Density Dependence

MSE for Mackerel

L Kell

03 March, 2023

Conditioning procedure

- Load ICES assessment
- Time varying M
- Conduct VPA

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Error in get_dropbox() : object 'info' not found
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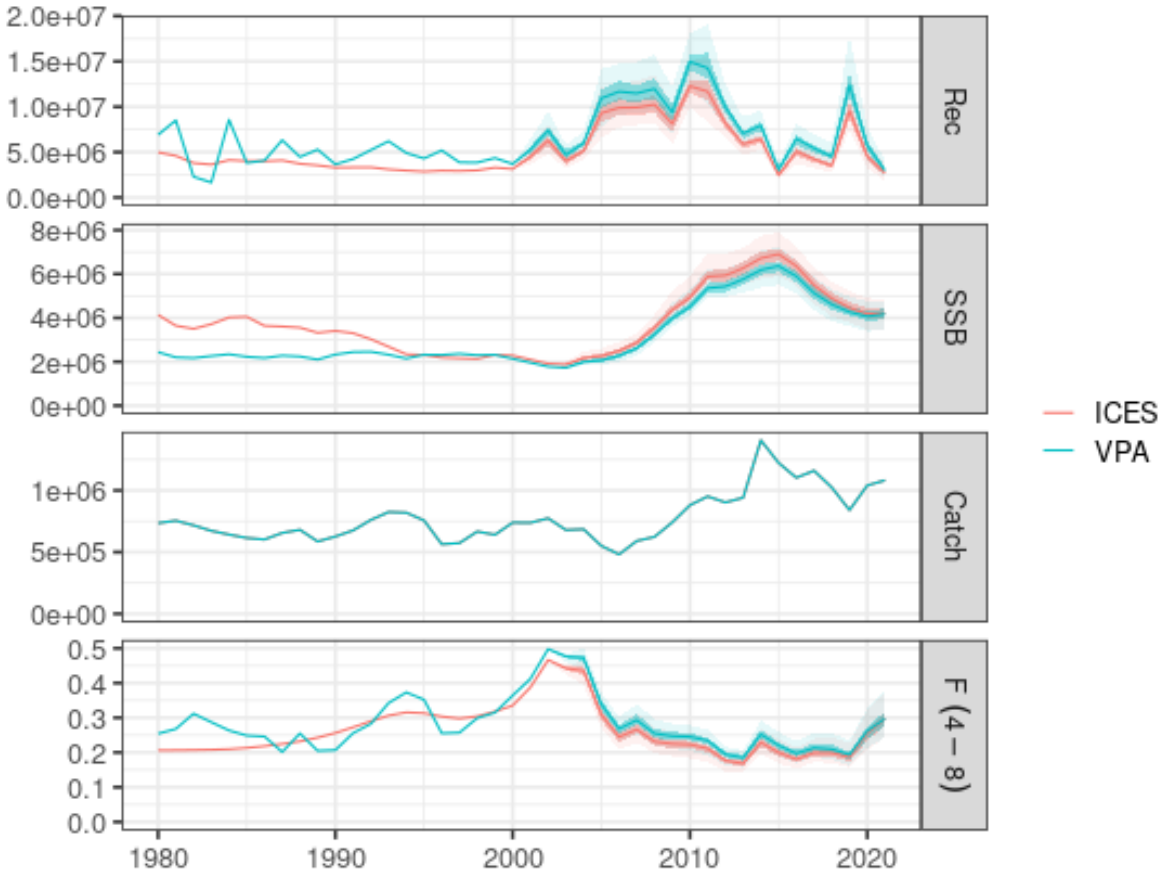


