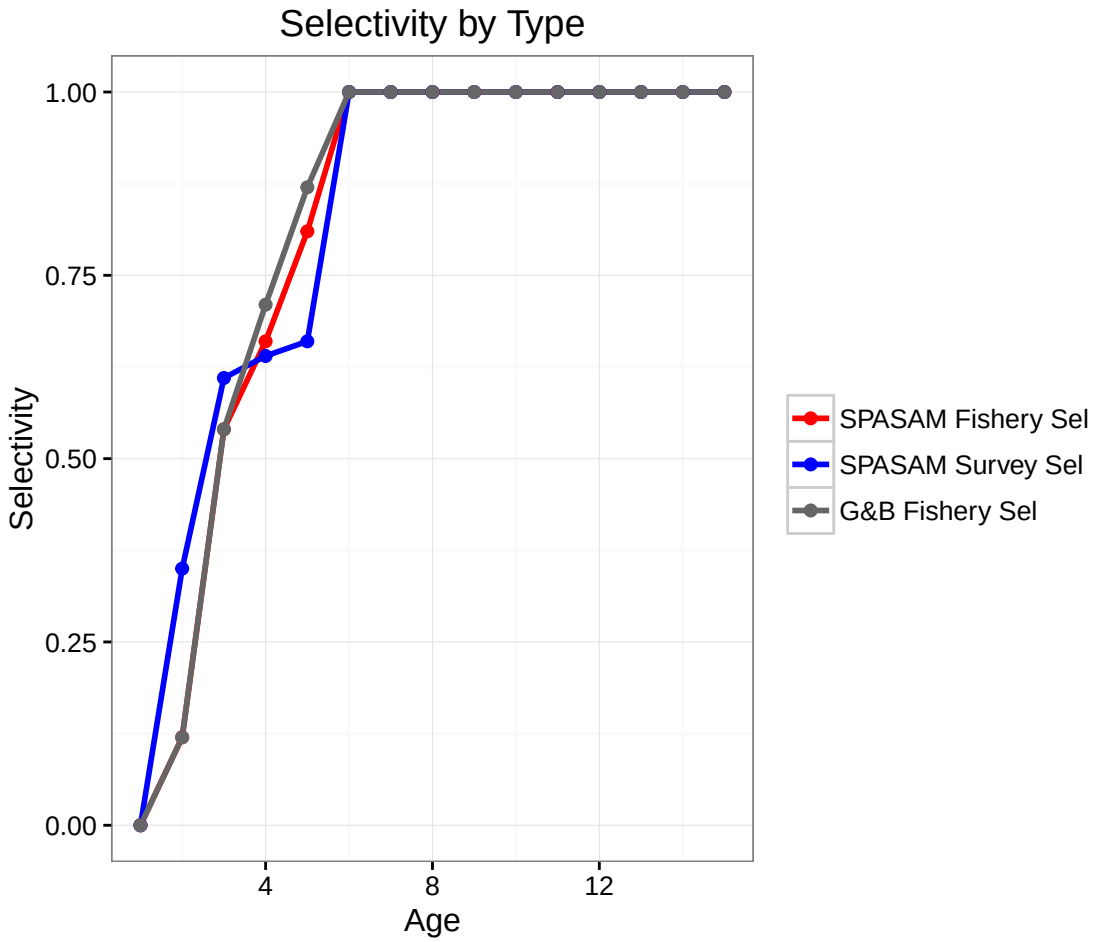
Hake recruitment apportionment by model run

