Appendix 2

**Detailed stock assessment reports for the Mediterranean and Black Sea**

**Gulf of Lions** (analyzed with CMSY_O_7m.R; see Comment for data sources)

Species: *Boops boops*, stock: BOOPBOO_LI
Bogue in Lions Gulf
Source:
Region: Mediterranean, Lions Gulf
Catch data used from years 1974 - 2014, abundance = None
Prior initial relative biomass = 0.2 - 0.6 expert
Prior intermediate rel. biomass = 0.01 - 0.4 in year 2007 default
Prior final relative biomass = 0.01 - 0.4, default
Prior range for $r = 0.31 - 1.1$ expert, prior range for $k = 0.739 - 10.5$

Results of CMSY analysis with altogether 276 viable trajectories for 268 $r$-$k$ pairs
$r = 0.522$, 95% CL = 0.424 - 0.642, $k = 4.46$, 95% CL = 3.47 - 5.75
MSY = 0.583, 95% CL = 0.492 - 0.69
Relative biomass last year = 0.185 $k$, 2.5th = 0.0341, 97.5th = 0.378
Exploitation $F/(r/2)$ in last year = 0.841

Results for Management (based on CMSY analysis)
Fmsy = 0.261, 95% CL = 0.212 - 0.321 (if $B > 1/2$ Bmsy then Fmsy = 0.5 $r$)
Fmsy = 0.193, 95% CL = 0.157 - 0.238 ($r$ and Fmsy are linearly reduced if $B < 1/2$ Bmsy)
MSY = 0.583, 95% CL = 0.492 - 0.69
Bmsy = 2.23, 95% CL = 1.73 - 2.87
Biomass in last year = 0.826, 2.5th perc = 0.152, 97.5 perc = 1.69
B/Bmsy in last year = 0.37, 2.5th perc = 0.0682, 97.5 perc = 0.756
Fishing mortality in last year = 0.306, 2.5th perc = 0.15, 97.5 perc = 1.66
F/Fmsy = 1.59, 2.5th perc = 0.776, 97.5 perc = 8.61

Stock status and exploitation in 2014
Biomass = 0.826, B/Bmsy = 0.37, fishing mortality $F = 0.306$, $F/Fmsy = 1.59$
Comment: Catch=landings from FishStat (Spain, France). GS OK

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Comment: Catch=landings from FishStat (Spain, France). GS OK
Species: *Conger conger*, stock: CONGCON_LI

Conger eel in Lions Gulf

Source:

Region: Mediterranean, Lions Gulf

Catch data used from years 1970 - 2014, abundance = None

Prior initial relative biomass = 0.2 - 0.6 expert

Prior intermediate rel. biomass = 0.01 - 0.4 in year 2005 expert

Prior final relative biomass = 0.01 - 0.3 expert

Prior range for $r = 0.16 - 0.46$ expert, prior range for $k = 1.72 - 19.8$

Results of CMSY analysis with altogether 2587 viable trajectories for 1442 r-k pairs

\[
\begin{align*}
    r &= 0.348, \quad 95\% \ CL = 0.269 - 0.45, \quad k = 6.23, \quad 95\% \ CL = 4.63 - 8.39 \\
    MSY &= 0.542, \quad 95\% \ CL = 0.491 - 0.599 \\
    Relative \ biomass \ last \ year &= 0.127 \ k, \ 2.5\text{th} = 0.0135, \ 97.5\text{th} = 0.288 \\
    Exploitation \ F/(r/2) \ in \ last \ year &= 0.845
\end{align*}
\]

Results for Management (based on CMSY analysis)

\[
\begin{align*}
    Fmsy &= 0.174, \quad 95\% \ CL = 0.135 - 0.225 \ (if \ B > 1/2 \ Bmsy \ then \ Fmsy = 0.5 \ r) \\
    Fmsy &= 0.0884, \quad 95\% \ CL = 0.0683 - 0.114 \ (r \ and \ Fmsy \ are \ linearly \ reduced \ if \ B < 1/2 \ Bmsy) \\
    MSY &= 0.542, \quad 95\% \ CL = 0.491 - 0.599 \\
    Bmsy &= 3.12, \quad 95\% \ CL = 2.31 - 4.19 \\
    Biomass \ in \ last \ year &= 0.791, \ 2.5\text{th} \ perc = 0.084, \ 97.5 \ perc = 1.79 \\
    B/Bmsy \ in \ last \ year &= 0.254, \ 2.5\text{th} \ perc = 0.0269, \ 97.5 \ perc = 0.575 \\
    Fishing \ mortality \ in \ last \ year &= 0.145, \ 2.5\text{th} \ perc = 0.0642, \ 97.5 \ perc = 1.37 \\
    F/Fmsy &= 1.65, \ 2.5\text{th} \ perc = 0.726, \ 97.5 \ perc = 15.5
\end{align*}
\]

Stock status and exploitation in 2014

Biomass = 0.791, B/Bmsy = 0.254, fishing mortality F = 0.145, F/Fmsy = 1.65

Comment: Catch=landings from FishStat (Spain, France). RF int 2005 0.01-0.4, final 0.3. GS OK

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Species: *Dicentrarchus labrax*, stock: DICELAB_LI

European seabass in Lions Gulf

Source:

Region: Mediterranean, Lions Gulf

Catch data used from years 1974 - 2014, abundance = None

Prior initial relative biomass = 0.2 - 0.6 expert

Prior intermediate rel. biomass = 0.01 - 0.4 in year 1997 default

Prior final relative biomass = 0.01 - 0.3 expert

Prior range for \( r = 0.17 - 0.88 \) expert, prior range for \( k = 0.834 - 17.3 \)

Results of CMSY analysis with altogether 1652 viable trajectories for 1493 \( r-k \) pairs

\( r = 0.387, \text{ 95\% CL} = 0.298 - 0.502, \quad k = 5.6, \text{ 95\% CL} = 3.88 - 8.08 \)

\( MSY = 0.542, \text{ 95\% CL} = 0.441 - 0.666 \)

Relative biomass last year = 0.121 \( k \), 2.5th = 0.0141, 97.5th = 0.291

Exploitation \( F/(r/2) \) in last year = 1.22

Results for Management (based on CMSY analysis)

\( F_{msy} = 0.193, \text{ 95\% CL} = 0.149 - 0.251 \) (if \( B > 1/2 \) \( B_{msy} \) then \( F_{msy} = 0.5 \) \( r \))

\( F_{msy} = 0.0933, \text{ 95\% CL} = 0.0718 - 0.121 \) (\( r \) and \( F_{msy} \) are linearly reduced if \( B < 1/2 \) \( B_{msy} \))

\( MSY = 0.542, \text{ 95\% CL} = 0.441 - 0.666 \)

\( B_{msy} = 2.8, \text{ 95\% CL} = 1.94 - 4.04 \)

Biomass in last year = 0.676, 2.5th perc = 0.0791, 97.5 perc = 1.63

\( B/B_{msy} \) in last year = 0.241, 2.5th perc = 0.0282, 97.5 perc = 0.583

Fishing mortality in last year = 0.243, 2.5th perc = 0.1, 97.5 perc = 2.07

\( F/F_{msy} = 2.6, \) 2.5th perc = 1.08, 97.5 perc = 22.2

Stock status and exploitation in 2014

Biomass = 0.676, \( B/B_{msy} = 0.241 \), fishing mortality \( F = 0.243 \), \( F/F_{msy} = 2.6 \)

Comment: Catch=landings from FishStat (Spain, France). RF final 0.3. GS OK

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Species: *Engraulis encrasicolus*, stock: ENGRENC_LI

Anchovy in Lions Gulf
Source: Colloca et al 2013
Region: Mediterranean, Lions Gulf
Catch data used from years 1970 - 2014, abundance = CPUE
Prior initial relative biomass = 0.5 - 0.9 expert
Prior intermediate rel. biomass= 0.01 - 0.4 in year 2005 expert
Prior final relative biomass = 0.01 - 0.3 expert
Prior range for r = 0.26 - 1.2 expert, prior range for k = 9.72 - 173
Prior range of q = 1.63 - 6.89

Results of CMSY analysis with altogether 1814 viable trajectories for 643 r-k pairs
\[ r = 0.73, 95\% CL = 0.484 - 1.1, k = 38.8, 95\% CL = 26.3 - 57.2 \]
MSY = 7.08, 95\% CL = 6.28 - 7.98
Relative biomass last year = 0.132 k, 2.5th = 0.0131, 97.5th = 0.291
Exploitation F/(r/2) in last year = 1.12

Results from Bayesian Schaefer model using catch & CPUE
\[ r = 0.583, 95\% CL = 0.408 - 0.832, k = 46.9, 95\% CL = 35.7 - 61.7 \]
MSY = 6.83, 95\% CL = 6.08 - 7.69
Relative biomass in last year = 0.259 k, 2.5th perc = 0.141, 97.5th perc = 0.351
Exploitation F/(r/2) in last year = 0.533
q = 2.68, lcl = 2, ucl = 3.59

Results for Management (based on BSM analysis)
Fmsy = 0.291, 95\% CL = 0.204 - 0.416 (if B > 1/2 Bmsy then Fmsy = 0.5 r)
Fmsy = 0.291, 95\% CL = 0.204 - 0.416 (r and Fmsy are linearly reduced if B < 1/2 Bmsy)
MSY = 6.83, 95\% CL = 6.08 - 7.69
Bmsy = 23.5, 95\% CL = 17.9 - 30.8
Biomass in last year = 12.2, 2.5th perc = 6.6, 97.5 perc = 16.5
B/Bmsy in last year = 0.519, 2.5th perc = 0.281, 97.5 perc = 0.702
Fishing mortality in last year = 0.155, 2.5th perc = 0.115, 97.5 perc = 0.286
F/Fmsy = 0.533, 2.5th perc = 0.394, 97.5 perc = 0.983

Stock status and exploitation in 2014
Biomass = 12.2, B/Bmsy = 0.519, fishing mortality F = 0.155, F/Fmsy = 0.533
Comment: Catch=landings from FishStat (Spain, France), Biomass from MEDIAS for GSA7. RF 2005 0.01-0.4, final 0.3. GS OK
Species: *Loligo vulgaris*, stock: LOLIVUL_LI

European squid in Lions Gulf

Source:
Region: Mediterranean, Lions Gulf
Catch data used from years 1980 - 2014, abundance = None
Prior initial relative biomass = 0.01 - 0.4 expert
Prior intermediate rel. biomass = 0.01 - 0.4 in year 1995 default
Prior final relative biomass = 0.01 - 0.4 expert
Prior range for r = 0.2 - 0.8 default, prior range for k = 0.579 - 9.26

Results of CMSY analysis with altogether 801 viable trajectories for 772 r-k pairs
r = 0.364, 95% CL = 0.254 - 0.522, k = 4.35, 95% CL = 2.97 - 6.36
MSY = 0.396, 95% CL = 0.272 - 0.575
Relative biomass last year = 0.141 k, 2.5th = 0.0148, 97.5th = 0.291
Exploitation F/(r/2) in last year = 1.84

Results for Management (based on CMSY analysis)
Fmsy = 0.182, 95% CL = 0.127 - 0.261 (if B > 1/2 Bmsy then Fmsy = 0.5 r)
Fmsy = 0.103, 95% CL = 0.0715 - 0.147 (r and Fmsy are linearly reduced if B < 1/2 Bmsy)
MSY = 0.396, 95% CL = 0.272 - 0.575
Bmsy = 2.17, 95% CL = 1.49 - 3.18
Biomass in last year = 0.612, 2.5th perc = 0.0645, 97.5 perc = 1.27
B/Bmsy in last year = 0.281, 2.5th perc = 0.0297, 97.5 perc = 0.582
Fishing mortality in last year = 0.368, 2.5th perc = 0.178, 97.5 perc = 3.49
F/Fmsy = 3.59, 2.5th perc = 1.73, 97.5 perc = 34

Stock status and exploitation in 2014
Biomass = 0.612, B/Bmsy = 0.281, fishing mortality F = 0.368, F/Fmsy = 3.59
Comment: Catch=landings from FishStat (Spain, France). RF start 1980, final 0.3. GS OK

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Species: *Merluccius merluccius*, stock: MERLMER_LI

Hake in Lions Gulf
Source: EASME EMFF 2014, M from Colloca et al 2013
Region: Mediterranean, Lions Gulf
Catch data used from years 1970 - 2014, abundance = CPUE
Prior initial relative biomass = 0.01 - 0.4 expert
Prior intermediate rel. biomass = 0.01 - 0.4 in year 1995 expert
Prior final relative biomass = 0.01 - 0.3 expert
Prior range for $r$ = 0.22 - 0.95 expert, prior range for $k$ = 4.7 - 81.1
Prior range of $q$ = 0.162 - 0.674

Results of CMSY analysis with altogether 2803 viable trajectories for 1836 r-k pairs
$r = 0.595$, 95% CL = 0.401 - 0.881, $k = 16.4$, 95% CL = 11.4 - 23.4
MSY = 2.43, 95% CL = 2.23 - 2.65
Relative biomass last year = 0.185 $k$, 2.5th = 0.0212, 97.5th = 0.297
Exploitation $F/(r/2)$ in last year = 1.55

Results from Bayesian Schaefer model using catch & CPUE
$r = 0.496$, 95% CL = 0.376 - 0.656, $k = 19.2$, 95% CL = 15.1 - 24.5
MSY = 2.38, 95% CL = 2.16 - 2.63
Relative biomass in last year = 0.185 $k$, 2.5th perc = 0.129, 97.5th perc = 0.264
Exploitation $F/(r/2)$ in last year = 1.88
$q = 0.252$, lcl = 0.198, ucl = 0.321

Results for Management (based on BSM analysis)
Fmsy = 0.248, 95% CL = 0.188 - 0.328 (if $B > 1/2$ Bmsy then Fmsy = 0.5 $r$)
Fmsy = 0.183, 95% CL = 0.139 - 0.242 (r and Fmsy are linearly reduced if $B < 1/2$ Bmsy)
MSY = 2.38, 95% CL = 2.16 - 2.63
Bmsy = 9.6, 95% CL = 7.53 - 12.2
Biomass in last year = 3.55, 2.5th perc = 2.48, 97.5 perc = 5.06
B/Bmsy in last year = 0.369, 2.5th perc = 0.259, 97.5 perc = 0.527
Fishing mortality in last year = 0.466, 2.5th perc = 0.327, 97.5 perc = 0.666
$F/Fmsy$ = 2.54, 2.5th perc = 1.78, 97.5 perc = 3.63

Stock status and exploitation in 2014
Biomass = 3.55, B/Bmsy = 0.369, fishing mortality $F$ = 0.466, $F/Fmsy$ = 2.54
Comment: Catch=landings from FishStat (Spain, France), Biomass from Medits for GSA7 (SGMED 2015, Part 1 GSA 7). RF final 0.3. GS OK
Species: *Micromesistius poutassou*, stock: MICMPOU_LI

Blue whiting in Lions Gulf
Source:
Region: Mediterranean, Lions Gulf
Catch data used from years 1990 - 2014, abundance = None
Prior initial relative biomass = 0.01 - 0.4 expert
Prior intermediate rel. biomass= 0.01 - 0.4 in year 2010 default
Prior final relative biomass = 0.01 - 0.3 expert
Prior range for r = 0.21 - 1.1 expert, prior range for k = 0.355 - 7.38

Results of CMSY analysis with altogether 1884 viable trajectories for 1652 r-k pairs
\[ r = 0.719, \text{ 95\% CL} = 0.491 - 1.05, k = 1.47, \text{ 95\% CL} = 0.605 - 3.58 \]
\[ MSY = 0.265, \text{ 95\% CL} = 0.105 - 0.664 \]

Relative biomass last year = 0.115 k, 2.5th = 0.019, 97.5th = 0.279
Exploitation \( F/(r/2) \) in last year = 1.62

Results for Management (based on CMSY analysis)
\[ F_{\text{msy}} = 0.359, \text{ 95\% CL} = 0.246 - 0.526 \text{ (if } B > 1/2 \text{ Bmsy then } F_{\text{msy}} = 0.5 r) \]
\[ F_{\text{msy}} = 0.166, \text{ 95\% CL} = 0.113 - 0.242 \text{ (r and } F_{\text{msy}} \text{ are linearly reduced if } B < 1/2 \text{ Bmsy) } \]
\[ MSY = 0.265, \text{ 95\% CL} = 0.105 - 0.664 \]
\[ B_{\text{msy}} = 0.736, \text{ 95\% CL} = 0.302 - 1.79 \]

Biomass in last year = 0.17, 2.5th perc = 0.028, 97.5 perc = 0.41
B/Bmsy in last year = 0.23, 2.5th perc = 0.038, 97.5 perc = 0.557
Fishing mortality in last year = 0.613, 2.5th perc = 0.254, 97.5 perc = 3.71
F/Fmsy = 3.7, 2.5th perc = 1.53, 97.5 perc = 22.4

Stock status and exploitation in 2014
Biomass = 0.17, B/Bmsy = 0.23, fishing mortality F = 0.613, F/Fmsy = 3.7
Comment: Catch=landings from FishStat (Spain, France). RF final 0.3. GS OK

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Species: *Mullus spp.*, stock: MULLSPP_LI

Red mullet and surmullet in Lions Gulf

Source:
Region: Mediterranean, Lions Gulf
Catch data used from years 1970 - 2014, abundance = CPUE
Prior initial relative biomass = 0.5 - 0.9 expert
Prior intermediate rel. biomass = 0.01 - 0.4 in year 1997 default
Prior final relative biomass = 0.2 - 0.6 expert
Prior range for r = 0.22 - 1.2 expert, prior range for k = 0.38 - 8.64
Prior range of q = 0.0012 - 0.0057

Results of CMSY analysis with altogether 3675 viable trajectories for 1147 r-k pairs
\[ r = 0.497, \text{ 95\% CI} = 0.35 - 0.704, \text{ 95\% CL} = 1.76 - 3.19 \]
\[ MSY = 0.294, \text{ 95\% CI} = 0.272 - 0.319 \]
Relative biomass last year = 0.526 k, 2.5th = 0.305, 97.5th = 0.597
Exploitation \( F/(r/2) \) in last year = 0.879

Results from Bayesian Schaefer model using catch & CPUE
\[ r = 0.609, \text{ 95\% CI} = 0.448 - 0.826, \text{ 95\% CL} = 1.59 - 2.67 \]
\[ MSY = 0.314, \text{ 95\% CI} = 0.284 - 0.346 \]
Relative biomass in last year = 0.592 k, 2.5th perc = 0.317, 97.5th perc = 0.729
Exploitation \( F/(r/2) \) in last year = 0.951
\[ q = 0.00176, \text{lcl} = 0.0013, \text{ucl} = 0.00239 \]

Results for Management (based on BSM analysis)
\[ Fmsy = 0.304, \text{ 95\% CI} = 0.224 - 0.413 (if B > 1/2 Bmsy then Fmsy = 0.5 r) \]
\[ Fmsy = 0.304, \text{ 95\% CI} = 0.224 - 0.413 (r and Fmsy are linearly reduced if B < 1/2 Bmsy) \]
\[ MSY = 0.314, \text{ 95\% CI} = 0.284 - 0.346 \]
\[ Bmsy = 1.03, \text{ 95\% CL} = 0.797 - 1.33 \]
Biomass in last year = 1.22, 2.5th perc = 0.653, 97.5 perc = 1.5
\[ B/Bmsy \text{ in last year} = 1.18, \text{ 2.5th perc} = 0.633, \text{ 97.5 perc} = 1.46 \]
Fishing mortality in last year = 0.289, 2.5th perc = 0.235, 97.5 perc = 0.541
\[ F/Fmsy = 0.951, \text{ 2.5th perc} = 0.771, \text{ 97.5 perc} = 1.78 \]

Stock status and exploitation in 2014
Biomass = 1.22, B/Bmsy = 1.18, fishing mortality F = 0.289, F/Fmsy = 0.951
Comment: Catch=landings from FishStat (Spain, France), Biomass from Medits for Mullus barbatus for GSA7. GS OK

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Species: *Nephrops norvegicus*, stock: NEPRNOR_LI

Norway lobster in Lions Gulf

Source:
Region: Mediterranean, Lions Gulf
Catch data used from years 1987 - 2014, abundance = CPUE
Prior initial relative biomass = 0.01 - 0.4 expert
Prior intermediate rel. biomass = 0.01 - 0.4 in year 1995 expert
Prior final relative biomass = 0.01 - 0.4 expert
Prior range for r = 0.2 - 0.8 default, prior range for k = 0.163 - 2.6
Prior range of q = 0.0664 - 0.266

Results of CMSY analysis with altogether 1637 viable trajectories for 1612 r-k pairs
r = 0.48, 95% CL = 0.305 - 0.753, k = 1.64, 95% CL = 0.859 - 3.15
MSY = 0.197, 95% CL = 0.0948 - 0.41
Relative biomass last year = 0.131 k, 2.5th = 0.0139, 97.5th = 0.382
Exploitation F/(r/2) in last year = 0.588

Results from Bayesian Schaefer model using catch & CPUE
r = 0.499, 95% CL = 0.337 - 0.74, k = 0.757, 95% CL = 0.536 - 1.07
MSY = 0.0945, 95% CL = 0.0601 - 0.148
Relative biomass in last year = 0.249 k, 2.5th perc = 0.0205, 97.5th perc = 0.474
Exploitation F/(r/2) in last year = 0.573
q = 0.1, lcl = 0.0752, ucl = 0.133

Results for Management (based on BSM analysis)
Fmsy = 0.25, 95% CL = 0.168 - 0.37 (if B > 1/2 Bmsy then Fmsy = 0.5 r)
Fmsy = 0.249, 95% CL = 0.168 - 0.369 (r and Fmsy are linearly reduced if B < 1/2 Bmsy)
MSY = 0.0945, 95% CL = 0.0601 - 0.148
Bmsy = 0.378, 95% CL = 0.268 - 0.534
Biomass in last year = 0.189, 2.5th perc = 0.0155, 97.5 perc = 0.359
B/Bmsy in last year = 0.499, 2.5th perc = 0.041, 97.5 perc = 0.948
Fishing mortality in last year = 0.143, 2.5th perc = 0.0753, 97.5 perc = 1.74
F/Fmsy = 0.574, 2.5th perc = 0.302, 97.5 perc = 6.99

Stock status and exploitation in 2014
Biomass = 0.189, B/Bmsy = 0.499, fishing mortality F = 0.143, F/Fmsy = 0.574
Comment: Catch=landings from FishStat (Spain, France), Biomass from Medits for GSA7. RF final 0.3.
GS OK final 0.4

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Species: *Octopus vulgaris*, stock: OCTOVUL_LI

Common octopus in Lions Gulf

Source:
Region: Mediterranean, Lions Gulf
Catch data used from years 1974 - 2014, abundance = None
Prior initial relative biomass = 0.5 - 0.9 expert
Prior intermediate rel. biomass= 0.3 - 0.7 in year 1995 expert
Prior final relative biomass = 0.2 - 0.6 expert
Prior range for r = 0.4 - 1 expert, , prior range for k = 1.73 - 17.3

Results of CMSY analysis with altogether 6884 viable trajectories for 1111 r-k pairs
r = 0.793, 95% CL = 0.639 - 0.984, k = 6.8, 95% CL = 5.09 - 9.08
MSY = 1.35, 95% CL = 1.17 - 1.55
Relative biomass last year = 0.414 k, 2.5th = 0.214, 97.5th = 0.585
Exploitation F/(r/2) in last year = 1.42

Results for Management (based on CMSY analysis)
Fmsy = 0.396, 95% CL = 0.319 - 0.492 (if B > 1/2 Bmsy then Fmsy = 0.5 r)
Fmsy = 0.396, 95% CL = 0.319 - 0.492 (r and Fmsy are linearly reduced if B < 1/2 Bmsy)
MSY = 1.35, 95% CL = 1.17 - 1.55
Bmsy = 3.4, 95% CL = 2.55 - 4.54
Biomass in last year = 2.81, 2.5th perc = 1.46, 97.5 perc = 3.98
B/Bmsy in last year = 0.827, 2.5th perc = 0.428, 97.5 perc = 1.17
Fishing mortality in last year = 0.523, 2.5th perc = 0.37, 97.5 perc = 1.01
F/Fmsy = 1.32, 2.5th perc = 0.934, 97.5 perc = 2.55

Stock status and exploitation in 2014
Biomass = 2.81, B/Bmsy = 0.827, fishing mortality F = 0.523, F/Fmsy = 1.32
Comment: Catch=landings from FishStat (France). GS OK

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Species: *Pagellus erythrinus*, stock: PAGEERY_CI

Common pandora in Lions Gulf

Source:
Region: Mediterranean, Lions Gulf
Catch data used from years 1973 - 2014, abundance = None
Prior initial relative biomass = 0.01 - 0.4 expert
Prior intermediate rel. biomass = 0.01 - 0.4 in year 1996 default
Prior final relative biomass = 0.01 - 0.4, default
Prior range for r = 0.22 - 0.97 expert, prior range for k = 0.639 - 11.3

Results of CMSY analysis with altogether 405 viable trajectories for 394 r-k pairs
r = 0.382, 95% CL = 0.32 - 0.456, k = 4.7, 95% CL = 2.88 - 7.66
MSY = 0.449, 95% CL = 0.244 - 0.826
Relative biomass last year = 0.162 k, 2.5th = 0.0455, 97.5th = 0.379
Exploitation F/(r/2) in last year = 0.965

Results for Management (based on CMSY analysis)
Fmsy = 0.191, 95% CL = 0.16 - 0.228 (if B > 1/2 Bmsy then Fmsy = 0.5 r)
Fmsy = 0.124, 95% CL = 0.103 - 0.148 (r and Fmsy are linearly reduced if B < 1/2 Bmsy)
MSY = 0.449, 95% CL = 0.244 - 0.826
Bmsy = 2.35, 95% CL = 1.44 - 3.83
Biomass in last year = 0.76, 2.5th perc = 0.214, 97.5 perc = 1.78
B/Bmsy in last year = 0.323, 2.5th perc = 0.0911, 97.5 perc = 0.758
Fishing mortality in last year = 0.23, 2.5th perc = 0.0982, 97.5 perc = 0.818
F/Fmsy = 1.87, 2.5th perc = 0.795, 97.5 perc = 6.62

Stock status and exploitation in 2014
Biomass = 0.76, B/Bmsy = 0.323, fishing mortality F = 0.23, F/Fmsy = 1.87
Comment: Catch=landings from FishStat (Spain, France). GS OK

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Species: *Sardina pilchardus*, stock: SARDPIL_LI

Sardine in Lions Gulf
Source:
Region: Mediterranean, Lions Gulf
Catch data used from years 1970 - 2014, abundance = CPUE
Prior initial relative biomass = 0.2 - 0.6 expert
Prior intermediate rel. biomass = 0.01 - 0.4 in year 1997 expert
Prior final relative biomass = 0.01 - 0.2 expert
Prior range for $r = 0.27 - 1.1$ expert, prior range for $k = 20.3 - 331$
Prior range of $q = 3.02 - 12.2$

Results of CMSY analysis with altogether 426 viable trajectories for 403 $r$-$k$ pairs
$r = 0.494$, 95% CL = 0.35 - 0.699, $k = 126$, 95% CL = 97.3 - 163
$MSY = 15.6$, 95% CL = 14 - 17.3
Relative biomass last year = 0.1 $k$, 2.5th = 0.0143, 97.5th = 0.198
Exploitation $F/(r/2)$ in last year = 0.317

Results from Bayesian Schaefer model using catch & CPUE
$r = 0.628$, 95% CL = 0.448 - 0.88, $k = 104$, 95% CL = 77.1 - 140
$MSY = 16.3$, 95% CL = 14.7 - 18
Relative biomass in last year = 0.158 $k$, 2.5th perc = 0.0815, 97.5th perc = 0.224
Exploitation $F/(r/2)$ in last year = 0.161
$q = 4.46$, lcl = 3.38, ucl = 5.88

Results for Management (based on BSM analysis)
$F_{msy} = 0.314$, 95% CL = 0.224 - 0.44 (if $B > 1/2 B_{msy}$ then $F_{msy} = 0.5 \times r$)
$F_{msy} = 0.198$, 95% CL = 0.141 - 0.277 ($r$ and $F_{msy}$ are linearly reduced if $B < 1/2 B_{msy}$)
$MSY = 16.3$, 95% CL = 14.7 - 18
$B_{msy} = 51.9$, 95% CL = 38.5 - 69.8
Biomass in last year = 16.4, 2.5th perc = 8.45, 97.5 perc = 23.3
$B/B_{msy}$ in last year = 0.315, 2.5th perc = 0.163, 97.5 perc = 0.449
Fishing mortality in last year = 0.0505, 2.5th perc = 0.0355, 97.5 perc = 0.0977
$F/F_{msy} = 0.255$, 2.5th perc = 0.179, 97.5 perc = 0.493

Stock status and exploitation in 2014
Biomass = 16.4, $B/B_{msy} = 0.315$, fishing mortality $F = 0.0505$, $F/F_{msy} = 0.255$
Comment: Catch=landings from FishStat (Spain, France), Biomass from MEDIAS for GSA7. RF int 1997 0.01-0.4, final 0.2. GS OK

-------------------------------------------------------------------
Species: *Scomber scombrus*, stock: SCOMSCO_LI

Atlantic mackerel in Lions Gulf

Source:
Region: Mediterranean, Lions Gulf
Catch data used from years 1970 - 2014, abundance = None
Prior initial relative biomass = 0.2 - 0.6 expert
Prior intermediate rel. biomass = 0.1 - 0.5 in year 2005 expert
Prior final relative biomass = 0.01 - 0.4 expert
Prior range for r = 0.23 - 1 expert, prior range for k = 2.32 - 40.3

Results of CMSY analysis with altogether 1141 viable trajectories for 831 r-k pairs
r = 0.628, 95% CL = 0.405 - 0.975, k = 8.26, 95% CL = 5.48 - 12.4
MSY = 1.3, 95% CL = 1.17 - 1.43
Relative biomass last year = 0.207 k, 2.5th = 0.0185, 97.5th = 0.392
Exploitation F/(r/2) in last year = 1.36

Results for Management (based on CMSY analysis)
Fmsy = 0.314, 95% CL = 0.202 - 0.487 (if B > 1/2 Bmsy then Fmsy = 0.5 r)
Fmsy = 0.26, 95% CL = 0.168 - 0.404 (r and Fmsy are linearly reduced if B < 1/2 Bmsy)
MSY = 1.3, 95% CL = 1.17 - 1.43
Bmsy = 4.13, 95% CL = 2.74 - 6.22
Biomass in last year = 1.71, 2.5th perc = 0.153, 97.5 perc = 3.24
B/Bmsy in last year = 0.414, 2.5th perc = 0.037, 97.5 perc = 0.785
Fishing mortality in last year = 0.432, 2.5th perc = 0.228, 97.5 perc = 4.84
F/Fmsy = 1.66, 2.5th perc = 0.877, 97.5 perc = 18.6

Stock status and exploitation in 2014
Biomass = 1.71, B/Bmsy = 0.414, fishing mortality F = 0.432, F/Fmsy = 1.66
Comment: Catch=landings from FishStat (Spain, France). RF 2005 0.1-0.5, final 0.01-0.4. GS OK

----------------------------------------------------------
Species: *Sepia officinalis*, stock: SEPIOFF_LI
Common cuttlefish in Lions Gulf
Source:
Region: Mediterranean, Lions Gulf
Catch data used from years 1973-2014, abundance = None
Prior initial relative biomass = 0.2 - 0.6 expert
Prior intermediate rel. biomass = 0.01 - 0.4 in year 2000 expert
Prior final relative biomass = 0.01 - 0.4 expert
Prior range for r = 0.2 - 0.8 default, prior range for k = 0.43 - 6.88

Results of CMSY analysis with altogether 591 viable trajectories for 560 r-k pairs
\[ r = 0.343, \text{ 95\% CL = 0.218 - 0.541}, k = 2.94, \text{ 95\% CL = 2.14 - 4.04} \]
\[ MSY = 0.252, \text{ 95\% CL = 0.189 - 0.336} \]
Relative biomass last year = 0.19 k, 2.5th = 0.015, 97.5th = 0.394
Exploitation F/(r/2) in last year = 1.12

Results for Management (based on CMSY analysis)
\[ F_{msy} = 0.172, \text{ 95\% CL = 0.109 - 0.27} \] (if B > 1/2 Bmsy then Fmsy = 0.5 r)
\[ F_{msy} = 0.13, \text{ 95\% CL = 0.0828 - 0.206} \] (r and Fmsy are linearly reduced if B < 1/2 Bmsy)
\[ MSY = 0.252, \text{ 95\% CL = 0.189 - 0.336} \]
\[ B_{msy} = 1.47, \text{ 95\% CL = 1.07 - 2.02} \]
Biomass in last year = 0.56, 2.5th perc = 0.044, 97.5 perc = 1.16
\[ B/B_{msy} \text{ in last year } = 0.38, \text{ 2.5th perc = 0.0299, 97.5 perc = 0.788} \]
Fishing mortality in last year = 0.214, 2.5th perc = 0.103, 97.5 perc = 2.73
\[ F/F_{msy} = 1.64, \text{ 2.5th perc = 0.793, 97.5 perc = 20.9} \]

Stock status and exploitation in 2014
\[ Biomass = 0.56, \text{ B/B}_{msy} = 0.38, \text{ fishing mortality } F = 0.214, \text{ F/F}_{msy} = 1.64 \]
Comment: Catch=landings from FishStat (France). GS OK

----------------------------------------------------------
Species: *Solea solea*, stock: SOLEVUL_LI

Common sole in Lions Gulf

Source:
Region: Mediterranean, Lions Gulf
Catch data used from years 1970 - 2014, abundance = None
Prior initial relative biomass = 0.2 - 0.6 expert
Prior intermediate rel. biomass = 0.01 - 0.4 in year 2009 default
Prior final relative biomass = 0.01 - 0.4, default
Prior range for $r = 0.21 - 1$ expert, prior range for $k = 0.931 - 18.1$

Results of CMSY analysis with altogether 315 viable trajectories for 304 $r$-$k$ pairs
$r = 0.313$, 95% CL = 0.274 - 0.356, $k = 6.71$, 95% CL = 4.89 - 9.22
$MSY = 0.525$, 95% CL = 0.364 - 0.756
Relative biomass last year = 0.15 $k$, 2.5th = 0.0142, 97.5th = 0.394
Exploitation $F/(r/2)$ in last year = 0.785

Results for Management (based on CMSY analysis)
$Fmsy = 0.156$, 95% CL = 0.137 - 0.178 (if $B > 1/2 Bmsy$ then $Fmsy = 0.5 r$)
$Fmsy = 0.0938$, 95% CL = 0.0823 - 0.107 ($r$ and $Fmsy$ are linearly reduced if $B < 1/2 Bmsy$)
$MSY = 0.525$, 95% CL = 0.364 - 0.756
$Bmsy = 3.36$, 95% CL = 2.45 - 4.61
Biomass in last year = 1.01, 2.5th perc = 0.0951, 97.5 perc = 2.64
$B/Bmsy$ in last year = 0.3, 2.5th perc = 0.0283, 97.5 perc = 0.788
Fishing mortality in last year = 0.129, 2.5th perc = 0.0492, 97.5 perc = 1.37
$F/Fmsy = 1.38$, 2.5th perc = 0.524, 97.5 perc = 14.6

Stock status and exploitation in 2014
Biomass = 1.01, $B/Bmsy = 0.3$, fishing mortality $F = 0.129$, $F/Fmsy = 1.38$
Comment: Catch=landings from FishStat (Spain, France). GS OK
Species: *Trisopterus minutus*, stock: TRISMIN_LI

Poor cod in Lions Gulf

Source:

Region: Mediterranean, Lions Gulf
Catch data used from years 1972 - 2014, abundance = None
Prior initial relative biomass = 0.5 - 0.9 expert
Prior intermediate rel. biomass = 0.01 - 0.4 in year 1997 expert
Prior final relative biomass = 0.01 - 0.4 expert
Prior range for r = 0.37 - 1.6 expert, prior range for k = 0.81 - 13.9

Results of CMSY analysis with altogether 575 viable trajectories for 495 r-k pairs
r = 0.592, 95% CL = 0.488 - 0.717, k = 6.06, 95% CL = 5.09 - 7.22
MSY = 0.897, 95% CL = 0.842 - 0.955
Relative biomass last year = 0.32 k, 2.5th = 0.0246, 97.5th = 0.395
Exploitation F/(r/2) in last year = 1.09

Results for Management (based on CMSY analysis)
Fmsy = 0.296, 95% CL = 0.244 - 0.359 (if B > 1/2 Bmsy then Fmsy = 0.5 r)
Fmsy = 0.296, 95% CL = 0.244 - 0.359 (r and Fmsy are linearly reduced if B < 1/2 Bmsy)
MSY = 0.897, 95% CL = 0.842 - 0.955
Bmsy = 3.03, 95% CL = 2.55 - 3.61
Biomass in last year = 1.94, 2.5th perc = 0.149, 97.5 perc = 2.39
B/Bmsy in last year = 0.639, 2.5th perc = 0.0493, 97.5 perc = 0.789
Fishing mortality in last year = 0.339, 2.5th perc = 0.274, 97.5 perc = 4.39
F/Fmsy = 1.14, 2.5th perc = 0.927, 97.5 perc = 14.8

Stock status and exploitation in 2014
Biomass = 1.94, B/Bmsy = 0.639, fishing mortality F = 0.339, F/Fmsy = 1.14
Comment: Catch=landings from FishStat (Spain, France). RF int 1997 0.01-0.4, final 0.01-0.4. GS OK

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Balearic Sea (analyzed with CMSY_O_7m.R; see Comment for data sources)

Species: *Aristeomorpha foliacea*, stock: ARISFOL_BA
Giant red shrimp in Balearic

Source:
Region: Mediterranean, Balearic
Catch data used from years 1999 - 2014, abundance = CPUE
Prior initial relative biomass = 0.5 - 0.9 expert
Prior intermediate rel. biomass = 0.01 - 0.4 in year 2005 expert
Prior final relative biomass = 0.01 - 0.3 expert
Prior range for r = 0.2 - 0.8 default, prior range for k = 0.125 - 2
Prior range of q = 0.000786 - 0.00314

Results of CMSY analysis with altogether 1879 viable trajectories for 939 r-k pairs
r = 0.499, 95% CL = 0.338 - 0.737, k = 0.307, 95% CL = 0.202 - 0.466
MSY = 0.0383, 95% CL = 0.0301 - 0.0488
Relative biomass last year = 0.145 k, 2.5th = 0.0147, 97.5th = 0.295
Exploitation F/(r/2) in last year = 1.14

Results from Bayesian Schaefer model using catch & CPUE
r = 0.312, 95% CL = 0.183 - 0.533, k = 0.422, 95% CL = 0.302 - 0.589
MSY = 0.0329, 95% CL = 0.0245 - 0.0443
Relative biomass in last year = 0.19 k, 2.5th perc = 0.0117, 97.5th perc = 0.356
Exploitation F/(r/2) in last year = 0.797
q = 0.00144, lcl = 0.00102, ucl = 0.00203

Results for Management (based on CMSY analysis)
Fmsy = 0.25, 95% CL = 0.169 - 0.369 (if B > 1/2 Bmsy then Fmsy = 0.5 r)
Fmsy = 0.144, 95% CL = 0.0977 - 0.213 (r and Fmsy are linearly reduced if B < 1/2 Bmsy)
MSY = 0.0383, 95% CL = 0.0301 - 0.0488
Bmsy = 0.153, 95% CL = 0.101 - 0.233
Biomass in last year = 0.0443, 2.5th perc = 0.00452, 97.5 perc = 0.0906
B/Bmsy in last year = 0.289, 2.5th perc = 0.0295, 97.5 perc = 0.59
Fishing mortality in last year = 0.225, 2.5th perc = 0.11, 97.5 perc = 2.21
F/Fmsy = 1.56, 2.5th perc = 0.766, 97.5 perc = 15.3

Stock status and exploitation in 2014
Biomass = 0.0443, B/Bmsy = 0.289, fishing mortality F = 0.225, F/Fmsy = 1.56
Comment: Catch=landings from FishStat (Spain), Biomass from Medits for GSAs 1-6. RF final 0.3; GS suggests to use CMSY; RF OK 12.10.16

----------------------------------------------------------
Species: *Aristeus antennatus*, stock: ARITANT BA
Blue and red shrimp in Balearic
Source: excel
Region: Mediterranean, Balearic
Catch data used from years 1970 - 2014, abundance = CPUE
Prior initial relative biomass = 0.01 - 0.4 expert
Prior intermediate relative biomass = 0.01 - 0.4 in year 1995 expert
Prior final relative biomass = 0.01 - 0.4 expert
Prior range for r = 0.2 - 0.8 default, prior range for k = 4.03 - 64.5
Prior range of q = 0.000273 - 0.00109

Results of CMSY analysis with altogether 1625 viable trajectories for 1068 r-k pairs
r = 0.563, 95% CL = 0.403 - 0.785, k = 13.2, 95% CL = 9.07 - 19.2
MSY = 1.85, 95% CL = 1.71 - 2.01
Relative biomass last year = 0.257 k, 2.5th = 0.0277, 97.5th = 0.392
Exploitation F/(r/2) in last year = 1.8

Results from Bayesian Schaefer model using catch & CPUE
r = 0.594, 95% CL = 0.398 - 0.888, k = 12.6, 95% CL = 8.8 - 18.1
MSY = 1.87, 95% CL = 1.73 - 2.04
Relative biomass in last year = 0.294 k, 2.5th perc = 0.138, 97.5th perc = 0.455
Exploitation F/(r/2) in last year = 1.48
q = 0.000421, lcl = 0.000312, ucl = 0.000569

Results for Management (based on CMSY analysis)
Fmsy = 0.281, 95% CL = 0.202 - 0.393 (if B > 1/2 Bmsy then Fmsy = 0.5 r)
Fmsy = 0.281, 95% CL = 0.202 - 0.393 (r and Fmsy are linearly reduced if B < 1/2 Bmsy)
MSY = 1.85, 95% CL = 1.71 - 2.01
Bmsy = 6.59, 95% CL = 4.54 - 9.58
Biomass in last year = 3.39, 2.5th perc = 0.366, 97.5 perc = 5.17
B/Bmsy in last year = 0.514, 2.5th perc = 0.0555, 97.5 perc = 0.784
Fishing mortality in last year = 0.481, 2.5th perc = 0.315, 97.5 perc = 4.46
F/Fmsy = 1.71, 2.5th perc = 1.12, 97.5 perc = 15.8

Stock status and exploitation in 2014
Biomass = 3.39, B/Bmsy = 0.514, fishing mortality F = 0.481, F/Fmsy = 1.71
Comment: Catch=landings from FishStat (Spain, Algeria), Biomass from Medits for GSAs 1-6. GS:
Results look ok. However, the depth range of the species is far below 1000 m where the fishery cannot operate, so probably the biomass exploited is just a portion of the real biomass.

