

MSE Mackerel

No misreporting SPM OM

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MSE SPM Perciformes from Thorson et al 2012, MSY/BMSY from Fmsy project, and K fitted to observation 1980-2017 assuming no misreported catches.

First step is to estimate the SPM curve parameters. This is done by the maximum likelihood methods like in WK DOC HS2. The result is shown in Figure 1.

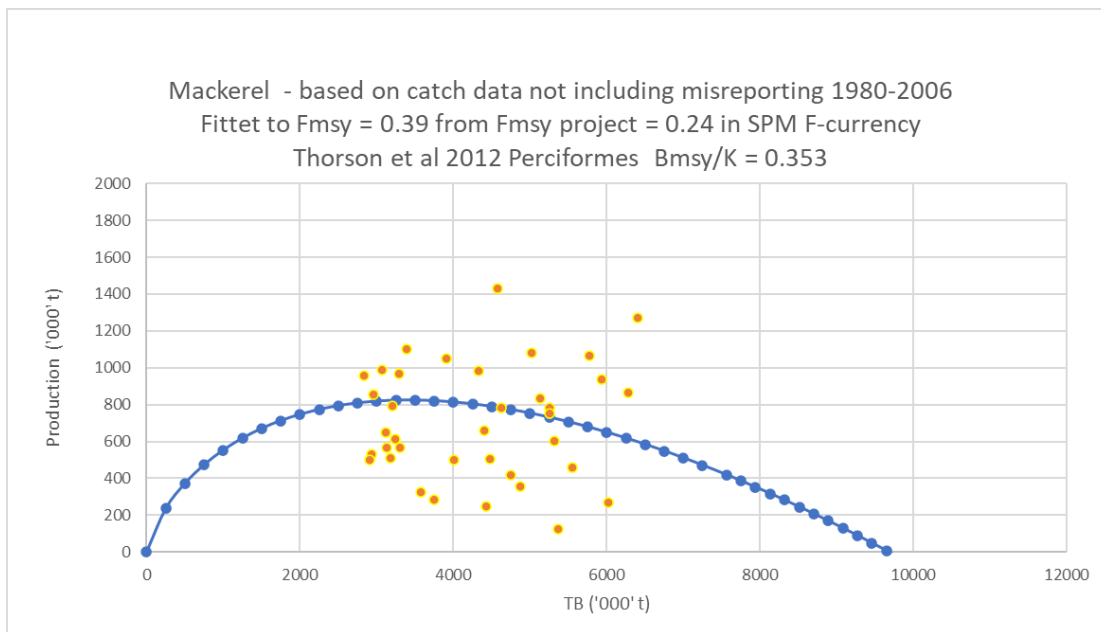


Figure 1. The estimated SPM fitted to the catch data without misreporting and given the Fmsy from the Fmsy-project. Only the K parameter needs then to be estimated and its estimate is 9.680 million t.

Input to the MSE runs is given below:

Input:					
Bpa =	2500	Fmsy =MSY/Bmsy=	0.2412		
Blim =	1990	K=	9680		
MSYBtrigger =	2500	n (called phi in formula)=	0.92	Autocorr.	
MS type =	MS1	SP process error STD=TB*q, q=	0.012	0.00	
B year 2020 =	5685	Observation CV =	0.09	0.00	
SSB vs TB coefficients:		Implementation CV =	0.01	0.00	
F target (SPM		a=	-0.3735	b=	0.8032
currency) =	0.2412	Ratio F (SPM currency vs			
		F (ICES currency) =	0.6236		

Figure 2 and Table 1 show TB, SSB, yield, lower 5% confidence limit for SSB, and TAV annual variability in 2060 as a function of target F, given Btrigger of 2.5 million t.