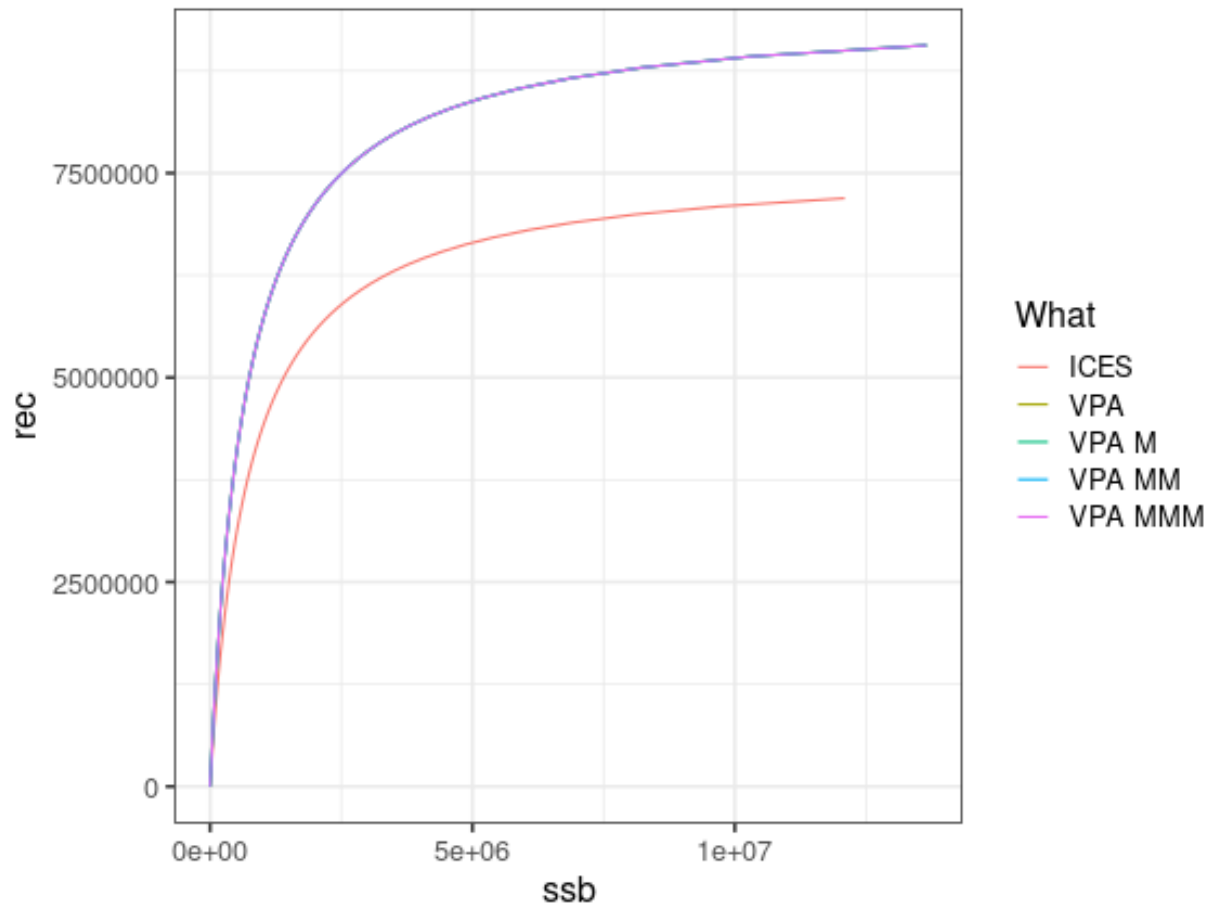


Figure 1 Stock recruitment relationships

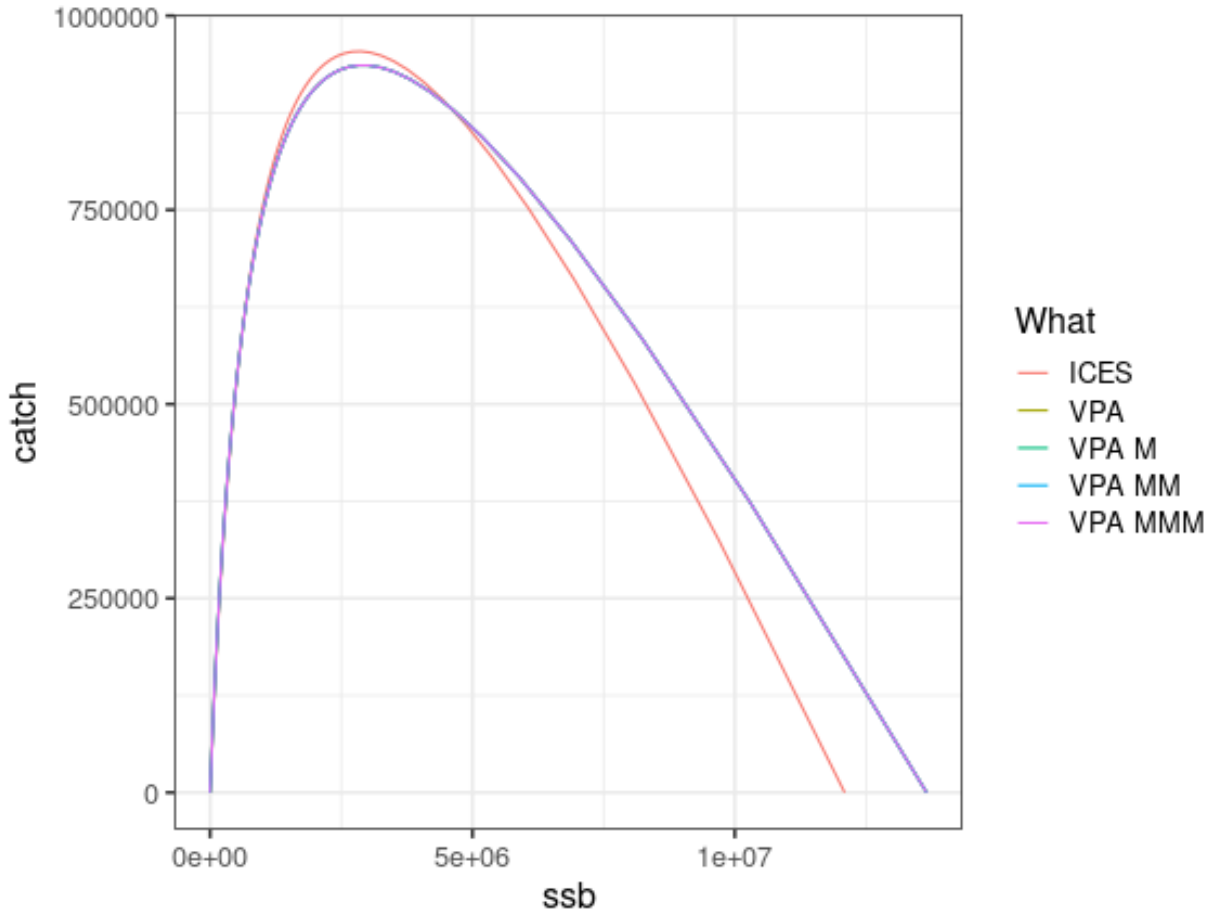


Figure 2 Equilibrium curves for assumptions about density dependence

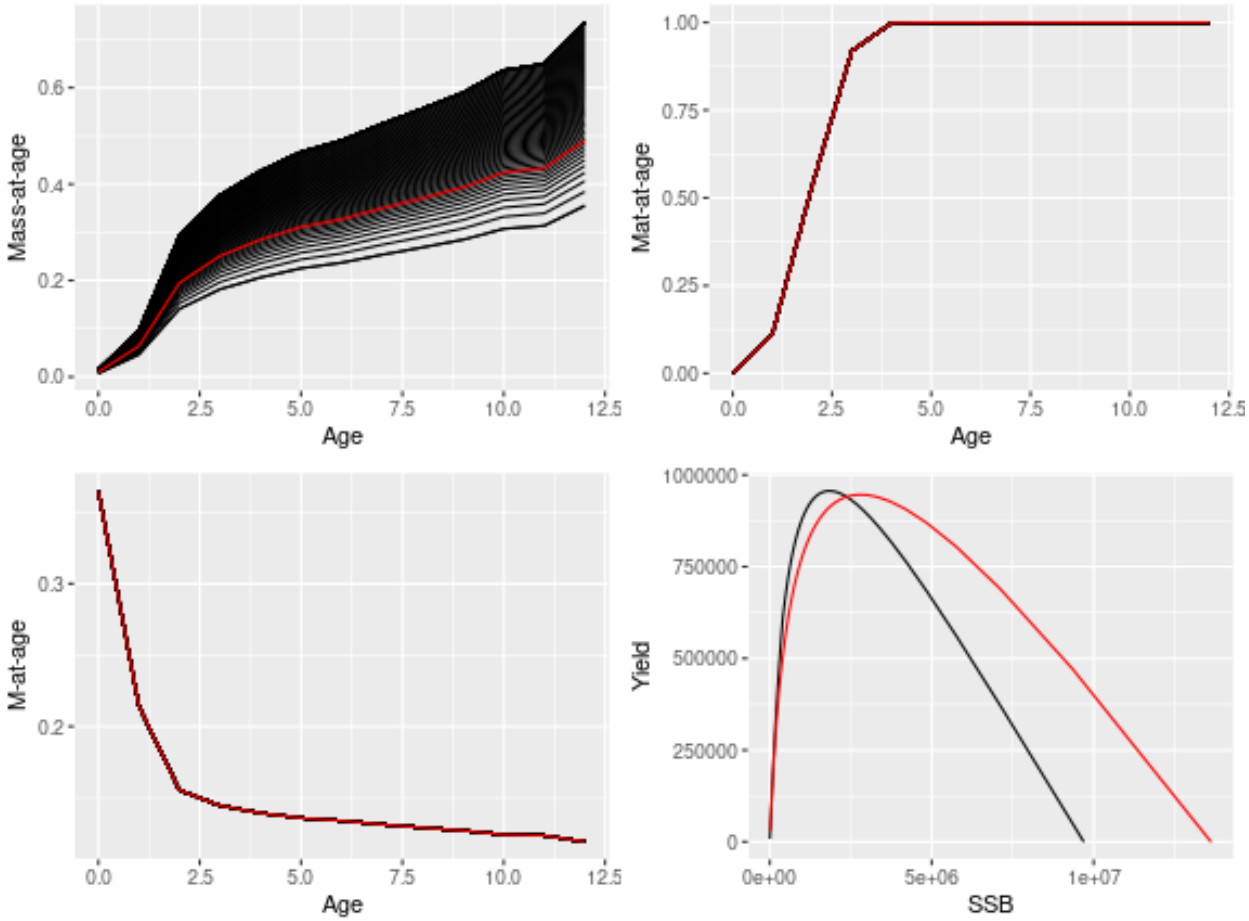


Figure 3 Equilibrium curves and biological parameters for assumptions about density dependence