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Species: *Boops boops*, stock: BOOPBOO_BA

Bogue in Balearic
Source:
Region: Mediterranean, Balearic
Catch data used from years 1974 - 2014, abundance = None
Prior initial relative biomass = 0.2 - 0.6 expert
Prior intermediate rel. biomass = 0.01 - 0.4 in year 1992 expert
Prior final relative biomass = 0.1 - 0.5 expert
Prior range for r = 0.31 - 1.1 expert, prior range for k = 10.6 - 151

Results of CMSY analysis with altogether 1391 viable trajectories for 1265 r-k pairs
r = 0.628, 95% CL = 0.446 - 0.885, k = 52.8, 95% CL = 39.6 - 70.5
MSY = 8.3, 95% CL = 7.3 - 9.43
Relative biomass last year = 0.27 k, 2.5th = 0.112, 97.5th = 0.476
Exploitation F/(r/2) in last year = 1.67

Results for Management (based on CMSY analysis)
Fmsy = 0.314, 95% CL = 0.223 - 0.443 (if B > 1/2 Bmsy then Fmsy = 0.5 r)
Fmsy = 0.314, 95% CL = 0.223 - 0.443 (r and Fmsy are linearly reduced if B < 1/2 Bmsy)
MSY = 8.3, 95% CL = 7.3 - 9.43
Bmsy = 26.4, 95% CL = 19.8 - 35.3
Biomass in last year = 14.2, 2.5th perc = 5.93, 97.5 perc = 25.1
B/Bmsy in last year = 0.539, 2.5th perc = 0.224, 97.5 perc = 0.951
Fishing mortality in last year = 0.464, 2.5th perc = 0.263, 97.5 perc = 1.12
F/Fmsy = 1.48, 2.5th perc = 0.838, 97.5 perc = 3.55

Stock status and exploitation in 2014
Biomass = 14.2, B/Bmsy = 0.539, fishing mortality F = 0.464, F/Fmsy = 1.48
Comment: Catch=landings from FishStat (Algeria, Spain, Morocco). RF int 1992 0.01-0.4, final 0.1-0.5.
GS OK

----------------------------------------------------------------------------------------------------------
Species: *Conger conger*, stock: CONGCON_BA

Conger eel in Balearic

Source:

Region: Mediterranean, Balearic

Catch data used from years 1980 - 2014, abundance = None

Prior initial relative biomass = 0.5 - 0.9 expert

Prior intermediate rel. biomass = 0.01 - 0.4 in year 2005 expert

Prior final relative biomass = 0.01 - 0.2 expert

Prior range for \( r \) = 0.16 - 0.46 expert, prior range for \( k \) = 1.74 - 20

Results of CMSY analysis with altogether 1307 viable trajectories for 624 r-k pairs

\( r = 0.352, \) 95% CL = 0.272 - 0.455, \( k = 6.43, \) 95% CL = 4.79 - 8.65

MSY = 0.566, 95% CL = 0.514 - 0.622

Relative biomass last year = 0.101 \( k \), 2.5th = 0.0136, 97.5th = 0.194

Exploitation \( F/(r/2) \) in last year = 1.21

Results for Management (based on CMSY analysis)

\( F_{msy} = 0.176, \) 95% CL = 0.136 - 0.227 (if \( B > 1/2 \) Bmsy then \( F_{msy} = 0.5 \) \( r \))

\( F_{msy} = 0.0708, \) 95% CL = 0.0547 - 0.0915 (\( r \) and \( F_{msy} \) are linearly reduced if \( B < 1/2 \) Bmsy)

MSY = 0.566, 95% CL = 0.514 - 0.622

Bmsy = 3.22, 95% CL = 2.39 - 4.32

Biomass in last year = 0.647, 2.5th perc = 0.0873, 97.5 perc = 1.25

\( B/B_{msy} \) in last year = 0.201, 2.5th perc = 0.0271, 97.5 perc = 0.388

Fishing mortality in last year = 0.202, 2.5th perc = 0.105, 97.5 perc = 1.5

\( F/F_{msy} \) = 2.86, 2.5th perc = 1.48, 97.5 perc = 21.2

Stock status and exploitation in 2014

Biomass = 0.647, \( B/B_{msy} = 0.201 \), fishing mortality \( F = 0.202 \), \( F/F_{msy} = 2.86 \)

Comment: Catch=landings from FishStat (Algeria, Spain, Morocco). RF int 2005 0.01-0.4, final 0.2. GS OK

----------------------------------------------------------
Species: *Engraulis encrasicolus*, stock: ENGREN_C_BA

Anchovy in Balearic
Source: excel
Region: Mediterranean, Balearic
Catch data used from years 1970 - 2014, abundance = CPUE
Prior initial relative biomass = 0.01 - 0.4 expert
Prior intermediate rel. biomass = 0.01 - 0.4 in year 1995 expert
Prior final relative biomass = 0.01 - 0.4 expert
Prior range for r = 0.26 - 1.2 expert, prior range for k = 49.2 - 878
Prior range of q = 0.372 - 1.57

Results of CMSY analysis with altogether 113 viable trajectories for 113 r-k pairs
r = 0.387, 95% CL = 0.299 - 0.5, k = 343, 95% CL = 283 - 415
MSY = 33.1, 95% CL = 28.8 - 38.2
Relative biomass last year = 0.278 k, 2.5th = 0.0199, 97.5th = 0.395
Exploitation F/(r/2) in last year = 1.02

Results from Bayesian Schaefer model using catch & CPUE
r = 0.608, 95% CL = 0.399 - 0.928, k = 232, 95% CL = 169 - 317
MSY = 35.3, 95% CL = 29.6 - 42.1
Relative biomass in last year = 0.255 k, 2.5th perc = 0.0931, 97.5th perc = 0.45
Exploitation F/(r/2) in last year = 1.23
q = 0.511, lcl = 0.366, ucl = 0.715

Results for Management (based on CMSY analysis)
Fmsy = 0.193, 95% CL = 0.15 - 0.25 (if B > 1/2 Bmsy then Fmsy = 0.5 r)
Fmsy = 0.193, 95% CL = 0.15 - 0.25 (r and Fmsy are linearly reduced if B < 1/2 Bmsy)
MSY = 33.1, 95% CL = 28.8 - 38.2
Bmsy = 171, 95% CL = 142 - 207
Biomass in last year = 95.4, 2.5th perc = 6.81, 97.5 perc = 135
B/Bmsy in last year = 0.557, 2.5th perc = 0.0398, 97.5 perc = 0.791
Fishing mortality in last year = 0.233, 2.5th perc = 0.164, 97.5 perc = 3.26
F/Fmsy = 1.2, 2.5th perc = 0.848, 97.5 perc = 16.9

Stock status and exploitation in 2014
Biomass = 95.4, B/Bmsy = 0.557, fishing mortality F = 0.233, F/Fmsy = 1.2
Comment: Catch=landings from FishStat (Algeria, Morocco, Spain), Average Biomass from MEDIAS for GSAs 1 & 6. RF 0.01-0.4. GS: The signals from MEDIAS are quite far from catches. I would try only with catch data considering that the survey is carried out only in EU GSA and not in Algeria and Morocco. RF OK 12.10.16

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Species: *Lepidorhombus whiffiagonis*, stock: LEPIWHI_BA
Megrim in Balearic
Source:
Region: Mediterranean, Balearic
Catch data used from years 1974 - 2014, abundance = None
Prior initial relative biomass = 0.5 - 0.9 expert
Prior intermediate rel. biomass = 0.01 - 0.4 in year 1999 default
Prior final relative biomass = 0.01 - 0.2 expert
Prior range for r = 0.34 - 1 expert, prior range for k = 0.178 - 2.1

Results of CMSY analysis with altogether 2198 viable trajectories for 1444 r-k pairs
r = 0.675, 95% CL = 0.502 - 0.908, k = 0.67, 95% CL = 0.51 - 0.881
MSY = 0.113, 95% CL = 0.101 - 0.127
Relative biomass last year = 0.113 k, 2.5th = 0.0163, 97.5th = 0.194
Exploitation F/(r/2) in last year = 0.911

Results for Management (based on CMSY analysis)
Fmsy = 0.338, 95% CL = 0.251 - 0.454 (if B > 1/2 Bmsy then Fmsy = 0.5 r)
Fmsy = 0.153, 95% CL = 0.114 - 0.205 (r and Fmsy are linearly reduced if B < 1/2 Bmsy)
MSY = 0.113, 95% CL = 0.101 - 0.127
Bmsy = 0.335, 95% CL = 0.255 - 0.441
Biomass in last year = 0.0758, 2.5th perc = 0.0109, 97.5 perc = 0.13
B/Bmsy in last year = 0.226, 2.5th perc = 0.0326, 97.5 perc = 0.388
Fishing mortality in last year = 0.251, 2.5th perc = 0.146, 97.5 perc = 1.74
F/Fmsy = 1.64, 2.5th perc = 0.957, 97.5 perc = 11.4

Stock status and exploitation in 2014
Biomass = 0.0758, B/Bmsy = 0.226, fishing mortality F = 0.251, F/Fmsy = 1.64
Comment: Catch=landings from FishStat (Spain). RF final 0.2. GS OK

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Species: *Loligo vulgaris*, stock: LOLIVUL_BA
European squid in Balearic

Source:
Region: Mediterranean, Balearic
Catch data used from years 1970 - 2014, abundance = None
Prior initial relative biomass = 0.2 - 0.6 expert
Prior intermediate rel. biomass = 0.01 - 0.4 in year 1998 expert
Prior final relative biomass = 0.01 - 0.3 expert
Prior range for r = 0.2 - 0.8 default, prior range for k = 3.2 - 51.2

Results of CMSY analysis with altogether 317 viable trajectories for 305 r-k pairs
r = 0.31, 95% CL = 0.246 - 0.392, k = 16.2, 95% CL = 12.4 - 21.2
MSY = 1.26, 95% CL = 1.05 - 1.51
Relative biomass last year = 0.18 k, 2.5th = 0.0161, 97.5th = 0.293
Exploitation F/(r/2) in last year = 0.913

Results for Management (based on CMSY analysis)
Fmsy = 0.155, 95% CL = 0.123 - 0.196 (if B > 1/2 Bmsy then Fmsy = 0.5 r)
Fmsy = 0.112, 95% CL = 0.0885 - 0.141 (r and Fmsy are linearly reduced if B < 1/2 Bmsy)
MSY = 1.26, 95% CL = 1.05 - 1.51
Bmsy = 8.12, 95% CL = 6.22 - 10.6
Biomass in last year = 2.93, 2.5th perc = 0.262, 97.5 perc = 4.76
B/Bmsy in last year = 0.36, 2.5th perc = 0.0323, 97.5 perc = 0.587
Fishing mortality in last year = 0.123, 2.5th perc = 0.0758, 97.5 perc = 1.38
F/Fmsy = 1.1, 2.5th perc = 0.678, 97.5 perc = 12.3

Stock status and exploitation in 2014
Biomass = 2.93, B/Bmsy = 0.36, fishing mortality F = 0.123, F/Fmsy = 1.1
Comment: Catch=landings from FishStat (Algeria, Spain). RF final 0.3. GS OK
Species: *Merluccius merluccius*, stock: MERLMER_BA
Hake in Balearic
Source: STECF 15-18, M from Colloca et al 2013
Region: Mediterranean, Balearic
Catch data used from years 1970 - 2014, abundance = CPUE
Prior initial relative biomass = 0.2 - 0.6 expert
Prior intermediate rel. biomass = 0.01 - 0.4 in year 1995 expert
Prior final relative biomass = 0.01 - 0.2 expert
Prior range for r = 0.22 - 0.95 expert, prior range for k = 8.96 - 155
Prior range of q = 0.379 - 1.58

Results of CMSY analysis with altogether 1188 viable trajectories for 1011 r-k pairs
r = 0.445, 95% CL = 0.264 - 0.749, k = 51, 95% CL = 39.2 - 66.4
MSY = 5.68, 95% CL = 5.25 - 6.14
Relative biomass last year = 0.118 k, 2.5th perc = 0.0152, 97.5th perc = 0.195
Exploitation F/(r/2) in last year = 2.51

Results from Bayesian Schaefer model using catch & CPUE
r = 0.5, 95% CL = 0.375 - 0.669, k = 46.4, 95% CL = 35.6 - 60.6
MSY = 5.81, 95% CL = 5.3 - 6.36
Relative biomass in last year = 0.198 k, 2.5th perc = 0.141, 97.5th perc = 0.242
Exploitation F/(r/2) in last year = 1.32
q = 0.632, lcl = 0.489, ucl = 0.817

Results for Management (based on CMSY analysis)
Fmsy = 0.222, 95% CL = 0.132 - 0.375 (if B > 1/2 Bmsy then Fmsy = 0.5 r)
Fmsy = 0.105, 95% CL = 0.0623 - 0.177 (r and Fmsy are linearly reduced if B < 1/2 Bmsy)
MSY = 5.68, 95% CL = 5.25 - 6.14
Bmsy = 25.5, 95% CL = 19.6 - 33.2
Biomass in last year = 6.02, 2.5th perc = 0.773, 97.5 perc = 9.93
B/Bmsy in last year = 0.236, 2.5th perc = 0.0303, 97.5 perc = 0.389
Fishing mortality in last year = 0.503, 2.5th perc = 0.305, 97.5 perc = 3.92
F/Fmsy = 4.79, 2.5th perc = 2.9, 97.5 perc = 37.3

Stock status and exploitation in 2014
Biomass = 6.02, B/Bmsy = 0.236, fishing mortality F = 0.503, F/Fmsy = 4.79
Comment: Catch=landings from FishStat (Algeria, France, Morocco, Spain), Biomass from Medits for GSAs 1,5,6 (SGMED 2015, Part 1- 1,5,6,7 minus 7). GS: Results look ok and similar with the STECF assessment

----------------------------------------------------------
Species: *Micromesistius poutassou*, stock: MICMPOU_BA

Blue whiting in Balearic
Source: excel
Region: Mediterranean, Balearic
Catch data used from years 1980 - 2014, abundance = CPUE
Prior initial relative biomass = 0.5 - 0.9 expert
Prior intermediate rel. biomass = 0.01 - 0.4 in year 2003 default
Prior final relative biomass = 0.01 - 0.2 expert
Prior range for r = 0.21 - 1.1 expert, prior range for k = 10.1 - 210
Prior range of q = 0.00195 - 0.00886

Results of CMSY analysis with altogether 893 viable trajectories for 771 r-k pairs
r = 0.363, 95% CL = 0.292 - 0.452, k = 59.1, 95% CL = 45.2 - 77.3
MSY = 5.37, 95% CL = 4.5 - 6.41
Relative biomass last year = 0.116 k, 2.5th = 0.0163, 97.5th = 0.19
Exploitation F/(r/2) in last year = 0.974

Results from Bayesian Schaefer model using catch & CPUE
r = 0.38, 95% CL = 0.252 - 0.573, k = 60.1, 95% CL = 45.1 - 80
MSY = 5.71, 95% CL = 4.57 - 7.14
Relative biomass in last year = 0.0924 k, 2.5th perc = 0.0233, 97.5th perc = 0.223
Exploitation F/(r/2) in last year = 1.16
q = 0.00273, lcl = 0.00199, ucl = 0.00374

Results for Management (based on CMSY analysis)
Fmsy = 0.182, 95% CL = 0.146 - 0.226 (if B > 1/2 Bmsy then Fmsy = 0.5 r)
Fmsy = 0.0842, 95% CL = 0.0677 - 0.105 (r and Fmsy are linearly reduced if B < 1/2 Bmsy)
MSY = 5.37, 95% CL = 4.5 - 6.41
Bmsy = 29.6, 95% CL = 22.6 - 38.7
Biomass in last year = 6.85, 2.5th perc = 0.967, 97.5 perc = 11.2
B/Bmsy in last year = 0.232, 2.5th perc = 0.0327, 97.5 perc = 0.38
Fishing mortality in last year = 0.178, 2.5th perc = 0.109, 97.5 perc = 1.26
F/Fmsy = 2.12, 2.5th perc = 1.29, 97.5 perc = 15

Stock status and exploitation in 2014
Biomass = 6.85, B/Bmsy = 0.232, fishing mortality F = 0.178, F/Fmsy = 2.12
Comment: Catch=landings from FishStat (Spain). GS: Results look ok and similar to STECF assessment

----------------------------------------------------------
Species: *Mullus barbatus*, stock: MULLBAR_BA

Red mullet in Balearic
Source: Colloca et al 2013
Region: Mediterranean, Balearic
Catch data used from years 1999 - 2014, abundance = CPUE
Prior initial relative biomass = 0.2 - 0.6 expert
Prior intermediate rel. biomass = 0.2 - 0.6 in year 2005 expert
Prior final relative biomass = 0.1 - 0.5 expert
Prior range for r = 0.22 - 1.2 expert, prior range for k = 0.7 - 15.9
Prior range of q = 0.00105 - 0.00501

Results of CMSY analysis with altogether 4627 viable trajectories for 1638 r-k pairs
r = 0.803 , 95% CL = 0.533 - 1.21 , k = 3.25 , 95% CL = 1.94 - 5.44
MSY = 0.652 , 95% CL = 0.529 - 0.804
Relative biomass last year = 0.328 k, 2.5th = 0.117 , 97.5th = 0.492
Exploitation F/(r/2) in last year = 1.79

Results from Bayesian Schaefer model using catch & CPUE
r = 0.775 , 95% CL = 0.537 - 1.12 , k = 3.3 , 95% CL = 2.37 - 4.6
MSY = 0.64 , 95% CL = 0.543 - 0.754
Relative biomass in last year = 0.364 k, 2.5th perc = 0.228 , 97.5th perc = 0.541
Exploitation F/(r/2) in last year = 1.36
q = 0.00145 , lcl = 0.00105 , ucl = 0.002

Results for Management (based on CMSY analysis)
Fmsy = 0.401 , 95% CL = 0.267 - 0.604 (if B > 1/2 Bmsy then Fmsy = 0.5 r)
Fmsy = 0.401 , 95% CL = 0.267 - 0.604 (r and Fmsy are linearly reduced if B < 1/2 Bmsy)
MSY = 0.652 , 95% CL = 0.529 - 0.804
Bmsy = 1.63 , 95% CL = 0.971 - 2.72
Biomass in last year = 1.07 , 2.5th perc = 0.38 , 97.5 perc = 1.6
B/Bmsy in last year = 0.656 , 2.5th perc = 0.233 , 97.5 perc = 0.985
Fishing mortality in last year = 0.595 , 2.5th perc = 0.396 , 97.5 perc = 1.67
F/Fmsy = 1.48 , 2.5th perc = 0.987 , 97.5 perc = 4.16

Stock status and exploitation in 2014
Biomass = 1.07 , B/Bmsy = 0.656 , fishing mortality F = 0.595 , F/Fmsy = 1.48
Comment: Catch=landings from FishStat (Spain), Biomass from Medits for GSAs 1-6. RF final 0.1-0.5.
GS OK

----------------------------------------------------------
Species: *Mullus surmuletus*, stock: MULLSUR_BA

Surmulet in Balearic
Source: Colloca et al 2013
Region: Mediterranean, Balearic
Catch data used from years 1999 - 2014, abundance = CPUE
Prior initial relative biomass = 0.2 - 0.6 expert
Prior intermediate rel. biomass = 0.01 - 0.4 in year 2010 default
Prior final relative biomass = 0.01 - 0.3 expert
Prior range for r = 0.46 - 1.6 expert, prior range for k = 0.42 - 5.77
Prior range of q = 0.00168 - 0.00624

Results of CMSY analysis with altogether 2540 viable trajectories for 1526 r-k pairs
r = 1.16, 95% CL = 0.865 - 1.55, k = 1.92, 95% CL = 1.34 - 2.76
MSY = 0.557, 95% CL = 0.484 - 0.641
Relative biomass last year = 0.155 k, 2.5th = 0.0199, 97.5th = 0.294
Exploitation F/(r/2) in last year = 1.28

Results from Bayesian Schaefer model using catch & CPUE
r = 1.01, 95% CL = 0.802 - 1.28, k = 2.24, 95% CL = 1.75 - 2.87
MSY = 0.567, 95% CL = 0.509 - 0.631
Relative biomass in last year = 0.245 k, 2.5th perc = 0.0913, 97.5th perc = 0.366
Exploitation F/(r/2) in last year = 0.829
q = 0.00269, lcl = 0.00206, ucl = 0.0035

Results for Management (based on CMSY analysis)
Fmsy = 0.579, 95% CL = 0.433 - 0.776 (if B > 1/2 Bmsy then Fmsy = 0.5 r)
Fmsy = 0.358, 95% CL = 0.268 - 0.48 (r and Fmsy are linearly reduced if B < 1/2 Bmsy)
MSY = 0.557, 95% CL = 0.484 - 0.641
Bmsy = 0.961, 95% CL = 0.668 - 1.38
Relative biomass in last year = 0.297, 2.5th perc = 0.0383, 97.5 perc = 0.566
B/Bmsy in last year = 0.309, 2.5th perc = 0.0398, 97.5 perc = 0.589
Fishing mortality in last year = 0.774, 2.5th perc = 0.407, 97.5 perc = 6.01
F/Fmsy = 2.16, 2.5th perc = 1.13, 97.5 perc = 16.8

Stock status and exploitation in 2014
Biomass = 0.297, B/Bmsy = 0.309, fishing mortality F = 0.774, F/Fmsy = 2.16
Comment: Catch=landings from FishStat (Spain). RF final 0.3. GS OK

----------------------------------------------------------
Species: *Nephrops norvegicus*, stock: NEPRNOR_BA
Norway lobster in Balearic
Source: excel
Region: Mediterranean, Balearic
Catch data used from years 1970 - 2014, abundance = CPUE
Prior initial relative biomass = 0.01 - 0.4 expert
Prior intermediate rel. biomass = 0.01 - 0.4 in year 1995 expert
Prior final relative biomass = 0.01 - 0.4 expert
Prior range for r = 0.2 - 0.8 default, prior range for k = 1.01 - 16.2
Prior range of q = 0.00167 - 0.00669

Results of CMSY analysis with altogether 1173 viable trajectories for 879 r-k pairs
r = 0.55, 95% CL = 0.388 - 0.78, k = 4.4, 95% CL = 3.05 - 6.34
MSY = 0.605, 95% CL = 0.559 - 0.655
Relative biomass last year = 0.267 k, 2.5th = 0.0433, 97.5th = 0.395
Exploitation F/(r/2) in last year = 1.48

Results from Bayesian Schaefer model using catch & CPUE
r = 0.707, 95% CL = 0.489 - 1.02, k = 3.45, 95% CL = 2.43 - 4.9
MSY = 0.609, 95% CL = 0.569 - 0.652
Relative biomass in last year = 0.393 k, 2.5th perc = 0.184, 97.5th perc = 0.492
Exploitation F/(r/2) in last year = 0.83
q = 0.00285, lcl = 0.00217, ucl = 0.00374

Results for Management (based on CMSY analysis)
Fmsy = 0.275, 95% CL = 0.194 - 0.39 (if B > 1/2 Bmsy then Fmsy = 0.5 r)
Fmsy = 0.275, 95% CL = 0.194 - 0.39 (r and Fmsy are linearly reduced if B < 1/2 Bmsy)
MSY = 0.605, 95% CL = 0.559 - 0.655
Bmsy = 2.2, 95% CL = 1.52 - 3.17
Biomass in last year = 1.17, 2.5th perc = 0.151, 97.5 perc = 1.74
B/Bmsy in last year = 0.534, 2.5th perc = 0.0687, 97.5 perc = 0.789
Fishing mortality in last year = 0.338, 2.5th perc = 0.229, 97.5 perc = 2.63
F/Fmsy = 1.23, 2.5th perc = 0.832, 97.5 perc = 9.56

Stock status and exploitation in 2014
Biomass = 1.17, B/Bmsy = 0.534, fishing mortality F = 0.338, F/Fmsy = 1.23
Comment: Catch=landings from FishStat (Algeria, Spain, Morocco), Biomass from Medits for GSAs 1-6.
GS OK

----------------------------------------------------------
Species: *Pagellus erythrinus*, stock: PAGEERY_BA
Common pandora in Balearic

Source:
Region: Mediterranean, Balearic
Catch data used from years 1995 - 2014, abundance = CPUE
Prior initial relative biomass = 0.2 - 0.6 expert
Prior intermediate rel. biomass = 0.2 - 0.6 in year 2000 expert
Prior final relative biomass = 0.2 - 0.6 expert
Prior range for r = 0.22 - 0.97 expert, prior range for k = 2.48 - 43.8
Prior range of q = 0.000283 - 0.00119

Results of CMSY analysis with altogether 6697 viable trajectories for 1745 r-k pairs
r = 0.67, 95% CL = 0.472 - 0.953, k = 12.4, 95% CL = 7.77 - 19.9
MSY = 2.08, 95% CL = 1.65 - 2.63
Relative biomass last year = 0.473 k, 2.5th = 0.217, 97.5th = 0.596
Exploitation F/(r/2) in last year = 0.993

Results from Bayesian Schaefer model using catch & CPUE
r = 0.992, 95% CL = 0.707 - 1.39, k = 9.5, 95% CL = 6.98 - 12.9
MSY = 2.36, 95% CL = 2.01 - 2.76
Relative biomass in last year = 0.638 k, 2.5th perc = 0.48, 97.5th perc = 0.736
Exploitation F/(r/2) in last year = 0.603
q = 0.000443, lcl = 0.000331, ucl = 0.000593

Results for Management (based on CMSY analysis)
Fmsy = 0.335, 95% CL = 0.236 - 0.476 (if B > 1/2 Bmsy then Fmsy = 0.5 r)
Fmsy = 0.335, 95% CL = 0.236 - 0.476 (r and Fmsy are linearly reduced if B < 1/2 Bmsy)
MSY = 2.08, 95% CL = 1.65 - 2.63
Bmsy = 6.22, 95% CL = 3.89 - 9.95
Biomass in last year = 5.88, 2.5th perc = 2.69, 97.5 perc = 7.41
B/Bmsy in last year = 0.946, 2.5th perc = 0.433, 97.5 perc = 1.19
Fishing mortality in last year = 0.308, 2.5th perc = 0.244, 97.5 perc = 0.672
F/Fmsy = 0.918, 2.5th perc = 0.729, 97.5 perc = 2.01

Stock status and exploitation in 2014
Biomass = 5.88, B/Bmsy = 0.946, fishing mortality F = 0.308, F/Fmsy = 0.918
Comment: Catch=landings from FishStat (Algeria, Spain, Morocco).
GS OK

-------------------------------------------------------------------
Species: *Parapenaeus longirostris*, stock: PAPELON_BA
Pink shrimp in Balearic
Source: excel
Region: Mediterranean, Balearic
Catch data used from years 1970 - 2014, abundance = CPUE
Prior initial relative biomass = 0.01 - 0.4 expert
Prior intermediate rel. biomass = 0.01 - 0.4 in year 2005 expert
Prior final relative biomass = 0.01 - 0.3 expert
Prior range for r = 0.6 - 1.5 default, prior range for k = 2.49 - 24.9
Prior range of q = 4.85e-05 - 0.000154

Results of CMSY analysis with altogether 207 viable trajectories for 205 r-k pairs
r = 0.946, 95% CL = 0.685 - 1.31, k = 10.5, 95% CL = 8.21 - 13.4
MSY = 2.48, 95% CL = 2.11 - 2.91
Relative biomass last year = 0.125 k, 2.5th = 0.0142, 97.5th = 0.287
Exploitation F/(r/2) in last year = 1.85

Results from Bayesian Schaefer model using catch & CPUE
r = 0.931, 95% CL = 0.761 - 1.14, k = 10.4, 95% CL = 8.71 - 12.3
MSY = 2.41, 95% CL = 2.26 - 2.56
Relative biomass in last year = 0.239 k, 2.5th perc = 0.122, 97.5th perc = 0.357
Exploitation F/(r/2) in last year = 0.906
q = 7.3e-05, lcl = 5.58e-05, ucl = 9.55e-05

Results for Management (based on CMSY analysis)
Fmsy = 0.473, 95% CL = 0.342 - 0.654 (if B > 1/2 Bmsy then Fmsy = 0.5 r)
Fmsy = 0.236, 95% CL = 0.171 - 0.326 (r and Fmsy are linearly reduced if B < 1/2 Bmsy)
MSY = 2.48, 95% CL = 2.11 - 2.91
Bmsy = 5.24, 95% CL = 4.11 - 6.7
Biomass in last year = 1.31, 2.5th perc = 0.149, 97.5 perc = 3
B/Bmsy in last year = 0.249, 2.5th perc = 0.0284, 97.5 perc = 0.573
Fishing mortality in last year = 0.797, 2.5th perc = 0.347, 97.5 perc = 7
F/Fmsy = 3.38, 2.5th perc = 1.47, 97.5 perc = 29.7

Stock status and exploitation in 2014
Biomass = 1.31, B/Bmsy = 0.249, fishing mortality F = 0.797, F/Fmsy = 3.38
Comment: Catch=landings from FishStat (Algeria, Spain), Biomass from Medits for GSAs 1-6. RF int 2005 0.01-0.4, final 0.3. GS OK

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Species: *Phycis blennoides*, stock: PHYCBL_BA

Greater forkbeard in Balearic Region: Mediterranean, Balearic

Catch data used from years 1974 - 2014, abundance = None

Prior initial relative biomass = 0.2 - 0.6 expert

Prior intermediate rel. biomass= 0.01 - 0.4 in year 1997 expert

Prior final relative biomass = 0.01 - 0.3 expert

Prior range for r = 0.28 - 0.76 expert, prior range for k = 1.03 - 11.2

Results of CMSY analysis with altogether 335 viable trajectories for 331 r-k pairs

\[ r = 0.419, \text{95\% CL} = 0.334 - 0.526, k = 5.15, \text{95\% CL} = 4 - 6.63 \]

MSY = 0.54, 95% CL = 0.423 - 0.688

Relative biomass last year = 0.222 k, 2.5th = 0.0246, 97.5th = 0.295

Exploitation \( F/(r/2) \) in last year = 1.23

Results for Management (based on CMSY analysis)

Fmsy = 0.209, 95% CL = 0.167 - 0.263 (if \( B > 1/2 B_{msy} \) then \( F_{msy} = 0.5 r \))

Fmsy = 0.186, 95% CL = 0.148 - 0.234 ( \( r \) and \( F_{msy} \) are linearly reduced if \( B < 1/2 B_{msy} \))

MSY = 0.54, 95% CL = 0.423 - 0.688

Bmsy = 2.58, 95% CL = 2 - 3.32

Biomass in last year = 1.15, 2.5th perc = 0.127, 97.5 perc = 1.52

B/Bmsy in last year = 0.445, 2.5th perc = 0.0491, 97.5 perc = 0.59

Fishing mortality in last year = 0.222, 2.5th perc = 0.167, 97.5 perc = 2.01

\( F/F_{msy} = 1.19, 2.5th \text{ perc} = 0.898, 97.5 \text{ perc} = 10.8 \)

Stock status and exploitation in 2014

Biomass = 1.15, B/Bmsy = 0.445, fishing mortality F = 0.222, \( F/F_{msy} = 1.19 \)

Comment: Catch=landings from FishStat (Algeria, Spain, Morocco). RF final 0.3

GS OK

------------------------------------------------------------------
Species: *Sardina pilchardus*, stock: SARDPIL_BA
Sardine in Balearic
Source: excel
Region: Mediterranean, Balearic
Catch data used from years 1990 - 2014, abundance = CPUE
Prior initial relative biomass = 0.2 - 0.6 expert
Prior intermediate rel. biomass = 0.2 - 0.6 in year 2005 expert
Prior final relative biomass = 0.01 - 0.4 expert
Prior range for \( r \) = 0.27 - 1.1 expert, prior range for \( k \) = 123 - 2001
Prior range of \( q \) = 0.0696 - 0.281

Results of CMSY analysis with altogether 2843 viable trajectories for 1952 r-k pairs
\( r = 0.715, \) 95\% CL = 0.483 - 1.06, \( k = 638, \) 95\% CL = 437 - 931
MSY = 114, 95\% CL = 99.6 - 131
Relative biomass last year = 0.275 \( k \), 2.5th = 0.0234, 97.5th = 0.396
Exploitation \( F/(r/2) \) in last year = 0.982

Results from Bayesian Schaefer model using catch & CPUE
\( r = 0.653, \) 95\% CL = 0.448 - 0.951, \( k = 704, \) 95\% CL = 493 - 1007
MSY = 115, 95\% CL = 101 - 131
Relative biomass in last year = 0.181 \( k \), 2.5th perc = 0.0879, 97.5th perc = 0.438
Exploitation \( F/(r/2) \) in last year = 1.59
\( q = 0.121, \) lcl = 0.0899, ucl = 0.163

Results for Management (based on CMSY analysis)
Fmsy = 0.358, 95\% CL = 0.242 - 0.53 (if \( B > 1/2 \) Bmsy then Fmsy = 0.5 \( r \))
Fmsy = 0.358, 95\% CL = 0.242 - 0.53 (\( r \) and Fmsy are linearly reduced if \( B < 1/2 \) Bmsy)
MSY = 114, 95\% CL = 99.6 - 131
Bmsy = 319, 95\% CL = 219 - 466
Biomass in last year = 175, 2.5th perc = 14.9, 97.5 perc = 253
B/Bmsy in last year = 0.549, 2.5th perc = 0.0468, 97.5 perc = 0.793
Fishing mortality in last year = 0.377, 2.5th perc = 0.262, 97.5 perc = 4.43
\( F/Fmsy = 1.06, \) 2.5th perc = 0.731, 97.5 perc = 12.4

Stock status and exploitation in 2014
Biomass = 175, B/Bmsy = 0.549, fishing mortality \( F = 0.377, \) \( F/Fmsy = 1.06 \)
Comment: Catch=landings from FishStat (Spain, Morocco, Algeria, France), Average Biomass from MEDIAS for GSAs 1 & 6. RF start 1990 0.2-0.6, int 2005 0.2-0.6, final 0.4.
GS OK

--------------------------------------------------------------------------
Species: *Sardinella aurita*, stock: SARIAUR_BA

Round sardinella in Balearic

Source:

Region: Mediterranean, Balearic

Catch data used from years 1982 - 2014, abundance = None

Prior initial relative biomass = 0.2 - 0.6 expert

Prior intermediate rel. biomass = 0.01 - 0.4 in year 2010 expert

Prior final relative biomass = 0.01 - 0.3 expert

Prior range for $r$ = 0.24 - 1.3 expert, prior range for $k$ = 30.5 - 641

Results of CMSY analysis with altogether 2021 viable trajectories for 457 r-k pairs

$r = 0.795$, 95% CL = 0.533 - 1.19, $k = 128$, 95% CL = 82.1 - 201

MSY = 25.5, 95% CL = 22.3 - 29.1

Relative biomass last year = 0.222 $k$, 2.5th = 0.0259, 97.5th = 0.296

Exploitation $F/(r/2)$ in last year = 1.67

Results for Management (based on CMSY analysis)

$F_{msy} = 0.397$, 95% CL = 0.266 - 0.593 (if $B > 1/2 B_{msy}$ then $F_{msy} = 0.5$ $r$)

$F_{msy} = 0.353$, 95% CL = 0.236 - 0.526 ($r$ and $F_{msy}$ are linearly reduced if $B < 1/2 B_{msy}$)

$MSY = 25.5$, 95% CL = 22.3 - 29.1

$B_{msy} = 64.2$, 95% CL = 41 - 100

Biomass in last year = 28.5, 2.5th perc = 3.32, 97.5 perc = 38

$B/B_{msy}$ in last year = 0.444, 2.5th perc = 0.0518, 97.5 perc = 0.593

Fishing mortality in last year = 0.567, 2.5th perc = 0.425, 97.5 perc = 4.86

$F/F_{msy} = 1.61$, 2.5th perc = 1.2, 97.5 perc = 13.8

Stock status and exploitation in 2014

Biomass = 28.5, $B/B_{msy} = 0.444$, fishing mortality $F = 0.567$, $F/F_{msy} = 1.61$

Comment: Catch=landings from FishStat (Algeria, Spain, Morocco). RF int 2010 0.01-0.4, final 0.01-0.3.