Model	Area 1(S)	Area 2(N)
G & B	0.3	0.7
SPASAM	0.9	0.1
SPASAM - alt	0.8	0.2

Looking at maturity values



Looking at selectivity values



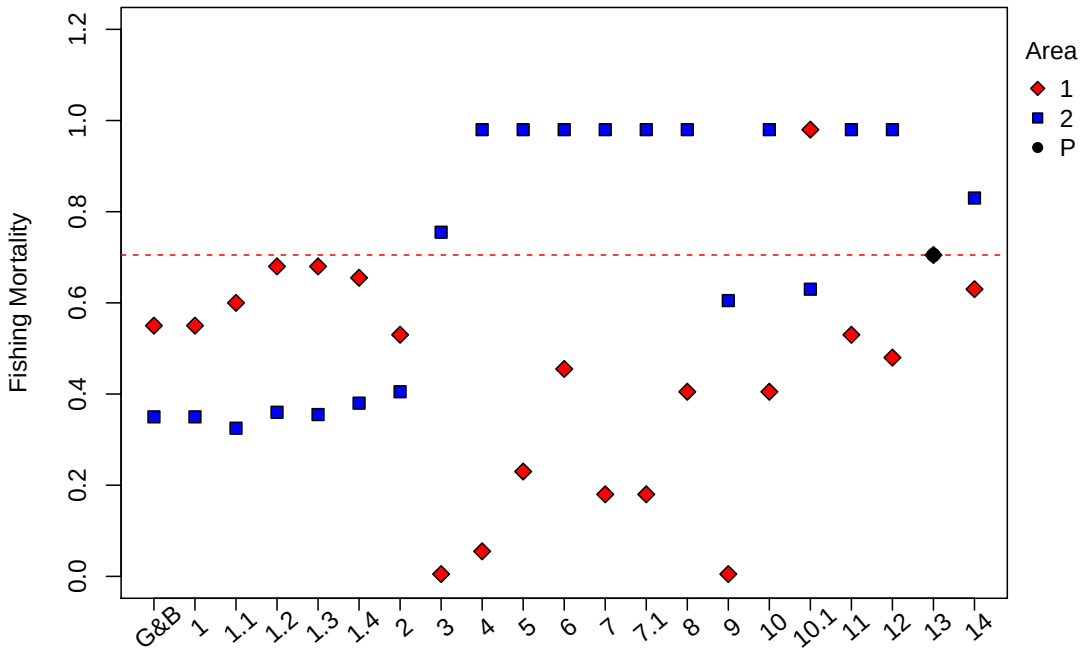
Specifications for model runs

Scenario	Description
G&B	from run #4 G&B output
1	G&B tspawn and init abund (matching), tspawn = 0.25
1.1	no larval movement
1.2	tspawn = 0
1.3	new initial abundance
1.4	update selectivity/maturity
2	new apportionment
3	new movement/G&B apportionment
4	new movment and apportionment
5	new mismatch maturity - equal by region
6	maturity vary by region (BASE)
7	Base model (6) with equal apportion
7.1	Same as above with recruit apportion ==2
8	rec apportion alternative (20/80)
9	stochastic recruitment
10	stochastic apportion (random devs)
10.1	recruit apportion fully random - uniform
11	movement alternative
12	both movement/apportion alternative
13	panmictic
14	metapopulation

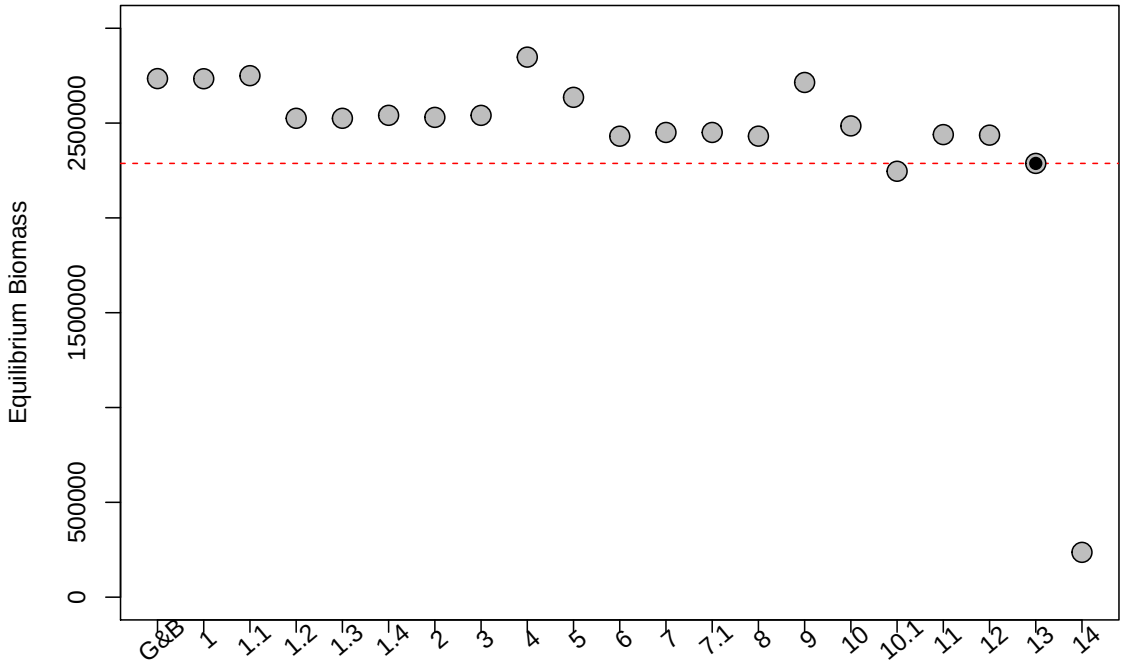
Model run results

In these plots the red diamonds represent South (Area 1) and the blue squares represent North (Area 2). Red dotted lines and black circles are the panmictic population levels @ MSY. Population totals aggregated over areas are represented in grey.