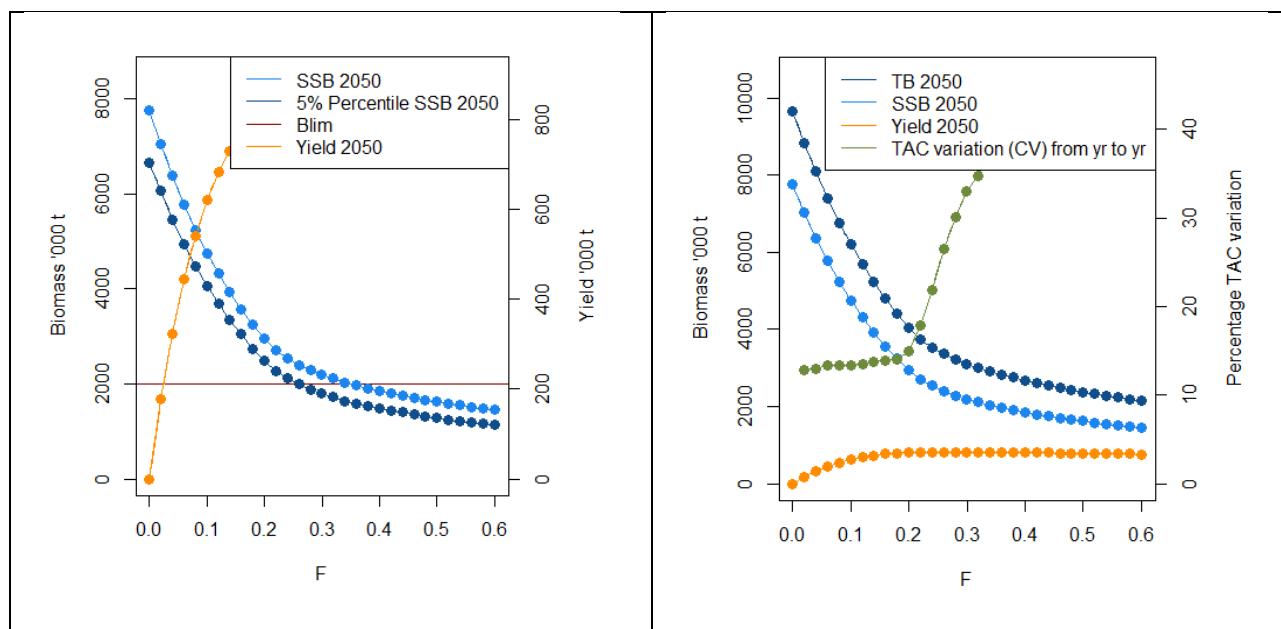


Figure 2. Average values in 2060 vs F target – given Btrigger at 2.5 million t. From the R-code.

Table 1. Results of simulations of in Excel with Btrigger=2.5 million t. From the Excel code.

F	TB 2060	Y 2060	Y 2020-2024*	Y 2025-2029*	SSB 2060	TAC variation (CV) from year to year	5% percentile of SSB 2060
	3519	821	5732	4302	2509	23	2075
0.00	9675	0	0	0	7771	14	6622
0.04	8121	327	1267	1508	6401	13	5493
0.08	6764	546	2345	2529	5231	13	4507
0.12	5721	697	3577	3383	4339	14	3777
0.16	4786	768	3897	3804	3558	13	2987
0.2	4062	813	4726	3896	2959	15	2533
0.24	3533	824	5544	4364	2521	19	2153
0.28	3262	821	6411	4447	2279	28	1906
0.32	3066	823	5909	4289	2096	32	1758
0.36	2853	810	6097	4454	1908	33	1618
0.4	2746	806	7018	3988	1795	34	1522
0.44	2652	800	7355	3964	1694	34	1423
0.48	2567	798	6878	4042	1602	35	1324
0.52	2481	798	7504	3796	1511	39	1265
0.56	2436	792	7429	3629	1447	38	1205
0.60	2356	780	7684	3811	1364	40	1112
0.64	2328	779	7247	4213	1314	36	1077
0.68	2283	773	7498	3963	1254	36	1042
0.72	2191	765	7547	4252	1171	34	978
0.76	2202	768	7626	3527	1144	34	947
0.8	2131	763	6359	3961	1075	41	871
0.84	2138	761	7246	4011	1047	37	871
0.88	2141	765	7432	3717	1016	32	832
0.92	2110	760	7012	3831	970	33	812
0.96	2084	755	7742	3923	927	38	754
1.00	2106	758	6830	3382	905	34	747
1.04	2084	757	6798	3566	864	38	702
1.08	2069	758	7151	3646	827	34	676
1.12	2065	752	6053	3037	795	36	644
1.16	2072	751	5577	262	766	32	647
1.2	2074	753	6726	3620	736	39	599
	* only one iteration						

The yield, SSB, risk to SSB>Blim, and Tac annual variability for 2060 as a function of target F and Btrigger are shown in Figure 3.