GS OK

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Species: *Scomber colias*, stock: SCOMPNE_BA

Atlantic chub mackerel in Balearic

Source:
Region: Mediterranean, Balearic
Catch data used from years 1970 - 2014, abundance = None
Prior initial relative biomass = 0.2 - 0.6 expert
Prior intermediate rel. biomass = 0.5 - 0.9 in year 2004 default
Prior final relative biomass = 0.01 - 0.4, default
Prior range for r = 0.31 - 1.2 expert, prior range for k = 5.9 - 89

Results of CMSY analysis with altogether 1859 viable trajectories for 563 r-k pairs
r = 0.789, 95% CL = 0.546 - 1.14, k = 16.2, 95% CL = 10.5 - 24.9
MSY = 3.19, 95% CL = 2.51 - 4.07
Relative biomass last year = 0.181 k, 2.5th = 0.0166, 97.5th = 0.394
Exploitation F/(r/2) in last year = 1.65

Results for Management (based on CMSY analysis)
Fmsy = 0.394, 95% CL = 0.273 - 0.569 (if B > 1/2 Bmsy then Fmsy = 0.5 r)
Fmsy = 0.285, 95% CL = 0.198 - 0.412 (r and Fmsy are linearly reduced if B < 1/2 Bmsy)
MSY = 3.19, 95% CL = 2.51 - 4.07
Bmsy = 8.1, 95% CL = 5.26 - 12.5
Biomass in last year = 2.93, 2.5th perc = 0.269, 97.5 perc = 6.37
B/Bmsy in last year = 0.362, 2.5th perc = 0.0332, 97.5 perc = 0.787
Fishing mortality in last year = 0.813, 2.5th perc = 0.374, 97.5 perc = 8.87
F/Fmsy = 2.85, 2.5th perc = 1.31, 97.5 perc = 31.1

Stock status and exploitation in 2014
Biomass = 2.93, B/Bmsy = 0.362, fishing mortality F = 0.813, F/Fmsy = 2.85
Comment: Catch=landings from FishStat (Spain, Morocco). GS OK  

--------------------------------------------
Species: *Scomber scombrus*, stock: SCOMSCO_BA
Atlantic mackerel in Balearic
Source:
Region: Mediterranean, Balearic
Catch data used from years 1970 - 2014, abundance = CPUE
Prior initial relative biomass = 0.2 - 0.6 expert
Prior intermediate rel. biomass = 0.2 - 0.6 in year 2005 default
Prior final relative biomass = 0.1 - 0.5 expert
Prior range for r = 0.23 - 1 expert, prior range for k = 9.84 - 171
Prior range of q = 3.98e-05 - 0.000166

Results of CMSY analysis with altogether 2724 viable trajectories for 1465 r-k pairs
r = 0.377, 95% CL = 0.231 - 0.616, k = 57, 95% CL = 44.4 - 73.4
MSY = 5.38, 95% CL = 4.47 - 6.48
Relative biomass last year = 0.162 k, 2.5th = 0.103, 97.5th = 0.331
Exploitation F/(r/2) in last year = 1.56

Results from Bayesian Schaefer model using catch & CPUE
r = 0.628, 95% CL = 0.366 - 1.08, k = 39.1, 95% CL = 27 - 56.7
MSY = 6.14, 95% CL = 4.88 - 7.72
Relative biomass in last year = 0.349 k, 2.5th perc = 0.103, 97.5th perc = 0.572
Exploitation F/(r/2) in last year = 0.363
q = 5.59e-05, lcl = 4.05e-05, ucl = 7.71e-05

Results for Management (based on CMSY analysis)
Fmsy = 0.189, 95% CL = 0.115 - 0.308 (if B > 1/2 Bmsy then Fmsy = 0.5 r)
Fmsy = 0.122, 95% CL = 0.0748 - 0.2 (r and Fmsy are linearly reduced if B < 1/2 Bmsy)
MSY = 5.38, 95% CL = 4.47 - 6.48
Bmsy = 28.5, 95% CL = 22.2 - 36.7
Biomass in last year = 9.24, 2.5th perc = 5.88, 97.5 perc = 18.9
B/Bmsy in last year = 0.324, 2.5th perc = 0.206, 97.5 perc = 0.661
Fishing mortality in last year = 0.168, 2.5th perc = 0.0824, 97.5 perc = 0.264
F/Fmsy = 1.38, 2.5th perc = 0.674, 97.5 perc = 2.16

Stock status and exploitation in 2014
Biomass = 9.24, B/Bmsy = 0.324, fishing mortality F = 0.168, F/Fmsy = 1.38
Comment: Catch=landings from FishStat (Algeria, France, Spain). RF final 0.1-0.5. GS OK
Species: *Sepia officinalis*, stock: SEPIOFF_BA  
Common cuttlefish in Balearic  
Source:  
Region: Mediterranean, Balearic  
Catch data used from years 1989 - 2014, abundance = None  
Prior initial relative biomass = 0.2 - 0.6 expert  
Prior intermediate rel. biomass = 0.01 - 0.4 in year 2010 default  
Prior final relative biomass = 0.01 - 0.3 expert  
Prior range for r = 0.2 - 0.8 default, prior range for k = 0.699 - 11.2  

Results of CMSY analysis with altogether 1030 viable trajectories for 678 r-k pairs  
r = 0.512, 95% CL = 0.333 - 0.786, k = 3.37, 95% CL = 2.24 - 5.08  
MSY = 0.432, 95% CL = 0.354 - 0.525  
Relative biomass last year = 0.172 k, 2.5th = 0.0258, 97.5th = 0.295  
Exploitation F/(r/2) in last year = 1.75  

Results for Management (based on CMSY analysis)  
Fmsy = 0.256, 95% CL = 0.166 - 0.393 (if B > 1/2 Bmsy then Fmsy = 0.5 r)  
Fmsy = 0.176, 95% CL = 0.114 - 0.27 (r and Fmsy are linearly reduced if B < 1/2 Bmsy)  
MSY = 0.432, 95% CL = 0.354 - 0.525  
Bmsy = 1.69, 95% CL = 1.12 - 2.54  
Biomass in last year = 0.579, 2.5th perc = 0.0871, 97.5 perc = 0.995  
B/Bmsy in last year = 0.343, 2.5th perc = 0.0516, 97.5 perc = 0.59  
Fishing mortality in last year = 0.467, 2.5th perc = 0.271, 97.5 perc = 3.1  
F/Fmsy = 2.66, 2.5th perc = 1.54, 97.5 perc = 17.7  

Stock status and exploitation in 2014  
Biomass = 0.579, B/Bmsy = 0.343, fishing mortality F = 0.467, F/Fmsy = 2.66  
Comment: Catch=landings from FishStat (Algeria). RF final 0.01-0.3. GS OK  

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Species: *Solea solea*, stock: SOLEVUL_BA

Common sole in Balearic

Source:

Region: Mediterranean, Balearic

Catch data used from years 1970 - 2014, abundance = CPUE

Prior initial relative biomass = 0.2 - 0.6 expert

Prior intermediate rel. biomass = 0.01 - 0.4 in year 2005 expert

Prior final relative biomass = 0.01 - 0.3 expert

Prior range for r = 0.21 - 1 expert, prior range for k = 1.16 - 22.6

Prior range of q = 0.000266 - 0.00117

Results of CMSY analysis with altogether 1299 viable trajectories for 1071 r-k pairs

r = 0.461, 95% CL = 0.271 - 0.784, k = 8.41, 95% CL = 6.23 - 11.4

MSY = 0.969, 95% CL = 0.88 - 1.07

Relative biomass last year = 0.135 k, 2.5th perc = 0.0117, 97.5th perc = 0.289

Exploitation F/(r/2) in last year = 1.21

Results from Bayesian Schaefer model using catch & CPUE

r = 0.483, 95% CL = 0.332 - 0.702, k = 8, 95% CL = 5.8 - 11

MSY = 0.965, 95% CL = 0.857 - 1.09

Relative biomass in last year = 0.219 k, 2.5th perc = 0.0505, 97.5th perc = 0.363

Exploitation F/(r/2) in last year = 0.73

q = 0.000444 , lcl = 0.000326 , ucl = 0.000605

Results for Management (based on CMSY analysis)

Fmsy = 0.23, 95% CL = 0.135 - 0.392 (if B > 1/2 Bmsy then Fmsy = 0.5 r)

Fmsy = 0.124, 95% CL = 0.0728 - 0.211 (r and Fmsy are linearly reduced if B < 1/2 Bmsy)

MSY = 0.969, 95% CL = 0.88 - 1.07

Bmsy = 4.21, 95% CL = 3.11 - 5.69

Biomass in last year = 1.13, 2.5th perc = 0.0983, 97.5 perc = 2.43

B/Bmsy in last year = 0.269, 2.5th perc = 0.0234, 97.5 perc = 0.578

Fishing mortality in last year = 0.272, 2.5th perc = 0.127, 97.5 perc = 3.13

F/Fmsy = 2.19, 2.5th perc = 1.02, 97.5 perc = 25.3

Stock status and exploitation in 2014

Biomass = 1.13, B/Bmsy = 0.269, fishing mortality F = 0.272, F/Fmsy = 2.19

Comment: Catch=landings from FishStat (Algeria, Spain, Morocco). RF int 2005 0.01-0.4, final 0.3. GS OK

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Species: *Trisopterus minutus*, stock: TRISLUS_BA
Pouting in Balearic
Source:
Region: Mediterranean, Balearic
Catch data used from years 1996 - 2014, abundance = CPUE
Prior initial relative biomass = 0.5 - 0.9 expert
Prior intermediate rel. biomass= 0.01 - 0.4 in year 2005 expert
Prior final relative biomass = 0.01 - 0.4 expert
Prior range for r = 0.37 - 1.6 expert, prior range for k = 0.245 - 4.22
Prior range of q = 0.00409 - 0.017

Results of CMSY analysis with altogether 2017 viable trajectories for 1477 r-k pairs
r = 0.741, 95% CL = 0.496 - 1.11, k = 1.35, 95% CL = 0.995 - 1.82
MSY = 0.249, 95% CL = 0.212 - 0.294
Relative biomass last year = 0.271 k, 2.5th = 0.0224, 97.5th = 0.397
Exploitation F/(r/2) in last year = 1.48

Results from Bayesian Schaefer model using catch & CPUE
r = 0.666, 95% CL = 0.426 - 1.04, k = 1.46, 95% CL = 1.08 - 1.96
MSY = 0.243, 95% CL = 0.198 - 0.297
Relative biomass in last year = 0.358 k, 2.5th perc = 0.135, 97.5th perc = 0.488
Exploitation F/(r/2) in last year = 0.834
q = 0.00683, lcl = 0.00495, ucl = 0.00943

Results for Management (based on CMSY analysis)
Fmsy = 0.37, 95% CL = 0.248 - 0.553 (if B > 1/2 Bmsy then Fmsy = 0.5 r)
Fmsy = 0.37, 95% CL = 0.248 - 0.553 (r and Fmsy are linearly reduced if B < 1/2 Bmsy)
MSY = 0.249, 95% CL = 0.212 - 0.294
Bmsy = 0.673, 95% CL = 0.498 - 0.911
Biomass in last year = 0.364, 2.5th perc = 0.0302, 97.5 perc = 0.534
B/Bmsy in last year = 0.541, 2.5th perc = 0.0448, 97.5 perc = 0.793
Fishing mortality in last year = 0.398, 2.5th perc = 0.272, 97.5 perc = 4.81
F/Fmsy = 1.07, 2.5th perc = 0.733, 97.5 perc = 13

Stock status and exploitation in 2014
Biomass = 0.364, B/Bmsy = 0.541, fishing mortality F = 0.398, F/Fmsy = 1.07
Comment: Catch=landings from FishStat (Spain, Morocco). GS OK
Sardinia (analyzed with CMSY_O_7l.R; see Comment for data sources)

Species: Belone belone, stock: BELOBEL_SA
Garfish in Sardinia
Source:
Region: Mediterranean, Sardinia
Catch data used from years 1982 - 2014, abundance = None
Prior initial relative biomass = 0.5 - 0.9 expert
Prior intermediate rel. biomass = 0.01 - 0.4 in year 2008 expert
Prior final relative biomass = 0.01 - 0.3 expert
Prior range for r = 0.19 - 1 expert, prior range for k = 0.391 - 8.22

Results of CMSY analysis with altogether 1772 viable trajectories for 1419 r-k pairs
r = 0.434, 95% CL = 0.311 - 0.605, k = 2, 95% CL = 1.41 - 2.84
MSY = 0.217, 95% CL = 0.187 - 0.252
Relative biomass last year = 0.0942 k, 2.5th = 0.0125, 97.5th = 0.267
Exploitation F/(r/2) in last year = 0.684

Results for Management (based on CMSY analysis)
Fmsy = 0.217, 95% CL = 0.156 - 0.302 (if B > 1/2 Bmsy then Fmsy = 0.5 r)
Fmsy = 0.0817, 95% CL = 0.0586 - 0.114 (r and Fmsy are linearly reduced if B < 1/2 Bmsy)
MSY = 0.217, 95% CL = 0.187 - 0.252
Bmsy = 1, 95% CL = 0.707 - 1.42
Biomass in last year = 0.189, 2.5th perc = 0.025, 97.5 perc = 0.534
B/Bmsy in last year = 0.188, 2.5th perc = 0.0249, 97.5 perc = 0.534
Fishing mortality in last year = 0.148, 2.5th perc = 0.0524, 97.5 perc = 1.12
F/Fmsy = 1.82, 2.5th perc = 0.641, 97.5 perc = 13.7

Stock status and exploitation in 2014
Biomass = 0.189, B/Bmsy = 0.188, fishing mortality F = 0.148, F/Fmsy = 1.82
Comment: Catch=landings from FishStat (Tunisia, Italy). RF int 2008 0.01-0.4, final 0.3
Species: *Boops boops*, stock: BOOPBOO_SA
Bogue in Sardinia
Source:
Region: Mediterranean, Sardinia
Catch data used from years 1980 - 2014, abundance = None
Prior initial relative biomass = 0.2 - 0.6 expert
Prior intermediate rel. biomass = 0.01 - 0.4 in year 1995 expert
Prior final relative biomass = 0.01 - 0.3 expert
Prior range for r = 0.31 - 1.1 expert, prior range for k = 2.89 - 41.1

Results of CMSY analysis with altogether 1130 viable trajectories for 996 r-k pairs
r = 0.595, 95% CL = 0.384 - 0.922, k = 17.4, 95% CL = 13.4 - 22.7
MSY = 2.59, 95% CL = 2.36 - 2.85
Relative biomass last year = 0.143 k, 2.5th = 0.0173, 97.5th = 0.297
Exploitation F/(r/2) in last year = 1.88

Results for Management (based on CMSY analysis)
Fmsy = 0.297, 95% CL = 0.192 - 0.461 (if B > 1/2 Bmsy then Fmsy = 0.5 r)
Fmsy = 0.171, 95% CL = 0.11 - 0.264 (r and Fmsy are linearly reduced if B < 1/2 Bmsy)
MSY = 2.59, 95% CL = 2.36 - 2.85
Bmsy = 8.72, 95% CL = 6.71 - 11.3
Biomass in last year = 2.5, 2.5th perc = 0.303, 97.5 perc = 5.18
B/Bmsy in last year = 0.287, 2.5th perc = 0.0347, 97.5 perc = 0.594
Fishing mortality in last year = 0.558, 2.5th perc = 0.27, 97.5 perc = 4.62
F/Fmsy = 3.27, 2.5th perc = 1.58, 97.5 perc = 27.1

Stock status and exploitation in 2014
Biomass = 2.5, B/Bmsy = 0.287, fishing mortality F = 0.558, F/Fmsy = 3.27
Comment: Catch=landings from FishStat (Tunisia, Italy, France). RF final 0.3
Species: *Chamelea gallina*, stock: CHAMGAL_SA
Striped venus in Sardinia
Source:
Region: Mediterranean, Sardinia
Catch data used from years 1995 - 2014, abundance = None
Prior initial relative biomass = 0.2 - 0.6 expert
Prior intermediate rel. biomass = 0.01 - 0.4 in year 2007 expert
Prior final relative biomass = 0.01 - 0.1 expert
Prior range for r = 0.2 - 0.8 default, prior range for k = 2.96 - 47.4

Results of CMSY analysis with altogether 2638 viable trajectories for 2158 r-k pairs
r = 0.554, 95% CL = 0.391 - 0.785, k = 14.6, 95% CL = 8.34 - 25.6
MSY = 2.02, 95% CL = 1.28 - 3.19
Relative biomass last year = 0.0462 k, 2.5th = 0.00119, 97.5th = 0.0953
Exploitation F/(r/2) in last year = 0.0589

Results for Management (based on CMSY analysis)
Fmsy = 0.277, 95% CL = 0.196 - 0.393 (if B > 1/2 Bmsy then Fmsy = 0.5 r)
Fmsy = 0.0512, 95% CL = 0.0361 - 0.0725 (r and Fmsy are linearly reduced if B < 1/2 Bmsy)
MSY = 2.02, 95% CL = 1.28 - 3.19
Bmsy = 7.3, 95% CL = 4.17 - 12.8
Biomass in last year = 0.674, 2.5th perc = 0.174, 97.5 perc = 1.39
B/Bmsy in last year = 0.0924, 2.5th perc = 0.0238, 97.5 perc = 0.191
Fishing mortality in last year = 0.0163, 2.5th perc = 0.00791, 97.5 perc = 0.0634
F/Fmsy = 0.319, 2.5th perc = 0.154, 97.5 perc = 1.24

Stock status and exploitation in 2014
Biomass = 0.674, B/Bmsy = 0.0924, fishing mortality F = 0.0163, F/Fmsy = 0.319
Comment: Catch=landings from FishStat (Italy). RF start 1995 0.2-0.6, int 2007 0.01-0.4, final 0.1
Species: *Coryphaena hippurus*, stock: CORYHIP_SA
Common dolphinfish in Sardinia
Source:
Region: Mediterranean, Sardinia
Catch data used from years 1986 - 2014, abundance = None
Prior initial relative biomass = 0.5 - 0.9 expert
Prior intermediate rel. biomass = 0.2 - 0.6 in year 2010 expert
Prior final relative biomass = 0.01 - 0.3 expert
Prior range for $r$ = 0.39 - 1.5 expert, prior range for $k$ = 0.735 - 11.6

Results of CMSY analysis with altogether 5487 viable trajectories for 927 r-k pairs

$r = 1.09 , 95\% \text{ CL} = 0.788 - 1.52 , k = 3.16 , 95\% \text{ CL} = 2.09 - 4.78$

$\text{MSY} = 0.866 , 95\% \text{ CL} = 0.732 - 1.02$

Relative biomass last year = 0.19 $k$, 2.5th = 0.0194, 97.5th = 0.296
Exploitation $F/(r/2)$ in last year = 1.36

Results for Management (based on CMSY analysis)
$F_{msy} = 0.547 , 95\% \text{ CL} = 0.394 - 0.759 \text{ (if } B > 1/2 B_{msy}\text{ then } F_{msy} = 0.5 r)$
$F_{msy} = 0.417 , 95\% \text{ CL} = 0.3 - 0.578 \text{ (r and } F_{msy}\text{ are linearly reduced if } B < 1/2 B_{msy})$

$\text{MSY} = 0.866 , 95\% \text{ CL} = 0.732 - 1.02$

$B_{msy} = 1.58 , 95\% \text{ CL} = 1.05 - 2.39$

Biomass in last year = 0.602, 2.5th perc = 0.0614, 97.5 perc = 0.937
$B/B_{msy}$ in last year = 0.381, 2.5th perc = 0.0388, 97.5 perc = 0.592
Fishing mortality in last year = 0.746, 2.5th perc = 0.479, 97.5 perc = 7.31
$F/F_{msy}$ = 1.79, 2.5th perc = 1.15, 97.5 perc = 17.6

Stock status and exploitation in 2014
Biomass = 0.602, $B/B_{msy} = 0.381$, fishing mortality $F = 0.746$, $F/F_{msy} = 1.79$
Comment: Catch = landings from FishStat (Italy, Tunisia). RF start 0.5-0.9, int 2010 0.2-0.6, final 0.01-0.3

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Species: *Dentex dentex*, stock: DENTDEN_SA
Common dentex in Sardinia

Source:
Region: Mediterranean, Sardinia
Catch data used from years 1990 - 2014, abundance = None
Prior initial relative biomass = 0.2 - 0.6 expert
Prior intermediate rel. biomass = 0.01 - 0.4 in year 2000 expert
Prior final relative biomass = 0.01 - 0.3 expert
Prior range for $r = 0.15 - 0.73$ expert, , prior range for $k = 2.65 - 51.6$

Results of CMSY analysis with altogether 1793 viable trajectories for 1700 r-k pairs
$r = 0.432$, 95% CL = 0.268 - 0.696, $k = 15.1$, 95% CL = 7.11 - 31.9
$MSY = 1.63$, 95% CL = 0.716 - 3.69
Relative biomass last year = 0.0963$k$, 2.5th = 0.012, 97.5th = 0.289
Exploitation $F/(r/2)$ in last year = 0.476

Results for Management (based on CMSY analysis)
$F_{msy} = 0.216$, 95% CL = 0.134 - 0.348 (if $B > 1/2 B_{msy}$ then $F_{msy} = 0.5 r$)
$F_{msy} = 0.0832$, 95% CL = 0.0516 - 0.134 ($r$ and $F_{msy}$ are linearly reduced if $B < 1/2 B_{msy}$)
$MSY = 1.63$, 95% CL = 0.716 - 3.69
$B_{msy} = 7.53$, 95% CL = 3.56 - 16
Biomass in last year = 1.45, 2.5th perc = 0.181, 97.5 perc = 4.36
B/B_{msy} in last year = 0.193, 2.5th perc = 0.024, 97.5 perc = 0.579
Fishing mortality in last year = 0.103, 2.5th perc = 0.0342, 97.5 perc = 0.823
$F/F_{msy} = 1.23$, 2.5th perc = 0.411, 97.5 perc = 9.9

Stock status and exploitation in 2014
Biomass = 1.45, B/B_{msy} = 0.193, fishing mortality F = 0.103, F/F_{msy} = 1.23
Comment: Catch=landings from FishStat (Tunisia, Italy, France). RF start 1990 0.2-0.6, int 2000 0.01-0.4, final 0.3

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Species: *Engraulis encrasicolus*, stock: ENGRENC_SA
Anchovy in Sardinia
Source: excel
Region: Mediterranean, Sardinia
Catch data used from years 1985 - 2014, abundance = CPUE
Prior initial relative biomass = 0.2 - 0.6 expert
Prior intermediate rel. biomass = 0.01 - 0.4 in year 2007 expert
Prior final relative biomass = 0.01 - 0.3 expert
Prior range for r = 0.26 - 1.2 expert, prior range for k = 13.7 - 244
Prior range of q = 0.00136 - 0.00576

Results of CMSY analysis with altogether 2037 viable trajectories for 1683 r-k pairs
r = 0.522, 95% CL = 0.401 - 0.68, k = 69.3, 95% CL = 43.7 - 110
MSY = 9.04, 95% CL = 5.58 - 14.6
Relative biomass last year = 0.141 k, 2.5th = 0.0134, 97.5th = 0.294
Exploitation F/(r/2) in last year = 2.97

Results from Bayesian Schaefer model using catch & CPUE
r = 0.541, 95% CL = 0.355 - 0.824, k = 70.7, 95% CL = 50.5 - 99
MSY = 9.56, 95% CL = 7.32 - 12.5
Relative biomass in last year = 0.242 k, 2.5th perc = 0.142, 97.5th perc = 0.346
Exploitation F/(r/2) in last year = 1.64
q = 0.00194, lcl = 0.00138, ucl = 0.00274

Results for Management (based on BSM analysis)
Fmsy = 0.271, 95% CL = 0.178 - 0.412 (if B > 1/2 Bmsy then Fmsy = 0.5 r)
Fmsy = 0.262, 95% CL = 0.172 - 0.399 (r and Fmsy are linearly reduced if B < 1/2 Bmsy)
MSY = 9.56, 95% CL = 7.32 - 12.5
Bmsy = 35.4, 95% CL = 25.2 - 49.5
Biomass in last year = 17.1, 2.5th perc = 10, 97.5 perc = 24.5
B/Bmsy in last year = 0.484, 2.5th perc = 0.284, 97.5 perc = 0.692
Fishing mortality in last year = 0.442, 2.5th perc = 0.31, 97.5 perc = 0.754
F/Fmsy = 1.69, 2.5th perc = 1.18, 97.5 perc = 2.88

Stock status and exploitation in 2014
Biomass = 17.1, B/Bmsy = 0.484, fishing mortality F = 0.442, F/Fmsy = 1.69
Comment: Catch=landings from FishStat (Tunisia, Italy, France), Biomass from MEDIAS for GSAs 8-10.
RF int 2007 0.01-0.4

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Species: *Epinephelus marginatus*, stock: EPINGUA_SA
Dusky grouper in Sardinia
Source:
Region: Mediterranean, Sardinia
Catch data used from years 1970 - 2014, abundance = None
Prior initial relative biomass = 0.2 - 0.6 expert
Prior intermediate rel. biomass= 0.01 - 0.4 in year 2000 expert
Prior final relative biomass = 0.01 - 0.3 expert
Prior range for r = 0.11 - 0.57 expert, prior range for k = 0.825 - 17.1

Results of CMSY analysis with altogether 2940 viable trajectories for 2284 r-k pairs
r = 0.364, 95% CL = 0.244 - 0.543, k = 3.05, 95% CL = 1.87 - 4.96
MSY = 0.277, 95% CL = 0.224 - 0.343
Relative biomass last year = 0.0956 k, 2.5th = 0.0151, 97.5th = 0.292
Exploitation F/(r/2) in last year = 0.905

Results for Management (based on CMSY analysis)
Fmsy = 0.182, 95% CL = 0.122 - 0.272 (if B > 1/2 Bmsy then Fmsy = 0.5 r)
Fmsy = 0.0697, 95% CL = 0.0467 - 0.104 (r and Fmsy are linearly reduced if B < 1/2 Bmsy)
MSY = 0.277, 95% CL = 0.224 - 0.343
Bmsy = 1.52, 95% CL = 0.934 - 2.48
Biomass in last year = 0.291, 2.5th perc = 0.0461, 97.5 perc = 0.89
B/Bmsy in last year = 0.191, 2.5th perc = 0.0302, 97.5 perc = 0.584
Fishing mortality in last year = 0.165, 2.5th perc = 0.0539, 97.5 perc = 1.04
F/Fmsy = 2.37, 2.5th perc = 0.774, 97.5 perc = 15

Stock status and exploitation in 2014
Biomass = 0.291, B/Bmsy = 0.191, fishing mortality F = 0.165, F/Fmsy = 2.37
Comment: Catch=landings from FishStat (Italy). RF int 2000 0.01-0.4, final 0.3
Species: *Illex coindettii*, stock: ILLECOI_SA

Shortfin squid in Sardinia

Source:

Region: Mediterranean, Sardinia

Catch data used from years 1970 - 2014, abundance = None

Prior initial relative biomass = 0.2 - 0.6 expert

Prior intermediate rel. biomass = 0.01 - 0.4 in year 2002 default

Prior final relative biomass = 0.01 - 0.4 expert

Prior range for r = 0.2 - 0.8 default, prior range for k = 1.96 - 31.4

Results of CMSY analysis with altogether 2005 viable trajectories for 1548 r-k pairs

r = 0.393, 95% CL = 0.262 - 0.589, k = 10.1, 95% CL = 7.77 - 13.1

MSY = 0.99, 95% CL = 0.903 - 1.09

Relative biomass last year = 0.294 k, 2.5th = 0.0413, 97.5th = 0.394

Exploitation F/(r/2) in last year = 1.07

Results for Management (based on CMSY analysis)

Fmsy = 0.196, 95% CL = 0.131 - 0.295 (if B > 1/2 Bmsy then Fmsy = 0.5 r)

Fmsy = 0.196, 95% CL = 0.131 - 0.295 (r and Fmsy are linearly reduced if B < 1/2 Bmsy)

MSY = 0.99, 95% CL = 0.903 - 1.09

Bmsy = 5.05, 95% CL = 3.89 - 6.55

Biomass in last year = 2.97, 2.5th perc = 0.417, 97.5 perc = 3.98

B/Bmsy in last year = 0.589, 2.5th perc = 0.0826, 97.5 perc = 0.789

Fishing mortality in last year = 0.21, 2.5th perc = 0.157, 97.5 perc = 1.5

F/Fmsy = 1.07, 2.5th perc = 0.798, 97.5 perc = 7.63

Stock status and exploitation in 2014

Biomass = 2.97, B/Bmsy = 0.589, fishing mortality F = 0.21, F/Fmsy = 1.07

Comment: Catch=landings from FishStat (Italy, France). RF final 0.01-0.4
Species: *Loligo vulgaris*, stock: LOLIVUL_SA
European squid in Sardinia
Source:
Region: Mediterranean, Sardinia
Catch data used from years 1970 - 2014, abundance = None
Prior initial relative biomass = 0.2 - 0.6 expert
Prior intermediate rel. biomass = 0.01 - 0.4 in year 2000 expert
Prior final relative biomass = 0.01 - 0.3 expert
Prior range for $r = 0.2 - 0.8$ default, prior range for $k = 3.13 - 50$

Results of CMSY analysis with altogether 313 viable trajectories for 307 r-k pairs
$r = 0.291$, 95% CL = 0.227 - 0.373, $k = 20$, 95% CL = 15.3 - 26
MSY = 1.45, 95% CL = 1.09 - 1.93
Relative biomass last year = 0.158 k, 2.5th = 0.0176, 97.5th = 0.295
Exploitation $F/(r/2)$ in last year = 1.76

Results for Management (based on CMSY analysis)
Fmsy = 0.145, 95% CL = 0.113 - 0.186 (if $B < 1/2 B_{msy}$ then $F_{msy} = 0.5 r$)
Fmsy = 0.0918, 95% CL = 0.0716 - 0.118 ($r$ and $F_{msy}$ are linearly reduced if $B < 1/2 B_{msy}$)
MSY = 1.45, 95% CL = 1.09 - 1.93
Bmsy = 9.99, 95% CL = 7.66 - 13
Biomass in last year = 3.15, 2.5th perc = 0.352, 97.5 perc = 5.9
B/Bmsy in last year = 0.316, 2.5th perc = 0.0353, 97.5 perc = 0.591
Fishing mortality in last year = 0.256, 2.5th perc = 0.137, 97.5 perc = 2.29
F/Fmsy = 2.79, 2.5th perc = 1.49, 97.5 perc = 24.9

Stock status and exploitation in 2014
Biomass = 3.15, B/Bmsy = 0.316, fishing mortality $F = 0.256$, $F/F_{msy} = 2.79$
Comment: Catch=landings from FishStat (Tunisia, Italy, France). RF int 2000 0.01-0.4, final 0.3
Species: *Merluccius merluccius*, stock: MERLMER_SA
Hake in Sardinia
Source: EASME EMFF 2014
Region: Mediterranean, Sardinia
Catch data used from years 1970 - 2014, abundance = CPUE
Prior initial relative biomass = 0.01 - 0.4 expert
Prior intermediate rel. biomass= 0.01 - 0.4 in year 1995 expert
Prior final relative biomass = 0.01 - 0.4 expert
Prior range for r = 0.22 - 0.95 expert, prior range for k = 8.13 - 140
Prior range of q = 0.159 - 0.662

Results of CMSY analysis with altogether 119 viable trajectories for 116 r-k pairs
r = 0.333, 95% CL = 0.281 - 0.394, k = 75.1, 95% CL = 58.4 - 96.6
MSY = 6.25, 95% CL = 5.05 - 7.73
Relative biomass last year = 0.309 k, 2.5th = 0.0169, 97.5th = 0.377
Exploitation F/(r/2) in last year = 1.16

Results from Bayesian Schaefer model using catch & CPUE
r = 0.454, 95% CL = 0.328 - 0.629, k = 46.4, 95% CL = 33 - 65.2
MSY = 5.27, 95% CL = 4.39 - 6.31
Relative biomass in last year = 0.256 k, 2.5th perc = 0.185, 97.5th perc = 0.365
Exploitation F/(r/2) in last year = 1.66
q = 0.237, lcl = 0.181, ucl = 0.309

Results for Management (based on BSM analysis)
Fmsy = 0.227, 95% CL = 0.164 - 0.315 (if B > 1/2 Bmsy then Fmsy = 0.5 r)
Fmsy = 0.227, 95% CL = 0.164 - 0.315 (r and Fmsy are linearly reduced if B < 1/2 Bmsy)
MSY = 5.27, 95% CL = 4.39 - 6.31
Bmsy = 23.2, 95% CL = 16.5 - 32.6
Biomass in last year = 11.9, 2.5th perc = 8.56, 97.5 perc = 16.9
B/Bmsy in last year = 0.512, 2.5th perc = 0.369, 97.5 perc = 0.73
Fishing mortality in last year = 0.378, 2.5th perc = 0.265, 97.5 perc = 0.524
F/Fmsy = 1.66, 2.5th perc = 1.17, 97.5 perc = 2.31

Stock status and exploitation in 2014
Biomass = 11.9, B/Bmsy = 0.512, fishing mortality F = 0.378, F/Fmsy = 1.66
Comment: Catch=landings from FishStat (Tunisia, Italy, France, Spain), Biomass from SGMED SSB for GSAs 9-11, SGMED 2015 Part 1 SSB)
A: MERLMER_SA catch

B: Finding stable r-k

C: Analysis of stable r-k

D: Biomass

E: Exploitation rate

F: Equilibrium curve

Catch MERLMER_SA

Biomass

Exploitation
Species: *Micromesistius poutassou*, stock: MICMPOU_SA
Blue whiting in Sardinia
Source: excel
Region: Mediterranean, Sardinia
Catch data used from years 1970 - 2014, abundance = None
Prior initial relative biomass = 0.5 - 0.9 expert
Prior intermediate rel. biomass = 0.01 - 0.4 in year 2000 expert
Prior final relative biomass = 0.01 - 0.3 expert
Prior range for r = 0.21 - 1.1 expert, prior range for k = 1.63 - 33.9

Results of CMSY analysis with altogether 601 viable trajectories for 553 r-k pairs
r = 0.368, 95% CL = 0.237 - 0.571, k = 12.3, 95% CL = 9.64 - 15.7
MSY = 1.13, 95% CL = 0.999 - 1.28
Relative biomass last year = 0.109 k, 2.5th = 0.0116, 97.5th = 0.276
Exploitation \( \frac{F}{r/2} \) in last year = 0.709

Results for Management (based on CMSY analysis)
\( F_{m_{sy}} = 0.184 \), 95% CL = 0.119 - 0.285 (if \( B > 1/2 \) Bmsy then \( F_{m_{sy}} = 0.5 \) r)
\( F_{m_{sy}} = 0.0804 \), 95% CL = 0.0518 - 0.125 (r and \( F_{m_{sy}} \) are linearly reduced if \( B < 1/2 \) Bmsy)
MSY = 1.13, 95% CL = 0.999 - 1.28
Bmsy = 6.15, 95% CL = 4.82 - 7.84
Biomass in last year = 1.34, 2.5th perc = 0.143, 97.5 perc = 3.39
\( B/B_{m_{sy}} \) in last year = 0.218, 2.5th perc = 0.0232, 97.5 perc = 0.552
Fishing mortality in last year = 0.13, 2.5th perc = 0.0516, 97.5 perc = 1.23
\( F/F_{m_{sy}} \) = 1.62, 2.5th perc = 0.642, 97.5 perc = 15.3

Stock status and exploitation in 2014
Biomass = 1.34, \( B/B_{m_{sy}} = 0.218 \), fishing mortality \( F = 0.13 \), \( F/F_{m_{sy}} = 1.62 \)
Comment: Catch=landings from FishStat (France, Italy)
Species: *Mullus barbatus*, stock: MULLBAR_SA
Red mullet in Sardinia
Source: EASME EMFF 2014, M from Colloca et al 2013
Region: Mediterranean, Sardinia
Catch data used from years 1994 - 2014, abundance = CPUE
Prior initial relative biomass = 0.2 - 0.6 expert
Prior intermediate relative biomass= 0.1 - 0.5 in year 2006 expert
Prior final relative biomass = 0.01 - 0.4 expert
Prior range for r = 0.22 - 1.2 expert, prior range for k = 1.93 - 43.9
Prior range of q = 0.00247 - 0.0118

Results of CMSY analysis with altogether 682 viable trajectories for 679 r-k pairs
r = 0.261, 95% CL = 0.247 - 0.275, k = 18.8, 95% CL = 17 - 20.8
MSY = 1.22, 95% CL = 1.11 - 1.35
Relative biomass last year = 0.0593 k, 2.5th = 0.0147, 97.5th = 0.201
Exploitation F/(r/2) in last year = 18.1

Results from Bayesian Schaefer model using catch & CPUE
r = 0.727, 95% CL = 0.299 - 1.76, k = 8.74, 95% CL = 4.63 - 16.5
MSY = 1.59, 95% CL = 1.12 - 2.25
Relative biomass in last year = 0.356 k, 2.5th perc = 0.177, 97.5th perc = 0.475
Exploitation F/(r/2) in last year = 2.33
q = 0.00293, lcl = 0.00176, ucl = 0.00488

Results for Management (based on BSM analysis)
Fmsy = 0.363, 95% CL = 0.15 - 0.882 (if B > 1/2 Bmsy then Fmsy = 0.5 r)
Fmsy = 0.363, 95% CL = 0.15 - 0.882 (r and Fmsy are linearly reduced if B < 1/2 Bmsy)
MSY = 1.59, 95% CL = 1.12 - 2.25
Bmsy = 4.37, 95% CL = 2.32 - 8.25
Biomass in last year = 3.11, 2.5th perc = 1.54, 97.5 perc = 4.15
B/Bmsy in last year = 0.711, 2.5th perc = 0.353, 97.5 perc = 0.95
Fishing mortality in last year = 0.846, 2.5th perc = 0.634, 97.5 perc = 1.7
F/Fmsy = 2.33, 2.5th perc = 1.74, 97.5 perc = 4.69

Stock status and exploitation in 2014
Biomass = 3.11, B/Bmsy = 0.711, fishing mortality F = 0.846, F/Fmsy = 2.33
Comment: Catch=landings from FishStat (Tunisia, Italy, Spain), Biomass from Medits for GSAs 8-10. RF int 2006 0.1-0.5

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Species: *Nephrops norvegicus*, stock: NEPRNOR_SA
Norway lobster in Sardinia
Source: excel
Region: Mediterranean, Sardinia
Catch data used from years 1970 - 2014, abundance = CPUE
Prior initial relative biomass = 0.01 - 0.4 expert
Prior intermediate rel. biomass = 0.01 - 0.4 in year 2000 expert
Prior final relative biomass = 0.01 - 0.2 expert
Prior range for r = 0.2 - 0.8 default, prior range for k = 1.32 - 21.2
Prior range of q = 0.00643 - 0.0257

Results of CMSY analysis with altogether 577 viable trajectories for 566 r-k pairs
r = 0.383, 95% CL = 0.287 - 0.511, k = 6.54, 95% CL = 4.91 - 8.71
MSY = 0.626, 95% CL = 0.538 - 0.729
Relative biomass last year = 0.0729 k, 2.5th = 0.0129, 97.5th = 0.191
Exploitation F/(r/2) in last year = 2.28

Results from Bayesian Schaefer model using catch & CPUE
r = 0.459, 95% CL = 0.32 - 0.66, k = 5.52, 95% CL = 3.92 - 7.78
MSY = 0.634, 95% CL = 0.554 - 0.726
Relative biomass in last year = 0.128 k, 2.5th perc = 0.0391, 97.5th perc = 0.23
Exploitation F/(r/2) in last year = 1.28
q = 0.00964, lcl = 0.00722, ucl = 0.0129

Results for Management (based on BSM analysis)
Fmsy = 0.23, 95% CL = 0.16 - 0.33 (if B > 1/2 Bmsy then Fmsy = 0.5 r)
Fmsy = 0.118, 95% CL = 0.0819 - 0.169 (r and Fmsy are linearly reduced if B < 1/2 Bmsy)
MSY = 0.634, 95% CL = 0.554 - 0.726
Bmsy = 2.76, 95% CL = 1.96 - 3.89
Biomass in last year = 0.707, 2.5th perc = 0.216, 97.5 perc = 1.27
B/Bmsy in last year = 0.256, 2.5th perc = 0.0783, 97.5 perc = 0.46
Fishing mortality in last year = 0.294, 2.5th perc = 0.164, 97.5 perc = 0.963
F/Fmsy = 2.5, 2.5th perc = 1.39, 97.5 perc = 8.19

Stock status and exploitation in 2014
Biomass = 0.707, B/Bmsy = 0.256, fishing mortality F = 0.294, F/Fmsy = 2.5
Comment: Catch=landings from FishStat (Tunisia, Italy, France, Spain), Biomass from Medits for GSAs 8-10. RF int 2000 0.01-0.4
Species: *Pagellus erythrinus*, stock: PAGEERY_SA
Common pandora in Sardinia
Source: excel
Region: Mediterranean, Sardinia
Catch data used from years 1990 - 2014, abundance = None
Prior initial relative biomass = 0.2 - 0.6 expert
Prior intermediate rel. biomass = 0.01 - 0.4 in year 2007 expert
Prior final relative biomass = 0.01 - 0.3 expert
Prior range for r = 0.22 - 0.97 expert, prior range for k = 0.93 - 16.4

Results of CMSY analysis with altogether 1812 viable trajectories for 790 r-k pairs
r = 0.641, 95% CL = 0.439 - 0.934, k = 2.77, 95% CL = 1.8 - 4.26
MSY = 0.444, 95% CL = 0.37 - 0.533
Relative biomass last year = 0.215 k, 2.5th = 0.0255, 97.5th = 0.296
Exploitation F/(r/2) in last year = 2.22

Results for Management (based on CMSY analysis)
Fmsy = 0.32, 95% CL = 0.22 - 0.467 (if B > 1/2 Bmsy then Fmsy = 0.5 r)
Fmsy = 0.275, 95% CL = 0.189 - 0.401 (r and Fmsy are linearly reduced if B < 1/2 Bmsy)
MSY = 0.444, 95% CL = 0.37 - 0.533
Bmsy = 1.39, 95% CL = 0.901 - 2.13
Biomass in last year = 0.595, 2.5th perc = 0.0706, 97.5 perc = 0.819
B/Bmsy in last year = 0.429, 2.5th perc = 0.0509, 97.5 perc = 0.591
Fishing mortality in last year = 0.713, 2.5th perc = 0.518, 97.5 perc = 6.01
F/Fmsy = 2.59, 2.5th perc = 1.88, 97.5 perc = 21.8