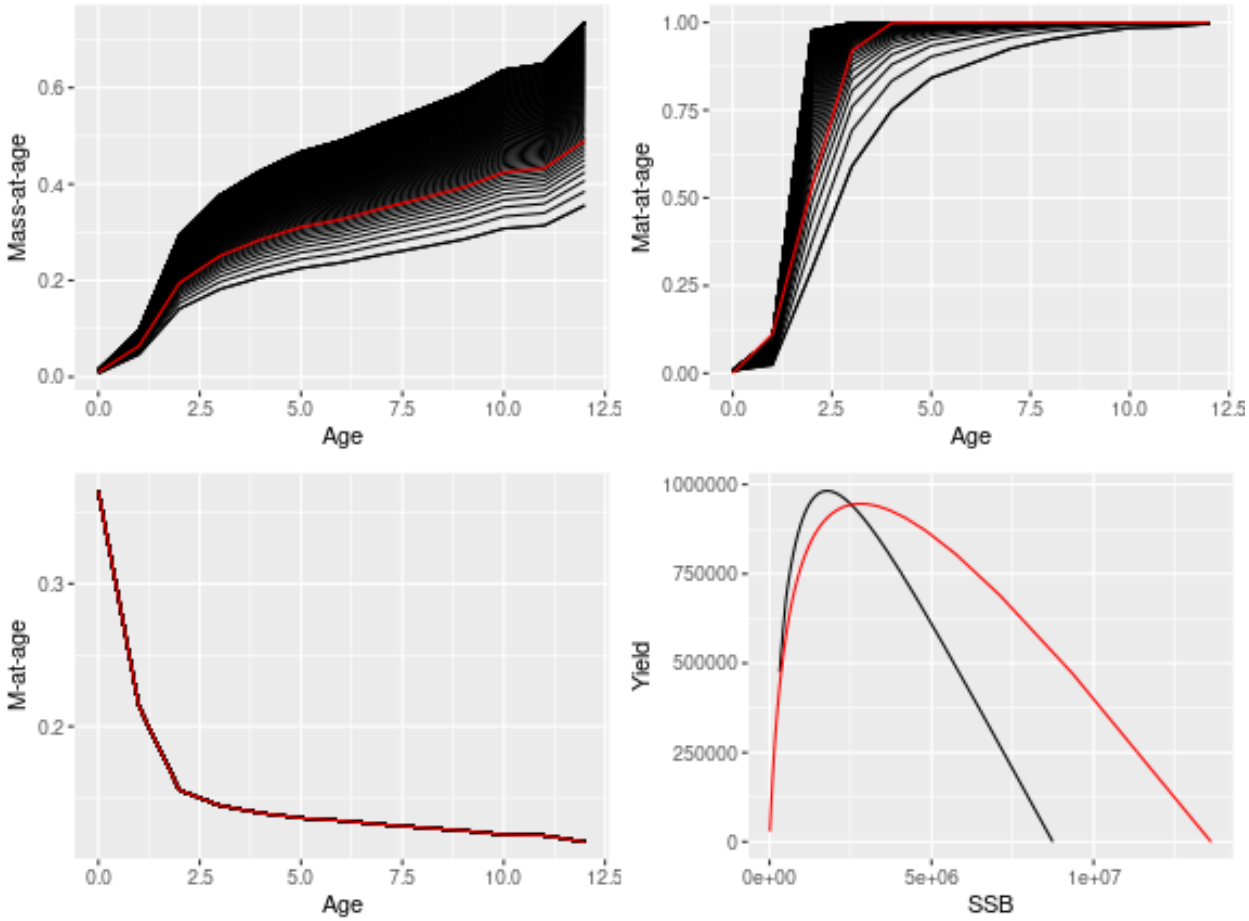


Figure 4 Equilibrium curves and biological parameters for assumptions about density dependence

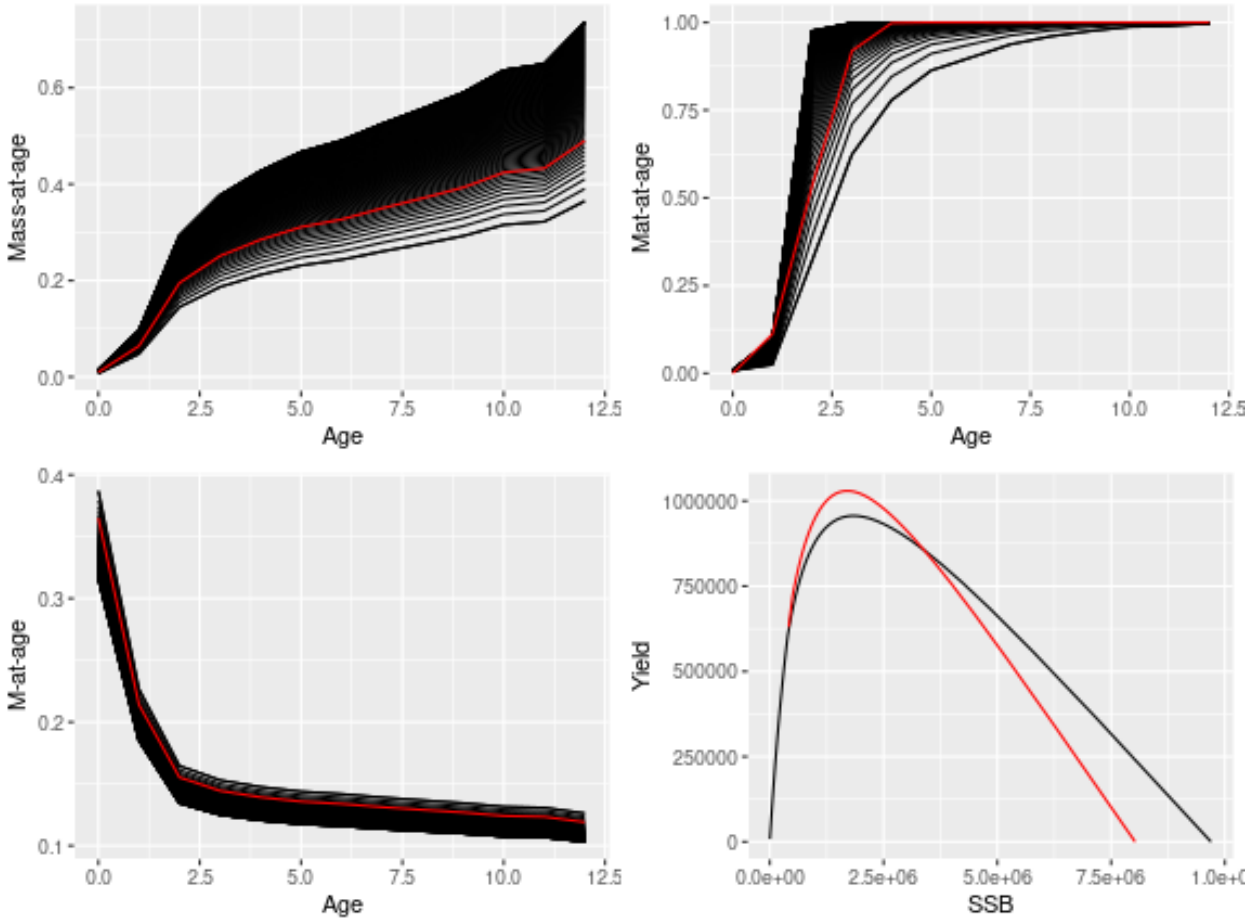


Figure 5 Equilibrium curves and biological parameters for assumptions about density dependence