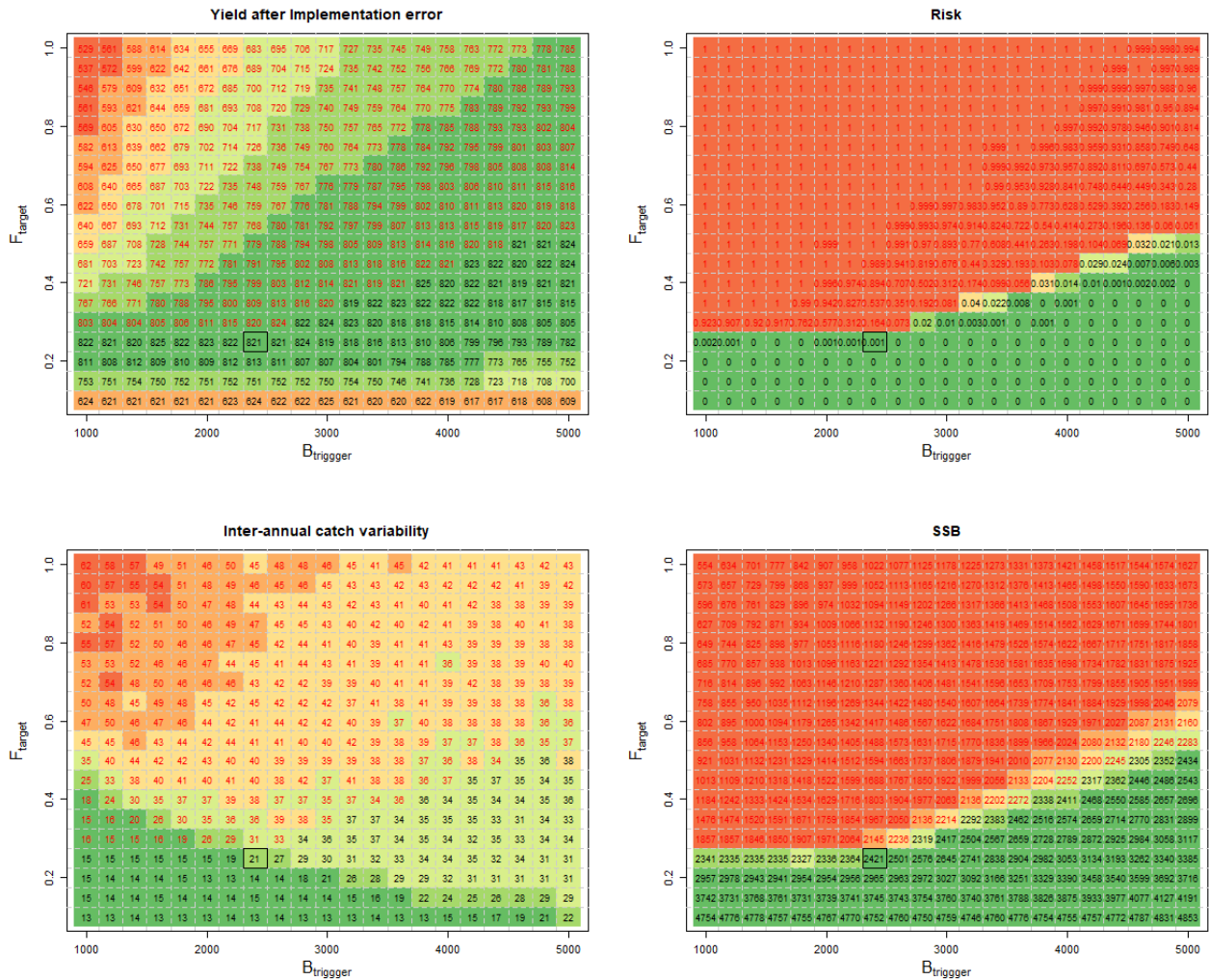


Figure 3. Trade-off between F and $B_{trigger}$. From the R-code.