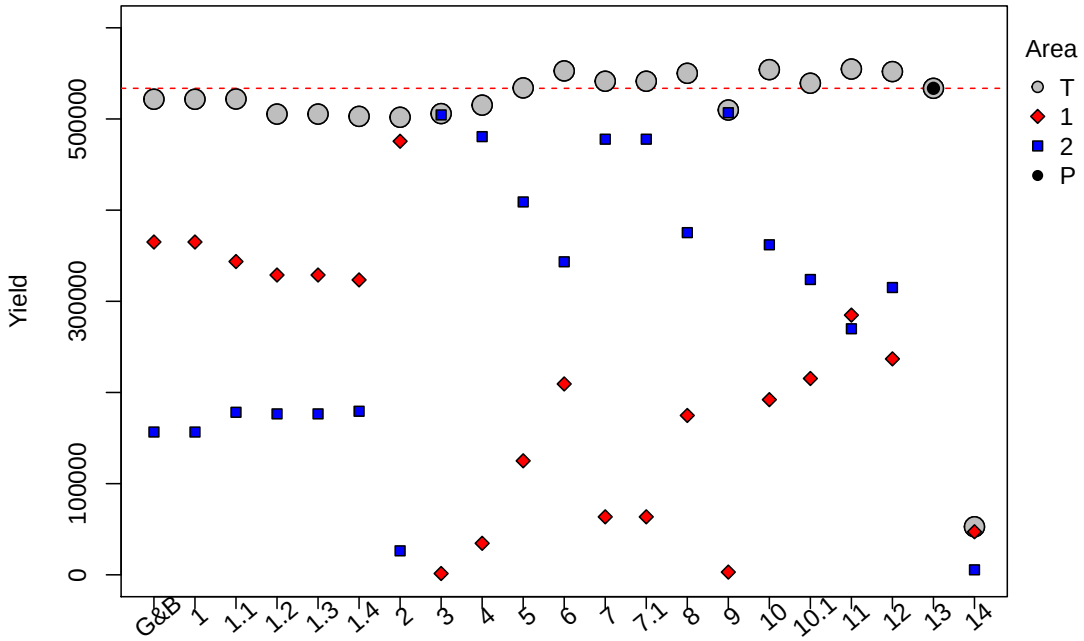
1. F for each area



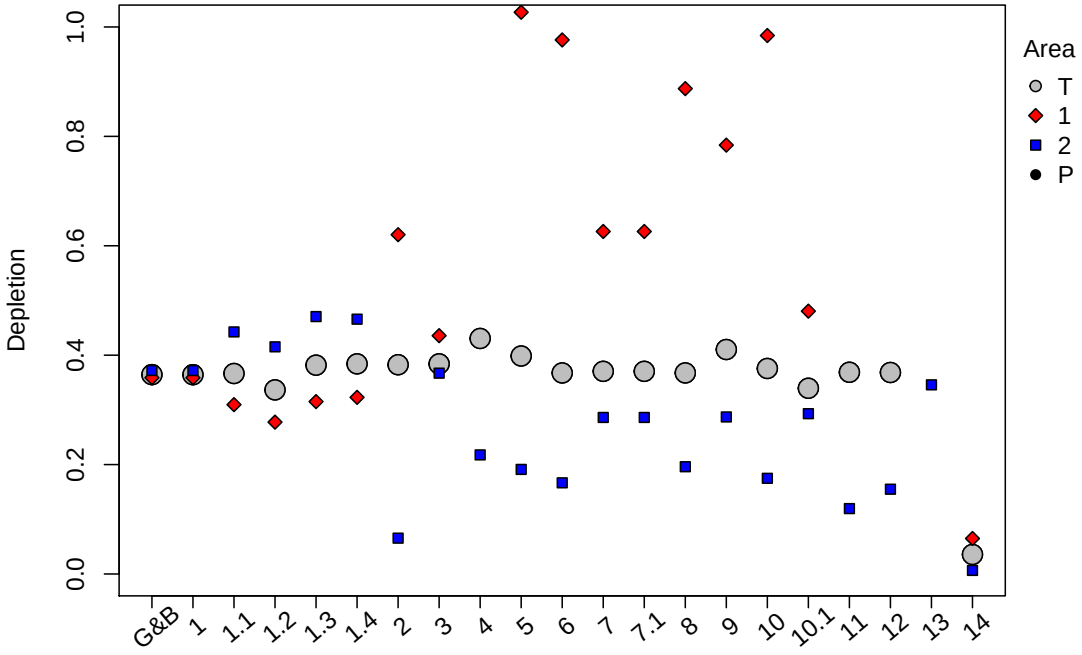
2.Total equilibrium biomass



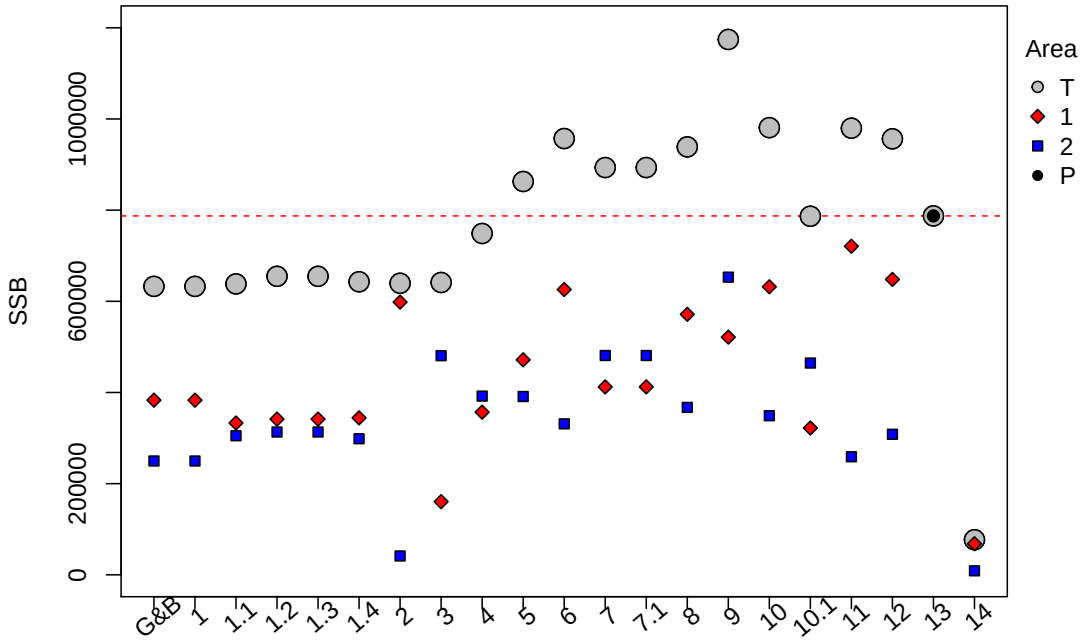
3.Yield


Yield
0
100000
300000
500000
G&B
1
1.1
1.2
1.3
1.4
2
3
4
5
6
7
7.1
8
9
10
10.1
11
12
13
14
Area
T
1
2
P