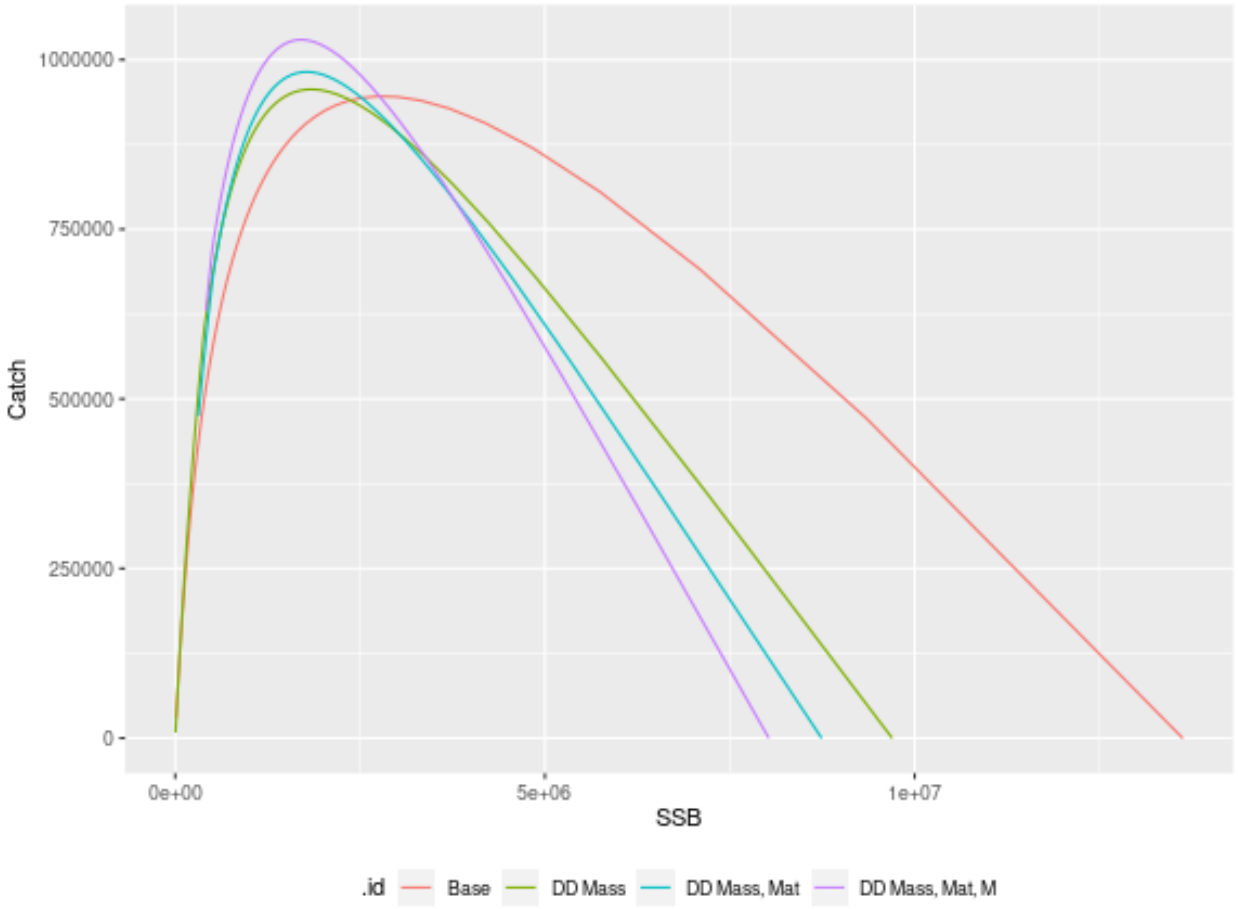


Figure 6 Equilibrium curves for assumptions about density dependence

Table 1 Reference points

.id	Bmsy	SSBmsy	MSY	Fmsy	Virgin	B0
Base	3881372	2744393	946105.7	0.3633555	13626259	15182017
DD Mass	2910041	1866875	956294.2	0.6055924	9696012	10803030
DD Mass, Mat	2626860	1783217	982041.8	0.7670837	8741925	10744477
DD Mass, Mat, M	2524846	1689880	1029369.9	0.8882022	8027718	9875301

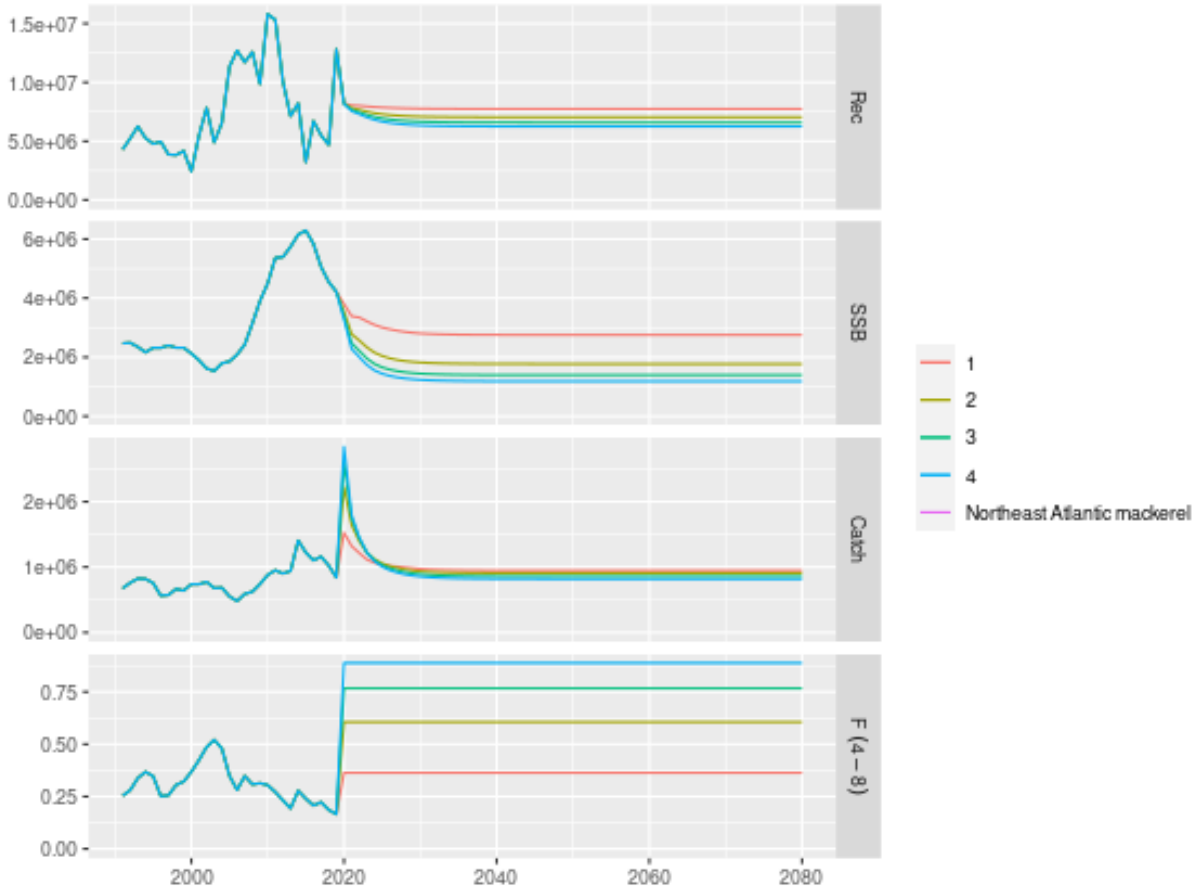


Figure 7 Projections for Operating Models, at F_{MSY} assuming no density dependence