Stock status and exploitation in 2014
Biomass = 0.595, B/Bmsy = 0.429, fishing mortality F = 0.713, F/Fmsy = 2.59
Comment: Catch=landings from FishStat (France, Tunisia). RF start 1990 0.2-0.6, int 2008 0.01-0.4
Species: *Palinurus elephas*, stock: PALIELE_SA
Common spiny lobster in Sardinia
Source:
Region: Mediterranean, Sardinia
Catch data used from years 1970 - 2014, abundance = None
Prior initial relative biomass = 0.2 - 0.6 expert
Prior intermediate rel. biomass = 0.01 - 0.4 in year 2001 default
Prior final relative biomass = 0.01 - 0.3 expert
Prior range for r = 0.05 - 0.5 default, prior range for k = 1.43 - 57.1

Results of CMSY analysis with altogether 2559 viable trajectories for 2221 r-k pairs
r = 0.176, 95% CL = 0.113 - 0.274, k = 12, 95% CL = 5.42 - 26.6
MSY = 0.528, 95% CL = 0.239 - 1.16
Relative biomass last year = 0.109 k, 2.5th = 0.0133, 97.5th = 0.293
Exploitation F/(r/2) in last year = 0.807

Results for Management (based on CMSY analysis)
Fmsy = 0.088, 95% CL = 0.0566 - 0.137 (if B > 1/2 Bmsy then Fmsy = 0.5 r)
Fmsy = 0.0384, 95% CL = 0.0247 - 0.0598 (r and Fmsy are linearly reduced if B < 1/2 Bmsy)
MSY = 0.528, 95% CL = 0.239 - 1.16
Bmsy = 6, 95% CL = 2.71 - 13.3
Biomass in last year = 1.31, 2.5th perc = 0.16, 97.5 perc = 3.52
B/Bmsy in last year = 0.218, 2.5th perc = 0.0267, 97.5 perc = 0.586
Fishing mortality in last year = 0.071, 2.5th perc = 0.0264, 97.5 perc = 0.581
F/Fmsy = 1.85, 2.5th perc = 0.688, 97.5 perc = 15.1

Stock status and exploitation in 2014
Biomass = 1.31, B/Bmsy = 0.218, fishing mortality F = 0.071, F/Fmsy = 1.85
Comment: Catch=landings from FishStat (Italy, France). RF final 0.3
Species: *Parapenaeus longirostris*, stock: PAPELON_SA
Pink shrimp in Sardinia
Source: excel
Region: Mediterranean, Sardinia
Catch data used from years 1998 - 2014, abundance = CPUE
Prior initial relative biomass = 0.2 - 0.6 expert
Prior intermediate rel. biomass= 0.01 - 0.4 in year 2007 expert
Prior final relative biomass = 0.2 - 0.6 expert
Prior range for r = 0.6 - 1.5 default, prior range for k = 2.32 - 23.2
Prior range of q = 0.000173 - 0.000546

Results of CMSY analysis with altogether 1097 viable trajectories for 1002 r-k pairs
r = 1.18 , 95% CL = 0.943 - 1.48 , k = 8.39 , 95% CL = 6.11 - 11.5
MSY = 2.48 , 95% CL = 2.03 - 3.02
Relative biomass last year = 0.347 k, 2.5th = 0.209 , 97.5th = 0.571
Exploitation F/(r/2) in last year = 1.77

Results from Bayesian Schaefer model using catch & CPUE
r = 1.07 , 95% CL = 0.858 - 1.32 , k = 9.22 , 95% CL = 7.51 - 11.3
MSY = 2.46 , 95% CL = 2.17 - 2.78
Relative biomass in last year = 0.47 k, 2.5th perc = 0.372 , 97.5th perc = 0.61
Exploitation F/(r/2) in last year = 1.32
q = 0.000244 , lcl = 0.000193 , ucl = 0.000308

Results for Management (based on BSM analysis)
Fmsy = 0.533 , 95% CL = 0.429 - 0.662 (if B > 1/2 Bmsy then Fmsy = 0.5 r)
Fmsy = 0.533 , 95% CL = 0.429 - 0.662 (r and Fmsy are linearly reduced if B < 1/2 Bmsy)
MSY = 2.46 , 95% CL = 2.17 - 2.78
Bmsy = 4.61 , 95% CL = 3.75 - 5.66
Biomass in last year = 4.34 , 2.5th perc = 3.43 , 97.5 perc = 5.62
B/Bmsy in last year = 0.94 , 2.5th perc = 0.743 , 97.5 perc = 1.22
Fishing mortality in last year = 0.705 , 2.5th perc = 0.543 , 97.5 perc = 0.891
F/Fmsy = 1.32 , 2.5th perc = 1.02 , 97.5 perc = 1.67

Stock status and exploitation in 2014
Biomass = 4.34 , B/Bmsy = 0.94 , fishing mortality F = 0.705 , F/Fmsy = 1.32
Comment: Catch=landings from FishStat (Tunisia, Italy, France, Spain), Biomass from Medits for GSAs 8-10. RF start 1998 0.2-0.6, int 2007 0.01-0.4

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Species: *Sardina pilchardus*, stock: SARDPIL_SA

Sardine in Sardinia

Source:
Region: Mediterranean, Sardinia

Catch data used from years 1974 - 2014, abundance = CPUE

Prior initial relative biomass = 0.5 - 0.9 expert
Prior intermediate rel. biomass = 0.01 - 0.4 in year 2005 expert
Prior final relative biomass = 0.01 - 0.4 expert
Prior range for $r$ = 0.27 - 1.1 expert, prior range for $k$ = 17.8 - 290
Prior range of $q$ = 0.0000664 - 0.00268

Results of CMSY analysis with altogether 155 viable trajectories for 152 r-k pairs

$r$ = 0.402, 95% CL = 0.352 - 0.458, $k$ = 116, 95% CL = 93.3 - 143

MSY = 11.6, 95% CL = 9.85 - 13.7

Relative biomass last year = 0.193 $k$, 2.5th = 0.051, 97.5th = 0.357

Exploitation $F/(r/2)$ in last year = 1.66

Results from Bayesian Schaefer model using catch & CPUE

$r$ = 0.497, 95% CL = 0.284 - 0.869, $k$ = 90.8, 95% CL = 58 - 142

MSY = 11.3, 95% CL = 9.16 - 13.9

Relative biomass in last year = 0.233 $k$, 2.5th perc = 0.0835, 97.5th perc = 0.438

Exploitation $F/(r/2)$ in last year = 1.42

$q$ = 0.000933, lcl = 0.000648, ucl = 0.00134

Results for Management (based on BSM analysis)

$F_{msy}$ = 0.248, 95% CL = 0.142 - 0.434 (if $B > 1/2$ $B_{msy}$ then $F_{msy}$ = 0.5 $r$)

$F_{msy}$ = 0.231, 95% CL = 0.132 - 0.404 ($r$ and $F_{msy}$ are linearly reduced if $B < 1/2$ $B_{msy}$)

MSY = 11.3, 95% CL = 9.16 - 13.9

$B_{msy}$ = 45.4, 95% CL = 29 - 71

Biomass in last year = 21.1, 2.5th perc = 7.58, 97.5 perc = 39.8

$B/B_{msy}$ in last year = 0.465, 2.5th perc = 0.167, 97.5 perc = 0.877

Fishing mortality in last year = 0.353, 2.5th perc = 0.187, 97.5 perc = 0.984

$F/F_{msy}$ = 1.53, 2.5th perc = 0.812, 97.5 perc = 4.26

Stock status and exploitation in 2014

Biomass = 21.1, $B/B_{msy}$ = 0.465, fishing mortality $F$ = 0.353, $F/F_{msy}$ = 1.53

Comment: Catch=landings from FishStat (Tunisia, Italy, France), Biomass from MEDIAS for GSAs 8-10.
RF int 2005 0.01-0.4

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Species: *Sepia officinalis*, stock: SEPIOFF_SA
Common cuttlefish in Sardinia
Source:
Region: Mediterranean, Sardinia
Catch data used from years 1973 - 2014, abundance = None
Prior initial relative biomass = 0.5 - 0.9 expert
Prior intermediate rel. biomass= 0.01 - 0.4 in year 2010 expert
Prior final relative biomass = 0.1 - 0.5 expert
Prior range for $r = 0.2 - 0.8$ default, prior range for $k = 0.749 - 12$

Results of CMSY analysis with altogether 5160 viable trajectories for 818 $r$-$k$ pairs
$r = 0.567, 95\% \text{ CL} = 0.409 - 0.785, k = 2.44, 95\% \text{ CL} = 1.63 - 3.65$
$\text{MSY} = 0.345, 95\% \text{ CL} = 0.296 - 0.403$
Relative biomass last year = 0.382 $k$, 2.5th = 0.135 , 97.5th = 0.495
Exploitation $F/(r/2)$ in last year = 1.21

Results for Management (based on CMSY analysis)
$F_{msy} = 0.283, 95\% \text{ CL} = 0.205 - 0.392$ (if $B > 1/2 B_{msy}$ then $F_{msy} = 0.5 \times r$)
$F_{msy} = 0.283, 95\% \text{ CL} = 0.205 - 0.392$ ($r$ and $F_{msy}$ are linearly reduced if $B < 1/2 B_{msy}$)
$MSY = 0.345, 95\% \text{ CL} = 0.296 - 0.403$
$B_{msy} = 1.22, 95\% \text{ CL} = 0.813 - 1.83$
Biomass in last year = 0.93, 2.5th perc = 0.329, 97.5 perc = 1.21
B/$B_{msy}$ in last year = 0.764, 2.5th perc = 0.27, 97.5 perc = 0.99
Fishing mortality in last year = 0.344, 2.5th perc = 0.265, 97.5 perc = 0.973
$F/F_{msy} = 1.21, 2.5th \text{ perc} = 0.936, 97.5 \text{ perc} = 3.43$

Stock status and exploitation in 2014
Biomass = 0.93, B/$B_{msy} = 0.764$, fishing mortality $F = 0.344$, $F/F_{msy} = 1.21$
Comment: Catch=landings from FishStat (Tunisia, France). RF start 0.5-0.9, int 2010 0.01-0.4, final 0.1-0.5

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Species: *Spicara maena*, stock: SPICMAE_SA
Blotched picarel in Sardinia
Source:
Region: Mediterranean, Sardinia
Catch data used from years 1989-2014, abundance = None
Prior initial relative biomass = 0.5 - 0.9 expert
Prior intermediate rel. biomass = 0.2 - 0.6 in year 2010 expert
Prior final relative biomass = 0.01 - 0.4 expert
Prior range for r = 0.48 - 1.3 expert, prior range for k = 0.295 - 3.17

Results of CMSY analysis with altogether 3462 viable trajectories for 773 r-k pairs
r = 1.01, 95% CL = 0.796 - 1.27, k = 1.15, 95% CL = 0.855 - 1.55
MSY = 0.29, 95% CL = 0.257 - 0.327
Relative biomass last year = 0.294 k, 2.5th = 0.0308, 97.5th = 0.397
Exploitation F/(r/2) in last year = 1.04

Results for Management (based on CMSY analysis)
Fmsy = 0.504, 95% CL = 0.398 - 0.637 (if B > 1/2 Bmsy then Fmsy = 0.5 r)
Fmsy = 0.504, 95% CL = 0.398 - 0.637 (r and Fmsy are linearly reduced if B < 1/2 Bmsy)
MSY = 0.29, 95% CL = 0.257 - 0.327
Bmsy = 0.575, 95% CL = 0.428 - 0.774
Biomass in last year = 0.339, 2.5th perc = 0.0354, 97.5 perc = 0.457
B/Bmsy in last year = 0.589, 2.5th perc = 0.0616, 97.5 perc = 0.793
Fishing mortality in last year = 0.522, 2.5th perc = 0.388, 97.5 perc = 4.99
F/Fmsy = 1.04, 2.5th perc = 0.77, 97.5 perc = 9.91

Stock status and exploitation in 2014
Biomass = 0.339, B/Bmsy = 0.589, fishing mortality F = 0.522, F/Fmsy = 1.04
Comment: Catch=landings from FishStat (Tunisia). RF start 0.5-0.9, int 2010 0.2-0.6, final 0.01-0.4
Adriatic Sea (analyzed with CMSY_O_7m.R; see Comment for data sources)

Species: *Atherina boyeri*, stock: Athe_boy_AD
Sand smelt in Adriatic Sea
Source:
Region: Mediterranean, Adriatic Sea
Catch data used from years 1970 - 2014, abundance = None
Prior initial relative biomass = 0.2 - 0.6 expert
Prior intermediate rel. biomass = 0.01 - 0.4 in year 2001 default
Prior final relative biomass = 0.01 - 0.4 expert
Prior range for r = 0.2 - 0.8 default, prior range for k = 4.61 - 73.7

Results of CMSY analysis with altogether 326 viable trajectories for 317 r-k pairs
r = 0.328, 95% CL = 0.226 - 0.475, k = 33.7, 95% CL = 22.3 - 51
MSY = 2.76, 95% CL = 1.67 - 4.58
Relative biomass last year = 0.186 k, 2.5th = 0.0182, 97.5th = 0.379
Exploitation F/(r/2) in last year = 0.413

Results for Management (based on CMSY analysis)
Fmsy = 0.164, 95% CL = 0.113 - 0.238 (if B > 1/2 Bmsy then Fmsy = 0.5 r)
Fmsy = 0.122, 95% CL = 0.0844 - 0.177 (r and Fmsy are linearly reduced if B < 1/2 Bmsy)
MSY = 2.76, 95% CL = 1.67 - 4.58
Bmsy = 16.9, 95% CL = 11.1 - 25.5
Biomass in last year = 6.28, 2.5th perc = 0.614, 97.5 perc = 12.8
B/Bmsy in last year = 0.373, 2.5th perc = 0.0364, 97.5 perc = 0.759
Fishing mortality in last year = 0.0554, 2.5th perc = 0.0272, 97.5 perc = 0.567
F/Fmsy = 0.453, 2.5th perc = 0.223, 97.5 perc = 4.64

Stock status and exploitation in 2014
Biomass = 6.28, B/Bmsy = 0.373, fishing mortality F = 0.0554, F/Fmsy = 0.453
Comment: Catch=landings from FishStat (Italy, Croatia, Slovenia). RF final 0.3. GS final 0.4 because trawling was banned in 3 nm zone, causing decline in catch.
Species: *Belone belone*, stock: Belo_bel_AD

Garfish in Adriatic Sea

Source:
Region: Mediterranean, Adriatic Sea
Catch data used from years 1970 - 2014, abundance = None
Prior initial relative biomass = 0.5 - 0.9 expert
Prior intermediate rel. biomass = 0.01 - 0.4 in year 2000 expert
Prior final relative biomass = 0.01 - 0.3 expert
Prior range for $r = 0.19 - 1$ expert, prior range for $k = 0.28 - 5.89$

Results of CMSY analysis with altogether 1506 viable trajectories for 1135 r-k pairs
$r = 0.423$, 95% CL = 0.281 - 0.637, $k = 1.72$, 95% CL = 1.27 - 2.35
MSY = 0.182, 95% CL = 0.165 - 0.202
Relative biomass last year = 0.0965 k, 2.5th = 0.0129, 97.5th = 0.282
Exploitation $F/(r/2)$ in last year = 0.123

Results for Management (based on CMSY analysis)
Fmsy = 0.212, 95% CL = 0.141 - 0.318 (if $B > 1/2 Bmsy$ then Fmsy = 0.5 $r$)
Fmsy = 0.0817, 95% CL = 0.0543 - 0.123 ($r$ and Fmsy are linearly reduced if $B < 1/2 Bmsy$)
MSY = 0.182, 95% CL = 0.165 - 0.202
Bmsy = 0.862, 95% CL = 0.634 - 1.17
Biomass in last year = 0.166, 2.5th perc = 0.0222, 97.5 perc = 0.487
B/Bmsy in last year = 0.193, 2.5th perc = 0.0258, 97.5 perc = 0.565
Fishing mortality in last year = 0.024, 2.5th perc = 0.00822, 97.5 perc = 0.18
F/Fmsy = 0.294, 2.5th perc = 0.101, 97.5 perc = 2.2

Stock status and exploitation in 2014
Biomass = 0.166, B/Bmsy = 0.193, fishing mortality F = 0.024, F/Fmsy = 0.294
Comment: Catch=landings from FishStat (Italy, Croatia, Slovenia, Serbia and Montenegro). RF final 0.2, GS final 0.3, low catches caused by low demand.
Species: *Bolinus brandaris*, stock: Boli_bra_AD

Purple dye murex in Adriatic

Source:

Region: Mediterranean, Adriatic Sea

Catch data used from years 1972 - 2015, abundance = CPUE

Prior initial relative biomass = 0.5 - 0.9 expert

Prior intermediate rel. biomass = 0.5 - 0.9 in year 1990 expert

Prior final relative biomass = 0.5 - 0.9 expert

Prior range for $r = 0.6 - 1.5$ default, prior range for $k = 1.73 - 25.9$

Prior range of $q = 0.0147 - 0.0464$

Results of CMSY analysis with altogether 35574 viable trajectories for 4001 $r$-$k$ pairs

$r = 1.19$, 95% CL = 0.957 - 1.48, $k = 5.38$, 95% CL = 3.15 - 9.2

MSY = 1.6, 95% CL = 0.859 - 2.99

Relative biomass last year = 0.735 $k$, 2.5th = 0.513, 97.5th = 0.867

Exploitation $F/(r/2)$ in last year = 0.484

Results from Bayesian Schaefer model using catch & CPUE

$r = 0.972$, 95% CL = 0.678 - 1.39, $k = 4.26$, 95% CL = 3.24 - 5.6

MSY = 1.04, 95% CL = 0.824 - 1.3

Relative biomass in last year = 0.518 $k$, 2.5th perc = 0.419, 97.5th perc = 0.694

Exploitation $F/(r/2)$ in last year = 0.838

$q = 0.0225$, lcl = 0.0175, ucl = 0.0289

Results for Management (based on BSM analysis)

$F_{msy} = 0.486$, 95% CL = 0.339 - 0.697 (if $B > 1/2 B_{msy}$ then $F_{msy} = 0.5$ $r$)

$F_{msy} = 0.486$, 95% CL = 0.339 - 0.697 ($r$ and $F_{msy}$ are linearly reduced if $B < 1/2 B_{msy}$)

MSY = 1.04, 95% CL = 0.824 - 1.3

$B_{msy} = 2.13$, 95% CL = 1.62 - 2.8

Biomass in last year = 2.21, 2.5th perc = 1.79, 97.5 perc = 2.96

$B/B_{msy}$ in last year = 1.04, 2.5th perc = 0.839, 97.5 perc = 1.39

Fishing mortality in last year = 0.407, 2.5th perc = 0.304, 97.5 perc = 0.504

$F/F_{msy} = 0.838$, 2.5th perc = 0.626, 97.5 perc = 1.04

Stock status and exploitation in 2014

Biomass = 2.41, $B/B_{msy} = 1.13$, fishing mortality $F = 0.498$, $F/F_{msy} = 1.02$

Comment: OK RF

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Species: *Boops boops*, stock: Boop_Boo_AD

Bogue in Adriatic Sea

Source:
Region: Mediterranean, Adriatic Sea
Catch data used from years 1970 - 2014, abundance = None
Prior initial relative biomass = 0.5 - 0.9 expert
Prior intermediate rel. biomass= 0.01 - 0.4 in year 1990 expert
Prior final relative biomass = 0.01 - 0.4 expert
Prior range for $r = 0.31 - 1.1$ expert, prior range for $k = 2.2 - 31.3$

Results of CMSY analysis with altogether 60 viable trajectories for 60 r-k pairs
$r = 0.449 , 95\% \text{ CL } = 0.399 - 0.506 , k = 14.2 , 95\% \text{ CL } = 11.5 - 17.7$
MSY = 1.6 , 95\% CL = 1.32 - 1.94
Relative biomass last year = 0.0669 k, 2.5th = 0.0239 , 97.5th = 0.157
Exploitation $F/(r/2)$ in last year = 0.627

Results for Management (based on CMSY analysis)
Fmsy = 0.225 , 95\% CL = 0.2 - 0.253 (if $B > 1/2 Bmsy$ then Fmsy = 0.5 r)
Fmsy = 0.0601 , 95\% CL = 0.0534 - 0.0677 (r and Fmsy are linearly reduced if $B < 1/2 Bmsy$)
MSY = 1.6 , 95\% CL = 1.32 - 1.94
Bmsy = 7.12 , 95\% CL = 5.74 - 8.84
Biomass in last year = 0.953 , 2.5th perc = 0.34 , 97.5 perc = 2.23
B/Bmsy in last year = 0.134 , 2.5th perc = 0.0478 , 97.5 perc = 0.313
Fishing mortality in last year = 0.108 , 2.5th perc = 0.0462 , 97.5 perc = 0.303
F/Fmsy = 1.8 , 2.5th perc = 0.768 , 97.5 perc = 5.03

Stock status and exploitation in 2014
Biomass = 0.953 , B/Bmsy = 0.134 , fishing mortality F = 0.108 , F/Fmsy = 1.8
Comment: Catch=landings from FishStat (Yugoslavia, Italy, Croatia, Serbia and Montenegro, Slovenia).
RF int 1990 0.01-0.4, final 0.3. GS final 0.4, decline in catches caused by low market demand.

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Species: *Chamelea gallina*, stock: Cham_gal_AD

Striped venus in Adriatic Sea

Source:
Region: Mediterranean, Adriatic Sea
Catch data used from years 1970 - 2014, abundance = None
Prior initial relative biomass = 0.2 - 0.6 expert
Prior intermediate rel. biomass= 0.1 - 0.5 in year 1995 expert
Prior final relative biomass = 0.01 - 0.3 expert
Prior range for r = 0.2 - 0.8 default, prior range for k = 47 - 752

Results of CMSY analysis with altogether 1571 viable trajectories for 845 r-k pairs
$r = 0.498$, 95% CL = 0.325 - 0.763, $k = 209$, 95% CL = 151 - 290
MSY = 26, 95% CL = 24 - 28.1
Relative biomass last year = 0.212 $k$, 2.5th = 0.0148, 97.5th = 0.296
Exploitation $F/(r/2)$ in last year = 1.44

Results for Management (based on CMSY analysis)
$F_{msy} = 0.249$, 95% CL = 0.162 - 0.381 (if $B > 1/2 B_{msy}$ then $F_{msy} = 0.5 r$)
$F_{msy} = 0.211$, 95% CL = 0.138 - 0.323 ($r$ and $F_{msy}$ are linearly reduced if $B < 1/2 B_{msy}$)
MSY = 26, 95% CL = 24 - 28.1
Bmsy = 104, 95% CL = 75.3 - 145
Biomass in last year = 44.2, 2.5th perc = 3.1, 97.5 perc = 61.9
B/Bmsy in last year = 0.423, 2.5th perc = 0.029, 97.5 perc = 0.593
Fishing mortality in last year = 0.316, 2.5th perc = 0.226, 97.5 perc = 4.51
$F/F_{msy} = 1.5$, 2.5th perc = 1.07, 97.5 perc = 21.4

Stock status and exploitation in 2014
Biomass = 44.2, B/Bmsy = 0.423, fishing mortality $F = 0.316$, $F/F_{msy} = 1.5$
Comment: Catch=landings from FishStat (Slovenia, Italy). RF int 1995 0.1-0.5, final 0.3. GS OK.

----------------------------------------------------------
Species: *Conger conger*, stock: Cong_con_AD
Conger eel in Adriatic Sea
Source:
Region: Mediterranean, Adriatic Sea
Catch data used from years 1970 - 2014, abundance = None
Prior initial relative biomass = 0.2 - 0.6 expert
Prior intermediate rel. biomass = 0.01 - 0.4 in year 2000 expert
Prior final relative biomass = 0.01 - 0.3 expert
Prior range for r = 0.16 - 0.46 expert, prior range for k = 0.368 - 4.23

Results of CMSY analysis with altogether 2324 viable trajectories for 1829 r-k pairs
r = 0.343, 95% CL = 0.259 - 0.455, k = 1.49, 95% CL = 1.06 - 2.08
MSY = 0.128, 95% CL = 0.106 - 0.154
Relative biomass last year = 0.172 k, 2.5th = 0.0193, 97.5th = 0.297
Exploitation F/(r/2) in last year = 2.15

Results for Management (based on CMSY analysis)
Fmsy = 0.172, 95% CL = 0.129 - 0.227 (if B > 1/2 Bmsy then Fmsy = 0.5 r)
Fmsy = 0.118, 95% CL = 0.089 - 0.157 (r and Fmsy are linearly reduced if B < 1/2 Bmsy)
MSY = 0.128, 95% CL = 0.106 - 0.154
Bmsy = 0.745, 95% CL = 0.532 - 1.04
Biomass in last year = 0.256, 2.5th perc = 0.0287, 97.5 perc = 0.442
B/Bmsy in last year = 0.344, 2.5th perc = 0.0386, 97.5 perc = 0.594
Fishing mortality in last year = 0.363, 2.5th perc = 0.21, 97.5 perc = 3.24
F/Fmsy = 3.07, 2.5th perc = 1.78, 97.5 perc = 27.4

Stock status and exploitation in 2014
Biomass = 0.256, B/Bmsy = 0.344, fishing mortality F = 0.363, F/Fmsy = 3.07
Comment: Catch=landings from FishStat (Serbia and Montenegro, Slovenia, Italy, Croatia, Yugoslavia).
RF int 2000 0.01-0.4, final 0.3. GS OK
Species: Dentex dentex, stock: Dent_den_AD
Common dentex in Adriatic Sea
Source:
Region: Mediterranean, Adriatic Sea
Catch data used from years 1970 - 2014, abundance = None
Prior initial relative biomass = 0.2 - 0.6 expert
Prior intermediate rel. biomass = 0.01 - 0.4 in year 1995 expert
Prior final relative biomass = 0.01 - 0.4 expert
Prior range for r = 0.15 - 0.73 expert, prior range for k = 0.213 - 4.14

Results of CMSY analysis with altogether 1436 viable trajectories for 1120 r-k pairs
r = 0.395, 95% CL = 0.256 - 0.608, k = 1.04, 95% CL = 0.716 - 1.51
MSY = 0.102, 95% CL = 0.0896 - 0.117
Relative biomass last year = 0.152 k, 2.5th = 0.0162, 97.5th = 0.387
Exploitation F/(r/2) in last year = 0.931

Results for Management (based on CMSY analysis)
Fmsy = 0.197, 95% CL = 0.128 - 0.304 (if B > 1/2 Bmsy then Fmsy = 0.5 r)
Fmsy = 0.12, 95% CL = 0.0779 - 0.185 (r and Fmsy are linearly reduced if B < 1/2 Bmsy)
MSY = 0.102, 95% CL = 0.0896 - 0.117
Bmsy = 0.519, 95% CL = 0.358 - 0.753
Biomass in last year = 0.158, 2.5th perc = 0.0169, 97.5 perc = 0.402
B/Bmsy in last year = 0.304, 2.5th perc = 0.0325, 97.5 perc = 0.774
Fishing mortality in last year = 0.209, 2.5th perc = 0.0821, 97.5 perc = 1.96
F/Fmsy = 1.74, 2.5th perc = 0.684, 97.5 perc = 16.3

Stock status and exploitation in 2014
Biomass = 0.158, B/Bmsy = 0.304, fishing mortality F = 0.209, F/Fmsy = 1.74
Comment: Catch=landings from FishStat (Croatia, Italy, Serbia and Montenegro, Yugoslavia, Montenegro). GS OK

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Species: *Engraulis encrasicolus*, stock: Engr_enc_AD

Anchovy in Adriatic Sea  
Source: GFCM 2014 WGSP, EASME EMFF 2014, M from Colloca et al 2013  
Region: Mediterranean, Adriatic Sea  
Catch data used from years 1975 - 2013, abundance = CPUE  
Prior initial relative biomass = 0.5 - 0.9 expert  
Prior intermediate rel. biomass = 0.01 - 0.4 in year 1990 expert  
Prior final relative biomass = 0.01 - 0.4 expert  
Prior range for r = 0.26 - 1.2 expert, prior range for k = 52.6 - 939  
Prior range of q = 3.27 - 13.8

Results of CMSY analysis with altogether 2068 viable trajectories for 1668 r-k pairs  
r = 0.752, 95% CL = 0.504 - 1.12, k = 188, 95% CL = 125 - 283  
MSY = 35.4, 95% CL = 30.8 - 40.6  
Relative biomass last year = 0.151 k, 2.5th = 0.0169, 97.5th = 0.358  
Exploitation F/(r/2) in last year = 3.51

Results from Bayesian Schaefer model using catch & CPUE  
r = 0.542, 95% CL = 0.361 - 0.812, k = 264, 95% CL = 191 - 363  
MSY = 35.7, 95% CL = 29.8 - 42.9  
Relative biomass in last year = 0.35 k, 2.5th perc = 0.213, 97.5th perc = 0.454  
Exploitation F/(r/2) in last year = 1.31  
q = 4.84, lcl = 3.68, ucl = 6.37

Results for Management (based on BSM analysis)  
Fmsy = 0.271, 95% CL = 0.181 - 0.406 (if B > 1/2 Bmsy then Fmsy = 0.5 r)  
Fmsy = 0.271, 95% CL = 0.181 - 0.406 (r and Fmsy are linearly reduced if B < 1/2 Bmsy)  
MSY = 35.7, 95% CL = 29.8 - 42.9  
Bmsy = 132, 95% CL = 95.7 - 182  
Biomass in last year = 92.4, 2.5th perc = 56.3, 97.5 perc = 120  
B/Bmsy in last year = 0.7, 2.5th perc = 0.427, 97.5 perc = 0.908  
Fishing mortality in last year = 0.355, 2.5th perc = 0.274, 97.5 perc = 0.582  
F/Fmsy = 1.31, 2.5th perc = 1.01, 97.5 perc = 2.15

Stock status and exploitation in 2014  
Biomass = , B/Bmsy = , fishing mortality F = , F/Fmsy =  
Comment: Landings from Stock assessment form GFCM 2015 (17+18) MEDIAS 17+18. GS OK, very similar to SAM  

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Species: *Homarus gammarus*, stock: Hom_gam_AD

Lobster in Adriatic Sea

Source:

Region: Mediterranean, Adriatic Sea

Catch data used from years 1970 - 2013, abundance = None

Prior initial relative biomass = 0.2 - 0.6 expert

Prior intermediate rel. biomass = 0.01 - 0.4 in year 1995 expert

Prior final relative biomass = 0.01 - 0.3 expert

Prior range for r = 0.2 - 0.8 default, prior range for k = 0.0542 - 0.867

Results of CMSY analysis with altogether 1367 viable trajectories for 1229 r-k pairs

\[ r = 0.373, \; 95\% \text{ CL} = 0.293 - 0.474, \; k = 0.331, \; 95\% \text{ CL} = 0.244 - 0.449 \]

MSY = 0.0308, 95% CL = 0.0252 - 0.0377

Relative biomass last year = 0.118 k, 2.5th = 0.0121, 97.5th = 0.287

Exploitation \( F/(r/2) \) in last year = 0.689

Results for Management (based on CMSY analysis)

\[ F_{msy} = 0.186, \; 95\% \text{ CL} = 0.146 - 0.237 \] (if B > 1/2 Bmsy then Fmsy = 0.5 r)

\[ F_{msy} = 0.0878, \; 95\% \text{ CL} = 0.069 - 0.112 \] (r and Fmsy are linearly reduced if B < 1/2 Bmsy)

MSY = 0.0308, 95% CL = 0.0252 - 0.0377

Bmsy = 0.165, 95% CL = 0.122 - 0.224

Biomass in last year = 0.039, 2.5th perc = 0.004, 97.5 perc = 0.095

B/Bmsy in last year = 0.236, 2.5th perc = 0.0242, 97.5 perc = 0.575

Fishing mortality in last year = 0.154, 2.5th perc = 0.0631, 97.5 perc = 1.5

F/Fmsy = 1.75, 2.5th perc = 0.719, 97.5 perc = 17.1

Stock status and exploitation in 2014

Biomass = , B/Bmsy = , fishing mortality F = , F/Fmsy =

Comment: Catch=landings from FishStat (Croatia, Italy, Serbia and Montenegro, Yugoslavia). GS OK

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131
Species: *Illex coindettii*, stock: Ille_coi_AD

Shortfin squid in Adriatic Sea

Source:
Region: Mediterranean, Adriatic Sea
Catch data used from years 1985 - 2013, abundance = CPUE
Prior initial relative biomass = 0.2 - 0.6 expert
Prior intermediate rel. biomass = 0.01 - 0.4 in year 1995 expert
Prior final relative biomass = 0.01 - 0.3 expert
Prior range for r = 0.2 - 0.8 default, prior range for k = 4.82 - 77
Prior range of q = 0.00358 - 0.0143

Results of CMSY analysis with altogether 1845 viable trajectories for 1741 r-k pairs
r = 0.435, 95% CL = 0.284 - 0.665, k = 34.5, 95% CL = 19.3 - 61.6
MSY = 3.75, 95% CL = 1.95 - 7.24
Relative biomass last year = 0.114 k, 2.5th = 0.0124, 97.5th = 0.29
Exploitation F/(r/2) in last year = 0.858

Results from Bayesian Schaefer model using catch & CPUE
r = 0.607, 95% CL = 0.409 - 0.901, k = 21.1, 95% CL = 14.9 - 29.8
MSY = 3.2, 95% CL = 2.62 - 3.91
Relative biomass in last year = 0.16 k, 2.5th perc = 0.0483, 97.5th perc = 0.328
Exploitation F/(r/2) in last year = 0.671
q = 0.00496, lcl = 0.00366, ucl = 0.00672

Results for Management (based on BSM analysis)
Fmsy = 0.304, 95% CL = 0.205 - 0.451 (if B > 1/2 Bmsy then Fmsy = 0.5 r)
Fmsy = 0.195, 95% CL = 0.131 - 0.289 (r and Fmsy are linearly reduced if B < 1/2 Bmsy)
MSY = 3.2, 95% CL = 2.62 - 3.91
Bmsy = 10.5, 95% CL = 7.44 - 14.9
Biomass in last year = 3.38, 2.5th perc = 1.02, 97.5 perc = 6.9
B/Bmsy in last year = 0.32, 2.5th perc = 0.0966, 97.5 perc = 0.655
Fishing mortality in last year = 0.204, 2.5th perc = 0.0997, 97.5 perc = 0.676
F/Fmsy = 1.05, 2.5th perc = 0.512, 97.5 perc = 3.47

Stock status and exploitation in 2014
Biomass = , B/Bmsy = , fishing mortality F = , F/Fmsy =
Comment: Catch=landings from FishStat (Italy). CPUE from MEDIT. RF final 0.3. GS OK [Thanasis source]

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Species: *Loligo vulgaris*, stock: Loli_vul_AD

European squid in Adriatic Sea

Source:

Region: Mediterranean, Adriatic Sea

Catch data used from years 1970 - 2013, abundance = CPUE

Prior initial relative biomass = 0.5 - 0.9 expert

Prior intermediate rel. biomass= 0.01 - 0.4 in year 2000 expert

Prior final relative biomass = 0.01 - 0.3 expert

Prior range for r = 0.2 - 0.8 default, prior range for k = 2.94 - 47

Prior range of q = 0.00091 - 0.00364

Results of CMSY analysis with altogether 726 viable trajectories for 674 r-k pairs

\[ r = 0.359, \text{ 95% CL} = 0.269 - 0.478, k = 15.5, \text{ 95% CL} = 12.1 - 19.8 \]

\[ \text{MSY} = 1.39, \text{ 95% CL} = 1.24 - 1.56 \]

Relative biomass last year = 0.101 k, 2.5th = 0.0138, 97.5th = 0.267

Exploitation \( F/(r/2) \) in last year = 0.428

Results from Bayesian Schaefer model using catch & CPUE

\[ r = 0.338, \text{ 95% CL} = 0.222 - 0.513, k = 16.3, \text{ 95% CL} = 11.8 - 22.4 \]

\[ \text{MSY} = 1.37, \text{ 95% CL} = 1.14 - 1.65 \]

Relative biomass in last year = 0.0533 k, 2.5th perc = 0.0121, 97.5th perc = 0.199

Exploitation \( F/(r/2) \) in last year = 0.683

\[ q = 0.00145, lcl = 0.00105, ucl = 0.002 \]

Results for Management (based on CMSY analysis)

\[ F_{\text{msy}} = 0.179, \text{ 95% CL} = 0.135 - 0.239 \] (if \( B > 1/2 \text{ Bmsy} \) then \( F_{\text{msy}} = 0.5 \ r \))

\[ F_{\text{msy}} = 0.0722, \text{ 95% CL} = 0.0542 - 0.0961 \] (r and \( F_{\text{msy}} \) are linearly reduced if \( B < 1/2 \text{ Bmsy} \))

\[ \text{MSY} = 1.39, \text{ 95% CL} = 1.24 - 1.56 \]

\[ \text{Bmsy} = 7.76, \text{ 95% CL} = 6.07 - 9.91 \]

Relative biomass in last year = 0.156, 2.5th perc = 0.214, 97.5 perc = 4.15

\[ B/\text{Bmsy} \text{ in last year} = 0.201, 2.5th perc = 0.0276, 97.5 perc = 0.535 \]

Fishing mortality in last year = 0.0641, 2.5th perc = 0.00241, 7.5 perc = 0.468

\[ F/\text{Fmsy} = 0.888, 2.5th perc = 0.334, 97.5 perc = 6.48 \]

Stock status and exploitation in 2014

Biomass = , \( B/\text{Bmsy} = \), fishing mortality \( F = \), \( F/\text{Fmsy} = \)

Comment: Catch=landings from FishStat. CPUE from MEDITS. RF int 2000 0.01-0.4, final 0.3. GS OK,
Species: *Lophius* spp., stock: Lophius_AD

Blackbellied angler in Adriatic Sea

Source:
Region: Mediterranean, Adriatic Sea
Catch data used from years 1970 - 2013, abundance = None
Prior initial relative biomass = 0.2 - 0.6 expert
Prior intermediate rel. biomass= 0.01 - 0.4 in year 1998 default
Prior final relative biomass = 0.1 - 0.5 expert
Prior range for $r = 0.2 - 0.54$ expert, prior range for $k = 1.25 - 13.4$

Results of CMSY analysis with altogether 1493 viable trajectories for 814 r-k pairs
$r = 0.422, \ 95\% \ CL = 0.334 - 0.534, \ k = 3.57, \ 95\% \ CL = 2.67 - 4.77$

MSY = 0.377, 95% CL = 0.338 - 0.42
Relative biomass last year = 0.358 k, 2.5th = 0.13, 97.5th = 0.492
Exploitation $F/(r/2)$ in last year = 1.16

Results for Management (based on CMSY analysis)
Fmsy = 0.211, 95% CL = 0.167 - 0.267 (if $B > 1/2 Bmsy$ then $Fmsy = 0.5 r$)
Fmsy = 0.211, 95% CL = 0.167 - 0.267 ($r$ and $Fmsy$ are linearly reduced if $B < 1/2 Bmsy$)
MSY = 0.377, 95% CL = 0.338 - 0.42

$Bmsy = 1.79, \ 95\% \ CL = 1.34 - 2.39$

Biomass in last year = 1.28, 2.5th perc = 0.465, 97.5 perc = 1.76
B/Bmsy in last year = 0.716, 2.5th perc = 0.261, 97.5 perc = 0.984
Fishing mortality in last year = 0.196, 2.5th perc = 0.142, 97.5 perc = 0.537
$F/Fmsy = 0.926, \ 2.5th \ perc = 0.674, \ 97.5 \ perc = 2.55$

Stock status and exploitation in 2014
Biomass = , B/Bmsy = , fishing mortality $F = , F/Fmsy =$
Comment: Catch=landings from FishStat (Italy). RF final 0.1-0.5. GS OK

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Species: *Merluccius merluccius*, stock: Merl_mer_AD

Hake in Adriatic Sea  
Source: STECF 16-08  
Region: Mediterranean, Adriatic Sea  
Catch data used from years 1978 - 2013, abundance = CPUE  
Prior initial relative biomass = 0.2 - 0.6 expert  
Prior intermediate rel. biomass = 0.01 - 0.3 in year 1997 expert  
Prior final relative biomass = 0.01 - 0.3 expert  
Prior range for r = 0.22 - 0.95 expert, prior range for k = 36.9 - 637  
Prior range of q = 0.00158 - 0.00658