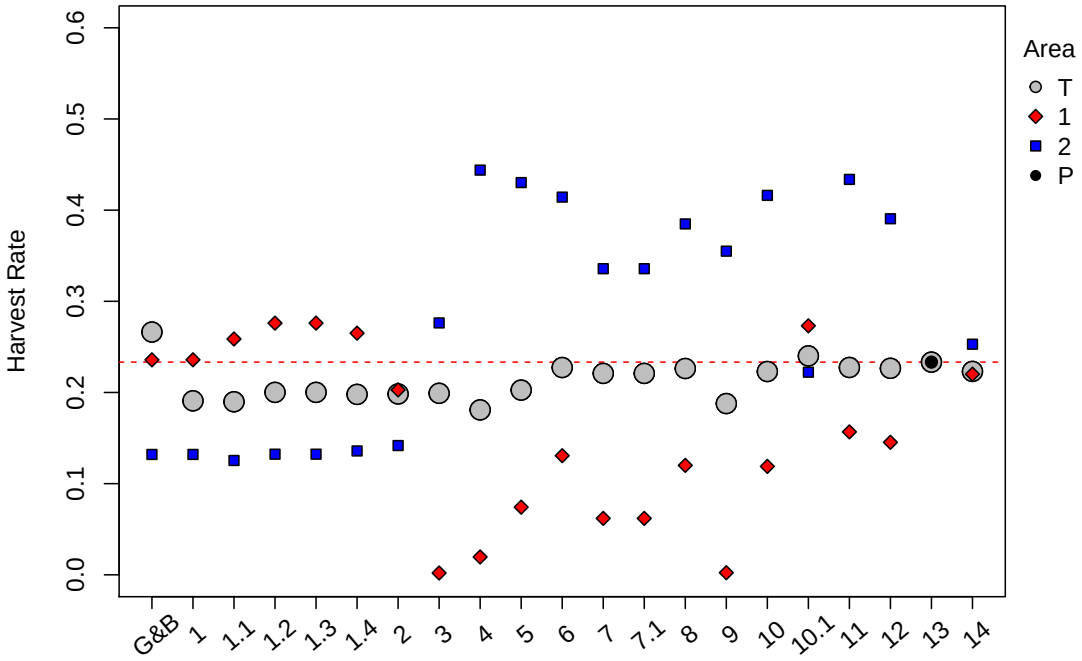
2. Depletion


Depletion
0.0
0.2
0.4
0.6
0.8
1.0
G&B
1
1.1
1.2
1.3
1.4
2
3
4
5
6
7
7.1
8
9
10
10.1
11
12
13
14
Area
T
1
2
P

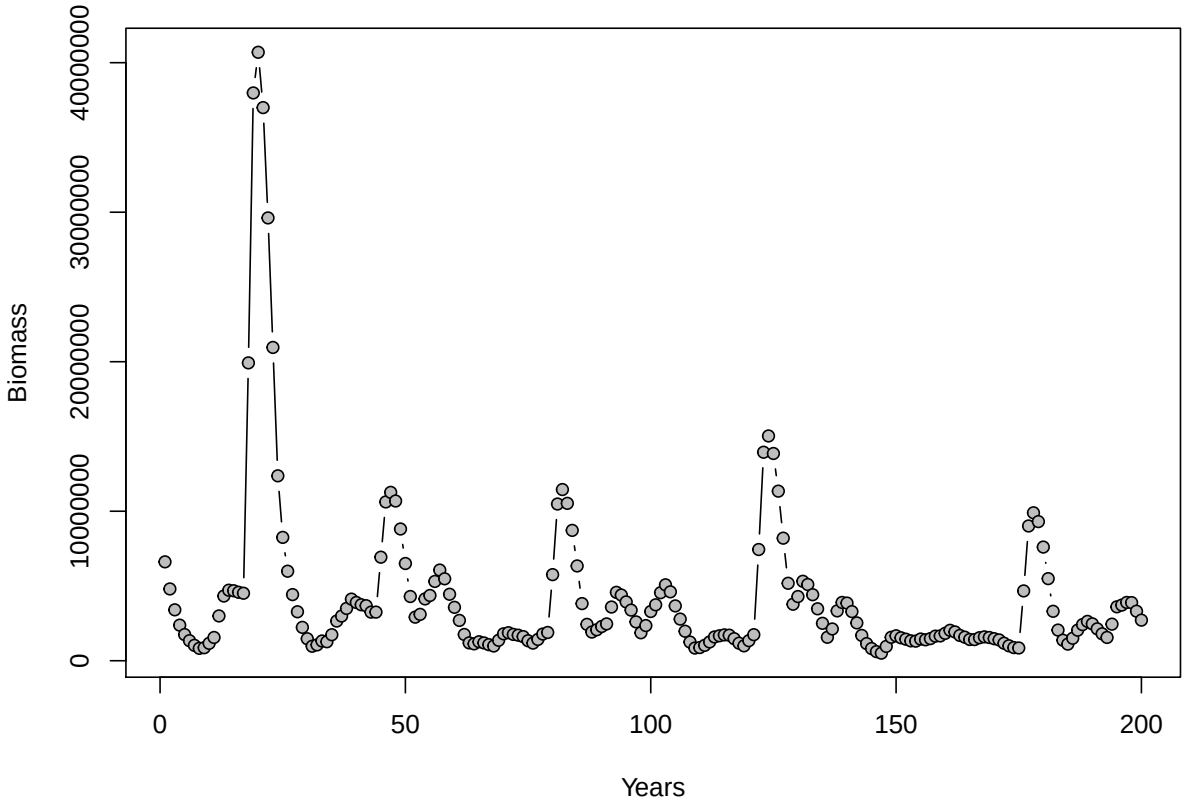
3. SSB


SSB
0
200000
600000
1000000
G&B
1
1.1
1.2
1.3
1.4
2
3
4
5
6
7
7.1
8
9
10
10.1
11
12
13
14
Area
T
1
2
P