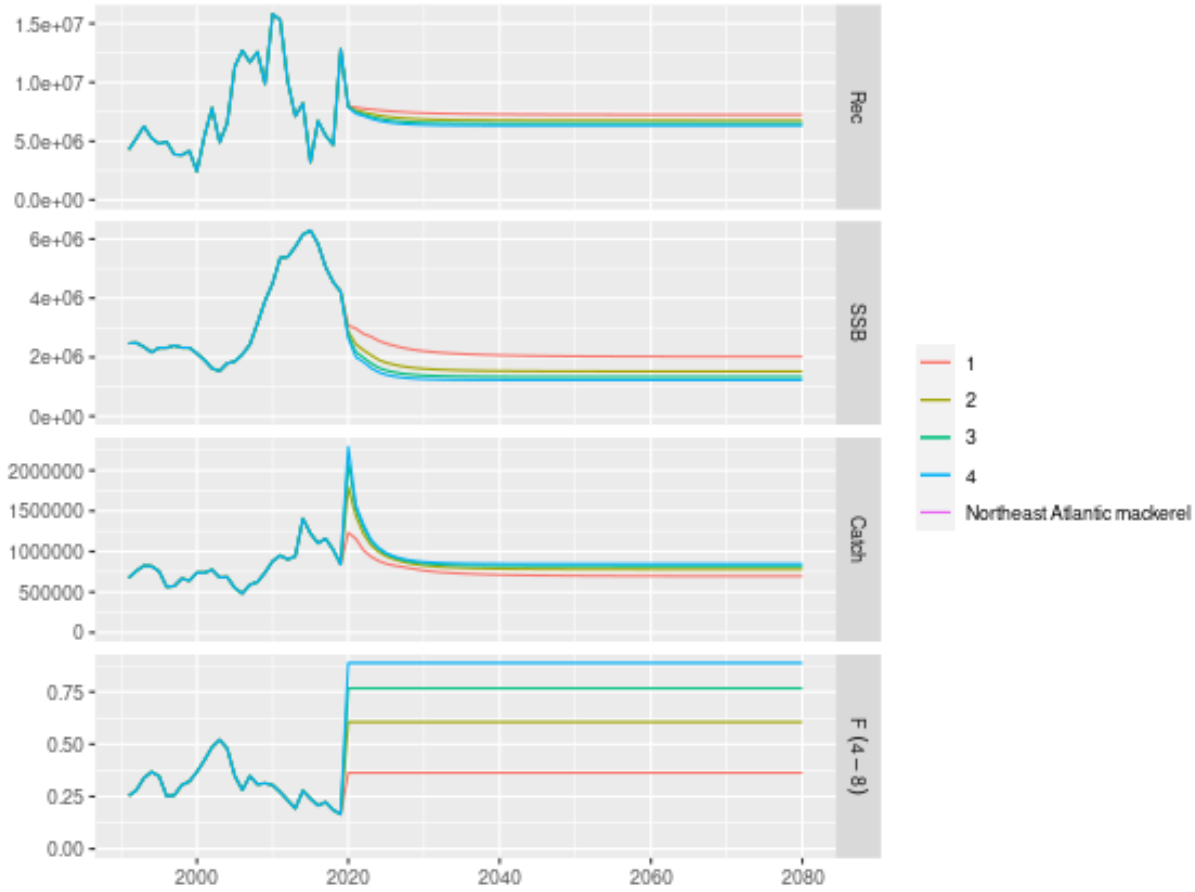


Figure 8 Projections for Operating Models, at F_{MSY} assuming density dependence in mass-at-age only

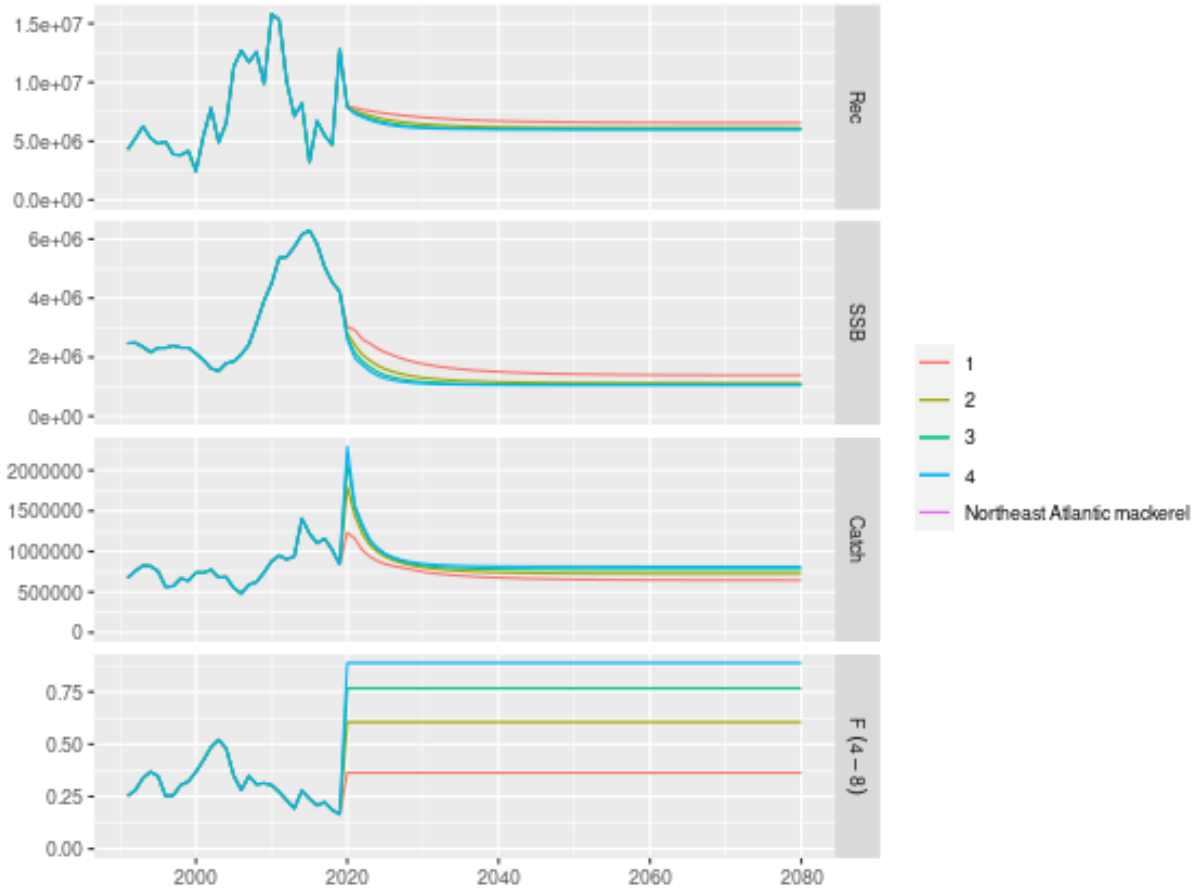


Figure 9 Projections for Operating Models, at F_{MSY} assuming density dependence in mass and maturity-at-age only