Results of CMSY analysis with altogether 1427 viable trajectories for 1206 r-k pairs  
r = 0.475, 95% CL = 0.328 - 0.688, k = 177, 95% CL = 131 - 238  
MSY = 21, 95% CL = 18.9 - 23.3  
Relative biomass last year = 0.119 k, 2.5th = 0.016, 97.5th = 0.291  
Exploitation F/(r/2) in last year = 1.89

Results from Bayesian Schaefer model using catch & CPUE  
r = 0.579, 95% CL = 0.422 - 0.795, k = 151, 95% CL = 117 - 193  
MSY = 21.8, 95% CL = 18.9 - 25.2  
Relative biomass in last year = 0.219 k, 2.5th perc = 0.142, 97.5th perc = 0.315  
Exploitation F/(r/2) in last year = 0.998  
q = 0.00218, lcl = 0.00164, ucl = 0.00289

Results for Management (based on CMSY analysis)  
Fmsy = 0.237, 95% CL = 0.164 - 0.344 (if B > 1/2 Bmsy then Fmsy = 0.5 r)  
Fmsy = 0.113, 95% CL = 0.0776 - 0.163 (r and Fmsy are linearly reduced if B < 1/2 Bmsy)  
MSY = 21, 95% CL = 18.9 - 23.3  
Bmsy = 88.3, 95% CL = 65.7 - 119  
Biomass in last year = 20.9, 2.5th perc = 2.83, 97.5 perc = 51.3  
B/Bmsy in last year = 0.237, 2.5th perc = 0.032, 97.5 perc = 0.581  
Fishing mortality in last year = 0.456, 2.5th perc = 0.186, 97.5 perc = 3.37  
F/Fmsy = 4.05, 2.5th perc = 1.65, 97.5 perc = 30

Stock status and exploitation in 2014  
Biomass = , B/Bmsy = , fishing mortality F = , F/Fmsy =  
Species: *Micromesistius poutassou*, stock: Micr_pou_AD

Blue whiting in Adriatic Sea
Source:
Region: Mediterranean, Adriatic Sea
Catch data used from years 1975 - 2013, abundance = CPUE
Prior initial relative biomass = 0.5 - 0.9 expert
Prior intermediate rel. biomass = 0.01 - 0.4 in year 1995 expert
Prior final relative biomass = 0.01 - 0.4 expert
Prior range for r = 0.21 - 1.1 expert, prior range for k = 1.56 - 32.5
Prior range of q = 0.0105 - 0.0479

Results of CMSY analysis with altogether 2221 viable trajectories for 1647 r-k pairs
r = 0.421, 95% CL = 0.286 - 0.621, k = 8.92, 95% CL = 6.72 - 11.9
MSY = 0.939, 95% CL = 0.834 - 1.06
Relative biomass last year = 0.178 k, 2.5th = 0.0151, 97.5th = 0.391
Exploitation F/(r/2) in last year = 0.379

Results from Bayesian Schaeffer model using catch & CPUE
r = 0.525, 95% CL = 0.327 - 0.843, k = 7.66, 95% CL = 5.25 - 11.2
MSY = 1.01, 95% CL = 0.869 - 1.17
Relative biomass in last year = 0.213 k, 2.5th perc = 0.0422, 97.5th perc = 0.445
Exploitation F/(r/2) in last year = 0.308
q = 0.0141, lcl = 0.00967, ucl = 0.0206

Results for Management (based on CMSY analysis)
Fmsy = 0.211, 95% CL = 0.143 - 0.31 (if B > 1/2 Bmsy then Fmsy = 0.5 r)
Fmsy = 0.15, 95% CL = 0.102 - 0.221 (r and Fmsy are linearly reduced if B < 1/2 Bmsy)
MSY = 0.939, 95% CL = 0.834 - 1.06
Bmsy = 4.46, 95% CL = 3.36 - 5.93
Biomass in last year = 1.59, 2.5th perc = 0.135, 97.5 perc = 3.49
B/Bmsy in last year = 0.356, 2.5th perc = 0.0302, 97.5 perc = 0.782
Fishing mortality in last year = 0.0831, 2.5th perc = 0.0378, 97.5 perc = 0.98
F/Fmsy = 0.554, 2.5th perc = 0.252, 97.5 perc = 6.54

Stock status and exploitation in 2014
Biomass = , B/Bmsy = , fishing mortality F = , F/Fmsy =
Comment: Catch=landings from FishStat (Italy, Croatia). CPUE from MEDITS. RF int 2000 0.01-0.4. GS OK

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Species: *Mullus barbatus*, stock: Mull_bar_AD

Red mullet in Adriatic Sea
Source: STECF 16-08
Region: Mediterranean, Adriatic Sea
Catch data used from years 1975 - 2013, abundance = CPUE
Prior initial relative biomass = 0.2 - 0.6 expert
Prior intermediate rel. biomass = 0.01 - 0.4 in year 1990 expert
Prior final relative biomass = 0.01 - 0.4 expert
Prior range for r = 0.22 - 1.2 expert, prior range for k = 4.22 - 95.8
Prior range of q = 0.000928 - 0.00443

Results of CMSY analysis with altogether 751 viable trajectories for 751 r-k pairs
r = 0.497, 95% CL = 0.382 - 0.645, k = 31.8, 95% CL = 23.6 - 43
MSY = 3.95, 95% CL = 3.65 - 4.28
Relative biomass last year = 0.254 k, 2.5th = 0.0557, 97.5th = 0.396
Exploitation F/(r/2) in last year = 1.71

Results from Bayesian Schaefer model using catch & CPUE
r = 0.681, 95% CL = 0.422 - 1.1, k = 22, 95% CL = 14.1 - 34.3
MSY = 3.74, 95% CL = 3.21 - 4.36
Relative biomass in last year = 0.392 k, 2.5th perc = 0.235, 97.5th perc = 0.495
Exploitation F/(r/2) in last year = 1.15
q = 0.00143, lcl = 0.00103, ucl = 0.00198

Results for Management (based on CMSY analysis)
Fmsy = 0.248, 95% CL = 0.191 - 0.322 (if B > 1/2 Bmsy then Fmsy = 0.5 r)
Fmsy = 0.248, 95% CL = 0.191 - 0.322 (r and Fmsy are linearly reduced if B < 1/2 Bmsy)
MSY = 3.95, 95% CL = 3.65 - 4.28
Bmsy = 15.9, 95% CL = 11.8 - 21.5
Biomass in last year = 8.07, 2.5th perc = 1.77, 97.5 perc = 12.6
B/Bmsy in last year = 0.507, 2.5th perc = 0.111, 97.5 perc = 0.792
Fishing mortality in last year = 0.418, 2.5th perc = 0.267, 97.5 perc = 1.9
F/Fmsy = 1.68, 2.5th perc = 1.08, 97.5 perc = 7.66

Stock status and exploitation in 2014
Biomass = , B/Bmsy = , fishing mortality F = , F/Fmsy =
Comment: GSA 17 Fishstat - MEDITS 17 (From SGMED 2014). GS OK
Species: *Oblada melanura*, stock: Obla_mel_AD

Saddled seabream in Adriatic Sea

Source:

Region: Mediterranean, Adriatic Sea

Catch data used from years 1972 - 2014, abundance = None

Prior initial relative biomass = 0.2 - 0.6 expert

Prior intermediate rel. biomass = 0.2 - 0.6 in year 1995 expert

Prior final relative biomass = 0.01 - 0.3 expert

Prior range for r = 0.68 - 0.88 expert, prior range for k = 0.277 - 1.43

Results of CMSY analysis with altogether 30 viable trajectories for 30 r-k pairs

\[ r = 0.78, \text{ 95\% CL} = 0.717 - 0.849, \text{ 95\% CL} = 0.839 - 1.05 \]

\[ MSY = 0.183, \text{ 95\% CL} = 0.161 - 0.208 \]

Relative biomass last year = 0.0803 k, 2.5th = 0.0129, 97.5th = 0.227

Exploitation \( F/(r/2) \) in last year = 1.42

Results for Management (based on CMSY analysis)

\[ F_{msy} = 0.39, \text{ 95\% CL} = 0.359 - 0.425 \] (if \( B > 1/2 \) Bmsy then \( F_{msy} = 0.5 \) r)

\[ MSY = 0.183, \text{ 95\% CL} = 0.161 - 0.208 \]

\[ B_{msy} = 0.469, \text{ 95\% CL} = 0.419 - 0.525 \]

Biomass in last year = 0.0754, 2.5th perc = 0.0121, 97.5 perc = 0.213

\[ B/B_{msy} \text{ in last year } = 0.161, \text{ 2.5th perc} = 0.0259, \text{ 97.5 perc} = 0.453 \]

Fishing mortality in last year = 0.451, 2.5th perc = 0.16, 97.5 perc = 2.8

\[ F/F_{msy} = 3.6, \text{ 2.5th perc} = 1.28, \text{ 97.5 perc} = 22.3 \]

Stock status and exploitation in 2014

Biomass = 0.0754, \( B/B_{msy} = 0.161 \), fishing mortality \( F = 0.451 \), \( F/F_{msy} = 3.6 \)

Comment: Catch=landings from FishStat (Italy, Croatia). RF int 1995 0.2-0.6, final 0.3. GS OK

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Species: *Pagellus erythrinus*, stock: Page_ery_AD

Common pandora in Adriatic Sea

Source:
Region: Mediterranean, Adriatic Sea
Catch data used from years 1970 - 2013, abundance = CPUE
Prior initial relative biomass = 0.2 - 0.6 expert
Prior intermediate rel. biomass = 0.01 - 0.3 in year 1996 expert
Prior final relative biomass = 0.01 - 0.3 expert
Prior range for r = 0.22 - 0.97 expert, prior range for k = 0.717 - 12.6
Prior range of q = 0.00505 - 0.0212

Results of CMSY analysis with altogether 555 viable trajectories for 510 r-k pairs
r = 0.368, 95% CL = 0.296 - 0.457, k = 3.9, 95% CL = 2.99 - 5.1
MSY = 0.359, 95% CL = 0.295 - 0.437
Relative biomass last year = 0.125 k, 2.5th = 0.0128, 97.5th = 0.298
Exploitation F/(r/2) in last year = 1.05

Results from Bayesian Schaefer model using catch & CPUE
r = 0.465, 95% CL = 0.289 - 0.748, k = 3.01, 95% CL = 2.02 - 4.47
MSY = 0.35, 95% CL = 0.306 - 0.4
Relative biomass in last year = 0.141 k, 2.5th perc = 0.0236, 97.5th perc = 0.329
Exploitation F/(r/2) in last year = 0.799
q = 0.00712, lcl = 0.00501, ucl = 0.0101

Results for Management (based on CMSY analysis)
Fmsy = 0.184, 95% CL = 0.148 - 0.228 (if B > 1/2 Bmsy then Fmsy = 0.5 r)
Fmsy = 0.092, 95% CL = 0.0741 - 0.114 (r and Fmsy are linearly reduced if B < 1/2 Bmsy)
MSY = 0.359, 95% CL = 0.295 - 0.437
Bmsy = 1.95, 95% CL = 1.49 - 2.55
Biomass in last year = 0.488, 2.5th perc = 0.0498, 97.5 perc = 1.16
B/Bmsy in last year = 0.25, 2.5th perc = 0.0255, 97.5 perc = 0.596
Fishing mortality in last year = 0.162, 2.5th perc = 0.068, 97.5 perc = 1.59
F/Fmsy = 1.76, 2.5th perc = 0.739, 97.5 perc = 17.2

Stock status and exploitation in 2014
Biomass = , B/Bmsy = , fishing mortality F = , F/Fmsy =

Comment: Catch=landings from FishStat (Croatia, Italy, Slovenia). CPUE from MEDITS. RF final 0.3. GS OK

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Species: *Palinurus elephas*, stock: Pali_ele_AD

Common spiny lobster in Adriatic Sea

Source:
Region: Mediterranean, Adriatic Sea
Catch data used from years 1972 - 2014, abundance = None
Prior initial relative biomass = 0.2 - 0.6 expert
Prior intermediate rel. biomass = 0.01 - 0.4 in year 2007 default
Prior final relative biomass = 0.01 - 0.4, default
Prior range for r = 0.05 - 0.5 default, prior range for k = 0.164 - 6.56

Results of CMSY analysis with altogether 4368 viable trajectories for 2841 r-k pairs
r = 0.225, 95% CL = 0.127 - 0.399, k = 0.847, 95% CL = 0.433 - 1.66
MSY = 0.0477, 95% CL = 0.0325 - 0.0701
Relative biomass last year = 0.182 k, 2.5th = 0.0142, 97.5th = 0.392
Exploitation F/(r/2) in last year = 0.632

Results for Management (based on CMSY analysis)
Fmsy = 0.113, 95% CL = 0.0637 - 0.199 (if B > 1/2 Bmsy then Fmsy = 0.5 r)
Fmsy = 0.0821, 95% CL = 0.0465 - 0.145 (r and Fmsy are linearly reduced if B < 1/2 Bmsy)
MSY = 0.0477, 95% CL = 0.0325 - 0.0701
Bmsy = 0.424, 95% CL = 0.217 - 0.829
Biomass in last year = 0.154, 2.5th perc = 0.012, 97.5 perc = 0.332
B/Bmsy in last year = 0.364, 2.5th perc = 0.0284, 97.5 perc = 0.785
Fishing mortality in last year = 0.0648, 2.5th perc = 0.0301, 97.5 perc = 0.831
F/Fmsy = 0.788, 2.5th perc = 0.366, 97.5 perc = 10.1

Stock status and exploitation in 2014
Biomass = 0.154, B/Bmsy = 0.364, fishing mortality F = 0.0648, F/Fmsy = 0.788
Comment: Catch=landings from FishStat (Italy, Croatia). GS OK

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Species: *Pecten jacobus*, stock: Pect_jac_AD

Scallop in Adriatic Sea

Source:
Region: Mediterranean, Adriatic Sea
Catch data used from years 1972 - 2015, abundance = CPUE
Prior initial relative biomass = 0.5 - 0.9 expert
Prior intermediate rel. biomass = 0.01 - 0.4 in year 1990 expert
Prior final relative biomass = 0.01 - 0.3 expert
Prior range for r = 0.2 - 0.8 default, prior range for k = 1.94 - 31
Prior range of q = 0.00604 - 0.0241

Results of CMSY analysis with altogether 2652 viable trajectories for 1670 r-k pairs
r = 0.453 , 95% CL = 0.286 - 0.718 , k = 8.05 , 95% CL = 5.85 - 11.1
MSY = 0.911 , 95% CL = 0.819 - 1.01
Relative biomass last year = 0.0943 k, 2.5th = 0.0126 , 97.5th = 0.287
Exploitation F/(r/2) in last year = 0.425

Results from Bayesian Schaefer model using catch & CPUE
r = 0.433 , 95% CL = 0.254 - 0.739 , k = 8.47 , 95% CL = 5.71 - 12.6
MSY = 0.917 , 95% CL = 0.762 - 1.1
Relative biomass in last year = 0.0296 k, 2.5th perc = 0.0114 , 97.5th perc = 0.0939
Exploitation F/(r/2) in last year = 0.917
q = 0.00869 , lcl = 0.00617 , ucl = 0.0123

Results for Management (based on CMSY analysis)
Fmsy = 0.226 , 95% CL = 0.143 - 0.359 (if B > 1/2 Bmsy then Fmsy = 0.5 r)
Fmsy = 0.0854 , 95% CL = 0.0538 - 0.135 (r and Fmsy are linearly reduced if B < 1/2 Bmsy)
MSY = 0.911 , 95% CL = 0.819 - 1.01
Bmsy = 4.02 , 95% CL = 2.93 - 5.53
Biomass in last year = 0.759 , 2.5th perc = 0.102 , 97.5 perc = 2.31
B/Bmsy in last year = 0.189 , 2.5th perc = 0.0252 , 97.5 perc = 0.574
Fishing mortality in last year = 0.0656 , 2.5th perc = 0.0216 , 97.5 perc = 0.491
F/Fmsy = 0.769 , 2.5th perc = 0.252 , 97.5 perc = 5.75

Stock status and exploitation in 2014
Biomass = 0.738 , B/Bmsy = 0.183 , fishing mortality F = 0.105 , F/Fmsy = 1.26
Comment: Catch=landings from FishStat. Final 0.3.

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Species: *Penaeus kerathurus*, stock: Pena_ker_AD

Caramote prawn in Adriatic

Source:
Region: Mediterranean, Adriatic Sea
Catch data used from years 1972 - 2015, abundance = CPUE
Prior initial relative biomass = 0.5 - 0.9 expert
Prior intermediate rel. biomass = 0.5 - 0.9 in year 1990 expert
Prior final relative biomass = 0.5 - 0.9 expert
Prior range for r = 0.6 - 1.5 default, prior range for k = 0.759 - 11.4
Prior range of q = 0.00414 - 0.0131

Results of CMSY analysis with altogether 3354 viable trajectories for 1039 r-k pairs
r = 1.19, 95% CL = 0.962 - 1.48, k = 1.6, 95% CL = 1.18 - 2.17
MSY = 0.477, 95% CL = 0.401 - 0.568
Relative biomass last year = 0.61 k, 2.5th = 0.507, 97.5th = 0.786
Exploitation F/(r/2) in last year = 0.739

Results from Bayesian Schaefer model using catch & CPUE
r = 1.07, 95% CL = 0.752 - 1.52, k = 1.84, 95% CL = 1.4 - 2.42
MSY = 0.493, 95% CL = 0.4 - 0.607
Relative biomass in last year = 0.647 k, 2.5th perc = 0.456, 97.5th perc = 0.831
Exploitation F/(r/2) in last year = 0.829
q = 0.00626, lcl = 0.00482, ucl = 0.00813

Results for Management (based on CMSY analysis)
Fmsy = 0.597, 95% CL = 0.481 - 0.741 (if B > 1/2 Bmsy then Fmsy = 0.5 r)
Fmsy = 0.597, 95% CL = 0.481 - 0.741 (r and Fmsy are linearly reduced if B < 1/2 Bmsy)
MSY = 0.477, 95% CL = 0.401 - 0.568
Bmsy = 0.8, 95% CL = 0.589 - 1.08
Biomass in last year = 0.976, 2.5th perc = 0.81, 97.5 perc = 1.26
B/Bmsy in last year = 1.22, 2.5th perc = 1.01, 97.5 perc = 1.57
Fishing mortality in last year = 0.541, 2.5th perc = 0.42, 97.5 perc = 0.652
F/Fmsy = 0.907, 2.5th perc = 0.704, 97.5 perc = 1.09

Stock status and exploitation in 2014
Biomass = 0.874, B/Bmsy = 1.09, fishing mortality F = 0.432, F/Fmsy = 0.723
Comment: RF OK

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Species: *Scophthalmus maximus*, stock: Pset_max_AD

Turbot in Adriatic Sea

Source:
Region: Mediterranean, Adriatic Sea
Catch data used from years 1970 - 2013, abundance = CPUE
Prior initial relative biomass = 0.2 - 0.6 expert
Prior intermediate rel. biomass = 0.2 - 0.6 in year 2006 default
Prior final relative biomass = 0.5 - 0.9, default
Prior range for r = 0.25 - 0.82 expert, prior range for k = 21.2 - 417
Prior range of q = 2.36e-05 - 8.54e-05

Results of CMSY analysis with altogether 2531 viable trajectories for 1704 r-k pairs
r = 0.611, 95% CL = 0.461 - 0.811, k = 45.7, 95% CL = 32.9 - 63.4
MSY = 6.98, 95% CL = 6.39 - 7.62
Relative biomass last year = 0.525 k, 2.5th = 0.501, 97.5th = 0.605
Exploitation F/(r/2) in last year = 0.96

Results from Bayesian Schaefer model using catch & CPUE
r = 0.455, 95% CL = 0.302 - 0.687, k = 65.8, 95% CL = 48.5 - 89.1
MSY = 7.49, 95% CL = 5.93 - 9.46
Relative biomass in last year = 0.584 k, 2.5th perc = 0.446, 97.5th perc = 0.774
Exploitation F/(r/2) in last year = 0.931
q = 4.04e-05, lcl = 3.05e-05, ucl = 5.35e-05

Results for Management (based on BSM analysis)
Fmsy = 0.228, 95% CL = 0.151 - 0.344 (if B > 1/2 Bmsy then Fmsy = 0.5 r)
Fmsy = 0.228, 95% CL = 0.151 - 0.344 (r and Fmsy are linearly reduced if B < 1/2 Bmsy)
MSY = 7.49, 95% CL = 5.93 - 9.46
Bmsy = 32.9, 95% CL = 24.3 - 44.5
Biomass in last year = 38.4, 2.5th perc = 29.3, 97.5 perc = 50.9
B/Bmsy in last year = 1.17, 2.5th perc = 0.891, 97.5 perc = 1.55
Fishing mortality in last year = 0.212, 2.5th perc = 0.16, 97.5 perc = 0.278
F/Fmsy = 0.931, 2.5th perc = 0.702, 97.5 perc = 1.22

Stock status and exploitation in 2014
Biomass = , B/Bmsy = , fishing mortality F = , F/Fmsy =
Comment: Catch=landings from FishStat. CPUE from SOLEMON
Species: *Scophthalmus rhombus*, stock: Scop_rho_AD

Brill in Adriatic
Source:
Region: Mediterranean, Adriatic Sea
Catch data used from years 1972 - 2015, abundance = CPUE
Prior initial relative biomass = 0.5 - 0.9 expert
Prior intermediate rel. biomass = 0.01 - 0.4 in year 1990 expert
Prior final relative biomass = 0.01 - 0.4 expert
Prior range for $r = 0.2 - 0.8$ default, prior range for $k = 0.716 - 11.5$
Prior range of $q = 0.0116 - 0.0465$

Results of CMSY analysis with altogether 1460 viable trajectories for 1089 r-k pairs
$r = 0.407$, 95% CL = 0.257 - 0.643, $k = 3.12$, 95% CL = 2.38 - 4.09
MSY = 0.317, 95% CL = 0.289 - 0.348
Relative biomass last year = 0.129 $k$, 2.5th = 0.012, 97.5th = 0.384
Exploitation $F/(r/2)$ in last year = 0.749

Results from Bayesian Schaefer model using catch & CPUE
$r = 0.424$, 95% CL = 0.256 - 0.703, $k = 3.03$, 95% CL = 2.02 - 4.53
MSY = 0.321, 95% CL = 0.274 - 0.377
Relative biomass in last year = 0.0373 $k$, 2.5th perc = 0.0123, 97.5th perc = 0.102
Exploitation $F/(r/2)$ in last year = 2.71
$q = 0.0172$, lcl = 0.0125, ucl = 0.0236

Results for Management (based on CMSY analysis)
$F_{msy} = 0.203$, 95% CL = 0.129 - 0.321 (if $B > 1/2 B_{msy}$ then $F_{msy} = 0.5 r$)
$F_{msy} = 0.105$, 95% CL = 0.0661 - 0.165 ($r$ and $F_{msy}$ are linearly reduced if $B < 1/2 B_{msy}$)
MSY = 0.317, 95% CL = 0.289 - 0.348
$B_{msy} = 1.56$, 95% CL = 1.19 - 2.04
$B$/$B_{msy}$ in last year = 0.401, 2.5th perc = 0.0373, 97.5 perc = 1.2
Fishing mortality in last year = 0.162, 2.5th perc = 0.0542, 97.5 perc = 1.74
$F/F_{msy} = 1.55$, 2.5th perc = 0.519, 97.5 perc = 16.7

Stock status and exploitation in 2014
$B$ = 0.399, $B$/$B_{msy} = 0.256$, fishing mortality $F = 0.172$, $F/F_{msy} = 1.66$
Comment: RF OK

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Species: *Sardina pilchardus*, stock: Sard_pil_AD

Sardine in Adriatic Sea  
Source: EASME EMFF 2014, M from Colloca et al 2013  
Region: Mediterranean, Adriatic Sea  
Catch data used from years 1975 - 2013, abundance = CPUE  
Prior initial relative biomass = 0.2 - 0.6 expert  
Prior intermediate rel. biomass = 0.01 - 0.4 in year 2005 expert  
Prior final relative biomass = 0.01 - 0.4 expert  
Prior range for r = 0.27 - 1.1 expert, prior range for k = 84.7 - 1381  
Prior range of q = 1.94 - 7.83

Results of CMSY analysis with altogether 414 viable trajectories for 407 r-k pairs  
r = 0.484, 95% CL = 0.401 - 0.586, k = 550, 95% CL = 415 - 728  
MSY = 66.6, 95% CL = 55.8 - 79.6  
Relative biomass last year = 0.284 k, 2.5th = 0.0153, 97.5th = 0.396  
Exploitation F/(r/2) in last year = 1.53

Results from Bayesian Schaefer model using catch & CPUE  
r = 0.687, 95% CL = 0.484 - 0.976, k = 401, 95% CL = 298 - 540  
MSY = 68.9, 95% CL = 62 - 76.7  
Relative biomass in last year = 0.338 k, 2.5th perc = 0.17, 97.5th perc = 0.472  
Exploitation F/(r/2) in last year = 1.28  
q = 2.86, lcl = 2.11, ucl = 3.87

Results for Management (based on CMSY analysis)  
Fmsy = 0.242, 95% CL = 0.2 - 0.293 (if B > 1/2 Bmsy then Fmsy = 0.5 r)  
Fmsy = 0.242, 95% CL = 0.2 - 0.293 (r and Fmsy are linearly reduced if B < 1/2 Bmsy)  
MSY = 66.6, 95% CL = 55.8 - 79.6  
Bmsy = 275, 95% CL = 208 - 364  
Biomass in last year = 156, 2.5th perc = 8.41, 97.5 perc = 218  
B/Bmsy in last year = 0.568, 2.5th perc = 0.0306, 97.5 perc = 0.791  
Fishing mortality in last year = 0.383, 2.5th perc = 0.275, 97.5 perc = 7.11  
F/Fmsy = 1.58, 2.5th perc = 1.14, 97.5 perc = 29.4

Stock status and exploitation in 2014  
Biomass = , B/Bmsy = , fishing mortality F = , F/Fmsy =  
Comment: Landings from Stock assessment from GFCM 2015 (17+18) MEDIAS 17+18. GS OK, similar to SAM  

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Species: *Sepia officinalis*, stock: Sepi_off_AD

Cuttlefish in Adriatic Sea

Source:

Region: Mediterranean, Adriatic Sea

Catch data used from years 1972 - 2015, abundance = CPUE

Prior initial relative biomass = 0.5 - 0.9 expert

Prior intermediate rel. biomass = 0.01 - 0.4 in year 1990 expert

Prior final relative biomass = 0.01 - 0.4 expert

Prior range for r = 0.2 - 0.8 default, prior range for k = 8.99 - 144

Prior range of q = 0.00205 - 0.00821

Results of CMSY analysis with altogether 254 viable trajectories for 245 r-k pairs

\[ r = 0.517, \; 95\% \; CL = 0.343 - 0.779, \; k = 29.5, \; 95\% \; CL = 20.5 - 42.6 \]

MSY = 3.81, 95% CL = 3.36 - 4.34

Relative biomass last year = 0.229 k, 2.5th = 0.0214, 97.5th = 0.395

Exploitation \( F/(r/2) \) in last year = 1.89

Results from Bayesian Schaefer model using catch & CPUE

\[ r = 0.44, \; 95\% \; CL = 0.297 - 0.652, \; k = 35.3, \; 95\% \; CL = 25.5 - 48.9 \]

MSY = 3.88, 95% CL = 3.37 - 4.48

Relative biomass in last year = 0.318 k, 2.5th perc = 0.152, 97.5th perc = 0.454

Exploitation \( F/(r/2) \) in last year = 1.38

q = 0.00323, lcl = 0.00245, ucl = 0.00427

Results for Management (based on CMSY analysis)

Fmsy = 0.258, 95% CL = 0.171 - 0.39 (if \( B > 1/2 \) Bmsy then Fmsy = 0.5 r)

Fmsy = 0.236, 95% CL = 0.157 - 0.356 (r and Fmsy are linearly reduced if \( B < 1/2 \) Bmsy)

MSY = 3.81, 95% CL = 3.36 - 4.34

Bmsy = 14.8, 95% CL = 10.2 - 21.3

Biomass in last year = 6.75, 2.5th perc = 0.631, 97.5 perc = 11.7

B/Bmsy in last year = 0.457, 2.5th perc = 0.0428, 97.5 perc = 0.79

Fishing mortality in last year = 0.505, 2.5th perc = 0.292, 97.5 perc = 5.4

F/Fmsy = 2.14, 2.5th perc = 1.24, 97.5 perc = 22.9

Stock status and exploitation in 2014

Biomass = 7.14, B/Bmsy = 0.484, fishing mortality F = 0.464, F/Fmsy = 1.85

Comment: Catch=landings from FishStat (Croatia, Italy, Serbia and Montenegro, Yugoslavia, Montenegro). CPUE from SOLEMON. RF final 0.3.
Species: *Seriola dumerili*, stock: Seri_dum_AD

Greater amberjack in Adriatic Sea

Source:

Region: Mediterranean, Adriatic Sea

Catch data used from years 1970 - 2014, abundance = None

Prior initial relative biomass = 0.5 - 0.9 expert

Prior intermediate rel. biomass = 0.3 - 0.7 in year 2000 expert

Prior final relative biomass = 0.3 - 0.7 expert

Prior range for \( r \) = 0.44 - 0.84 expert, prior range for \( k \) = 0.102 - 0.782

Results of CMSY analysis with altogether 10113 viable trajectories for 1559 \( r \)-\( k \) pairs

\( r = 0.715, \ 95\% \ CL = 0.613 - 0.835, \ k = 0.306, \ 95\% \ CL = 0.239 - 0.392 \)

\( MSY = 0.0547, \ 95\% \ CL = 0.0457 - 0.0656 \)

Relative biomass last year = 0.67 \( k \), 2.5th = 0.479, 97.5th = 0.699

Exploitation \( F/(r/2) \) in last year = 0.923

Results for Management (based on CMSY analysis)

\( F_{msy} = 0.358, \ 95\% \ CL = 0.307 - 0.417 \) (if \( B > 1/2 B_{msy} \) then \( F_{msy} = 0.5 \ r \))

\( F_{msy} = 0.358, \ 95\% \ CL = 0.307 - 0.417 \) (\( r \) and \( F_{msy} \) are linearly reduced if \( B < 1/2 B_{msy} \))

\( MSY = 0.0547, \ 95\% \ CL = 0.0457 - 0.0656 \)

\( B_{msy} = 0.153, \ 95\% \ CL = 0.12 - 0.196 \)

Biomass in last year = 0.205, 2.5th perc = 0.147, 97.5 perc = 0.214

B/B_{msy} in last year = 1.34, 2.5th perc = 0.958, 97.5 perc = 1.4

Fishing mortality in last year = 0.454, 2.5th perc = 0.435, 97.5 perc = 0.634

\( F/F_{msy} = 1.27, \ 2.5th \ perc = 1.22, \ 97.5 \ perc = 1.77 \)

Stock status and exploitation in 2014

Biomass = 0.205, B/B_{msy} = 1.34, fishing mortality F = 0.454, F/F_{msy} = 1.27

Comment: Catch=landings from FishStat (Italy, Croatia). RF int 2000 0.3-0.7, final 0.3-0.7. GS OK

-------------------------------------------------------------------------------------------------------------------
Species: *Solea solea*, stock: Sole_sol_AD

Common sole in Adriatic Sea
Source: EASME EMFF 2014, M from Colloca et al 2013
Region: Mediterranean, Adriatic Sea
Catch data used from years 1972 - 2015, abundance = CPUE
Prior initial relative biomass = 0.5 - 0.9 expert
Prior intermediate rel. biomass = 0.01 - 0.4 in year 1990 expert
Prior final relative biomass = 0.01 - 0.4 expert
Prior range for r = 0.21 - 1 expert, prior range for k = 2.48 - 48.2
Prior range of q = 0.0068 - 0.03

Results of CMSY analysis with altogether 3114 viable trajectories for 1890 r-k pairs
r = 0.616, 95% CL = 0.397 - 0.956, k = 11.3, 95% CL = 7.78 - 16.4
MSY = 1.74, 95% CL = 1.62 - 1.87
Relative biomass last year = 0.3 k, 2.5th = 0.0277, 97.5th = 0.397
Exploitation $F/(r/2)$ in last year = 1.74

Results from Bayesian Schaefer model using catch & CPUE
r = 0.643, 95% CL = 0.45 - 0.917, k = 11.2, 95% CL = 8.13 - 15.5
MSY = 1.8, 95% CL = 1.64 - 1.98
Relative biomass in last year = 0.403 k, 2.5th perc = 0.238, 97.5th perc = 0.505
Exploitation $F/(r/2)$ in last year = 1.48
q = 0.0101, lcl = 0.00758, ucl = 0.0135

Results for Management (based on CMSY analysis)
Fmsy = 0.308, 95% CL = 0.198 - 0.478 (if B > 1/2 Bmsy then Fmsy = 0.5 r)
Fmsy = 0.308, 95% CL = 0.198 - 0.478 (r and Fmsy are linearly reduced if B < 1/2 Bmsy)
MSY = 1.74, 95% CL = 1.62 - 1.87
Bmsy = 5.65, 95% CL = 3.89 - 8.21
Biomass in last year = 3.39, 2.5th perc = 0.313, 97.5 perc = 4.49
B/Bmsy in last year = 0.6, 2.5th perc = 0.0554, 97.5 perc = 0.794
Fishing mortality in last year = 0.634, 2.5th perc = 0.479, 97.5 perc = 6.87
F/Fmsy = 2.06, 2.5th perc = 1.56, 97.5 perc = 22.3

Stock status and exploitation in 2014
Biomass = 3.6, B/Bmsy = 0.637, fishing mortality F = 0.569, F/Fmsy = 1.85
Comment: Landings from Stock assessment SGMED 2015 - CPUE from SOLEMON Only 17. RF OK
Species: *Spondyliosoma cantharus*, stock: Spod_can_AD

Black seabream in Adriatic Sea

Source:
Region: Mediterranean, Adriatic Sea
Catch data used from years 1972 - 2014, abundance = None
Prior initial relative biomass = 0.2 - 0.6 expert
Prior intermediate rel. biomass = 0.01 - 0.4 in year 2004 default
Prior final relative biomass = 0.01 - 0.3 expert
Prior range for $r$ = 0.24 - 1.0 expert, prior range for $k$ = 0.06 - 1.05

Results of CMSY analysis with altogether 726 viable trajectories for 691 r-k pairs
$r = 0.472$, 95% CL = 0.381 - 0.585, $k = 0.392$, 95% CL = 0.293 - 0.523
MSY = 0.0462, 95% CL = 0.0398 - 0.0537
Relative biomass last year = 0.11 $k$, 2.5th = 0.0132, 97.5th = 0.283
Exploitation $F/(r/2)$ in last year = 0.691

Results for Management (based on CMSY analysis)
Fmsy = 0.236, 95% CL = 0.191 - 0.292 (if $B > 1/2 Bmsy$ then Fmsy = 0.5 $r$)
Fmsy = 0.104, 95% CL = 0.0836 - 0.128 ($r$ and Fmsy are linearly reduced if $B < 1/2 Bmsy$)
MSY = 0.0462, 95% CL = 0.0398 - 0.0537
Bmsy = 0.196, 95% CL = 0.146 - 0.262
Biomass in last year = 0.0429, 2.5th perc = 0.00516, 97.5 perc = 0.111
B/Bmsy in last year = 0.219, 2.5th perc = 0.0263, 97.5 perc = 0.565
Fishing mortality in last year = 0.21, 2.5th perc = 0.0813, 97.5 perc = 1.75
F/Fmsy = 2.03, 2.5th perc = 0.785, 97.5 perc = 16.9

Stock status and exploitation in 2014
Biomass = 0.0429, B/Bmsy = 0.219, fishing mortality $F = 0.21$, F/Fmsy = 2.03

Comment: Catch=landings from FishStat (Croatia, Serbia and Montenegro, Yugoslavia). RF final 0.3. GS OK

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Species: *Squilla mantis*, stock: Squi_man_AD

Mantis shrimp in Adriatic Sea
Source: STECF 16-08
Region: Mediterranean, Adriatic Sea
Catch data used from years 1970 - 2014, abundance = CPUE
Prior initial relative biomass = 0.2 - 0.6 expert
Prior intermediate rel. biomass = 0.01 - 0.4 in year 1995 expert
Prior final relative biomass = 0.2 - 0.6 expert
Prior range for r = 0.2 - 0.8 default, prior range for k = 5.78 - 92.5
Prior range of q = 0.000644 - 0.00258

Results of CMSY analysis with altogether 807 viable trajectories for 798 r-k pairs
r = 0.37, 95% CL = 0.275 - 0.496, k = 44.5, 95% CL = 32.7 - 60.7
MSY = 4.12, 95% CL = 3.29 - 5.15
Relative biomass last year = 0.35 k, 2.5th = 0.213, 97.5th = 0.566
Exploitation F/(r/2) in last year = 0.99

Results from Bayesian Schaefer model using catch & CPUE
r = 0.448, 95% CL = 0.292 - 0.689, k = 32, 95% CL = 21.8 - 47.2
MSY = 3.59, 95% CL = 3.11 - 4.15
Relative biomass in last year = 0.351 k, 2.5th perc = 0.191, 97.5th perc = 0.621
Exploitation F/(r/2) in last year = 1.25
q = 0.00109, lcl = 0.000803, ucl = 0.00148

Results for Management (based on CMSY analysis)
Fmsy = 0.185, 95% CL = 0.138 - 0.248 (if B > 1/2 Bmsy then Fmsy = 0.5 r)
Fmsy = 0.185, 95% CL = 0.138 - 0.248 (r and Fmsy are linearly reduced if B < 1/2 Bmsy)
MSY = 4.12, 95% CL = 3.29 - 5.15
Bmsy = 22.3, 95% CL = 16.4 - 30.3
Biomass in last year = 15.6, 2.5th perc = 9.49, 97.5 perc = 25.2
B/Bmsy in last year = 0.7, 2.5th perc = 0.426, 97.5 perc = 1.13
Fishing mortality in last year = 0.202, 2.5th perc = 0.125, 97.5 perc = 0.332
F/Fmsy = 1.09, 2.5th perc = 0.676, 97.5 perc = 1.8

Stock status and exploitation in 2014
Biomass = 15.6, B/Bmsy = 0.7, fishing mortality F = 0.202, F/Fmsy = 1.09
Comment: Catch=landings from FishStat (Italy, Croatia, Slovenia). GS OK
Species: *Trachurus spp*, stock: Trachurus_AD

Horse mackerels in Adriatic Sea

Source:
Region: Mediterranean, Adriatic Sea

Catch data used from years 1970 - 2014, abundance = None

Prior initial relative biomass = 0.2 - 0.6 expert
Prior intermediate relative biomass = 0.01 - 0.4 in year 1995 expert
Prior final relative biomass = 0.01 - 0.4 expert

Prior range for r = 0.2 - 0.8 default, prior range for k = 4.01 - 64.1

Results of CMSY analysis with altogether 653 viable trajectories for 622 r-k pairs

\[ r = 0.333, \quad 95\% \text{ CL} = 0.282 - 0.393, \quad k = 28.4, \quad 95\% \text{ CL} = 21.5 - 37.4 \]

MSY = 2.36, 95% CL = 1.9 - 2.93

Relative biomass last year = 0.197 k, 2.5th = 0.0201, 97.5th = 0.389

Exploitation \( F/(r/2) \) in last year = 0.934

Results for Management (based on CMSY analysis)

\[ F_{\text{msy}} = 0.166, \quad 95\% \text{ CL} = 0.141 - 0.197 \quad (\text{if } B > 1/2 B_{\text{msy}} \text{ then } F_{\text{msy}} = 0.5 r) \]

\[ F_{\text{msy}} = 0.131, \quad 95\% \text{ CL} = 0.111 - 0.155 \quad (r \text{ and } F_{\text{msy}} \text{ are linearly reduced if } B < 1/2 B_{\text{msy}}) \]

MSY = 2.36, 95% CL = 1.9 - 2.93

B_{\text{msy}} = 14.2, 95% CL = 10.8 - 18.7

Biomass in last year = 5.6, 2.5th perc = 0.57, 97.5 perc = 11

B/B_{\text{msy}} in last year = 0.395, 2.5th perc = 0.0402, 97.5 perc = 0.777

Fishing mortality in last year = 0.121, 2.5th perc = 0.0616, 97.5 perc = 1.19

\[ F/F_{\text{msy}} = 0.925, \quad 2.5th \text{ perc} = 0.469, \quad 97.5 \text{ perc} = 9.09 \]