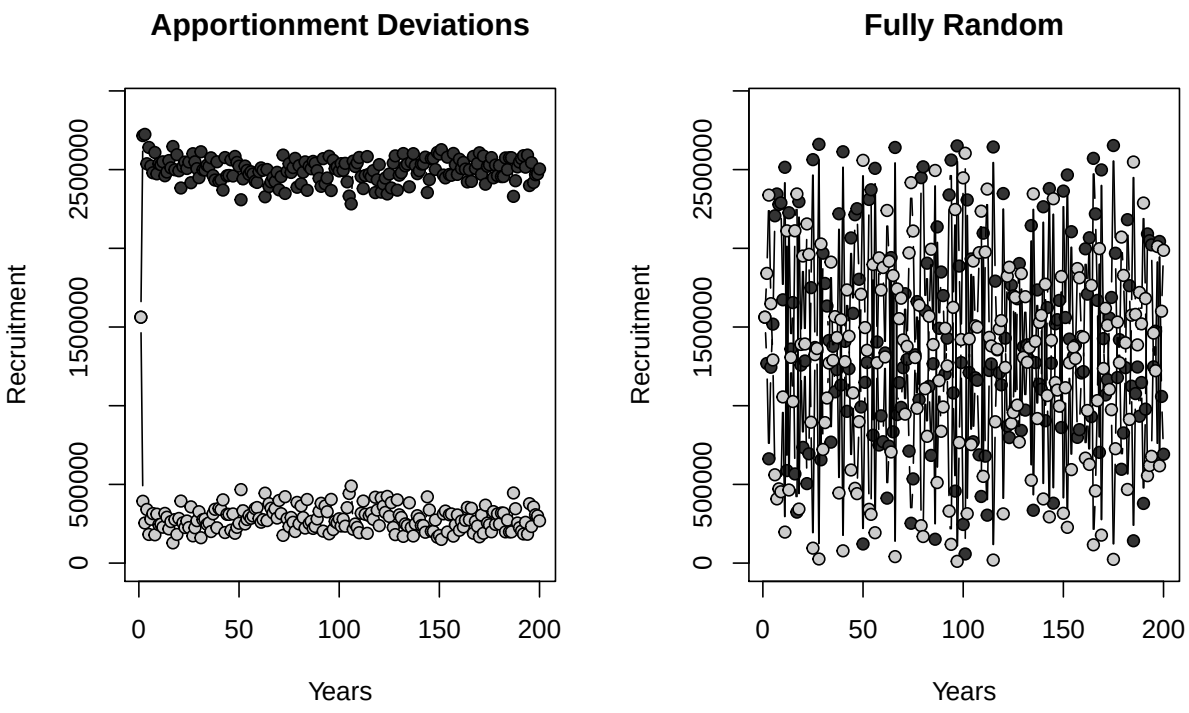
4. MSY Harvest rate



Stochasitic recruitment

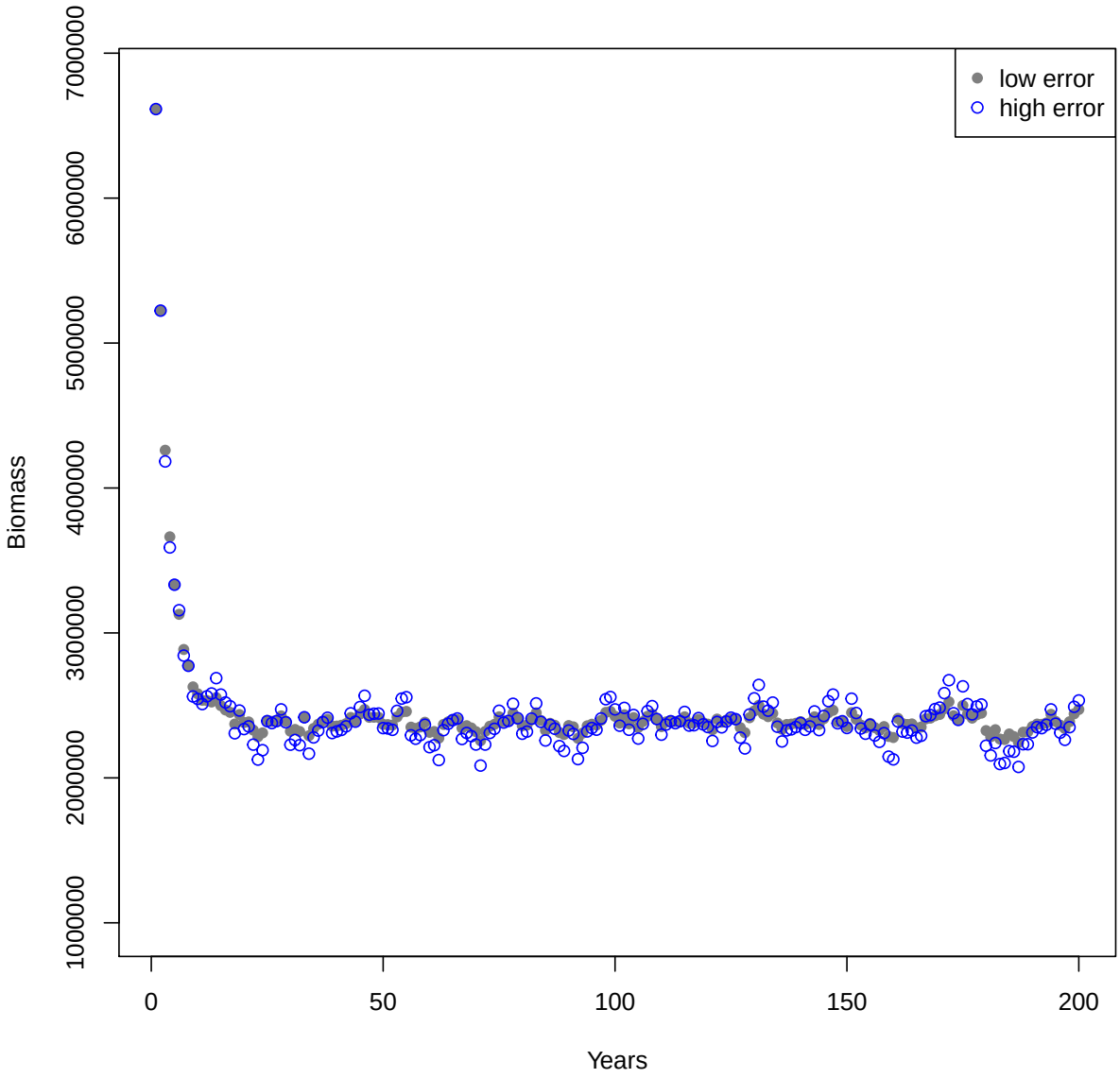


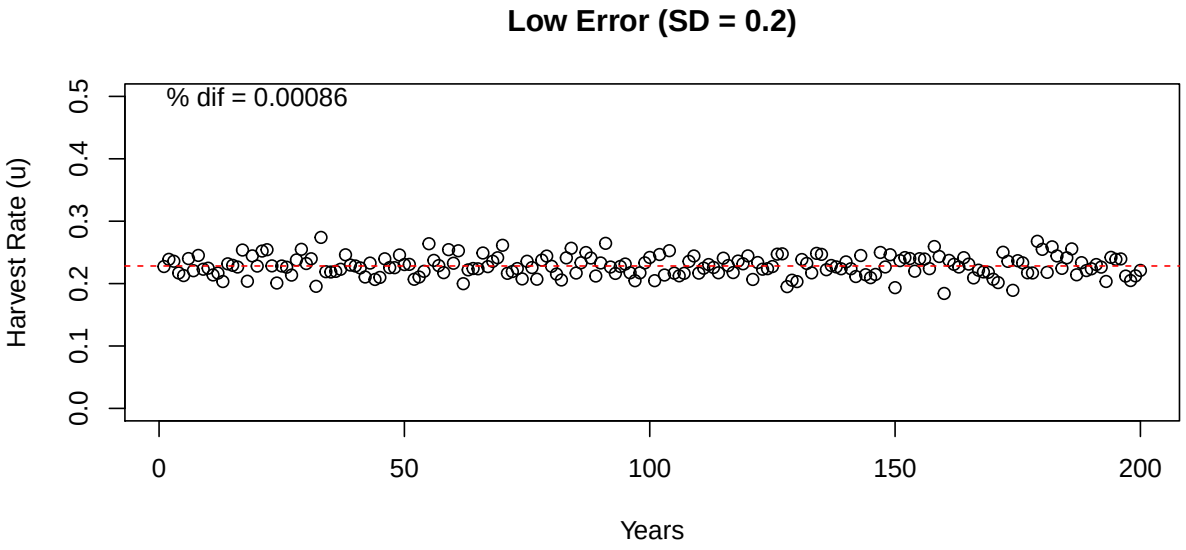
Stochasitic apportionment

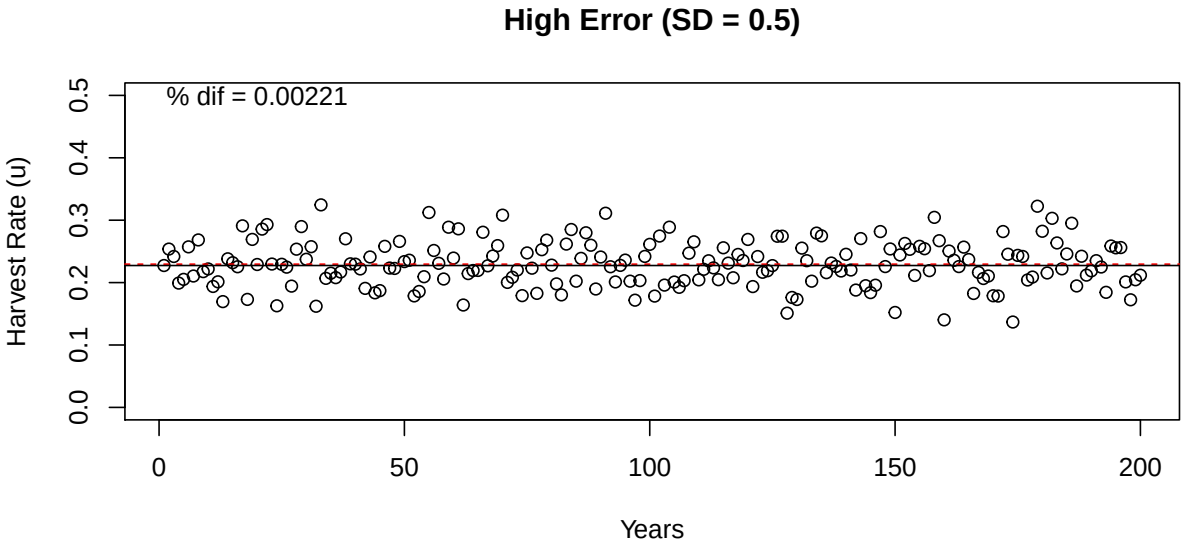


PHASE 2 Examples

TAC allocation based on survey biomass

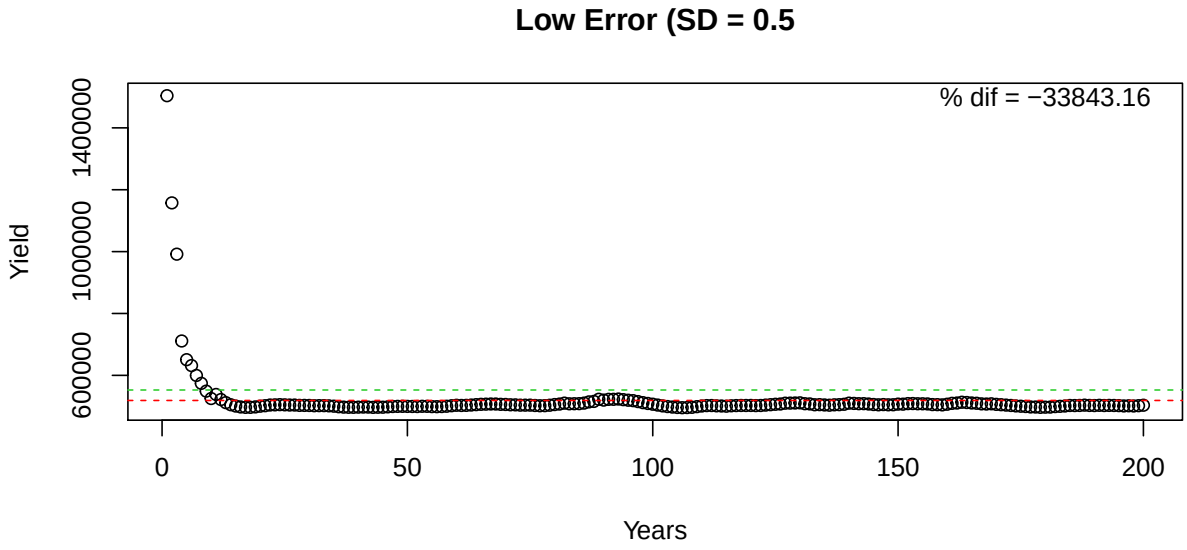


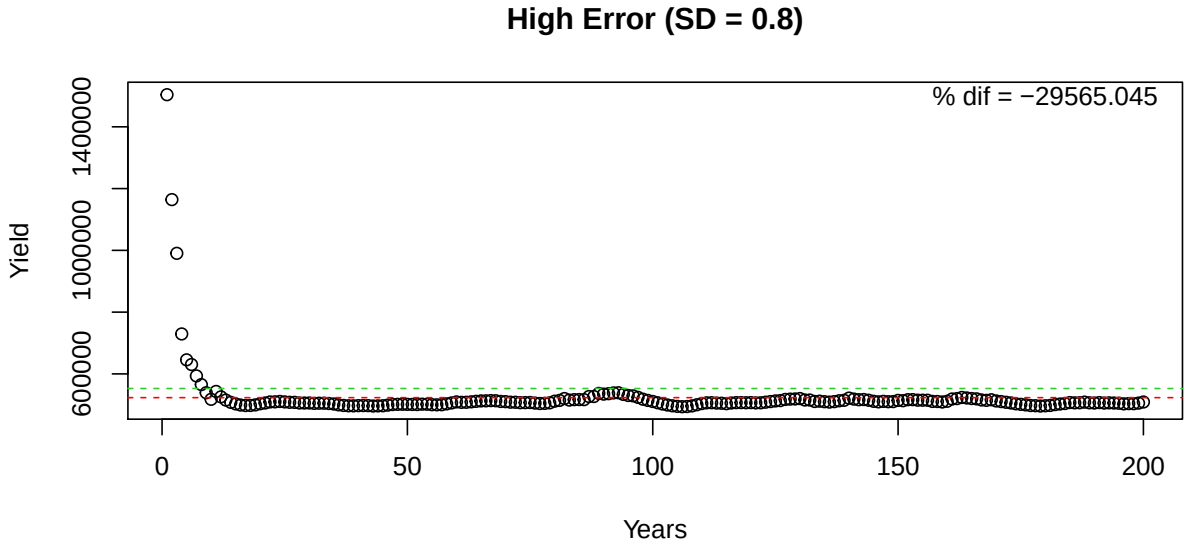

Low Error (SD = 0.2)
% dif = 0.00086
Harvest Rate (u)
0.0
0.1
0.2
0.3
0.4
0.5
0
50
100
150
200
Years


High Error (SD = 0.5)
% dif = 0.00221
Harvest Rate (u)
0.0
0.1
0.2
0.3
0.4
0.5
0
50
100
150
200
Years

TAC Allocation based on Rec Index

This time looking at yeild





SABLEFISH