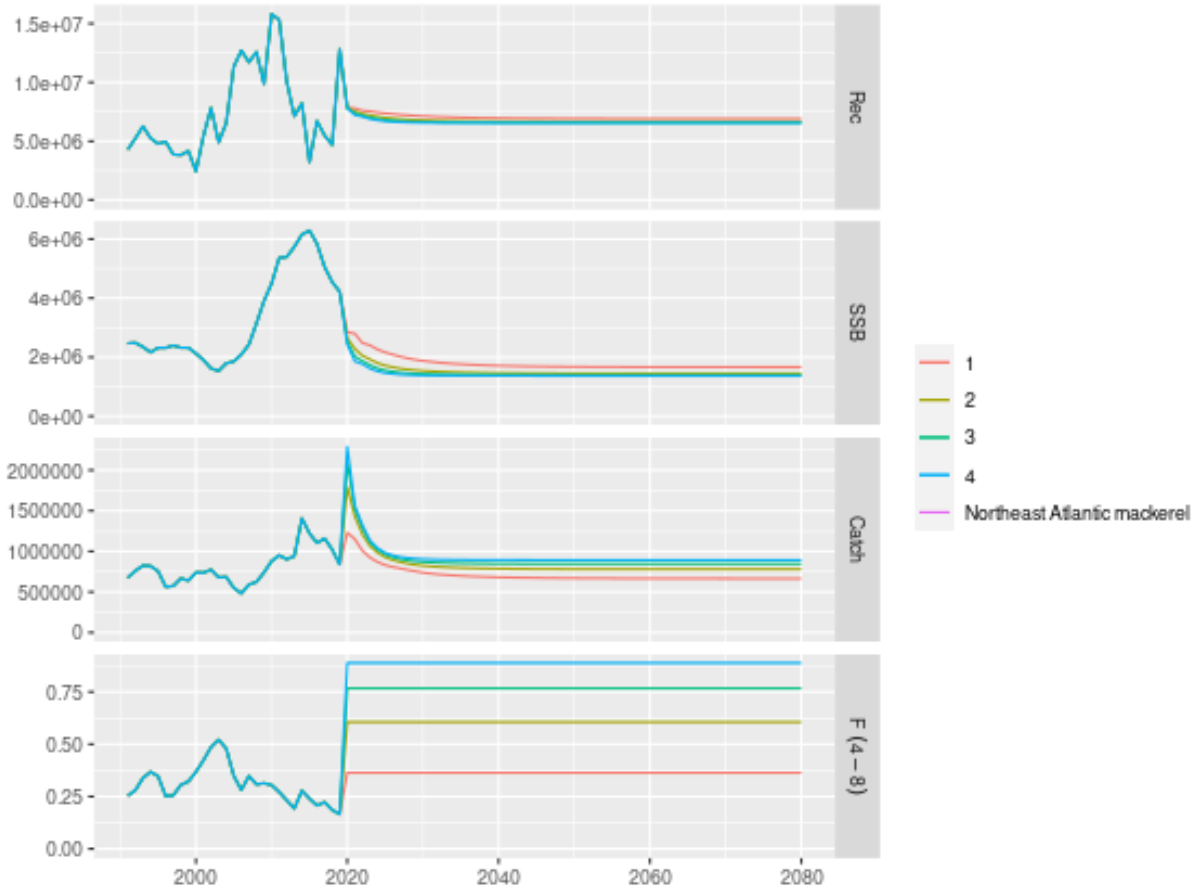


Figure 10 Projections for Operating Models, at F_{MSY} assuming density dependence in mass, maturity and natural mortality-at-age