Stock status and exploitation in 2014

Biomass = 5.6, B/B_{\text{msy}} = 0.395, fishing mortality F = 0.121, F/F_{\text{msy}} = 0.925

Comment: Catch=landings from FishStat (Italy, Croatia, Slovenia, Montenegro). GS OK

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Species: *Trisopterus minutus*, stock: Tris_min_AD

Poor cod in Adriatic Sea

Source:
Region: Mediterranean, Adriatic Sea
Catch data used from years 1990 - 2013, abundance = None
Prior initial relative biomass = 0.2 - 0.6 expert
Prior intermediate rel. biomass = 0.5 - 0.9 in year 2005 default
Prior final relative biomass = 0.01 - 0.3 expert
Prior range for r = 0.2 - 0.8 default, prior range for k = 0.484 - 7.75

Results of CMSY analysis with altogether 1820 viable trajectories for 1158 r-k pairs
r = 0.566, 95% CL = 0.407 - 0.785, k = 1.31, 95% CL = 0.877 - 1.95
MSY = 0.185, 95% CL = 0.161 - 0.213
Relative biomass last year = 0.145 k, 2.5th = 0.0174, 97.5th = 0.296
Exploitation F/(r/2) in last year = 1.62

Results for Management (based on CMSY analysis)
Fmsy = 0.283, 95% CL = 0.204 - 0.392 (if B > 1/2 Bmsy then Fmsy = 0.5 r)
Fmsy = 0.165, 95% CL = 0.119 - 0.228 (r and Fmsy are linearly reduced if B < 1/2 Bmsy)
MSY = 0.185, 95% CL = 0.161 - 0.213
Bmsy = 0.654, 95% CL = 0.439 - 0.976
Biomass in last year = 0.19, 2.5th perc = 0.0227, 97.5 perc = 0.387
B/Bmsy in last year = 0.291, 2.5th perc = 0.0347, 97.5 perc = 0.591
Fishing mortality in last year = 0.604, 2.5th perc = 0.297, 97.5 perc = 5.06
F/Fmsy = 3.67, 2.5th perc = 1.81, 97.5 perc = 30.8

Stock status and exploitation in 2014
Biomass = , B/Bmsy = , fishing mortality F = , F/Fmsy =
Comment: Catch=landings from FishStat. RF final 0.3. GS OK

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Species: *Aristeomorpha foliacea*, stock: ARISFOL_IS

Giant red shrimp in Ionian Sea

Source: STECF 16-08

Region: Mediterranean, Ionian Sea

Catch data used from years 1995 - 2014, abundance = CPUE

Prior initial relative biomass = 0.2 - 0.6 expert

Prior intermediate rel. biomass = 0.01 - 0.4 in year 2000 expert

Prior final relative biomass = 0.01 - 0.4 expert

Prior range for $r = 0.2 - 0.8$ default, prior range for $k = 2.96 - 47.3$

Prior range of $q = 0.000198 - 0.000791$

Results of CMSY analysis with altogether 1651 viable trajectories for 1135 r-k pairs

$r = 0.566$, 95% CL = 0.407 - 0.785, $k = 14.4$, 95% CL = 9.28 - 22.5

MSY = 2.04, 95% CL = 1.63 - 2.56

Relative biomass last year = 0.252 $k$, 2.5th perc = 0.024, 97.5th perc = 0.395

Exploitation $F/(r/2)$ in last year = 2.25

Results from Bayesian Schaefer model using catch & CPUE

$r = 0.624$, 95% CL = 0.415 - 0.937, $k = 12.4$, 95% CL = 8.42 - 18.1

MSY = 1.93, 95% CL = 1.71 - 2.17

Relative biomass in last year = 0.319 $k$, 2.5th perc = 0.186, 97.5th perc = 0.462

Exploitation $F/(r/2)$ in last year = 1.67

$q = 0.000319$, lcl = 0.000236, ucl = 0.000432

Results for Management (based on BSM analysis)

$Fmsy = 0.312$, 95% CL = 0.208 - 0.468 (if $B > 1/2$ Bmsy then $Fmsy = 0.5$ $r$)

$Fmsy = 0.312$, 95% CL = 0.208 - 0.468 ($r$ and $Fmsy$ are linearly reduced if $B < 1/2$ Bmsy)

MSY = 1.93, 95% CL = 1.71 - 2.17

Bmsy = 6.18, 95% CL = 4.21 - 9.07

Biomass in last year = 3.94, 2.5th perc = 2.3, 97.5 perc = 5.71

B/Bmsy in last year = 0.638, 2.5th perc = 0.372, 97.5 perc = 0.923

Fishing mortality in last year = 0.522, 2.5th perc = 0.361, 97.5 perc = 0.896

$F/Fmsy = 1.67$, 2.5th perc = 1.16, 97.5 perc = 2.87

Stock status and exploitation in 2014

Biomass = 3.94, B/Bmsy = 0.638, fishing mortality $F = 0.522$, $F/Fmsy = 1.67$

Comment: Catch=landings from FishStat (Italy), Biomass from Medits for GSAs 19+20. GS OK
Species: *Atherina boyeri*, stock: ATHEBOY_IS
Sand smelt in Ionian Sea

**Source:**
Region: Mediterranean, Ionian Sea
Catch data used from years 1970 - 2014, abundance = None
Prior initial relative biomass = 0.5 - 0.9 expert
Prior intermediate rel. biomass = 0.01 - 0.4 in year 2005 default
Prior final relative biomass = 0.01 - 0.4 expert
Prior range for r = 0.33 - 1.7 expert, prior range for k = 0.314 - 6.63

Results of CMSY analysis with altogether 391 viable trajectories for 356 r-k pairs
r = 0.57, 95% CL = 0.477 - 0.681, k = 2.74, 95% CL = 2.16 - 3.48
MSY = 0.391, 95% CL = 0.348 - 0.439
Relative biomass last year = 0.162 k, 2.5th = 0.0291, 97.5th = 0.387
Exploitation F/(r/2) in last year = 0.352

**Results for Management (based on CMSY analysis)**
Fmsy = 0.285, 95% CL = 0.238 - 0.34 (if B > 1/2 Bmsy then Fmsy = 0.5 r)
Fmsy = 0.185, 95% CL = 0.155 - 0.221 (r and Fmsy are linearly reduced if B < 1/2 Bmsy)
MSY = 0.391, 95% CL = 0.348 - 0.439
Bmsy = 1.37, 95% CL = 1.08 - 1.74
Biomass in last year = 0.445, 2.5th perc = 0.0799, 97.5 perc = 1.06
B/Bmsy in last year = 0.324, 2.5th perc = 0.0582, 97.5 perc = 0.774
Fishing mortality in last year = 0.191, 2.5th perc = 0.0801, 97.5 perc = 1.06
F/Fmsy = 1.03, 2.5th perc = 0.433, 97.5 perc = 5.76

Stock status and exploitation in 2014
Biomass = 0.445, B/Bmsy = 0.324, fishing mortality F = 0.191, F/Fmsy = 1.03
Comment: Catch=landings from FishStat (Tunisia, Greece, Italy, Albania). RF final 0.3. GS final 0.4
Species: *Belone belone*, stock: BELOBEL_IS

Garfish in Ionian Sea

Source:

Region: Mediterranean, Ionian Sea

Catch data used from years 1970 - 2014, abundance = None

Prior initial relative biomass = 0.5 - 0.9 expert

Prior intermediate rel. biomass = 0.2 - 0.6 in year 2000 expert

Prior final relative biomass = 0.01 - 0.4 expert

Prior range for $r = 0.19$ - 1 expert, prior range for $k = 0.398$ - 8.39

Results of CMSY analysis with altogether 3733 viable trajectories for 1315 r-k pairs

$r = 0.556$, 95% CL = 0.394 - 0.784, $k = 2.1$, 95% CL = 1.44 - 3.06

MSY = 0.291, 95% CL = 0.272 - 0.312

Relative biomass last year = 0.283 $k$, 2.5th = 0.0237, 97.5th = 0.397

Exploitation $F/(r/2)$ in last year = 0.868

Results for Management (based on CMSY analysis)

Fmsy = 0.278, 95% CL = 0.197 - 0.392 (if B > 1/2 Bmsy then Fmsy = 0.5 r)

Fmsy = 0.278, 95% CL = 0.197 - 0.392 ($r$ and Fmsy are linearly reduced if B < 1/2 Bmsy)

MSY = 0.291, 95% CL = 0.272 - 0.312

Bmsy = 1.05, 95% CL = 0.718 - 1.53

Biomass in last year = 0.593, 2.5th perc = 0.0498, 97.5 perc = 0.833

B/Bmsy in last year = 0.566, 2.5th perc = 0.0475, 97.5 perc = 0.795

Fishing mortality in last year = 0.278, 2.5th perc = 0.198, 97.5 perc = 3.32

F/Fmsy = 1, 2.5th perc = 0.713, 97.5 perc = 11.9

Stock status and exploitation in 2014

Biomass = 0.593, B/Bmsy = 0.566, fishing mortality F = 0.278, F/Fmsy = 1

Comment: Catch=landings from FishStat (Italy, Greece, Tunisia, Albania). RF int 2000 0.2-0.6, final 0.01-0.4. GS OK

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Species: *Boops boops*, stock: BOOPBOO_IS

Bogue in Ionian Sea

Source:

Region: Mediterranean, Ionian Sea

Catch data used from years 1973 - 2014, abundance = CPUE

Prior initial relative biomass = 0.5 - 0.9 expert

Prior intermediate rel. biomass = 0.2 - 0.6 in year 1995 expert

Prior final relative biomass = 0.01 - 0.3 expert

Prior range for \( r = 0.31 - 1.1 \) expert, prior range for \( k = 5.71 - 81 \)

Prior range of \( q = 0.000607 - 0.00229 \)

Results of CMSY analysis with altogether 295 viable trajectories for 283 \( r-k \) pairs

\( r = 0.475, \) 95% CL = 0.412 - 0.547, \( k = 36.5, \) 95% CL = 29.4 - 45.3

MSY = 4.33, 95% CL = 3.79 - 4.94

Relative biomass last year = 0.151 \( k, \) 2.5th = 0.012, 97.5th = 0.29

Exploitation \( F/(r/2) \) in last year = 1.34

Results from Bayesian Schaefer model using catch & CPUE

\( r = 0.59, \) 95% CL = 0.44 - 0.79, \( k = 30.7, \) 95% CL = 23.9 - 39.3

MSY = 4.52, 95% CL = 4.07 - 5.02

Relative biomass in last year = 0.208 \( k, \) 2.5th perc = 0.0682, 97.5th perc = 0.354

Exploitation \( F/(r/2) \) in last year = 0.697

\( q = 0.000895, \) lcl = 0.000693, ucl = 0.00116

Results for Management (based on BSM analysis)

\( F_{msy} = 0.295, \) 95% CL = 0.22 - 0.395 (if \( B > 1/2 \) Bmsy then \( F_{msy} = 0.5 \) \( r \))

\( F_{msy} = 0.246, \) 95% CL = 0.183 - 0.329 (\( r \) and \( F_{msy} \) are linearly reduced if \( B < 1/2 \) Bmsy)

MSY = 4.52, 95% CL = 4.07 - 5.02

Bmsy = 15.3, 95% CL = 12 - 19.6

Biomass in last year = 6.38, 2.5th perc = 2.09, 97.5 perc = 10.8

\( B/B_{msy} \) in last year = 0.416, 2.5th perc = 0.136, 97.5 perc = 0.707

Fishing mortality in last year = 0.206, 2.5th perc = 0.121, 97.5 perc = 0.627

\( F/F_{msy} = 0.837, \) 2.5th perc = 0.493, 97.5 perc = 2.55

Stock status and exploitation in 2014

Biomass = 6.38, \( B/B_{msy} = 0.416, \) fishing mortality \( F = 0.206, \) \( F/F_{msy} = 0.837 \)

Comment: Catch=landings from FishStat (Italy+Greece+Albania), Biomass from Medits for GSAs 19+20.

RF final 0.3. GS OK

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Species: *Conger conger*, stock: CONGCON_IS

*Conger eel in Ionian Sea*

**Source:**

- **Region:** Mediterranean, Ionian Sea
- **Catch data used from years 1994 - 2014**, abundance = None
- **Prior initial relative biomass** = 0.4 - 0.8 expert
- **Prior intermediate rel. biomass** = 0.4 - 0.8 in year 2004 expert
- **Prior final relative biomass** = 0.1 - 0.5 expert
- **Prior range for r** = 0.16 - 0.46 expert, **prior range for k** = 1.6 - 18.4

Results of CMSY analysis with altogether 12576 viable trajectories for 1917 r-k pairs
- **r** = 0.353, 95% CL = 0.275 - 0.455, k = 4.27, 95% CL = 2.96 - 6.17
- **MSY** = 0.378, 95% CL = 0.301 - 0.474

Relative biomass last year = 0.305 k, 2.5th = 0.11, 97.5th = 0.492

Exploitation F/(r/2) in last year = 1.56

Results for Management (based on CMSY analysis)
- **Fmsy** = 0.177, 95% CL = 0.137 - 0.227 (if B > 1/2 Bmsy then Fmsy = 0.5 r)
- **Fmsy** = 0.177, 95% CL = 0.137 - 0.227 (r and Fmsy are linearly reduced if B < 1/2 Bmsy)
- **MSY** = 0.378, 95% CL = 0.301 - 0.474
- **Bmsy** = 2.14, 95% CL = 1.48 - 3.09

- **Biomass in last year** = 1.3, 2.5th perc = 0.468, 97.5 perc = 2.1
- **B/Bmsy in last year** = 0.61, 2.5th perc = 0.219, 97.5 perc = 0.984
- **Fishing mortality in last year** = 0.253, 2.5th perc = 0.157, 97.5 perc = 0.705
- **F/Fmsy** = 1.43, 2.5th perc = 0.888, 97.5 perc = 3.99

Stock status and exploitation in 2014
- **Biomass** = 1.3, **B/Bmsy** = 0.61, **fishing mortality F** = 0.253, **F/Fmsy** = 1.43

Comment: Catch=landings from FishStat (Malta, Greece, Italy, Tunisia, Albania). RF start 0.4-0.8, int 2004 0.4-0.8, final 0.1-0.5. GS OK

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Species: *Coryphaena hippurus*, stock: CORYHIP_IS

Common dolphinfish in Ionian Sea

Source:

Region: Mediterranean, Ionian Sea

Catch data used from years 1970 - 2014, abundance = None

Prior initial relative biomass = 0.5 - 0.9 expert

Prior intermediate rel. biomass= 0.2 - 0.6 in year 2007 default

Prior final relative biomass = 0.01 - 0.3 expert

Prior range for r = 0.39 - 1.5 expert, prior range for k = 1.81 - 28.5

Results of CMSY analysis with altogether 2496 viable trajectories for 1711 r-k pairs

\[ r = 1.09, \text{ 95\% CL = 0.788 - 1.52, } k = 7.74, \text{ 95\% CL = 5.18 - 11.6} \]

\[ \text{MSY = 2.12, 95\% CL = 1.83 - 2.45} \]

Relative biomass last year = 0.163 k, 2.5th = 0.0166, 97.5th = 0.295

Exploitation \( F/(r/2) \) in last year = 1.83

Results for Management (based on CMSY analysis)

\[ F_{msy} = 0.547, \text{ 95\% CL = 0.394 - 0.759 (if B > 1/2 B_{msy} then F_{msy} = 0.5 r)} \]

\[ F_{msy} = 0.357, \text{ 95\% CL = 0.257 - 0.495 (r and F_{msy} are linearly reduced if B < 1/2 B_{msy})} \]

\[ \text{MSY = 2.12, 95\% CL = 1.83 - 2.45} \]

\[ B_{msy} = 3.87, \text{ 95\% CL = 2.59 - 5.79} \]

Biomass in last year = 1.26, 2.5th perc = 0.129, 97.5 perc = 2.29

\[ B/B_{msy} \text{ in last year} = 0.326, \text{ 2.5th perc = 0.0332, 97.5 perc = 0.59} \]

Fishing mortality in last year = 0.694, 2.5th perc = 0.384, 97.5 perc = 6.81

\[ F/F_{msy} = 1.95, \text{ 2.5th perc = 1.08, 97.5 perc = 19.1} \]

Stock status and exploitation in 2014

Biomass = 1.26, B/B_{msy} = 0.326, fishing mortality \( F = 0.694 \), \( F/F_{msy} = 1.95 \)

Comment: Catch=landings from FishStat (Libya, Italy, Malta, Tunisia). RF final 0.3. GS OK

----------------------------------------------------------
Species: Dentex dentex, stock: DENTDEN_IS

Common dentex in Ionian Sea
Source:
Region: Mediterranean, Ionian Sea
Catch data used from years 1972 - 2014, abundance = None
Prior initial relative biomass = 0.4 - 0.8 expert
Prior intermediate rel. biomass = 0.01 - 0.3 in year 2000 expert
Prior final relative biomass = 0.01 - 0.4 expert
Prior range for r = 0.15 - 0.73 expert, prior range for k = 4.64 - 90.2

Results of CMSY analysis with altogether 3084 viable trajectories for 1437 r-k pairs
r = 0.438, 95% CL = 0.314 - 0.611, k = 15.9, 95% CL = 10.7 - 23.7
MSY = 1.74, 95% CL = 1.53 - 1.99
Relative biomass last year = 0.219 k, 2.5th = 0.0156, 97.5th = 0.395
Exploitation F/(r/2) in last year = 1.04

Results for Management (based on CMSY analysis)
Fmsy = 0.219, 95% CL = 0.157 - 0.306 (if B > 1/2 Bmsy then Fmsy = 0.5 r)
Fmsy = 0.192, 95% CL = 0.137 - 0.267 (r and Fmsy are linearly reduced if B < 1/2 Bmsy)
MSY = 1.74, 95% CL = 1.53 - 1.99
Bmsy = 7.95, 95% CL = 5.33 - 11.9
Biomass in last year = 3.48, 2.5th perc = 0.248, 97.5 perc = 6.28
B/Bmsy in last year = 0.437, 2.5th perc = 0.0312, 97.5 perc = 0.79
Fishing mortality in last year = 0.234, 2.5th perc = 0.129, 97.5 perc = 3.28
F/Fmsy = 1.22, 2.5th perc = 0.675, 97.5 perc = 17.1

Stock status and exploitation in 2014
Biomass = 3.48, B/Bmsy = 0.437, fishing mortality F = 0.234, F/Fmsy = 1.22
Comment: Catch=landings from FishStat (Tunisia, Malta, Greece, Libya, Italy, Albania). RF start 0.4-0.8, int 2000 0.01-0.3, final 0.01-0.4. GS OK

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Species: *Dicentrarchus labrax*, stock: DICELAB_IS

European seabass in Ionian Sea

Source:
Region: Mediterranean, Ionian Sea
Catch data used from years 1970 - 2014, abundance = None
Prior initial relative biomass = 0.2 - 0.6 expert
Prior intermediate rel. biomass = 0.01 - 0.4 in year 2006 default
Prior final relative biomass = 0.01 - 0.2 expert
Prior range for r = 0.17 - 0.88 expert, prior range for k = 1.65 - 34.1

Results of CMSY analysis with altogether 2938 viable trajectories for 1527 r-k pairs
r = 0.517, 95% CL = 0.322 - 0.829, k = 4.87, 95% CL = 3.19 - 7.43
MSY = 0.63, 95% CL = 0.548 - 0.724
Relative biomass last year = 0.0839 k, 2.5th = 0.0128, 97.5th = 0.189
Exploitation F/(r/2) in last year = 1.01

Results for Management (based on CMSY analysis)
Fmsy = 0.258, 95% CL = 0.161 - 0.415 (if B > 1/2 Bmsy then Fmsy = 0.5 r)
Fmsy = 0.0867, 95% CL = 0.054 - 0.139 (r and Fmsy are linearly reduced if B < 1/2 Bmsy)
MSY = 0.63, 95% CL = 0.548 - 0.724
Bmsy = 2.44, 95% CL = 1.6 - 3.72
Biomass in last year = 0.409, 2.5th perc = 0.0625, 97.5 perc = 0.922
B/Bmsy in last year = 0.168, 2.5th perc = 0.0257, 97.5 perc = 0.379
Fishing mortality in last year = 0.223, 2.5th perc = 0.0987, 97.5 perc = 1.46
F/Fmsy = 2.57, 2.5th perc = 1.14, 97.5 perc = 16.8

Stock status and exploitation in 2014
Biomass = 0.409, B/Bmsy = 0.168, fishing mortality F = 0.223, F/Fmsy = 2.57
Comment: Catch=landings from FishStat. RF final 0.2. GS OK

------------------------------
Species: *Eledone cirrosa*, stock: ELEDCIR_IS
Horned octopus in Ionian Sea
Source:
Region: Mediterranean, Ionian Sea
Catch data used from years 1970 - 2014, abundance = None
Prior initial relative biomass = 0.4 - 0.8 expert
Prior intermediate rel. biomass = 0.4 - 0.8 in year 2005 expert
Prior final relative biomass = 0.2 - 0.6 expert
Prior range for $r = 0.2 - 0.8$ default, prior range for $k = 3.58 - 57.2$

Results of CMSY analysis with altogether 2241 viable trajectories for 1002 r-k pairs
$r = 0.236, 95\% \text{ CL} = 0.224 - 0.248, k = 19.5, 95\% \text{ CL} = 17.9 - 21.2$
$MSY = 1.15, 95\% \text{ CL} = 1.08 - 1.22$
Relative biomass last year = 0.217 $k$, 2.5th = 0.201, 97.5th = 0.277
Exploitation $F/(r/2)$ in last year = 4.05

Results for Management (based on CMSY analysis)
$F_{msy} = 0.118, 95\% \text{ CL} = 0.112 - 0.124$ (if $B > 1/2 B_{msy}$ then $F_{msy} = 0.5 r$)
$F_{msy} = 0.102, 95\% \text{ CL} = 0.0971 - 0.108$ ($r$ and $F_{msy}$ are linearly reduced if $B < 1/2 B_{msy}$)
$MSY = 1.15, 95\% \text{ CL} = 1.08 - 1.22$
$B_{msy} = 9.74, 95\% \text{ CL} = 8.96 - 10.6$
Biomass in last year = 4.23, 2.5th perc = 3.92, 97.5 perc = 5.4
$B/B_{msy}$ in last year = 0.434, 2.5th perc = 0.402, 97.5 perc = 0.554
Fishing mortality in last year = 0.457, 2.5th perc = 0.358, 97.5 perc = 0.493
$F/F_{msy} = 4.47, 2.5th \text{ perc} = 3.5, 97.5 \text{ perc} = 4.82$

Stock status and exploitation in 2014
Biomass = 4.23, $B/B_{msy} = 0.434$, fishing mortality $F = 0.457, F/F_{msy} = 4.47$
Comment: Catch=landings from FishStat (Italy). RF start 0.4-0.8, int 2005 0.4-0.8, final 0.2-0.6
Species: *Engraulis encrasicolus*, stock: ENGRENC_IS

Anchovy in Ionian Sea

Source:

Region: Mediterranean, Ionian Sea

Catch data used from years 1970 - 2014, abundance = CPUE

Prior initial relative biomass = 0.4 - 0.8 expert

Prior intermediate rel. biomass = 0.4 - 0.8 in year 2000 expert

Prior final relative biomass = 0.01 - 0.3 expert

Prior range for r = 0.26 - 1.2 expert, prior range for k = 16.5 - 294

Prior range of q = 0.000112 - 0.000471

Results of CMSY analysis with altogether 3785 viable trajectories for 676 r-k pairs

<table>
<thead>
<tr>
<th>r</th>
<th>95% CL</th>
<th>k</th>
<th>95% CL</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.799</td>
<td>0.559 - 1.14</td>
<td>67</td>
<td>43.4 - 103</td>
</tr>
</tbody>
</table>

MSY = 13.4, 95% CL = 11.5 - 15.6

Relative biomass last year = 0.184 k, 2.5th = 0.0202, 97.5th = 0.296

Exploitation F/(r/2) in last year = 1.65

Results from Bayesian Schaefer model using catch & CPUE

<table>
<thead>
<tr>
<th>r</th>
<th>95% CL</th>
<th>k</th>
<th>95% CL</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.658</td>
<td>0.392 - 1.11</td>
<td>78.4</td>
<td>52.5 - 117</td>
</tr>
</tbody>
</table>

MSY = 12.9, 95% CL = 11.1 - 15

Relative biomass in last year = 0.258 k, 2.5th perc = 0.116, 97.5th perc = 0.361

Exploitation F/(r/2) in last year = 0.916

q = 0.000201, lcl = 0.000142, ucl = 0.000285

Results for Management (based on BSM analysis)

Fmsy = 0.329, 95% CL = 0.196 - 0.553 (if B > 1/2 Bmsy then Fmsy = 0.5 r)

Fmsy = 0.329, 95% CL = 0.196 - 0.553 (r and Fmsy are linearly reduced if B < 1/2 Bmsy)

MSY = 12.9, 95% CL = 11.1 - 15

Bmsy = 39.2, 95% CL = 26.2 - 58.5

B/Bmsy in last year = 0.515, 2.5th perc = 0.232, 97.5 perc = 0.721

Fishing mortality in last year = 0.302, 2.5th perc = 0.215, 97.5 perc = 0.671

F/Fmsy = 0.916, 2.5th perc = 0.654, 97.5 perc = 2.04

Stock status and exploitation in 2014

Biomass = 20.2, B/Bmsy = 0.515, fishing mortality F = 0.302, F/Fmsy = 0.916

Comment: Catch=landings from FishStat (Greece, Italy, Albania), Biomass from Medits for GSA 20. RF start 0.4-0.8, int 2000 0.4-0.8, final 0.01-0.3. RF OK
Species: *Epinephelus marginatus*, stock: EPINGUA_IS

Dusky grouper in Ionian Sea

Source:

Region: Mediterranean, Ionian Sea

Catch data used from years 1985 - 2014, abundance = None

Prior initial relative biomass = 0.2 - 0.6 expert

Prior intermediate rel. biomass = 0.01 - 0.4 in year 2000 expert

Prior final relative biomass = 0.01 - 0.1 expert

Prior range for r = 0.11 - 0.57 expert, prior range for k = 3.55 - 73.6

Results of CMSY analysis with altogether 2007 viable trajectories for 1853 r-k pairs

r = 0.364, 95% CL = 0.239 - 0.554, k = 19.4, 95% CL = 9.71 - 38.9

MSY = 1.77, 95% CL = 0.956 - 3.28

Relative biomass last year = 0.0407 k, 2.5th = 0.0111, 97.5th = 0.0965

Exploitation F/(r/2) in last year = 0.273

Results for Management (based on CMSY analysis)

Fmsy = 0.182, 95% CL = 0.12 - 0.277 (if B > 1/2 Bmsy then Fmsy = 0.5 r)

Fmsy = 0.0296, 95% CL = 0.0195 - 0.0451 (r and Fmsy are linearly reduced if B < 1/2 Bmsy)

MSY = 1.77, 95% CL = 0.956 - 3.28

Bmsy = 9.72, 95% CL = 4.85 - 19.5

Biomass in last year = 0.791, 2.5th perc = 0.216, 97.5 perc = 1.88

B/Bmsy in last year = 0.0814, 2.5th perc = 0.0222, 97.5 perc = 0.193

Fishing mortality in last year = 0.0557, 2.5th perc = 0.0235, 97.5 perc = 0.204

F/Fmsy = 1.88, 2.5th perc = 0.792, 97.5 perc = 6.88

Stock status and exploitation in 2014

Biomass = 0.791, B/Bmsy = 0.0814, fishing mortality F = 0.0557, F/Fmsy = 1.88

Comment: Catch=landings from FishStat (Greece, Italy). RF start 1985, int 2000 0.01-0.4, final 0.01-0.1.

GS OK

--------------------------------------------------------------------------
Species: *Illex coindetii*, stock: ILLECOI_IS

Shortfin squid in Ionian Sea

Source:

Region: Mediterranean, Ionian Sea

Catch data used from years 1973 - 2014, abundance = CPUE

Prior initial relative biomass = 0.2 - 0.6 expert

Prior intermediate rel. biomass = 0.1 - 0.5 in year 2000 expert

Prior final relative biomass = 0.01 - 0.3 expert

Prior range for r = 0.2 - 0.8 default, prior range for k = 4.26 - 68.1

Prior range of q = 0.000826 - 0.0033

Results of CMSY analysis with altogether 2647 viable trajectories for 1801 r-k pairs

\[ r = 0.449, \text{ 95\% CL} = 0.341 - 0.592, k = 20.2, \text{ 95\% CL} = 14.9 - 27.4 \]

\[ MSY = 2.27, \text{ 95\% CL} = 2.06 - 2.49 \]

Relative biomass last year = 0.203 k, 2.5th perc = 0.018, 97.5th perc = 0.297

Exploitation \( F/(r/2) \) in last year = 1.11

Results from Bayesian Schaefer model using catch & CPUE

\[ r = 0.433, \text{ 95\% CL} = 0.301 - 0.621, k = 21, \text{ 95\% CL} = 15.8 - 27.9 \]

\[ MSY = 2.27, \text{ 95\% CL} = 1.97 - 2.63 \]

Relative biomass in last year = 0.288 k, 2.5th perc = 0.0751, 97.5th perc = 0.37

Exploitation \( F/(r/2) \) in last year = 0.604

\[ q = 0.00133, \text{ lcl} = 0.000983, \text{ ucl} = 0.00181 \]

Results for Management (based on BSM analysis)

\[ F_{msy} = 0.216, \text{ 95\% CL} = 0.151 - 0.31 \text{ (if } B > 1/2 \text{ Bmsy then } F_{msy} = 0.5 \text{ r)} \]

\[ F_{msy} = 0.216, \text{ 95\% CL} = 0.151 - 0.31 \text{ (r and } F_{msy} \text{ are linearly reduced if } B < 1/2 \text{ Bmsy)} \]

\[ MSY = 2.27, \text{ 95\% CL} = 1.97 - 2.63 \]

\[ B_{msy} = 10.5, \text{ 95\% CL} = 7.92 - 14 \]

Biomass in last year = 6.06, 2.5th perc = 1.58, 97.5 perc = 7.79

\[ B/B_{msy} \text{ in last year} = 0.576, \text{ 2.5th perc} = 0.15, 97.5 \text{ perc} = 0.741 \]

Fishing mortality in last year = 0.131, 2.5th perc = 0.102, 97.5 perc = 0.501

\[ F/F_{msy} = 0.604, \text{ 2.5th perc} = 0.47, 97.5 \text{ perc} = 2.32 \]

Stock status and exploitation in 2014

Biomass = 6.06, \( B/B_{msy} = 0.576 \), fishing mortality \( F = 0.131 \), \( F/F_{msy} = 0.604 \)

Comment: Catch=landings from FishStat (Italy), Biomass from Medits for GSAs 19+20. RF int 2000 0.1-0.5, final 0.01-0.3. GS OK

----------------------------------------------------------
Species: *Merluccius merluccius*, stock: MERLMER_IS
Hake in Ionian Sea
Source: STECF 16-08, M from Colloca et al 2013
Region: Mediterranean, Ionian Sea
Catch data used from years 1980 - 2014, abundance = CPUE
Prior initial relative biomass = 0.5 - 0.9 expert
Prior intermediate rel. biomass= 0.5 - 0.9 in year 1993 expert
Prior final relative biomass = 0.01 - 0.1 expert
Prior range for $r = 0.22 - 0.95$ expert, prior range for $k = 30.2 - 522$
Prior range of $q = 0.000392 - 0.00163$

Results of CMSY analysis with altogether 950 viable trajectories for 834 r-k pairs
$r = 0.462$, 95% CL = 0.269 - 0.792, $k = 144$, 95% CL = 107 - 194
MSY = 16.7, 95% CL = 14.8 - 18.8
Relative biomass last year = 0.0463 $k$, 2.5th = 0.012, 97.5th = 0.0958
Exploitation $F/(r/2)$ in last year = 3.78

Results from Bayesian Schaefer model using catch & CPUE
$r = 0.44$, 95% CL = 0.31 - 0.627, $k = 153$, 95% CL = 118 - 199
MSY = 16.9, 95% CL = 14.5 - 19.7
Relative biomass in last year = 0.106 $k$, 2.5th perc = 0.0732, 97.5th perc = 0.13
Exploitation $F/(r/2)$ in last year = 1.37
$q = 0.000648$, lcl = 0.000497, ucl = 0.000845

Results for Management (based on BSM analysis)
Fmsy = 0.22, 95% CL = 0.155 - 0.313 (if $B > 1/2$ Bmsy then Fmsy = 0.5 $r$)
Fmsy = 0.093, 95% CL = 0.0653 - 0.132 ($r$ and Fmsy are linearly reduced if $B < 1/2$ Bmsy)
MSY = 16.9, 95% CL = 14.5 - 19.7
Bmsy = 76.7, 95% CL = 59.2 - 99.3
Biomass in last year = 16.2, 2.5th perc = 11.2, 97.5 perc = 20
B/Bmsy in last year = 0.211, 2.5th perc = 0.146, 97.5 perc = 0.26
Fishing mortality in last year = 0.302, 2.5th perc = 0.245, 97.5 perc = 0.435
$F/Fmsy = 3.24$, 2.5th perc = 2.63, 97.5 perc = 4.68

Stock status and exploitation in 2014
Biomass = 16.2, B/Bmsy = 0.211, fishing mortality F = 0.302, $F/Fmsy = 3.24$
Comment: Catch=landings from FishStat (Greece, Italy, Albania), Biomass from Medits for GSAs 19
(SGMED 2015 Part 2, Table 5.2.2.6.1.3.1). GS OK

---------------------------------------------------------
Species: *Micromesistius poutassou*, stock: MICRPOU_IS

Blue whiting in Ionian Sea

Source:

Region: Mediterranean, Ionian Sea

Catch data used from years 1975 - 2014, abundance = None

Prior initial relative biomass = 0.5 - 0.9 expert

Prior intermediate rel. biomass= 0.01 - 0.4 in year 2000 expert

Prior final relative biomass = 0.01 - 0.2 expert

Prior range for r = 0.21 - 1.1 expert, prior range for k = 1.34 - 27.9

Results of CMSY analysis with altogether 1245 viable trajectories for 1036 r-k pairs

\[ r = 0.392, \ 95\% \ CL = 0.32 - 0.479, \ k = 7.65, \ 95\% \ CL = 5.9 - 9.91 \]

\[ MSY = 0.749, \ 95\% \ CL = 0.669 - 0.838 \]

Relative biomass last year = 0.115 k, 2.5th = 0.015, 97.5th = 0.193

Exploitation \( F/(r/2) \) in last year = 1.03

Results for Management (based on CMSY analysis)

\[ Fmsy = 0.196, \ 95\% \ CL = 0.16 - 0.24 \] (if \( B > 1/2 \) \( B_{msy} \) then \( F_{msy} = 0.5 \) r)

\[ Fmsy = 0.0903, \ 95\% \ CL = 0.0738 - 0.11 \] (r and \( F_{msy} \) are linearly reduced if \( B < 1/2 \) \( B_{msy} \))

\[ MSY = 0.749, \ 95\% \ CL = 0.669 - 0.838 \]

\[ B_{msy} = 3.82, \ 95\% \ CL = 2.95 - 4.96 \]

Biomass in last year = 0.882, 2.5th perc = 0.115, 97.5 perc = 1.47

\[ B/B_{msy} \] in last year = 0.231, 2.5th perc = 0.03, 97.5 perc = 0.385

Fishing mortality in last year = 0.0579, 2.5th perc = 0.0346, 97.5 perc = 0.445

\[ F/F_{msy} = 0.641, \ 2.5th \ perc = 0.383, \ 97.5 \ perc = 4.93 \]

Stock status and exploitation in 2014

Biomass = 0.882, \( B/B_{msy} = 0.231 \), fishing mortality \( F = 0.0579 \), \( F/F_{msy} = 0.641 \)

Comment: Catch=landings from FishStat (Greece, Italy). RF int 2000 0.01-0.4, final 0.2. GS OK

----------------------------------------------------------
Species: *Mullus barbatus*, stock: MULLBAR_IS

Red mullet in Ionian Sea
Source: STECF 16-08
Region: Mediterranean, Ionian Sea
Catch data used from years 1974 - 2014, abundance = CPUE
Prior initial relative biomass = 0.5 - 0.9 expert
Prior intermediate rel. biomass = 0.2 - 0.6 in year 1992 expert
Prior final relative biomass = 0.01 - 0.1 expert
Prior range for \( r = 0.22 - 1.2 \) expert, prior range for \( k = 5.06 - 115 \)
Prior range of \( q = 0.00134 - 0.00641 \)

Results of CMSY analysis with altogether 710 viable trajectories for 609 \( r-k \) pairs
\( r = 0.497, 95\% \text{ CL} = 0.289 - 0.854, k = 36.6, 95\% \text{ CL} = 27 - 49.5 \)
MSY = 4.54, 95\% CL = 4.18 - 4.93
Relative biomass last year = 0.0479 \( k \), 2.5th = 0.0136, 97.5th = 0.0967
Exploitation \( F/(r/2) \) in last year = 2.82

Results from Bayesian Schaefer model using catch & CPUE
\( r = 0.529, 95\% \text{ CL} = 0.34 - 0.824, k = 35.1, 95\% \text{ CL} = 23.9 - 51.6 \)
MSY = 4.64, 95\% CL = 4.19 - 5.14
Relative biomass in last year = 0.0964 \( k \), 2.5th perc = 0.0515, 97.5th perc = 0.124
Exploitation \( F/(r/2) \) in last year = 1.34
\( q = 0.00234, \text{ lcl} = 0.00168, \text{ ucl} = 0.00327 \)

Results for Management (based on BSM analysis)
\( F_{\text{msy}} = 0.265, 95\% \text{ CL} = 0.17 - 0.412 \) (if \( B > 1/2 \text{ Bmsy} \) then \( F_{\text{msy}} = 0.5 \) \( r \))
\( F_{\text{msy}} = 0.102, 95\% \text{ CL} = 0.0655 - 0.159 \) (\( r \) and \( F_{\text{msy}} \) are linearly reduced if \( B < 1/2 \text{ Bmsy} \))
MSY = 4.64, 95\% CL = 4.19 - 5.14
Bmsy = 17.5, 95\% CL = 11.9 - 25.8
Biomass in last year = 3.38, 2.5th perc = 1.81, 97.5 perc = 4.34
\( B/\text{Bmsy} \) in last year = 0.193, 2.5th perc = 0.103, 97.5 perc = 0.247
Fishing mortality in last year = 0.355, 2.5th perc = 0.277, 97.5 perc = 0.664
\( F/F_{\text{msy}} \) = 3.48, 2.5th perc = 2.71, 97.5 perc = 6.51

Stock status and exploitation in 2014
Biomass = 3.38, \( B/\text{Bmsy} = 0.193 \), fishing mortality \( F = 0.355 \), \( F/F_{\text{msy}} = 3.48 \)
Comment: Catch=landings from FishStat, Biomass from Medits for GSAs 19+20. GS OK

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Species: *Mullus surmuletus*, stock: MULLSUR_IS
Surmulet in Ionian Sea
Source:
Region: Mediterranean, Ionian Sea
Catch data used from years 1982 - 2014, abundance = CPUE
Prior initial relative biomass = 0.2 - 0.6 expert
Prior intermediate rel. biomass = 0.01 - 0.4 in year 2000 expert
Prior final relative biomass = 0.01 - 0.3 expert
Prior range for r = 0.46 - 1.6 expert, prior range for k = 0.255 - 3.51
Prior range of q = 0.00349 - 0.013

Results of CMSY analysis with altogether 166 viable trajectories for 163 r-k pairs
r = 0.715, 95% CL = 0.599 - 0.854, k = 1.51, 95% CL = 1.23 - 1.86
MSY = 0.271, 95% CL = 0.237 - 0.309
Relative biomass last year = 0.15 k, 2.5th = 0.0258, 97.5th = 0.28
Exploitation F/(r/2) in last year = 0.933

Results from Bayesian Schaefer model using catch & CPUE
r = 0.874, 95% CL = 0.655 - 1.17, k = 1.26, 95% CL = 0.987 - 1.62
MSY = 0.276, 95% CL = 0.254 - 0.3
Relative biomass in last year = 0.137 k, 2.5th perc = 0.0277, 97.5th perc = 0.342
Exploitation F/(r/2) in last year = 0.941
q = 0.00525, lcl = 0.00398, ucl = 0.00691