MSY_Search range for test = 0.005 - 0.8 by 0.05

Sablefish recruitment apportionment by model run

Model	Area 1	Area 2	Area 3
BASE	0.4369	0.301	0.269

Table 8: Table continues below

Age	M	Init.N	wt.age.pop.male	wt.age.pop.female
1	0.1	15.54	0.97	0.92
2	0.1	14.06	1.46	1.48
3	0.1	12.73	1.88	2.05
4	0.1	11.51	2.22	2.6
5	0.1	10.42	2.48	3.09
6	0.1	9.43	2.67	3.52
7	0.1	8.53	2.81	3.89
8	0.1	7.72	2.91	4.19
9	0.1	6.98	2.99	4.44
10	0.1	6.32	3.04	4.65
11	0.1	5.72	3.07	4.81
12	0.1	5.17	3.1	4.95
13	0.1	4.68	3.12	5.05
14	0.1	4.24	3.13	5.14
15	0.1	3.83	3.14	5.21
16	0.1	3.47	3.15	5.26
17	0.1	3.14	3.15	5.3
18	0.1	2.84	3.15	5.34
19	0.1	2.57	3.16	5.36
20	0.1	2.32	3.16	5.38
21	0.1	2.1	3.16	5.4
22	0.1	1.9	3.16	5.41