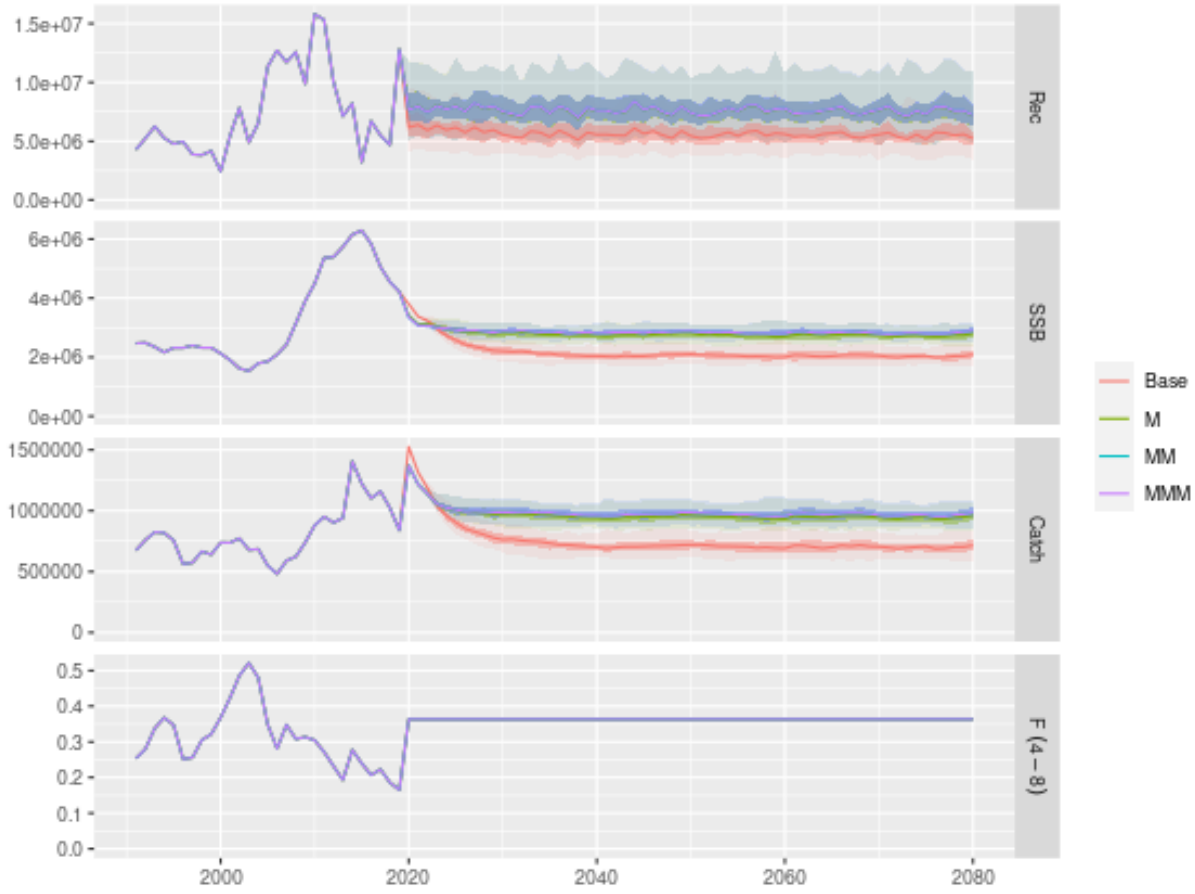


Figure 11 Projections for Operating Models, at Base F_{MSY}

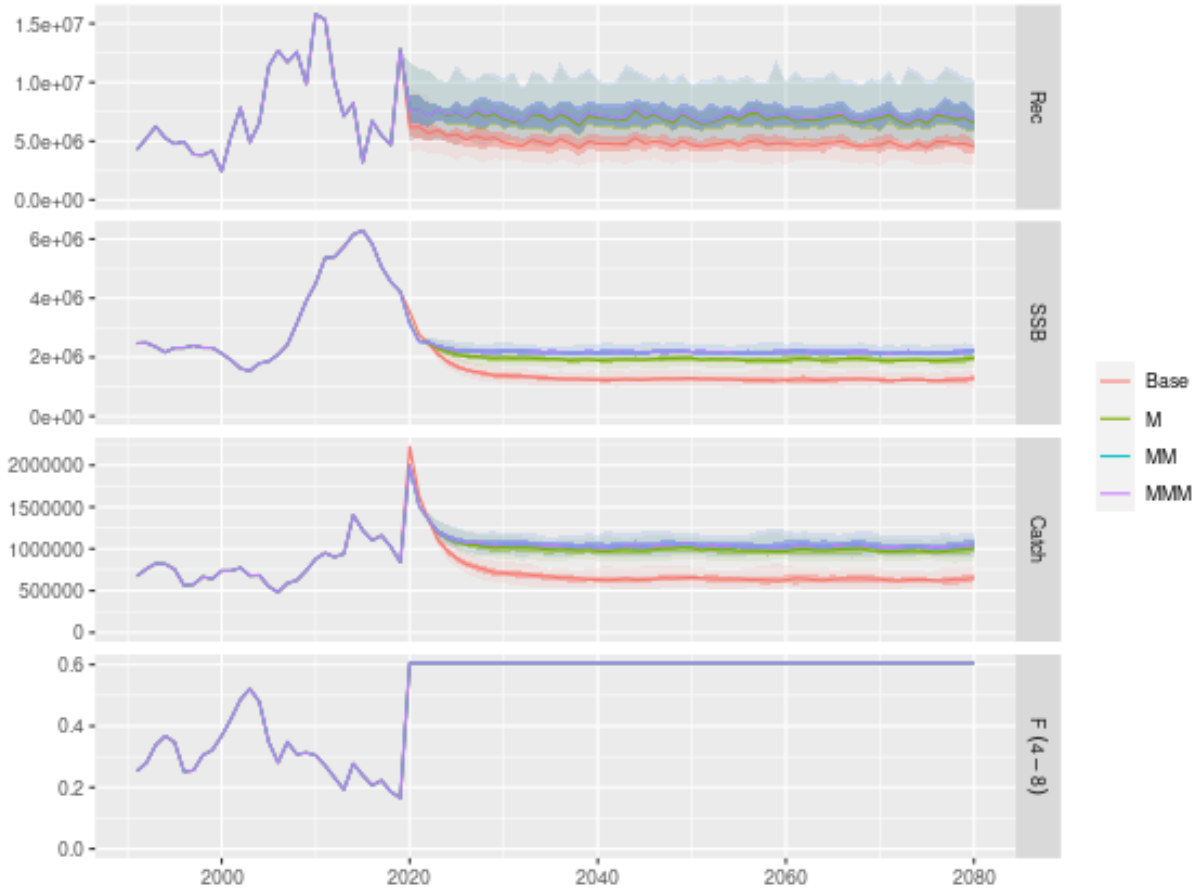


Figure 12 Projections for Operating Models, with F_{MSY} for density dependence in mass-at-age

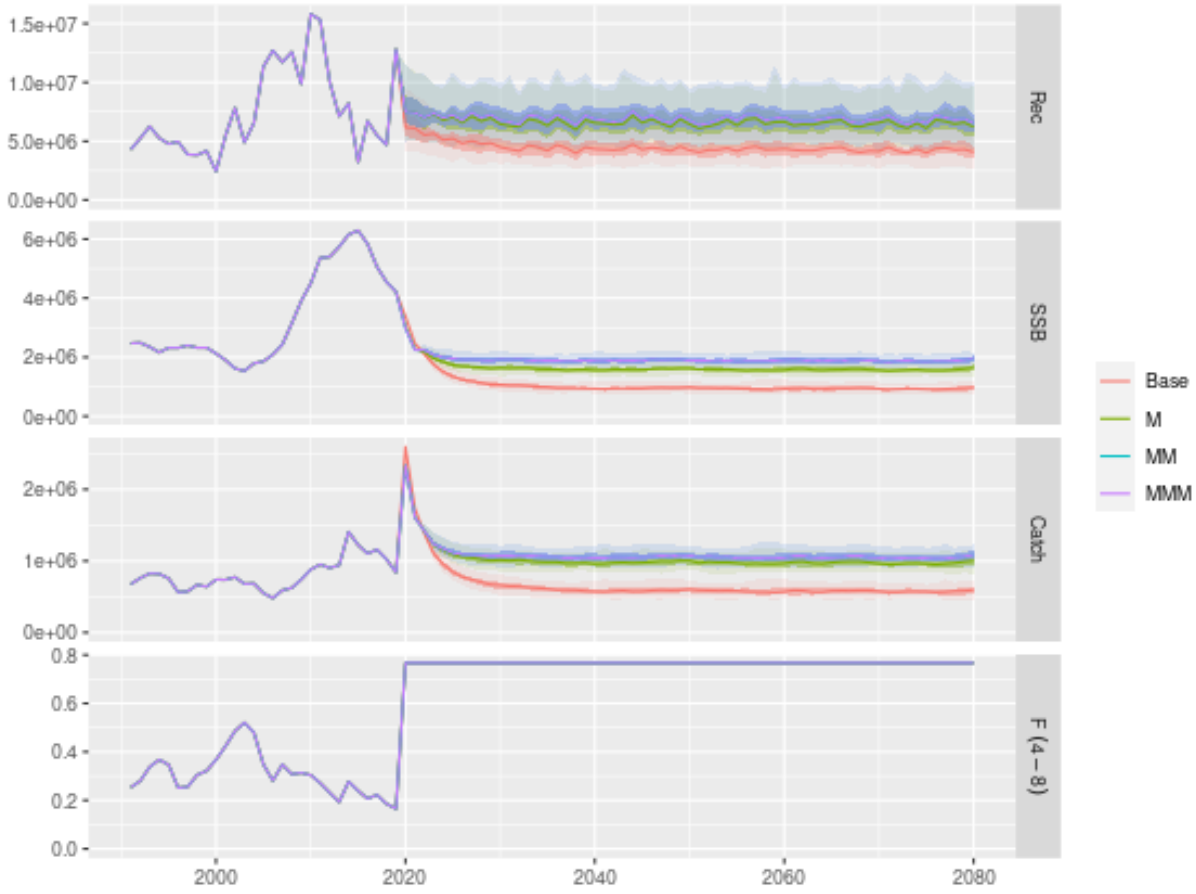


Figure 13 Projections for Operating Models, with F_{MSY} for density dependence in mass, maturity-at-age