Results for Management (based on BSM analysis)
Fmsy = 0.437, 95% CL = 0.328 - 0.583 (if B > 1/2 Bmsy then Fmsy = 0.5 r)
Fmsy = 0.239, 95% CL = 0.179 - 0.319 (r and Fmsy are linearly reduced if B < 1/2 Bmsy)
MSY = 0.276, 95% CL = 0.254 - 0.3
Bmsy = 0.632, 95% CL = 0.494 - 0.808
Biomass in last year = 0.173, 2.5th perc = 0.035, 97.5 perc = 0.432
B/Bmsy in last year = 0.273, 2.5th perc = 0.0555, 97.5 perc = 0.683
Fishing mortality in last year = 0.411, 2.5th perc = 0.164, 97.5 perc = 2.03
F/Fmsy = 1.72, 2.5th perc = 0.689, 97.5 perc = 8.48

Stock status and exploitation in 2014
Biomass = 0.173, B/Bmsy = 0.273, fishing mortality F = 0.411, F/Fmsy = 1.72
Comment: Greek landings from FishStat, Italian biomass. RF final 0.3. GS OK
Species: *Nephrops norvegicus*, stock: NEPRNOR_IS

Norway lobster in Ionian Sea

Source:
Region: Mediterranean, Ionian Sea
Catch data used from years 1980 - 2014, abundance = CPUE
Prior initial relative biomass = 0.2 - 0.6 expert
Prior intermediate rel. biomass = 0.01 - 0.4 in year 2003 expert
Prior final relative biomass = 0.01 - 0.3 expert
Prior range for r = 0.2 - 0.8 default, prior range for k = 4.19 - 67
Prior range of q = 0.000142 - 0.000568

Results of CMSY analysis with altogether 2939 viable trajectories for 1774 r-k pairs
r = 0.49, 95% CL = 0.343 - 0.702, k = 17.2, 95% CL = 12.3 - 24
MSY = 2.1, 95% CL = 1.89 - 2.34
Relative biomass last year = 0.19 k, 2.5th = 0.0184, 97.5th = 0.298
Exploitation F/(r/2) in last year = 1.24

Results from Bayesian Schaefer model using catch & CPUE
r = 0.431, 95% CL = 0.313 - 0.593, k = 19.3, 95% CL = 14.6 - 25.5
MSY = 2.08, 95% CL = 1.83 - 2.37
Relative biomass in last year = 0.149 k, 2.5th perc = 0.0534, 97.5th perc = 0.33
Exploitation F/(r/2) in last year = 1.26
q = 0.000229, lcl = 0.000175, ucl = 0.000301

Results for Management (based on BSM analysis)
Fmsy = 0.215, 95% CL = 0.157 - 0.297 (if B > 1/2 Bmsy then Fmsy = 0.5 r)
Fmsy = 0.128, 95% CL = 0.0933 - 0.177 (r and Fmsy are linearly reduced if B < 1/2 Bmsy)
MSY = 2.08, 95% CL = 1.83 - 2.37
Bmsy = 9.65, 95% CL = 7.3 - 12.7
Biomass in last year = 2.88, 2.5th perc = 1.03, 97.5 perc = 6.36
B/Bmsy in last year = 0.298, 2.5th perc = 0.107, 97.5 perc = 0.659
Fishing mortality in last year = 0.271, 2.5th perc = 0.123, 97.5 perc = 0.756
F/Fmsy = 2.11, 2.5th perc = 0.954, 97.5 perc = 5.89

Stock status and exploitation in 2014
Biomass = 2.88, B/Bmsy = 0.298, fishing mortality F = 0.271, F/Fmsy = 2.11
Comment: Catch=landings from FishStat (Italy), Biomass from Medits for GSAs 19+20. RF start 1980, int 2003, final 0.3. GS OK

----------------------------------------------------------------------------------------------
Species: *Octopus vulgaris*, stock: OCTOVUL_IS

Common octopus in Ionian Sea

Source:

Region: Mediterranean, Ionian Sea

Catch data used from years 1975 - 2014, abundance = CPUE

Prior initial relative biomass = 0.5 - 0.9 expert

Prior intermediate rel. biomass = 0.1 - 0.5 in year 2000 expert

Prior final relative biomass = 0.01 - 0.2 expert

Prior range for r = 0.4 - 1 expert, prior range for k = 6.38 - 63.8

Prior range of q = 0.000377 - 0.00119

Results of CMSY analysis with altogether 332 viable trajectories for 318 r-k pairs

\[ r = 0.654, \quad 95\% \text{ CL} = 0.519 - 0.824, \quad k = 32.7, \quad 95\% \text{ CL} = 26.2 - 40.9 \]

\[ \text{MSY} = 5.35, \quad 95\% \text{ CL} = 4.79 - 5.97 \]

Relative biomass last year = 0.0909 k, 2.5th = 0.0111, 97.5th = 0.183

Exploitation \( F/(r/2) \) in last year = 1.19

Results from Bayesian Schaefer model using catch & CPUE

\[ r = 0.713, \quad 95\% \text{ CL} = 0.545 - 0.932, \quad k = 29.3, \quad 95\% \text{ CL} = 23.2 - 37.1 \]

\[ \text{MSY} = 5.23, \quad 95\% \text{ CL} = 4.83 - 5.66 \]

Relative biomass in last year = 0.139 k, 2.5th perc = 0.0468, 97.5th perc = 0.231

Exploitation \( F/(r/2) \) in last year = 0.673

\[ q = 0.000619, \quad \text{lcl} = 0.000487, \quad \text{ucl} = 0.000786 \]

Results for Management (based on BSM analysis)

\[ F_{\text{msy}} = 0.356, \quad 95\% \text{ CL} = 0.273 - 0.466, \quad (\text{if } B > 1/2 B_{\text{msy}} \text{ then } F_{\text{msy}} = 0.5 r) \]

\[ F_{\text{msy}} = 0.199, \quad 95\% \text{ CL} = 0.152 - 0.259, \quad (r \text{ and } F_{\text{msy}} \text{ are linearly reduced if } B < 1/2 B_{\text{msy}}) \]

\[ \text{MSY} = 5.23, \quad 95\% \text{ CL} = 4.83 - 5.66 \]

\[ B_{\text{msy}} = 14.7, \quad 95\% \text{ CL} = 11.6 - 18.5 \]

Biomass in last year = 4.09, 2.5th perc = 1.37, 97.5 perc = 6.79

\[ \text{B}/B_{\text{msy}} \text{ in last year} = 0.279, \quad 2.5th \text{ perc} = 0.0935, \quad 97.5 \text{ perc} = 0.463 \]

Fishing mortality in last year = 0.24, 2.5th perc = 0.144, 97.5 perc = 0.714

\[ F/F_{\text{msy}} = 1.21, \quad 2.5th \text{ perc} = 0.727, \quad 97.5 \text{ perc} = 3.6 \]

Stock status and exploitation in 2014

Biomass = 4.09, \( B/B_{\text{msy}} = 0.279 \), fishing mortality \( F = 0.24 \), \( F/F_{\text{msy}} = 1.21 \)

Comment: Catch=landings from FishStat (Italy, Greece, Albania), Biomass from Medits for GSAs 19+20.

RF int 0.1-0.5, final 0.2. GS OK

===================================================================================================
Species: *Pagrus pagrus*, stock: PAGRPAG_IS

Red porgy in Ionian Sea

Source:

Region: Mediterranean, Ionian Sea

Catch data used from years 1970 - 2014, abundance = None

Prior initial relative biomass = 0.2 - 0.6 expert

Prior intermediate rel. biomass= 0.2 - 0.6 in year 2005 default

Prior final relative biomass = 0.2 - 0.6, default

Prior range for r = 0.27 - 0.86 expert, prior range for k = 0.403 - 5.14

Results of CMSY analysis with altogether 3423 viable trajectories for 720 r-k pairs

r = 0.642 , 95% CL = 0.489 - 0.844 , k = 1.61 , 95% CL = 1.15 - 2.25

MSY = 0.258 , 95% CL = 0.228 - 0.292

Relative biomass last year = 0.294 k, 2.5th = 0.206 , 97.5th = 0.503

Exploitation F/(r/2) in last year = 1.5

Results for Management (based on CMSY analysis)

Fmsy = 0.321 , 95% CL = 0.244 - 0.422 (if B > 1/2 Bmsy then Fmsy = 0.5 r)

Fmsy = 0.321 , 95% CL = 0.244 - 0.422 (r and Fmsy are linearly reduced if B < 1/2 Bmsy)

MSY = 0.258 , 95% CL = 0.228 - 0.292

Bmsy = 0.803 , 95% CL = 0.574 - 1.12

Biomass in last year = 0.472 , 2.5th perc = 0.33 , 97.5 perc = 0.808

B/Bmsy in last year = 0.588 , 2.5th perc = 0.411 , 97.5 perc = 1.01

Fishing mortality in last year = 0.586 , 2.5th perc = 0.343 , 97.5 perc = 0.839

F/Fmsy = 1.83 , 2.5th perc = 1.07 , 97.5 perc = 2.61

Stock status and exploitation in 2014

Biomass = 0.472 , B/Bmsy = 0.588 , fishing mortality F = 0.586 , F/Fmsy = 1.83

Comment: Catch=landings from FishStat (Tunisia, Malta, Greece). GS OK
Species: *Palinurus elephas*, stock: PALIELE_IS
Common spiny lobster in Ionian Sea
Region: Mediterranean, Ionian Sea
Catch data used from years 1975 - 2014, abundance = None
Prior initial relative biomass = 0.2 - 0.6 expert
Prior intermediate rel. biomass = 0.01 - 0.4 in year 1998 default
Prior final relative biomass = 0.01 - 0.3 expert
Prior range for r = 0.05 - 0.5 default, prior range for k = 0.803 - 32.1

Results of CMSY analysis with altogether 3040 viable trajectories for 2567 r-k pairs
r = 0.212, 95% CL = 0.135 - 0.333, k = 6.27, 95% CL = 2.7 - 14.6
MSY = 0.333, 95% CL = 0.154 - 0.717
Relative biomass last year = 0.121 k, 2.5th = 0.0148, 97.5th = 0.293
Exploitation F/(r/2) in last year = 1.11

Results for Management (based on CMSY analysis)
Fmsy = 0.106, 95% CL = 0.0676 - 0.167 (if B > 1/2 Bmsy then Fmsy = 0.5 r)
Fmsy = 0.0515, 95% CL = 0.0328 - 0.0808 (r and Fmsy are linearly reduced if B < 1/2 Bmsy)
MSY = 0.333, 95% CL = 0.154 - 0.717
Bmsy = 3.14, 95% CL = 1.35 - 7.29
Biomass in last year = 0.761, 2.5th perc = 0.093, 97.5 perc = 1.84
B/Bmsy in last year = 0.243, 2.5th perc = 0.0297, 97.5 perc = 0.586
Fishing mortality in last year = 0.104, 2.5th perc = 0.043, 97.5 perc = 0.849
F/Fmsy = 2.02, 2.5th perc = 0.835, 97.5 perc = 16.5

Stock status and exploitation in 2014
Biomass = 0.761, B/Bmsy = 0.243, fishing mortality F = 0.104, F/Fmsy = 2.02
Comment: Catch=landings from FishStat (Italy). RF final 0.3. GS OK

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Species: *Parapenaeus longirostris*, stock: PARELON_IS
Pink shrimp in Ionian Sea
Source: STECF 16-08
Region: Mediterranean, Ionian Sea
Catch data used from years 1970 - 2014, abundance = CPUE
Prior initial relative biomass = 0.2 - 0.6 expert
Prior intermediate rel. biomass = 0.01 - 0.4 in year 2000 expert
Prior final relative biomass = 0.01 - 0.4 expert
Prior range for r = 0.6 - 1.5 default, prior range for k = 11.1 - 111
Prior range of q = 0.000455 - 0.00144

Results of CMSY analysis with altogether 471 viable trajectories for 439 r-k pairs
\( r = 0.993, 95\% \text{ CL} = 0.684 - 1.44, k = 40.1, 95\% \text{ CL} = 31.3 - 51.4 \)
MSY = 9.95, 95\% CL = 8.6 - 11.5
Relative biomass last year = 0.334 k, 2.5th = 0.0515, 97.5th = 0.398
Exploitation \( F/(r/2) \) in last year = 1.06

Results from Bayesian Schaefer model using catch & CPUE
\( r = 0.944, 95\% \text{ CL} = 0.813 - 1.1, k = 45.9, 95\% \text{ CL} = 40.5 - 52 \)
MSY = 10.8, 95\% CL = 10.1 - 11.6
Relative biomass in last year = 0.331 k, 2.5th perc = 0.205, 97.5th perc = 0.45
Exploitation \( F/(r/2) \) in last year = 0.914
q = 0.00061, lcl = 0.000509, ucl = 0.000731

Results for Management (based on BSM analysis)
Fmsy = 0.472, 95\% CL = 0.406 - 0.548 (if B > 1/2 Bmsy then Fmsy = 0.5 r)
Fmsy = 0.472, 95\% CL = 0.406 - 0.548 (r and Fmsy are linearly reduced if B < 1/2 Bmsy)
MSY = 10.8, 95\% CL = 10.1 - 11.6
Bmsy = 22.9, 95\% CL = 20.2 - 26
Biomass in last year = 15.2, 2.5th perc = 9.4, 97.5 perc = 20.7
B/Bmsy in last year = 0.662, 2.5th perc = 0.41, 97.5 perc = 0.9
Fishing mortality in last year = 0.431, 2.5th perc = 0.317, 97.5 perc = 0.697
F/Fmsy = 0.914, 2.5th perc = 0.672, 97.5 perc = 1.48

Stock status and exploitation in 2014
Biomass = 15.2, B/Bmsy = 0.662, fishing mortality F = 0.431, F/Fmsy = 0.914
Comment: Catch=landings from FishStat (Italy+Greece), Biomass from Medits for GSA 19 SGMED 2015
Table 5.2.11.6.1.3.1.1. GS OK

---------------------------------------------
Species: *Penaeus kerathurus*, stock: PENAKER_IS

Caramote prawn in Ionian Sea  
Source:  
Region: Mediterranean, Ionian Sea  
Catch data used from years 1994 - 2014, abundance = None  
Prior initial relative biomass = 0.2 - 0.6 expert  
Prior intermediate rel. biomass= 0.01 - 0.4 in year 2000 expert  
Prior final relative biomass = 0.2 - 0.6 expert  
Prior range for r = 0.2 - 0.8 default, prior range for k = 0.692 - 11.1

Results of CMSY analysis with altogether 3220 viable trajectories for 2974 r-k pairs  
$r = 0.387, 95\% \text{ CL} = 0.284 - 0.527, k = 2.09, 95\% \text{ CL} = 1.55 - 2.81$  
$\text{MSY} = 0.202, 95\% \text{ CL} = 0.17 - 0.24$  
Relative biomass last year = 0.313 k, 2.5th = 0.207, 97.5th = 0.507  
Exploitation $F/(r/2)$ in last year = 4.37

Results for Management (based on CMSY analysis)  
$F_{\text{msy}} = 0.193, 95\% \text{ CL} = 0.142 - 0.264$ (if $B > 1/2 B_{\text{msy}}$ then $F_{\text{msy}} = 0.5 r$)  
$F_{\text{msy}} = 0.193, 95\% \text{ CL} = 0.142 - 0.264$ ($r$ and $F_{\text{msy}}$ are linearly reduced if $B < 1/2 B_{\text{msy}}$)  
$\text{MSY} = 0.202, 95\% \text{ CL} = 0.17 - 0.24$  
$B_{\text{msy}} = 1.04, 95\% \text{ CL} = 0.776 - 1.41$  
Biomass in last year = 0.655, 2.5th perc = 0.433, 97.5 perc = 1.06  
B/B_{\text{msy}} in last year = 0.626, 2.5th perc = 0.415, 97.5 perc = 1.01  
Fishing mortality in last year = 1.17, 2.5th perc = 0.723, 97.5 perc = 1.77  
$F/F_{\text{msy}} = 6.06, 2.5th \text{ perc} = 3.74, 97.5 \text{ perc} = 9.15$

Stock status and exploitation in 2014  
Biomass = 0.655, B/B_{\text{msy}} = 0.626, fishing mortality $F = 1.17$, $F/F_{\text{msy}} = 6.06$  
Comment: Catch=landings from FishStat (Italy+Greece+Albania). GS final 0.2-0.6; scientific name changed. RF OK

------------------------------------------------------------------
A: PERAKER_IS catch

B: Finding viable r-k

C: Analysis of viable r-k

D: Biomass

E: Exploitation rate

F: Equilibrium curve

Catch PERAKER_IS

Biomass

Exploitation

F / Fssy

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Species: *Scophthalmus maximus*, stock: PSETMAX_IS

Turbot in Ionian Sea

Source:

Region: Mediterranean, Ionian Sea

Catch data used from years 1970 - 2013, abundance = None

Prior initial relative biomass = 0.5 - 0.9 expert

Prior intermediate relative biomass = 0.01 - 0.4 in year 1995 default

Prior final relative biomass = 0.01 - 0.3 expert

Prior range for $r = 0.25 - 0.82$ expert, prior range for $k = 1.38 - 18.1$

Results of CMSY analysis with altogether 580 viable trajectories for 521 $r$-$k$ pairs

$r = 0.385, 95\% \text{ CL} = 0.314 - 0.472, k = 4.25, 95\% \text{ CL} = 3.37 - 5.36$

$MSY = 0.409, 95\% \text{ CL} = 0.341 - 0.491$

Relative biomass last year = 0.138 $k$, 2.5th = 0.0201, 97.5th = 0.294

Exploitation $F/(r/2)$ in last year = 1.8

Results for Management (based on CMSY analysis)

$F_{msy} = 0.192, 95\% \text{ CL} = 0.157 - 0.236$ (if $B > 1/2$ $B_{msy}$ then $F_{msy} = 0.5 \cdot r$)

$F_{msy} = 0.106, 95\% \text{ CL} = 0.0869 - 0.13$ ($r$ and $F_{msy}$ are linearly reduced if $B < 1/2$ $B_{msy}$)

$MSY = 0.409, 95\% \text{ CL} = 0.341 - 0.491$

$B_{msy} = 2.13, 95\% \text{ CL} = 1.69 - 2.68$

Biomass in last year = 0.588, 2.5th perc = 0.0854, 97.5 perc = 1.25

$B/B_{msy}$ in last year = 0.277, 2.5th perc = 0.0402, 97.5 perc = 0.589

Fishing mortality in last year = 0.274, 2.5th perc = 0.129, 97.5 perc = 1.88

$F/F_{msy} = 2.57, 2.5th \text{ perc} = 1.21, 97.5 \text{ perc} = 17.7$

Stock status and exploitation in 2014

Biomass =, $B/B_{msy}$ =, fishing mortality $F$ =, $F/F_{msy}$ =

Comment: Catch=landings from FishStat. RF final 0.3. GS OK

----------------------------------------------------------
Species: *Sardina pilchardus*, stock: SARDPIL_IS

Sardine in Ionian Sea

Source:
Region: Mediterranean, Ionian Sea
Catch data used from years 1970 - 2014, abundance = CPUE
Prior initial relative biomass = 0.2 - 0.6 expert
Prior intermediate rel. biomass = 0.01 - 0.4 in year 2000 expert
Prior final relative biomass = 0.01 - 0.3 expert
Prior range for r = 0.27 - 1.1 expert, prior range for k = 14.5 - 237
Prior range of q = 0.000105 - 0.000426

Results of CMSY analysis with altogether 726 viable trajectories for 634 r-k pairs

r = 0.538, 95% CL = 0.391 - 0.74, k = 87.9, 95% CL = 67.9 - 114
MSY = 11.8, 95% CL = 10.9 - 12.8
Relative biomass last year = 0.0931 k, 2.5th = 0.0148, 97.5th = 0.283
Exploitation F/(r/2) in last year = 1.97

Results from Bayesian Schaefer model using catch & CPUE

r = 0.571, 95% CL = 0.387 - 0.843, k = 84.1, 95% CL = 60.4 - 117
MSY = 12, 95% CL = 10.8 - 13.4
Relative biomass in last year = 0.182 k, 2.5th perc = 0.0583, 97.5th perc = 0.346
Exploitation F/(r/2) in last year = 1.18
q = 0.000173, lcl = 0.000128, ucl = 0.000235

Results for Management (based on BSM analysis)

Fmsy = 0.286, 95% CL = 0.194 - 0.422 (if B > 1/2 Bmsy then Fmsy = 0.5 r)
Fmsy = 0.208, 95% CL = 0.141 - 0.307 (r and Fmsy are linearly reduced if B < 1/2 Bmsy)
MSY = 12, 95% CL = 10.8 - 13.4
Bmsy = 42, 95% CL = 30.2 - 58.5
Biomass in last year = 15.3, 2.5th perc = 4.9, 97.5 perc = 29.1
B/Bmsy in last year = 0.365, 2.5th perc = 0.117, 97.5 perc = 0.691
Fishing mortality in last year = 0.337, 2.5th perc = 0.178, 97.5 perc = 1.05
F/Fmsy = 1.62, 2.5th perc = 0.852, 97.5 perc = 5.05

Stock status and exploitation in 2014

Biomass = 15.3, B/Bmsy = 0.365, fishing mortality F = 0.337, F/Fmsy = 1.62
Comment: Catch=landings from FishStat (Italy+Greece+Albania), Biomass from Medits for GSA 20. RF final 0.3. RF OK

------------------------------------------------------------------
Species: *Scomber colias*, stock: SCOMPNE_IS

Atlantic chub mackerel in Ionian Sea

Source:
Region: Mediterranean, Ionian Sea
Catch data used from years 1996 - 2014, abundance = None
Prior initial relative biomass = 0.2 - 0.6 expert
Prior intermediate rel. biomass = 0.01 - 0.4 in year 2000 expert
Prior final relative biomass = 0.01 - 0.4 expert
Prior range for $r = 0.31$ - 1.2 expert, prior range for $k = 1.13$ - 17.1

Results of CMSY analysis with altogether 3551 viable trajectories for 3050 $r$-$k$ pairs
$r = 0.777$, 95% CL = 0.574 - 1.05, $k = 4.09$, 95% CL = 2.9 - 5.76
MSY = 0.794, 95% CL = 0.718 - 0.877
Relative biomass last year = 0.26 $k$, 2.5th = 0.026, 97.5th = 0.394
Exploitation $F/(r/2)$ in last year = 2.05

Results for Management (based on CMSY analysis)
Fmsy = 0.388, 95% CL = 0.287 - 0.525 (if $B > 1/2 Bmsy$ then Fmsy = 0.5 $r$)
Fmsy = 0.388, 95% CL = 0.287 - 0.525 ($r$ and Fmsy are linearly reduced if $B < 1/2 Bmsy$)
MSY = 0.794, 95% CL = 0.718 - 0.877
Bmsy = 2.04, 95% CL = 1.45 - 2.88
Biomass in last year = 1.06, 2.5th perc = 0.106, 97.5 perc = 1.61
B/Bmsy in last year = 0.52, 2.5th perc = 0.0519, 97.5 perc = 0.788
Fishing mortality in last year = 0.881, 2.5th perc = 0.581, 97.5 perc = 8.81
F/Fmsy = 2.27, 2.5th perc = 1.5, 97.5 perc = 22.7

Stock status and exploitation in 2014
Biomass = 1.06, B/Bmsy = 0.52, fishing mortality F = 0.881, F/Fmsy = 2.27
Comment: Catch=landings from FishStat. GS OK

----------------------------------------------------------
Species: *Scomber scombrus*, stock: SCOMSCO_IS

Atlantic mackerel in Ionian Sea

Source:

Region: Mediterranean, Ionian Sea

Catch data used from years 1970 - 2014, abundance = CPUE

Prior initial relative biomass = 0.2 - 0.6 expert

Prior intermediate rel. biomass = 0.01 - 0.4 in year 2000 expert

Prior final relative biomass = 0.01 - 0.3 expert

Prior range for $r = 0.23 - 1$ expert, prior range for $k = 5.52 - 96$

Prior range of $q = 1.94e-05 - 8.1e-05$

Results of CMSY analysis with altogether 2138 viable trajectories for 1228 r-k pairs

$r = 0.657$, 95% CL = 0.461 - 0.937, $k = 20.2$, 95% CL = 13.5 - 30.2

$MSY = 3.32$, 95% CL = 2.91 - 3.8

Relative biomass last year = 0.119 $k$, 2.5th = 0.0128, 97.5th = 0.29

Exploitation $F/(r/2)$ in last year = 0.737

Results from Bayesian Schaefer model using catch & CPUE

$r = 0.525$, 95% CL = 0.319 - 0.862, $k = 24.6$, 95% CL = 17.3 - 34.8

$MSY = 3.22$, 95% CL = 2.68 - 3.87

Relative biomass in last year = 0.121 $k$, 2.5th perc = 0.027, 97.5th perc = 0.325

Exploitation $F/(r/2)$ in last year = 0.63

$q = 3.13e-05$, lcl = 2.26e-05, ucl = 4.35e-05

Results for Management (based on BSM analysis)

$F_{msy} = 0.262$, 95% CL = 0.16 - 0.431 (if $B > 1/2 B_{msy}$ then $F_{msy} = 0.5 \cdot r$)

$F_{msy} = 0.126$, 95% CL = 0.077 - 0.208 ($r$ and $F_{msy}$ are linearly reduced if $B < 1/2 B_{msy}$)

$MSY = 3.22$, 95% CL = 2.68 - 3.87

$B_{msy} = 12.3$, 95% CL = 8.67 - 17.4

Biomass in last year = 2.96, 2.5th perc = 0.663, 97.5 perc = 7.99

$B/B_{msy}$ in last year = 0.241, 2.5th perc = 0.054, 97.5 perc = 0.65

Fishing mortality in last year = 0.165, 2.5th perc = 0.0612, 97.5 perc = 0.737

$F/F_{msy} = 1.31$, 2.5th perc = 0.484, 97.5 perc = 5.83

Stock status and exploitation in 2014

Biomass = 2.96, $B/B_{msy} = 0.241$, fishing mortality $F = 0.165$, $F/F_{msy} = 1.31$

Comment: Catch=landings from FishStat (Greece, Italy, Albania), Biomass from Medits for GSAs 19+20.

RF final 0.3. GS OK

----------------------------------------------------------
Species: *Sepia officinalis*, stock: SEPIOFF_IS
Common cuttlefish in Ionian Sea
Source:
Region: Mediterranean, Ionian Sea
Catch data used from years 1970 - 2014, abundance = None
Prior initial relative biomass = 0.2 - 0.6 expert
Prior intermediate rel. biomass = 0.2 - 0.6 in year 2002 default
Prior final relative biomass = 0.3 - 0.7 expert
Prior range for r = 0.2 - 0.8 default, prior range for k = 9.96 - 159

Results of CMSY analysis with altogether 2929 viable trajectories for 617 r-k pairs
r = 0.566, 95% CL = 0.407 - 0.785, k = 41.5, 95% CL = 28.3 - 61
MSY = 5.87, 95% CL = 5.25 - 6.56
Relative biomass last year = 0.381 k, 2.5th = 0.304, 97.5th = 0.529
Exploitation F/(r/2) in last year = 1.71

Results for Management (based on CMSY analysis)
Fmsy = 0.283, 95% CL = 0.204 - 0.392 (if B > 1/2 Bmsy then Fmsy = 0.5 r)
Fmsy = 0.283, 95% CL = 0.204 - 0.392 (r and Fmsy are linearly reduced if B < 1/2 Bmsy)
MSY = 5.87, 95% CL = 5.25 - 6.56
Bmsy = 20.8, 95% CL = 14.1 - 30.5
Biomass in last year = 15.8, 2.5th perc = 12.6, 97.5 perc = 22
B/Bmsy in last year = 0.763, 2.5th perc = 0.608, 97.5 perc = 1.06
Fishing mortality in last year = 0.405, 2.5th perc = 0.292, 97.5 perc = 0.508
F/Fmsy = 1.43, 2.5th perc = 1.03, 97.5 perc = 1.8

Stock status and exploitation in 2014
Biomass = 15.8, B/Bmsy = 0.763, fishing mortality F = 0.405, F/Fmsy = 1.43
Comment: Catch=landings from FishStat (Malta, Greece, Tunisia, Albania, Libya). RF final 0.3-0.7. GS OK

----------------------------------------------------------------------
Species: *Solea solea*, stock: SOLEVUL_IS

Common sole in Ionian Sea

Source:

Region: Mediterranean, Ionian Sea

Catch data used from years 1985 - 2014, abundance = None

Prior initial relative biomass = 0.2 - 0.6 expert

Prior intermediate rel. biomass= 0.01 - 0.4 in year 2000 expert

Prior final relative biomass = 0.01 - 0.2 expert

Prior range for $r = 0.21 - 1$ expert, prior range for $k = 3.34 - 64.9$

Results of CMSY analysis with altogether 1857 viable trajectories for 1737 r-k pairs

$r = 0.456$, 95% CL = 0.32 - 0.65, $k = 26.3$, 95% CL = 14.3 - 48.3

MSY = 2.99, 95% CL = 1.46 - 6.14

Relative biomass last year = 0.0652 $k$, 2.5th = 0.0128, 97.5th = 0.182

Exploitation $F/(r/2)$ in last year = 0.559

Results for Management (based on CMSY analysis)

$F_{msy} = 0.228$, 95% CL = 0.16 - 0.325 (if $B > 1/2 B_{msy}$ then $F_{msy} = 0.5 r$)

$F_{msy} = 0.0595$, 95% CL = 0.0417 - 0.0848 ($r$ and $F_{msy}$ are linearly reduced if $B < 1/2 B_{msy}$)

$MSY = 2.99$, 95% CL = 1.46 - 6.14

$B_{msy} = 13.1$, 95% CL = 7.14 - 24.1

Biomass in last year = 1.71, 2.5th perc = 0.335, 97.5 perc = 4.78

$B/B_{msy}$ in last year = 0.13, 2.5th perc = 0.0255, 97.5 perc = 0.364

Fishing mortality in last year = 0.112, 2.5th perc = 0.0399, 97.5 perc = 0.57

$F/F_{msy} = 1.88$, 2.5th perc = 0.672, 97.5 perc = 9.58

Stock status and exploitation in 2014

Biomass = 1.71, $B/B_{msy} = 0.13$, fishing mortality $F = 0.112$, $F/F_{msy} = 1.88$

Comment: Catch=landings from FishStat (Greece, Italy, Albania). RF start 1985, int 2000 0.01-0.4, final 0.2. GS OK

---------------------------------------------------------------------
Species: *Squilla mantis*, stock: SQUIMAN_IS
Mantis shrimp in Ionian Sea

Source:
Region: Mediterranean, Ionian Sea
Catch data used from years 1970 - 2014, abundance = CPUE
Prior initial relative biomass = 0.2 - 0.6 expert
Prior intermediate rel. biomass= 0.01 - 0.4 in year 2000 expert
Prior final relative biomass = 0.01 - 0.4 expert
Prior range for r = 0.2 - 0.8 default, prior range for k = 1.91 - 30.5
Prior range of q = 6.29e-05 - 0.000251

Results of CMSY analysis with altogether 227 viable trajectories for 224 r-k pairs
r = 0.32, 95% CL = 0.205 - 0.499, k = 13.2, 95% CL = 9.54 - 18.2
MSY = 1.05, 95% CL = 0.835 - 1.33
Relative biomass last year = 0.104 k, 2.5th = 0.0208, 97.5th = 0.361
Exploitation F/(r/2) in last year = 6.94

Results from Bayesian Schaefer model using catch & CPUE
r = 0.358, 95% CL = 0.207 - 0.62, k = 9.83, 95% CL = 6.28 - 15.4
MSY = 0.88, 95% CL = 0.693 - 1.12
Relative biomass in last year = 0.257 k, 2.5th perc = 0.138, 97.5th perc = 0.436
Exploitation F/(r/2) in last year = 2.72
q = 9.66e-05, lcl = 6.92e-05, ucl = 0.000135

Results for Management (based on BSM analysis)
Fmsy = 0.179, 95% CL = 0.103 - 0.31 (if B > 1/2 Bmsy then Fmsy = 0.5 r)
Fmsy = 0.179, 95% CL = 0.103 - 0.31 (r and Fmsy are linearly reduced if B < 1/2 Bmsy)
MSY = 0.88, 95% CL = 0.693 - 1.12
Bmsy = 4.92, 95% CL = 3.14 - 7.7
Biomass in last year = 2.52, 2.5th perc = 1.36, 97.5 perc = 4.29
B/Bmsy in last year = 0.513, 2.5th perc = 0.277, 97.5 perc = 0.872
Fishing mortality in last year = 0.487, 2.5th perc = 0.287, 97.5 perc = 0.903
F/Fmsy = 2.72, 2.5th perc = 1.6, 97.5 perc = 5.04

Stock status and exploitation in 2014
Biomass = 2.52, B/Bmsy = 0.513, fishing mortality F = 0.487, F/Fmsy = 2.72
Comment: Catch=landings from FishStat (Italy), Biomass from Medits for GSAs 19+20. GS OK
Species: *Trachurus mediterraneus*, stock: TRACHMED_IS

Mediterranean horse mackerel in Ionian Sea

Source:
Region: Mediterranean, Ionian Sea
Catch data used from years 1995 - 2014, abundance = CPUE
Prior initial relative biomass = 0.2 - 0.6 expert
Prior intermediate rel. biomass = 0.01 - 0.4 in year 2004 expert
Prior final relative biomass = 0.01 - 0.2 expert
Prior range for r = 0.59 - 1.3 expert, prior range for k = 0.444 - 4
Prior range of q = 0.00384 - 0.0115

Results of CMSY analysis with altogether 1118 viable trajectories for 1050 r-k pairs
r = 1.04, 95% CL = 0.834 - 1.29, k = 1.83, 95% CL = 1.45 - 2.32
MSY = 0.476, 95% CL = 0.426 - 0.532
Relative biomass last year = 0.106 k, 2.5th = 0.0148, 97.5th = 0.196
Exploitation $F/(r/2)$ in last year = 2.71

Results from Bayesian Schaefer model using catch & CPUE
r = 1.01, 95% CL = 0.81 - 1.25, k = 1.94, 95% CL = 1.57 - 2.39
MSY = 0.487, 95% CL = 0.436 - 0.543
Relative biomass in last year = 0.19 k, 2.5th perc = 0.126, 97.5th perc = 0.246
Exploitation $F/(r/2)$ in last year = 0.968
q = 0.0059, lcl = 0.00457, ucl = 0.00763

Results for Management (based on BSM analysis)
Fmsy = 0.503, 95% CL = 0.405 - 0.624 (if B > 1/2 Bmsy then Fmsy = 0.5 r)
Fmsy = 0.382, 95% CL = 0.308 - 0.474 (r and Fmsy are linearly reduced if B < 1/2 Bmsy)
MSY = 0.487, 95% CL = 0.436 - 0.543
Bmsy = 0.968, 95% CL = 0.785 - 1.19
Biomass in last year = 0.368, 2.5th perc = 0.243, 97.5 perc = 0.476
B/Bmsy in last year = 0.38, 2.5th perc = 0.251, 97.5 perc = 0.492
Fishing mortality in last year = 0.487, 2.5th perc = 0.376, 97.5 perc = 0.736
F/Fmsy = 1.27, 2.5th perc = 0.984, 97.5 perc = 1.93

Stock status and exploitation in 2014
Biomass = 0.368, B/Bmsy = 0.38, fishing mortality F = 0.487, F/Fmsy = 1.27
Comment: Catch=landings from FishStat (Greece), Biomass from Medits for GSAs 19+20. RF start 1995, int 2004 0.01-0.4, final 0.2. GS OK
Species: *Umbrina cirrosa*, stock: UMBRCIR_IS

Shi drum in Ionian Sea  
Source:  
Region: Mediterranean, Ionian Sea  
Catch data used from years 1995 - 2013, abundance = None  
Prior initial relative biomass = 0.2 - 0.6 expert  
Prior intermediate rel. biomass = 0.2 - 0.6 in year 2010 expert  
Prior final relative biomass = 0.2 - 0.6 expert  
Prior range for r = 0.59 - 1.2 expert, prior range for k = 1.21 - 9.88

Results of CMSY analysis with altogether 11216 viable trajectories for 1793 r-k pairs  
r = 1.01, 95% CL = 0.851 - 1.19, k = 4.69, 95% CL = 3.53 - 6.23  
MSY = 1.18, 95% CL = 0.943 - 1.48  
Relative biomass last year = 0.366 k, 2.5th = 0.21, 97.5th = 0.56  
Exploitation F/(r/2) in last year = 1.56

Results for Management (based on CMSY analysis)  
Fmsy = 0.504, 95% CL = 0.426 - 0.596 (if B > 1/2 Bmsy then Fmsy = 0.5 r)  
Fmsy = 0.504, 95% CL = 0.426 - 0.596 (r and Fmsy are linearly reduced if B < 1/2 Bmsy)  
MSY = 1.18, 95% CL = 0.943 - 1.48  
Bmsy = 2.34, 95% CL = 1.77 - 3.11  
Biomass in last year = 1.72, 2.5th perc = 0.983, 97.5 perc = 2.63  
B/Bmsy in last year = 0.733, 2.5th perc = 0.419, 97.5 perc = 1.12  
Fishing mortality in last year = 0.682, 2.5th perc = 0.446, 97.5 perc = 1.19  
F/Fmsy = 1.35, 2.5th perc = 0.886, 97.5 perc = 2.37

Stock status and exploitation in 2014  
Biomass = , B/Bmsy = , fishing mortality F = , F/Fmsy =

Comment: Catch=landings from FishStat. RF start 1995 0.2-0.6, int 2010 0.2-0.6, final 0.2-0.6. GS OK

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**Aegean Sea** (analyzed with CMSY_O_7m.R; data sources are indicated in the Comment field)

Species: *Atherina boyeri*, stock: ATHEBOY_AL
Sand smelt in Aegean Sea

Source:
Region: Mediterranean, Aegean Sea
Catch data used from years 1982 - 2014, abundance = None
Prior initial relative biomass = 0.5 - 0.9 expert
Prior intermediate rel. biomass = 0.01 - 0.3 in year 2003 expert
Prior final relative biomass = 0.01 - 0.3 expert
Prior range for r = 0.33 - 1.7 expert, prior range for k = 0.526 - 11.1

Results of CMSY analysis with altogether 892 viable trajectories for 725 r-k pairs
r = 0.687, 95% CL = 0.516 - 0.916, k = 3.46, 95% CL = 2.59 - 4.63
MSY = 0.595, 95% CL = 0.537 - 0.659
Relative biomass last year = 0.093 k, 2.5th = 0.0119, 97.5th = 0.282
Exploitation F/(r/2) in last year = 0.346

Results for Management (based on CMSY analysis)
Fmsy = 0.344, 95% CL = 0.258 - 0.458 (if B > 1/2 Bmsy then Fmsy = 0.5 r)
Fmsy = 0.128, 95% CL = 0.0959 - 0.17 (r and Fmsy are linearly reduced if B < 1/2 Bmsy)
MSY = 0.595, 95% CL = 0.537 - 0.659
Bmsy = 1.73, 95% CL = 1.3 - 2.31
Biomass in last year = 0.322, 2.5th perc = 0.0411, 97.5 perc = 0.977
B/Bmsy in last year = 0.186, 2.5th perc = 0.0238, 97.5 perc = 0.564
Fishing mortality in last year = 0.14, 2.5th perc = 0.0461, 97.5 perc = 1.09
F/Fmsy = 1.09, 2.5th perc = 0.36, 97.5 perc = 8.56

Stock status and exploitation in 2014
Biomass = 0.322, B/Bmsy = 0.186, fishing mortality F = 0.14, F/Fmsy = 1.09
Comment: Catch=landings from FishStat. RF int 2003 0.3, final 0.3, OK 04.10.16

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Species: *Belone belone*, stock: BELOBEL_AL
Garfish in Aegean Sea

Source:
Region: Mediterranean, Aegean Sea
Catch data used from years 1985 - 2014, abundance = None
Prior initial relative biomass = 0.5 - 0.9 expert
Prior intermediate rel. biomass= 0.01 - 0.4 in year 2000 expert
Prior final relative biomass = 0.01 - 0.3 expert
Prior range for r = 0.19 - 1 expert, prior range for k = 0.443 - 9.33