23	0.1	1.72	3.16	5.43
24	0.1	1.56	3.16	5.43
25	0.1	1.41	3.16	5.44
26	0.1	1.28	3.16	5.45
27	0.1	1.15	3.16	5.45
28	0.1	1.04	3.16	5.45
29	0.1	0.95	3.16	5.45
30	0.1	0.86	3.16	5.46

Table 9: Table continues below

wt.age.pop.ave	mat.1	fish.sel.male1	fish.sel.female1
0.94	0.01	0	0
1.47	0.02	0.39	0
1.96	0.08	1	1
2.41	0.2	1	1
2.78	0.39	1	1

wt.age.pop.ave	mat.1	fish.sel.male1	fish.sel.female1
3.1	0.6	1	1
3.35	0.77	1	1
3.55	0.86	1	1
3.71	0.92	1	1
3.84	0.95	1	1
3.94	0.97	1	1
4.02	0.98	1	1
4.09	0.99	1	1
4.14	0.99	1	1
4.17	0.99	1	1
4.2	0.99	1	1
4.23	1	1	1
4.25	1	1	1
4.26	1	1	1
4.27	1	1	1
4.28	1	1	1
4.29	1	1	1
4.29	1	1	1
4.3	1	1	1
4.3	1	1	1
4.3	1	1	1
4.31	1	1	1
4.31	1	1	1
4.31	1	1	1
4.31	1	1	1