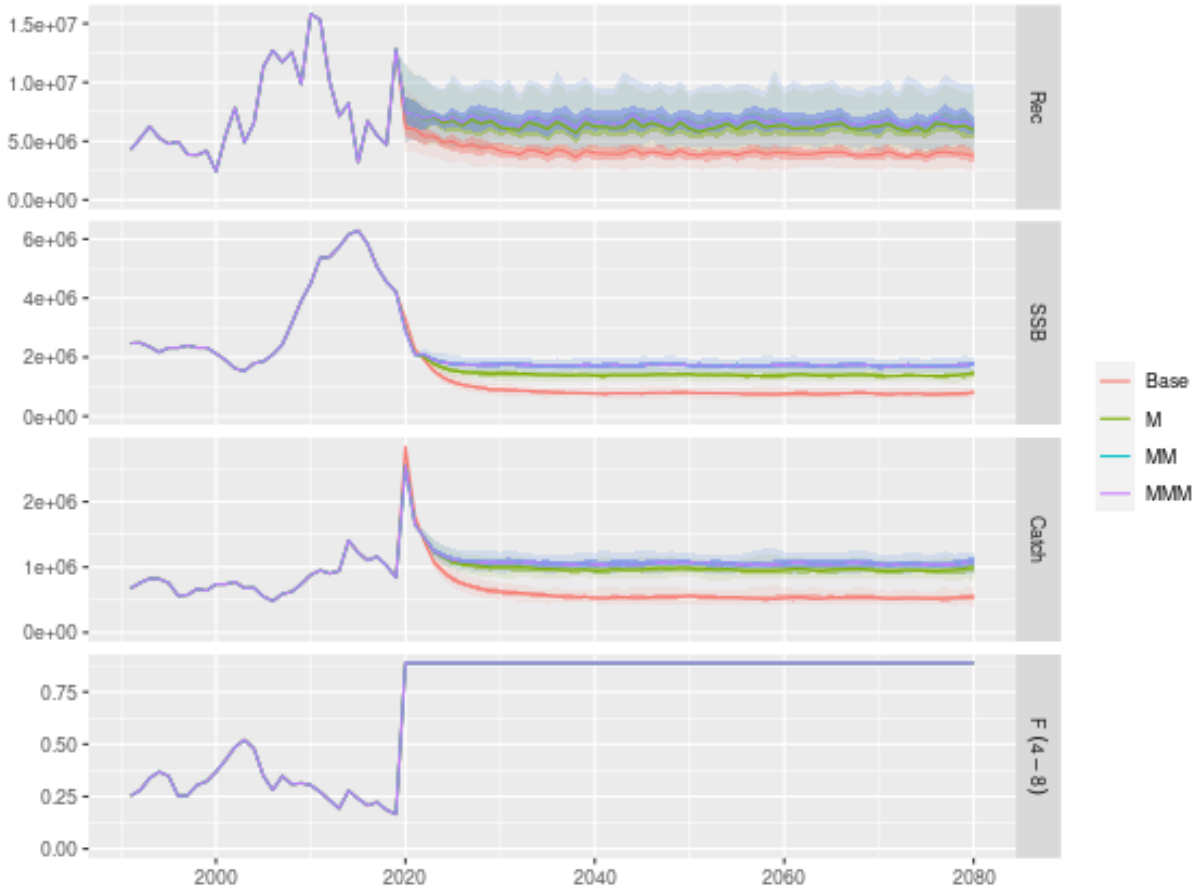
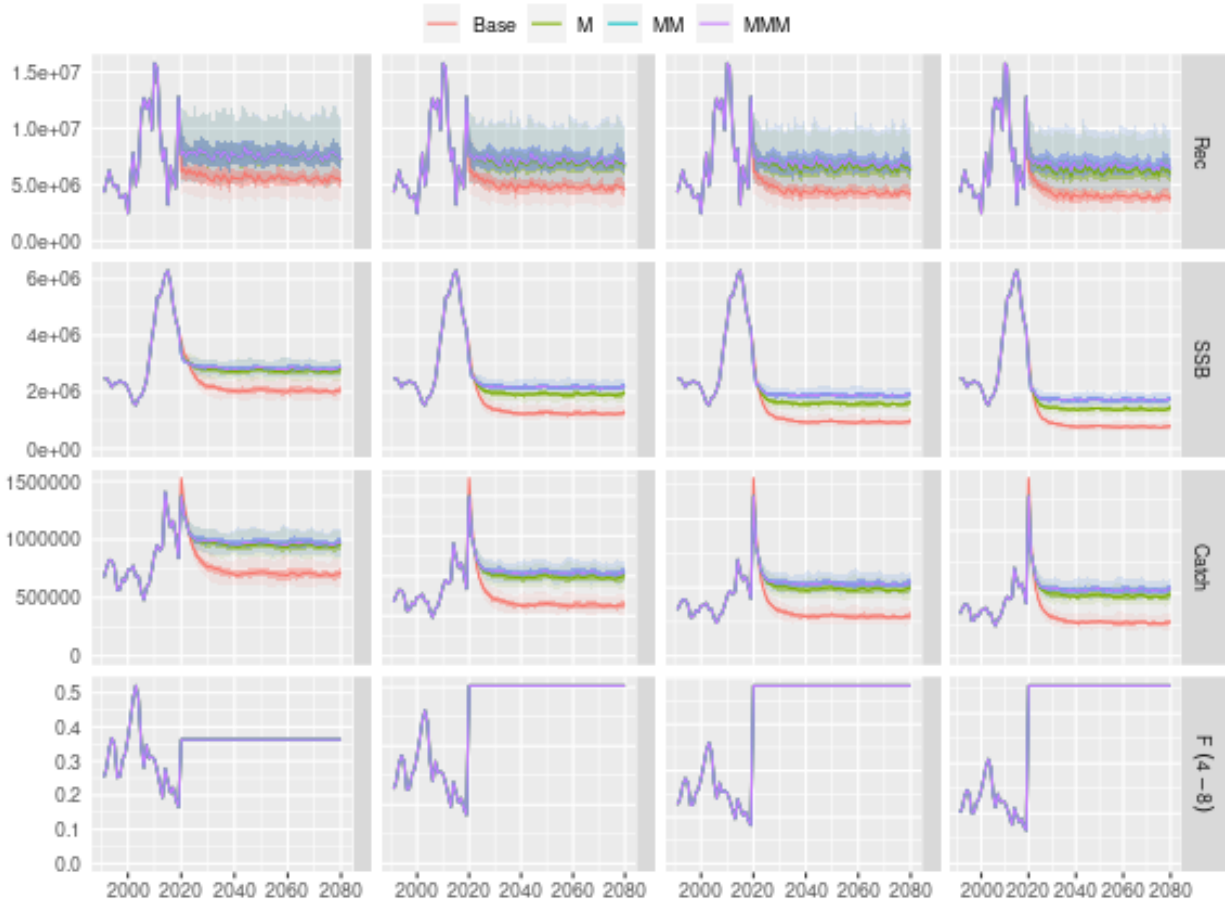


Figure 14 Projections for Operating Models, with F_{MSY} for density dependence in mass, maturity, natural mortality-at-age


Base
M
MM
MMM
Rec
SSB
Catch
F (4 – 8)
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1.0e+07
5.0e+06
0.0e+00
6e+06
4e+06
2e+06
0e+00
1500000
1000000
500000
0
0.5
0.4
0.3
0.2
0.1
0.0
2000 2020 2040 2060 2080