Analyses of tagging data for evidence of decreased fishing mortality for large yellowtail flounder: more results

Yellowtail Flounder Selectivity Working Group
Tim Miller, Dvora Hart, Steve Cadrin, Larry Jacobson, Chris Legault and Paul Rago
Northeast Fisheries Science Center, National Marine Fisheries Service, 166 Water Street, Woods Hole, MA 02543 USA

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More FSCT model results

Since the writing of the first version of the working paper on analyses of tagging data for dome-shaped selectivity of yellowtail flounder, we have fit more models to the yellowtail tagging data that may be informative.

Fixing natural mortality at 0.2

We fit an alternative model to estimate fishing mortality on the two size classes (greater and less than 44 cm) as well as reporting probability, non-mixing scalar and a constant migration rate, but assuming the instantaneous natural mortality rate is 0.2 (Table 1).

Three size classes, natural mortality by sex

We were concerned that having only two size classes might mask any decrease in fishing mortality for the larger size class because if there is also low fishing mortality for small fish, this would also bring down the estimate of fishing mortality for the smaller size class. We also were concerned that different natural mortality rates for males and females might confound fishing mortality rate estimates. We fit a model with fishing mortality for 3 size classes ($\leq$ 35 cm, $>$ 35 and $\leq$ 44, $>$ 44) and natural mortality by sex (Table 2).

Three size classes, natural mortality by sex and size

We also fit a more general model where natural mortality was also allowed to differ by size class (Table 3).

Regional migration and natural mortality, year-specific fishing mortality

We had also previously fit a model allowing regional migration among the three regions as well as region-specific natural mortality, reporting probability and non-mixing scalar and region- and year-specific fishing mortality (Table 4).

Table 1. Parameter estimates and approximate 95% confidence intervals.

Parameter	$\widehat{\theta}$	CI_L	CI_U
μ	0.045	0.042	0.050
$F_{\leq 44}$	0.105	0.095	0.115
$F_{>44}$	0.106	0.095	0.118
γ	8.493	8.165	8.834
ρ	0.362	0.334	0.391

Table 2. Parameter estimates and approximate 95% confidence intervals.

Parameter	$\widehat{\theta}$	CI_L	CI_U
μ	0.045	0.042	0.050
$F_{L\leq 35}$	0.122	0.110	0.134
$F_{35<L\leq 44}$	0.133	0.122	0.146
$F_{L>44}$	0.131	0.118	0.145
M_f	1.056	1.018	1.094
M_m	1.406	1.346	1.470
γ	3.977	3.810	4.151
ρ	0.655	0.597	0.709

Table 3. Parameter estimates and approximate 95% confidence intervals.

Parameter	$\widehat{\theta}$	CI_L	CI_U
μ	0.045	0.042	0.050
$F_{L\leq 35}$	0.114	0.103	0.126
$F_{35<L\leq 44}$	0.139	0.127	0.152
$F_{L>44}$	0.121	0.109	0.135
$M_{f,L\leq 35}$	0.948	0.871	1.031
$M_{f,35<L\leq 44}$	1.118	1.074	1.164
$M_{f,L>44}$	0.927	0.852	1.008
$M_{m,L\leq 35}$	1.207	1.126	1.295
$M_{m,35<L\leq 44}$	1.606	1.520	1.696
$M_{m,L>44}$	0.717	0.468	1.098
γ	3.957	3.791	4.130
ρ	0.655	0.598	0.709

Table 4. Parameter estimates and approximate 95% confidence intervals.

Parameter	$\widehat{\theta}$	CI_L	CI_U
$\mu_{1,2}$	0.099	0.081	0.121
$\mu_{1,3}$	0.116	0.078	0.173
$\mu_{2,1}$	0.020	0.016	0.025
$\mu_{2,3}$	0.053	0.036	0.077
$\mu_{3,1}$	0.044	0.031	0.063
$\mu_{3,2}$	0.238	0.194	0.294
$F_{2003,1}$	0.265	0.224	0.313
$F_{2003,2}$	0.119	0.105	0.134
$F_{2003,3}$	0.043	0.018	0.103
$F_{2004,1}$	0.099	0.083	0.118
$F_{2004,2}$	0.146	0.130	0.164
$F_{2004,3}$	0.019	0.010	0.035
$F_{2005,1}$	0.124	0.103	0.149
$F_{2005,2}$	0.174	0.155	0.196
$F_{2005,3}$	0.016	0.008	0.032
$F_{2006,1}$	0.196	0.165	0.233
$F_{2006,2}$	0.094	0.083	0.106
$F_{2006,3}$	0.015	0.008	0.028
M_1	1.308	1.231	1.391
M_2	0.896	0.846	0.949
M_3	0.721	0.554	0.938
γ_1	2.025	1.873	2.189
γ_2	5.602	5.306	5.914
γ_3	1.128	0.685	1.858
ρ_1	0.882	0.663	0.966
ρ_2	0.519	0.465	0.572
ρ_3	0.590	0.253	0.859