Table 10: Table continues below

fish.sel.ave1	fish.sel.male2	fish.sel.female2	fish.sel.ave2
0	0.01	0	0.01
0.2	0.07	0.04	0.05
1	0.32	0.42	0.37
1	0.76	0.93	0.84
1	0.95	1	0.97
1	0.99	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
1	1	1	1
1	1	1	1
1	1	1	1
1	1	1	1
1	1	1	1
1	1	1	1

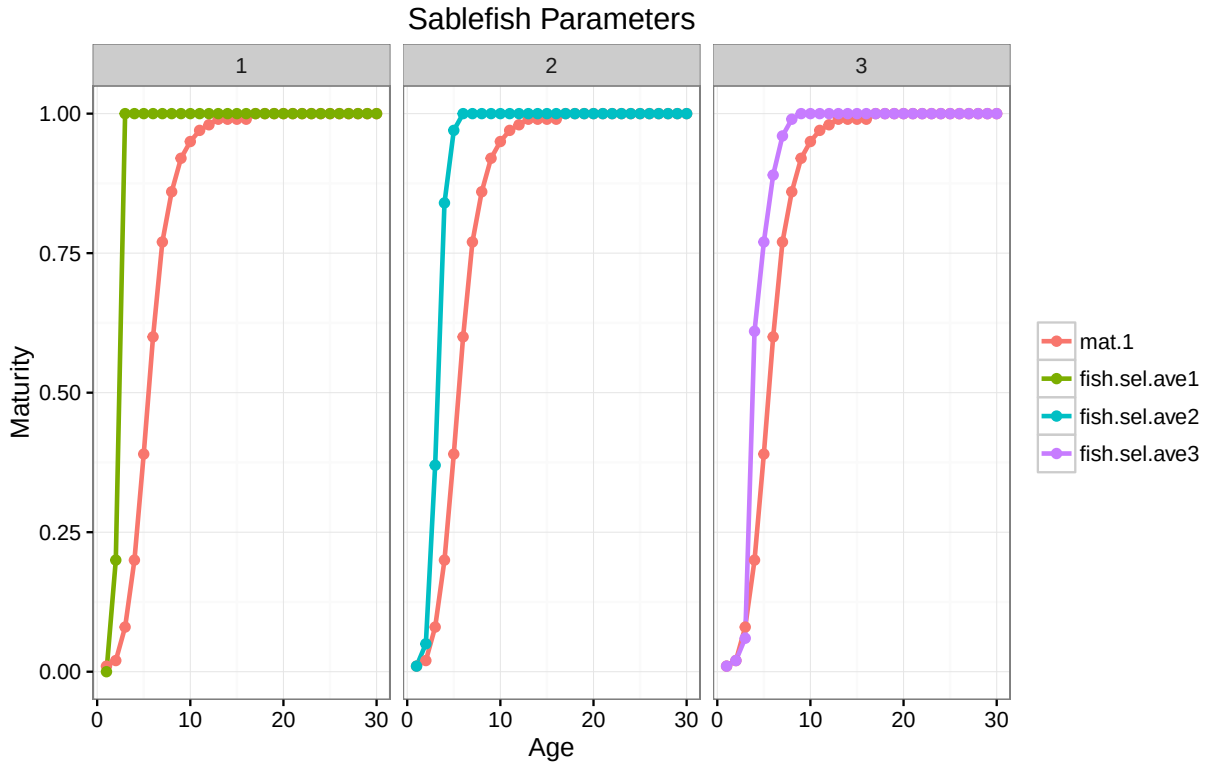
fish.sel.ave1	fish.sel.male2	fish.sel.female2	fish.sel.ave2
1	1	1	1
1	1	1	1
1	1	1	1
1	1	1	1
1	1	1	1
1	1	1	1
1	1	1	1
1	1	1	1

Table 11: Table continues below

fish.sel.male3	fish.sel.female3	fish.sel.ave3	sur.sel
0	0.01	0.01	0
0	0.04	0.02	0
0	0.11	0.06	0.23
0.95	0.28	0.61	0.98
1	0.55	0.77	1
1	0.79	0.89	1
1	0.92	0.96	1
1	0.97	0.99	1
1	0.99	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
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	1	1

fish.caa.err	sur.caa.err	sel.pan
0.05	0.15	0.01
0.05	0.15	0.08
0.05	0.15	0.39
0.05	0.15	0.8
0.05	0.15	0.95

fish.caa.err	sur.caa.err	sel.pan
0.05	0.15	0.99
0.05	0.15	1
0.05	0.15	1
0.05	0.15	1
0.05	0.15	1
0.05	0.15	1
0.05	0.15	1
0.05	0.15	1
0.05	0.15	1
0.05	0.15	1
0.05	0.15	1
0.05	0.15	1
0.05	0.15	1
0.05	0.15	1
0.05	0.15	1
0.05	0.15	1
0.05	0.15	1
0.05	0.15	1
0.05	0.15	1
0.05	0.15	1
0.05	0.15	1
0.05	0.15	1
0.05	0.15	1
0.05	0.15	1
0.05	0.15	1


Sablefish Parameters
1
2
3
1.00
0.75
0.50
0.25
0.00
Maturity
0
10
20
30
Age
mat.1
fish.sel.ave1
fish.sel.ave2
fish.sel.ave3

Menhaden