Results of CMSY analysis with altogether 2604 viable trajectories for 2058 r-k pairs
r = 0.47, 95% CL = 0.338 - 0.654, k = 2.2, 95% CL = 1.51 - 3.22
MSY = 0.259, 95% CL = 0.218 - 0.308
Relative biomass last year = 0.112 k, 2.5th = 0.0154, 97.5th = 0.288
Exploitation F/(r/2) in last year = 1.19

Results for Management (based on CMSY analysis)
Fmsy = 0.235, 95% CL = 0.169 - 0.327 (if B > 1/2 Bmsy then Fmsy = 0.5 r)
Fmsy = 0.105, 95% CL = 0.0758 - 0.147 (r and Fmsy are linearly reduced if B < 1/2 Bmsy)
MSY = 0.259, 95% CL = 0.218 - 0.308
Bmsy = 1.1, 95% CL = 0.755 - 1.61
Biomass in last year = 0.247, 2.5th perc = 0.0339, 97.5 perc = 0.635
B/Bmsy in last year = 0.224, 2.5th perc = 0.0307, 97.5 perc = 0.576
Fishing mortality in last year = 0.231, 2.5th perc = 0.0897, 97.5 perc = 1.68
F/Fmsy = 2.19, 2.5th perc = 0.851, 97.5 perc = 16

Stock status and exploitation in 2014
Biomass = 0.247, B/Bmsy = 0.224, fishing mortality F = 0.231, F/Fmsy = 2.19
Comment: Catch=landings from FishStat (Greece). RF int 2000 0.4, final 0.3, OK 04.10.16

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Species: *Boops boops*, stock: BOOPBOO_AL
Bogue in Aegean Sea
Source:
Region: Mediterranean, Aegean Sea
Catch data used from years 1982 - 2014, abundance = CPUE
Prior initial relative biomass = 0.2 - 0.6 expert
Prior intermediate rel. biomass = 0.01 - 0.4 in year 2000 expert
Prior final relative biomass = 0.01 - 0.3 expert
Prior range for r = 0.31 - 1.1 expert, prior range for k = 12.1 - 172
Prior range of q = 0.127 - 0.478

Results of CMSY analysis with altogether 392 viable trajectories for 382 r-k pairs
r = 0.549, 95% CL = 0.397 - 0.758, k = 64.9, 95% CL = 48.2 - 87.3
MSY = 8.9, 95% CL = 7.08 - 11.2
Relative biomass last year = 0.115 k, 2.5th = 0.0173, 97.5th = 0.284
Exploitation F/(r/2) in last year = 1.92

Results from Bayesian Schaefer model using catch & CPUE
r = 0.585, 95% CL = 0.421 - 0.813, k = 58.1, 95% CL = 43.7 - 77.4
MSY = 8.5, 95% CL = 7.47 - 9.68
Relative biomass in last year = 0.256 k, 2.5th perc = 0.103, 97.5th perc = 0.364
Exploitation F/(r/2) in last year = 1.01
q = 0.197, lcl = 0.149, ucl = 0.261

Results for Management (based on BSM analysis)
Fmsy = 0.292, 95% CL = 0.21 - 0.406 (if B > 1/2 Bmsy then Fmsy = 0.5 r)
Fmsy = 0.292, 95% CL = 0.21 - 0.406 (r and Fmsy are linearly reduced if B < 1/2 Bmsy)
MSY = 8.5, 95% CL = 7.47 - 9.68
Bmsy = 29.1, 95% CL = 21.9 - 38.7
Biomass in last year = 14.9, 2.5th perc = 6.01, 97.5 perc = 21.2
B/Bmsy in last year = 0.512, 2.5th perc = 0.207, 97.5 perc = 0.728
Fishing mortality in last year = 0.295, 2.5th perc = 0.207, 97.5 perc = 0.73
F/Fmsy = 1.01, 2.5th perc = 0.709, 97.5 perc = 2.5

Stock status and exploitation in 2014
Biomass = 14.9, B/Bmsy = 0.512, fishing mortality F = 0.295, F/Fmsy = 1.01
Comment: Catch=landings from FishStat (Greece+Turkey). RF final 0.3, OK 04.10.16
Species: *Dentex dentex*, stock: DENTDEN_AL

Common dentex in Aegean Sea

Source:

Region: Mediterranean, Aegean Sea

Catch data used from years 1970 - 2014, abundance = None

Prior initial relative biomass = 0.2 - 0.6 expert

Prior intermediate rel. biomass = 0.01 - 0.4 in year 1998 default

Prior final relative biomass = 0.01 - 0.3 expert

Prior range for r = 0.15 - 0.73 expert, prior range for k = 0.531 - 10.3

Results of CMSY analysis with altogether 1819 viable trajectories for 1488 r-k pairs

r = 0.29, 95% CL = 0.228 - 0.369, k = 3.22, 95% CL = 2.16 - 4.79

MSY = 0.233, 95% CL = 0.159 - 0.343

Relative biomass last year = 0.236 k, 2.5th = 0.0333, 97.5th = 0.299

Exploitation F/(r/2) in last year = 1.22

Results for Management (based on CMSY analysis)

Fmsy = 0.145, 95% CL = 0.114 - 0.185 (if B > 1/2 Bmsy then Fmsy = 0.5 r)

Fmsy = 0.137, 95% CL = 0.108 - 0.174 (r and Fmsy are linearly reduced if B < 1/2 Bmsy)

MSY = 0.233, 95% CL = 0.159 - 0.343

Bmsy = 1.61, 95% CL = 1.08 - 2.4

Biomass in last year = 0.758, 2.5th perc = 0.107, 97.5 perc = 0.962

B/Bmsy in last year = 0.472, 2.5th perc = 0.0667, 97.5 perc = 0.598

Fishing mortality in last year = 0.162, 2.5th perc = 0.128, 97.5 perc = 1.15

F/Fmsy = 1.18, 2.5th perc = 0.935, 97.5 perc = 8.39

Stock status and exploitation in 2014

Biomass = 0.758, B/Bmsy = 0.472, fishing mortality F = 0.162, F/Fmsy = 1.18

Comment: Catch=landings from FishStat (Greece). RF final 0.3; OK 04.10.16
Species: *Dentex macrophthalmus*, stock: DENTMAC_AL
Large-eye dentex in Aegean Sea
Source:
Region: Mediterranean, Aegean Sea
Catch data used from years 1982 - 2014, abundance = None
Prior initial relative biomass = 0.2 - 0.6 expert
Prior intermediate rel. biomass = 0.5 - 0.9 in year 1996 default
Prior final relative biomass = 0.1 - 0.5 expert
Prior range for r = 0.38 - 1.3 expert, prior range for k = 0.458 - 6.47

Results of CMSY analysis with altogether 4908 viable trajectories for 798 r-k pairs
r = 0.98, 95% CL = 0.727 - 1.32, k = 1.72, 95% CL = 1.2 - 2.48
MSY = 0.422, 95% CL = 0.373 - 0.478
Relative biomass last year = 0.421 k, 2.5th = 0.145, 97.5th = 0.497
Exploitation F/(r/2) in last year = 1.05

Results for Management (based on CMSY analysis)
Fmsy = 0.49, 95% CL = 0.363 - 0.661 (if B > 1/2 Bmsy then Fmsy = 0.5 r)
Fmsy = 0.49, 95% CL = 0.363 - 0.661 (r and Fmsy are linearly reduced if B < 1/2 Bmsy)
MSY = 0.422, 95% CL = 0.373 - 0.478
Bmsy = 0.862, 95% CL = 0.6 - 1.24
Biomass in last year = 0.725, 2.5th perc = 0.251, 97.5 perc = 0.857
B/Bmsy in last year = 0.842, 2.5th perc = 0.291, 97.5 perc = 0.995
Fishing mortality in last year = 0.531, 2.5th perc = 0.449, 97.5 perc = 1.54
F/Fmsy = 1.08, 2.5th perc = 0.916, 97.5 perc = 3.14

Stock status and exploitation in 2014
Biomass = 0.725, B/Bmsy = 0.842, fishing mortality F = 0.531, F/Fmsy = 1.08
Comment: Catch=landings from FishStat (Greece). RF final 0.1-0.5; OK 04.10.16

245
Species: *Dicentrarchus labrax*, stock: DICELAB_AL
European seabass in Aegean Sea
Source:
Region: Mediterranean, Aegean Sea
Catch data used from years 1982 - 2014, abundance = None
Prior initial relative biomass = 0.5 - 0.9 expert
Prior intermediate rel. biomass = 0.5 - 0.9 in year 2006 default
Prior final relative biomass = 0.01 - 0.3 expert
Prior range for $r = 0.17 - 0.88$ expert, prior range for $k = 1.06 - 21.9$

Results of CMSY analysis with altogether 3314 viable trajectories for 618 r-k pairs
$r = 0.583$, 95% CL = 0.395 - 0.86, $k = 3.22$, 95% CL = 1.95 - 5.34
MSY = 0.47, 95% CL = 0.375 - 0.588
Relative biomass last year = 0.139 $k$, 2.5th = 0.0175, 97.5th = 0.294
Exploitation $F/(r/2)$ in last year = 1.75

Results for Management (based on CMSY analysis)
Fmsy = 0.291, 95% CL = 0.197 - 0.43 (if $B > 1/2$ Bmsy then Fmsy = 0.5 $r$)
Fmsy = 0.162, 95% CL = 0.109 - 0.239 ($r$ and Fmsy are linearly reduced if $B < 1/2$ Bmsy)
MSY = 0.47, 95% CL = 0.375 - 0.588
Bmsy = 1.61, 95% CL = 0.974 - 2.67
Biomass in last year = 0.447, 2.5th perc = 0.0564, 97.5 perc = 0.948
B/Bmsy in last year = 0.277, 2.5th perc = 0.035, 97.5 perc = 0.588
Fishing mortality in last year = 0.494, 2.5th perc = 0.233, 97.5 perc = 3.92
F/Fmsy = 3.06, 2.5th perc = 1.44, 97.5 perc = 24.2

Stock status and exploitation in 2014
Biomass = 0.447, B/Bmsy = 0.277, fishing mortality $F = 0.494$, $F/Fmsy = 3.06$
Comment: Catch=landings from FishStat (Greece). RF start 0.5 0.9, final 0.3; OK 04.10.16

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Species: *Diplodus annularis*, stock: DIPLANN_AL
Annular seabream in Aegean Sea
Source:
Region: Mediterranean, Aegean Sea
Catch data used from years 1982 - 2014, abundance = CPUE
Prior initial relative biomass = 0.5 - 0.9 expert
Prior intermediate rel. biomass = 0.01 - 0.4 in year 2004 default
Prior final relative biomass = 0.01 - 0.3 expert
Prior range for \( r = 0.2 - 0.8 \) default, prior range for \( k = 0.8 - 12.8 \)
Prior range of \( q = 7.2 - 28.8 \)

Results of CMSY analysis with altogether 1976 viable trajectories for 1220 \( r-k \) pairs
\( r = 0.449, 95\% \text{ CL} = 0.325 - 0.621, k = 3.05, 95\% \text{ CL} = 2.23 - 4.16 \)
MSY = 0.342, 95\% CL = 0.308 - 0.38
Relative biomass last year = 0.145 \( k \), 2.5th = 0.0147, 97.5th = 0.296
Exploitation \( F/(r/2) \) in last year = 1.54

Results from Bayesian Schaefer model using catch & CPUE
\( r = 0.402, 95\% \text{ CL} = 0.277 - 0.583, k = 3.36, 95\% \text{ CL} = 2.57 - 4.39 \)
MSY = 0.338, 95\% CL = 0.284 - 0.402
Relative biomass in last year = 0.168 \( k \), 2.5th perc = 0.069, 97.5th perc = 0.335
Exploitation \( F/(r/2) \) in last year = 0.988
\( q = 11.4, \text{lcl} = 8.51, \text{ucl} = 15.2 \)

Results for Management (based on BSM analysis)
Fmsy = 0.201, 95\% CL = 0.139 - 0.291 (if \( B > 1/2 \) Bmsy then Fmsy = 0.5 \( r \))
Fmsy = 0.135, 95\% CL = 0.0931 - 0.196 (\( r \) and Fmsy are linearly reduced if \( B < 1/2 \) Bmsy)
MSY = 0.338, 95\% CL = 0.284 - 0.402
Bmsy = 1.68, 95\% CL = 1.29 - 2.2
Biomass in last year = 0.564, 2.5th perc = 0.232, 97.5 perc = 1.12
B/Bmsy in last year = 0.336, 2.5th perc = 0.138, 97.5 perc = 0.669
Fishing mortality in last year = 0.199, 2.5th perc = 0.0996, 97.5 perc = 0.483
\( F/\text{Fmsy} = 1.47, 2.5\text{th perc} = 0.738, 97.5 \text{ perc} = 3.58 \)

Stock status and exploitation in 2014
Biomass = 0.564, B/Bmsy = 0.336, fishing mortality F = 0.199, F/Fmsy = 1.47
Comment: Catch=landings from FishStat (Greece), Biomass estimates standardized relative to max value. RF final 0.3; OK 04.10.16

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Species: *Diplodus sargus*, stock: DIPLSAR_AL
White seabream in Aegean Sea

Source:
Region: Mediterranean, Aegean Sea
Catch data used from years 1982 - 2014, abundance = None
Prior initial relative biomass = 0.5 - 0.9 expert
Prior intermediate rel. biomass = 0.01 - 0.4 in year 2008 default
Prior final relative biomass = 0.01 - 0.3 expert
Prior range for $r$ = 0.23 - 0.85 expert, prior range for $k$ = 0.605 - 8.95

Results of CMSY analysis with altogether 2545 viable trajectories for 1686 r-k pairs
$r = 0.535$, 95% CL = 0.381 - 0.752, $k = 2.74$, 95% CL = 2 - 3.74
$MSY = 0.366$, 95% CL = 0.333 - 0.402
Relative biomass last year = 0.136 $k$, 2.5th = 0.0169, 97.5th = 0.296
Exploitation $F/(r/2)$ in last year = 1.52

Results for Management (based on CMSY analysis)
$F_{msy} = 0.268$, 95% CL = 0.19 - 0.376 (if $B > 1/2 B_{msy}$ then $F_{msy} = 0.5 r$)
$F_{msy} = 0.146$, 95% CL = 0.104 - 0.205 ($r$ and $F_{msy}$ are linearly reduced if $B < 1/2 B_{msy}$)
$MSY = 0.366$, 95% CL = 0.333 - 0.402
$B_{msy} = 1.37$, 95% CL = 0.999 - 1.87
Biomass in last year = 0.372, 2.5th perc = 0.0463, 97.5 perc = 0.81
$B/B_{msy}$ in last year = 0.272, 2.5th perc = 0.0338, 97.5 perc = 0.592
Fishing mortality in last year = 0.365, 2.5th perc = 0.168, 97.5 perc = 2.94
$F/F_{msy} = 2.51$, 2.5th perc = 1.15, 97.5 perc = 20.2

Stock status and exploitation in 2014
Biomass = 0.372, $B/B_{msy} = 0.272$, fishing mortality $F = 0.365$, $F/F_{msy} = 2.51$
Comment: Catch=landings from FishStat (Greece). RF final 0.3; OK 04.10.16
Species: *Eledone moschata*, stock: ELEDMOS_AL
Musky octopus in Aegean Sea

Source:
Region: Mediterranean, Aegean Sea
Catch data used from years 1982 - 2014, abundance = CPUE
Prior initial relative biomass = 0.5 - 0.9 expert
Prior intermediate rel. biomass= 0.5 - 0.9 in year 1994 default
Prior final relative biomass = 0.01 - 0.4 expert
Prior range for r = 0.2 - 0.8 default, prior range for k = 1.31 - 21
Prior range of q = 0.702 - 2.81

Results of CMSY analysis with altogether 2970 viable trajectories for 643 r-k pairs
\[ r = 0.57, \text{95\% CL = 0.413 - 0.785}, \quad k = 4.66, \text{95\% CL = 3.18 - 6.83} \]
\[ \text{MSY = 0.664, 95\% CL = 0.601 - 0.734} \]
Relative biomass last year = 0.298 \(k\), 2.5th = 0.0229, 97.5th = 0.394
Exploitation \(F/(r/2)\) in last year = 1.19

Results from Bayesian Schaefer model using catch & CPUE
\[ r = 0.538, \text{95\% CL = 0.38 - 0.761}, \quad k = 4.92, \text{95\% CL = 3.65 - 6.64} \]
\[ \text{MSY = 0.661, 95\% CL = 0.597 - 0.733} \]
Relative biomass in last year = 0.376 \(k\), 2.5th perc = 0.218, 97.5th perc = 0.484
Exploitation \(F/(r/2)\) in last year = 0.864
\[ q = 1.11, \text{lcl = 0.828, ucl = 1.48} \]

Results for Management (based on BSM analysis)
\[ \text{Fmsy = 0.269, 95\% CL = 0.19 - 0.38 (if B > 1/2 Bmsy then Fmsy = 0.5 r)} \]
\[ \text{Fmsy = 0.269, 95\% CL = 0.19 - 0.38 (r and Fmsy are linearly reduced if B < 1/2 Bmsy)} \]
\[ \text{MSY = 0.661, 95\% CL = 0.597 - 0.733} \]
\[ \text{Bmsy = 2.46, 95\% CL = 1.82 - 3.32} \]
Biomass in last year\ = 1.85, 2.5th perc = 1.07, 97.5 perc = 2.38
\[ \text{B/Bmsy in last year = 0.752, 2.5th perc = 0.436, 97.5 perc = 0.969} \]
Fishing mortality in last year = 0.232, 2.5th perc = 0.18, 97.5 perc = 0.401
\[ F/\text{Fmsy} = 0.864, 2.5th perc = 0.671, 97.5 perc = 1.49 \]

Stock status and exploitation in 2014
Biomass = 1.85, \(B/Bmsy = 0.752\), fishing mortality \(F = 0.232\), \(F/Fmsy = 0.864\)
Comment: Catch=landings from FishStat (Greece), Biomass estimates standardized relative to max value. RF final 0.4; OK 04.10.16

----------------------------------------------------------
Species: *Engraulis encrasicolus*, stock: ENGRENC_AL
Anchovy in Aegean Sea
Source:
Region: Mediterranean, Aegean Sea
Catch data used from years 1970 - 2014, abundance = CPUE
Prior initial relative biomass = 0.5 - 0.9 expert
Prior intermediate rel. biomass= 0.2 - 0.6 in year 2000 expert
Prior final relative biomass = 0.01 - 0.4 expert
Prior range for r = 0.26 - 1.2 expert, prior range for k = 20.8 - 371
Prior range of q = 0.2 - 0.843

Results of CMSY analysis with altogether 2767 viable trajectories for 540 r-k pairs
r = 0.799, 95% CL = 0.559 - 1.14, k = 94.8, 95% CL = 63.1 - 142
MSY = 18.9, 95% CL = 17.1 - 20.9
Relative biomass last year = 0.255 k, 2.5th = 0.0298, 97.5th = 0.393
Exploitation F/(r/2) in last year = 1.96

Results from Bayesian Schaefer model using catch & CPUE
r = 0.837, 95% CL = 0.604 - 1.16, k = 92.1, 95% CL = 69.4 - 122
MSY = 19.3, 95% CL = 16.5 - 22.5
Relative biomass in last year = 0.343 k, 2.5th perc = 0.232, 97.5th perc = 0.458
Exploitation F/(r/2) in last year = 1.54
q = 0.315, lcl = 0.242, ucl = 0.411

Results for Management (based on BSM analysis)
Fmsy = 0.418, 95% CL = 0.302 - 0.58 (if B > 1/2 Bmsy then Fmsy = 0.5 r)
Fmsy = 0.418, 95% CL = 0.302 - 0.58 (r and Fmsy are linearly reduced if B < 1/2 Bmsy)
MSY = 19.3, 95% CL = 16.5 - 22.5
Bmsy = 46, 95% CL = 34.7 - 61.1
Biomass in last year = 31.6, 2.5th perc = 21.3, 97.5 perc = 42.2
B/Bmsy in last year = 0.685, 2.5th perc = 0.463, 97.5 perc = 0.916
Fishing mortality in last year = 0.644, 2.5th perc = 0.482, 97.5 perc = 0.953
F/Fmsy = 1.54, 2.5th perc = 1.15, 97.5 perc = 2.28

Stock status and exploitation in 2014
Biomass = 31.6, B/Bmsy = 0.685, fishing mortality F = 0.644, F/Fmsy = 1.54
Comment: Catch=landings from FishStat (Greece+Turkey), Biomass estimates standardized relative to max value; RF OK 04.10.16

-------------------------------------------------------------------------
Species: *Epinephelus marginatus*, stock: EPINGUA_AL

Dusky grouper in Aegean Sea

Source:

Region: Mediterranean, Aegean Sea

Catch data used from years 1985 - 2014, abundance = None

Prior initial relative biomass = 0.2 - 0.6 expert

Prior intermediate rel. biomass = 0.01 - 0.4 in year 1999 default

Prior final relative biomass = 0.01 - 0.3 expert

Prior range for r = 0.11 - 0.57 expert, prior range for k = 0.287 - 5.94

Results of CMSY analysis with altogether 2893 viable trajectories for 1996 r-k pairs

r = 0.343, 95% CL = 0.234 - 0.502, k = 0.959, 95% CL = 0.579 - 1.59

MSY = 0.0822, 95% CL = 0.062 - 0.109

Relative biomass last year = 0.165 k, 2.5th = 0.0201, 97.5th = 0.298

Exploitation F/(r/2) in last year = 1.74

Results for Management (based on CMSY analysis)

Fmsy = 0.172, 95% CL = 0.117 - 0.251 (if B > 1/2 Bmsy then Fmsy = 0.5 r)

Fmsy = 0.113, 95% CL = 0.0775 - 0.166 (r and Fmsy are linearly reduced if B < 1/2 Bmsy)

MSY = 0.0822, 95% CL = 0.062 - 0.109

Bmsy = 0.479, 95% CL = 0.289 - 0.794

Biomass in last year = 0.158, 2.5th perc = 0.0193, 97.5 perc = 0.286

B/Bmsy in last year = 0.331, 2.5th perc = 0.0402, 97.5 perc = 0.596

Fishing mortality in last year = 0.309, 2.5th perc = 0.171, 97.5 perc = 2.54

F/Fmsy = 2.73, 2.5th perc = 1.51, 97.5 perc = 22.4

Stock status and exploitation in 2014

Biomass = 0.158, B/Bmsy = 0.331, fishing mortality F = 0.309, F/Fmsy = 2.73

Comment: Catch=landings from FishStat (Greece). RF final 0.3; OK 04.10.16
Species: *Illex coindetii*, stock: ILLECOI_AL
Shortfin squid in Aegean Sea
Source:
Region: Mediterranean, Aegean Sea
Catch data used from years 1990 - 2014, abundance = CPUE
Prior initial relative biomass = 0.2 - 0.6 expert
Prior intermediate rel. biomass = 0.2 - 0.6 in year 2000 expert
Prior final relative biomass = 0.2 - 0.6 expert
Prior range for r = 0.2 - 0.8 default, prior range for k = 1.52 - 24.3
Prior range of q = 1.09 - 4.36

Results of CMSY analysis with altogether 3365 viable trajectories for 1465 r-k pairs
\( r = 0.566, \ 95\% \ CL = 0.407 - 0.785, \ k = 6.83, \ 95\% \ CL = 4.44 - 10.5 \)
MSY = 0.966, 95% CL = 0.79 - 1.18
Relative biomass last year = 0.414 k, 2.5th = 0.211, 97.5th = 0.586
Exploitation \( F/(r/2) \) in last year = 1.52

Results from Bayesian Schaefer model using catch & CPUE
\( r = 0.658, \ 95\% \ CL = 0.444 - 0.974, \ k = 5.97, \ 95\% \ CL = 4.36 - 8.16 \)
MSY = 0.982, 95% CL = 0.785 - 1.23
Relative biomass in last year = 0.519 k, 2.5th perc = 0.287, 97.5th perc = 0.678
Exploitation \( F/(r/2) \) in last year = 0.997
q = 1.59, lcl = 1.2, ucl = 2.1

Results for Management (based on CMSY analysis)
Fmsy = 0.283, 95% CL = 0.204 - 0.392 (if B > 1/2 Bmsy then Fmsy = 0.5 r)
Fmsy = 0.283, 95% CL = 0.204 - 0.392 (r and Fmsy are linearly reduced if B < 1/2 Bmsy)
MSY = 0.966, 95% CL = 0.79 - 1.18
Bmsy = 3.42, 95% CL = 2.22 - 5.26
Biomass in last year = 2.83, 2.5th perc = 1.44, 97.5 perc = 4.01
B/Bmsy in last year = 0.827, 2.5th perc = 0.423, 97.5 perc = 1.17
Fishing mortality in last year = 0.359, 2.5th perc = 0.253, 97.5 perc = 0.703
F/Fmsy = 1.27, 2.5th perc = 0.896, 97.5 perc = 2.49

Stock status and exploitation in 2014
Biomass = 2.83, B/Bmsy = 0.827, fishing mortality F = 0.359, F/Fmsy = 1.27
Comment: Catch=landings from FishStat (Greece), Biomass estimates standardized relative to max value; RF OK 04.10.16

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Species: *Loligo vulgaris*, stock: LOLIVUL_AL
European squid in Aegean Sea

Source:
Region: Mediterranean, Aegean Sea
Catch data used from years 1980 - 2014, abundance = CPUE
Prior initial relative biomass = 0.2 - 0.6 expert
Prior intermediate rel. biomass = 0.2 - 0.6 in year 2000 expert
Prior final relative biomass = 0.01 - 0.4 expert
Prior range for $r = 0.2 - 0.8$ default, prior range for $k = 1.37 - 22$
Prior range of $q = 0.256 - 1.03$

Results of CMSY analysis with altogether 3835 viable trajectories for 2178 $r$-$k$ pairs
$r = 0.458$, 95% CL = 0.336 - 0.625, $k = 5.3$, 95% CL = 3.86 - 7.28
MSY = 0.607, 95% CL = 0.544 - 0.678
Relative biomass last year = 0.314 $k$, 2.5th = 0.0361, 97.5th = 0.397
Exploitation $F/(r/2)$ in last year = 1.55

Results from Bayesian Schaefer model using catch & CPUE
$r = 0.442$, 95% CL = 0.321 - 0.609, $k = 5.57$, 95% CL = 4.24 - 7.32
MSY = 0.615, 95% CL = 0.542 - 0.697
Relative biomass in last year = 0.283 $k$, 2.5th perc = 0.143, 97.5th perc = 0.44
Exploitation $F/(r/2)$ in last year = 1.42
$q = 0.421$, lcl = 0.318, ucl = 0.558

Results for Management (based on CMSY analysis)
Fmsy = 0.229, 95% CL = 0.168 - 0.313 (if $B > 1/2$ Bmsy then Fmsy = 0.5 $r$)
Fmsy = 0.229, 95% CL = 0.168 - 0.313 ($r$ and Fmsy are linearly reduced if $B < 1/2$ Bmsy)
MSY = 0.607, 95% CL = 0.544 - 0.678
Bmsy = 2.65, 95% CL = 1.93 - 3.64
Biomass in last year = 1.66, 2.5th perc = 0.191, 97.5 perc = 2.1
B/Bmsy in last year = 0.628, 2.5th perc = 0.0722, 97.5 perc = 0.795
Fishing mortality in last year = 0.297, 2.5th perc = 0.235, 97.5 perc = 2.58
F/Fmsy = 1.29, 2.5th perc = 1.02, 97.5 perc = 11.3

Stock status and exploitation in 2014
Biomass = 1.66, B/Bmsy = 0.628, fishing mortality $F = 0.297$, $F/Fmsy = 1.29$
Comment: Catch=landings from FishStat (Greece), Biomass estimates standardized relative to max value. RF OK 04.10.16

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Species: *Lophius budegassa*, stock: LOPHBUD_AL  
Blackbellied angler in Aegean Sea  
Source:  
Region: Mediterranean, Aegean Sea  
Catch data used from years 1982-2014, abundance = CPUE  
Prior initial relative biomass = 0.2 - 0.6 expert  
Prior intermediate rel. biomass= 0.2 - 0.6 in year 1995 expert  
Prior final relative biomass = 0.01 - 0.4 expert  
Prior range for r = 0.2 - 0.54 expert, prior range for k = 2.28 - 24.7  
Prior range of q = 0.609 - 2  

Results of CMSY analysis with altogether 1883 viable trajectories for 1043 r-k pairs  
r = 0.419, 95% CL = 0.332 - 0.529, k = 7.88, 95% CL = 5.79 - 10.7  
MSY = 0.826, 95% CL = 0.711 - 0.959  
Relative biomass last year = 0.246 k, 2.5th = 0.0267, 97.5th = 0.388  
Exploitation F/(r/2) in last year = 1.65  

Results from Bayesian Schaefer model using catch & CPUE  
r = 0.437, 95% CL = 0.321 - 0.595, k = 7.66, 95% CL = 5.8 - 10.1  
MSY = 0.837, 95% CL = 0.704 - 0.995  
Relative biomass in last year = 0.302 k, 2.5th perc = 0.211, 97.5th perc = 0.415  
Exploitation F/(r/2) in last year = 1.1  
q = 0.905, lcl = 0.722, ucl = 1.13  

Results for Management (based on CMSY analysis)  
Fmsy = 0.209, 95% CL = 0.166 - 0.264 (if B > 1/2 Bmsy then Fmsy = 0.5 r)  
Fmsy = 0.206, 95% CL = 0.163 - 0.26 (r and Fmsy are linearly reduced if B < 1/2 Bmsy)  
MSY = 0.826, 95% CL = 0.711 - 0.959  
Bmsy = 3.94, 95% CL = 2.89 - 5.37  
Biomass in last year = 1.94, 2.5th perc = 0.21, 97.5 perc = 3.06  
B/Bmsy in last year = 0.492, 2.5th perc = 0.0534, 97.5 perc = 0.776  
Fishing mortality in last year = 0.287, 2.5th perc = 0.182, 97.5 perc = 2.65  
F/Fmsy = 1.39, 2.5th perc = 0.884, 97.5 perc = 12.8  

Stock status and exploitation in 2014  
Biomass = 1.94, B/Bmsy = 0.492, fishing mortality F = 0.287, F/Fmsy = 1.39  
Comment: Catch=landings from FishStat (Greece), Biomass estimates standardized relative to max value; RF OK 04.10.16  

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Species: *Merluccius merluccius*, stock: MERLMER_AL

Hake in Aegean Sea

Source: excel

Region: Mediterranean, Aegean Sea

Catch data used from years 1980 - 2014, abundance = CPUE

Prior initial relative biomass = 0.01 - 0.4 expert

Prior intermediate rel. biomass = 0.01 - 0.4 in year 2000 expert

Prior final relative biomass = 0.01 - 0.4 expert

Prior range for r = 0.22 - 0.95 expert, prior range for k = 4.32 - 74.7

Prior range of q = 0.346 - 1.44

Results of CMSY analysis with altogether 2589 viable trajectories for 1486 r-k pairs

r = 0.66, 95% CL = 0.467 - 0.934, k = 19.4, 95% CL = 13.1 - 28.6

MSY = 3.2, 95% CL = 2.93 - 3.49

Relative biomass last year = 0.26 k, 2.5th = 0.0334, 97.5th = 0.393

Exploitation F/(r/2) in last year = 1.97

Results from Bayesian Schaefer model using catch & CPUE

r = 0.719, 95% CL = 0.523 - 0.988, k = 18.2, 95% CL = 13.4 - 24.6

MSY = 3.26, 95% CL = 3.02 - 3.53

Relative biomass in last year = 0.354 k, 2.5th perc = 0.252, 97.5th perc = 0.443

Exploitation F/(r/2) in last year = 1.13

q = 0.573, lcl = 0.442, ucl = 0.743

Results for Management (based on CMSY analysis)

Fmsy = 0.33, 95% CL = 0.233 - 0.467 (if B > 1/2 Bmsy then Fmsy = 0.5 r)

Fmsy = 0.33, 95% CL = 0.233 - 0.467 (r and Fmsy are linearly reduced if B < 1/2 Bmsy)

MSY = 3.2, 95% CL = 2.93 - 3.49

Bmsy = 9.68, 95% CL = 6.54 - 14.3

Biomass in last year = 5.04, 2.5th perc = 0.647, 97.5 perc = 7.61

B/Bmsy in last year = 0.521, 2.5th perc = 0.0669, 97.5 perc = 0.786

Fishing mortality in last year = 0.518, 2.5th perc = 0.343, 97.5 perc = 4.03

F/Fmsy = 1.57, 2.5th perc = 1.04, 97.5 perc = 12.2

Stock status and exploitation in 2014

Biomass = 5.04, B/Bmsy = 0.521, fishing mortality F = 0.518, F/Fmsy = 1.57

Comment: Catch=landings from FishStat (Greece), Biomass estimates standardized relative to max value. OK RF 04.10.16

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Species: *Micromesistius poutassou*, stock: MICMPOU_AL

Blue whiting in Aegean Sea

Source:

Region: Mediterranean, Aegean Sea

Catch data used from years 1985 - 2014, abundance = CPUE

Prior initial relative biomass = 0.2 - 0.6 expert

Prior intermediate rel. biomass = 0.01 - 0.3 in year 1996 expert

Prior final relative biomass = 0.01 - 0.3 expert

Prior range for r = 0.21 - 1.1 expert, prior range for k = 1.68 - 35

Prior range of q = 2.73 - 12.4

Results of CMSY analysis with altogether 1698 viable trajectories for 1575 r-k pairs

\[ r = 0.44, \text{ 95\% CL = 0.299 - 0.649, } k = 12, \text{ 95\% CL = 8.08 - 17.9} \]

MSY = 1.32, 95\% CL = 0.969 - 1.81

Relative biomass last year = 0.14 \( k \), 2.5th = 0.0153, 97.5th = 0.284

Exploitation \( F/(r/2) \) in last year = 1.96

Results from Bayesian Schaefer model using catch & CPUE

\[ r = 0.492, \text{ 95\% CL = 0.336 - 0.72, } k = 9.7, \text{ 95\% CL = 6.9 - 13.6} \]

MSY = 1.19, 95\% CL = 1.03 - 1.38

Relative biomass in last year = 0.134 \( k \), 2.5th perc = 0.0732, 97.5th perc = 0.312

Exploitation \( F/(r/2) \) in last year = 1.64

\( q = 4.37, \text{ lcl = 3.19, ucl = 5.99} \)

Results for Management (based on CMSY analysis)

\[ F_{msy} = 0.22, \text{ 95\% CL = 0.149 - 0.324 (if B > 1/2 Bmsy then Fmsy = 0.5 r)} \]

\[ F_{msy} = 0.124, \text{ 95\% CL = 0.084 - 0.182 (r and Fmsy are linearly reduced if B < 1/2 Bmsy)} \]

MSY = 1.32, 95\% CL = 0.969 - 1.81

\[ B_{msy} = 6.01, \text{ 95\% CL = 4.04 - 8.94} \]

Biomass in last year = 1.69, 2.5th perc = 0.184, 97.5 perc = 3.42

\[ B/B_{msy} \text{ in last year} = 0.281, \text{ 2.5th perc = 0.0306, 97.5 perc = 0.568} \]

Fishing mortality in last year = 0.31, 2.5th perc = 0.153, 97.5 perc = 2.84

\[ F/F_{msy} = 2.51, \text{ 2.5th perc = 1.24, 97.5 perc = 23} \]

Stock status and exploitation in 2014

Biomass = 1.69, B/B_{msy} = 0.281, fishing mortality F = 0.31, F/F_{msy} = 2.51

Comment: Catch=landings from FishStat (Greece), Biomass estimates standardized relative to max value. RF final 0.3; OK 04.10.16

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Species: *Mullus barbatus*, stock: MULLBAR_AL
Red mullet in Aegean Sea

Region: Mediterranean, Aegean Sea
Catch data used from years 1985 - 2014, abundance = CPUE
Prior initial relative biomass = 0.01 - 0.4 expert
Prior intermediate rel. biomass= 0.01 - 0.4 in year 1995 expert
Prior final relative biomass = 0.01 - 0.2 expert
Prior range for r = 0.22 - 1.2 expert, prior range for k = 3.34 - 75.9
Prior range of q = 0.605 - 2.88

Results of CMSY analysis with altogether 644 viable trajectories for 627 r-k pairs
\( r = 0.434, \) 95% CL = 0.267 - 0.706, \( k = 32.1, \) 95% CL = 20.9 - 49.4
MSY = 3.49, 95% CL = 2.29 - 5.32
Relative biomass last year = 0.101 k, 2.5th = 0.0163, 97.5th = 0.195
Exploitation \( F/(r/2) \) in last year = 2.8

Results from Bayesian Schaefer model using catch & CPUE
\( r = 0.526, \) 95% CL = 0.367 - 0.754, \( k = 24.3, \) 95% CL = 16.9 - 34.9
MSY = 3.2, 95% CL = 2.55 - 4.01
Relative biomass in last year = 0.195 k, 2.5th perc = 0.112, 97.5th perc = 0.252
Exploitation \( F/(r/2) \) in last year = 1.54
\( q = 0.993, \) lcl = 0.722, ucl = 1.36

Results for Management (based on BSM analysis)
Fmsy = 0.263, 95% CL = 0.183 - 0.377 (if B > 1/2 Bmsy then Fmsy = 0.5 r)
Fmsy = 0.205, 95% CL = 0.143 - 0.294 (r and Fmsy are linearly reduced if B < 1/2 Bmsy)
MSY = 3.2, 95% CL = 2.55 - 4.01
Bmsy = 12.2, 95% CL = 8.46 - 17.5
Biomass in last year = 4.75, 2.5th perc = 2.72, 97.5 perc = 6.14
B/Bmsy in last year = 0.39, 2.5th perc = 0.224, 97.5 perc = 0.505
Fishing mortality in last year = 0.404, 2.5th perc = 0.313, 97.5 perc = 0.705
\( F/Fmsy = 1.97, \) 2.5th perc = 1.52, 97.5 perc = 3.43

Stock status and exploitation in 2014
Biomass = 4.75, \( B/Bmsy = 0.39, \) fishing mortality \( F = 0.404, \) \( F/Fmsy = 1.97 \)
Comment: Catch=landings from FishStat (Greece+Turkey), Biomass estimates standardized relative to max value. RF OK 04.10.16
Species: *Mullus surmuletus*, stock: MULLSUR_AL
Surmulet in Aegean Sea
Source:
Region: Mediterranean, Aegean Sea
Catch data used from years 1985 - 2014, abundance = CPUE
Prior initial relative biomass = 0.2 - 0.6 expert
Prior intermediate rel. biomass= 0.01 - 0.4 in year 1995 expert
Prior final relative biomass = 0.01 - 0.3 expert
Prior range for r = 0.46 - 1.6 expert, , prior range for k = 1.8 - 24.8
Prior range of q = 0.588 - 2.18

Results of CMSY analysis with altogether 194 viable trajectories for 189 r-k pairs
r = 0.674, 95% CL = 0.393 - 1.15, k = 12.4, 95% CL = 10.1 - 15.3
MSY = 2.09, 95% CL = 1.82 - 2.41
Relative biomass last year = 0.224 k, 2.5th = 0.0523, 97.5th = 0.297
Exploitation $F/(r/2)$ in last year = 1.61

Results from Bayesian Schaefer model using catch & CPUE
r = 0.833, 95% CL = 0.642 - 1.08, k = 10.3, 95% CL = 7.99 - 13.3
MSY = 2.14, 95% CL = 1.94 - 2.37
Relative biomass in last year = 0.27 k, 2.5th perc = 0.158, 97.5th perc = 0.354
Exploitation $F/(r/2)$ in last year = 1.28
q = 0.866, lcl = 0.672, ucl = 1.11

Results for Management (based on CMSY analysis)
Fmsy = 0.337, 95% CL = 0.197 - 0.577 (if B > 1/2 Bmsy then Fmsy = 0.5 r)
Fmsy = 0.302, 95% CL = 0.176 - 0.518 (r and Fmsy are linearly reduced if B < 1/2 Bmsy)
MSY = 2.09, 95% CL = 1.82 - 2.41
Bmsy = 6.21, 95% CL = 5.06 - 7.63
Biomass in last year = 2.79, 2.5th perc = 0.649, 97.5 perc = 3.69
B/Bmsy in last year = 0.449, 2.5th perc = 0.105, 97.5 perc = 0.594
Fishing mortality in last year = 0.529, 2.5th perc = 0.4, 97.5 perc = 2.27
F/Fmsy = 1.75, 2.5th perc = 1.32, 97.5 perc = 7.51

Stock status and exploitation in 2014
Biomass = 2.79, B/Bmsy = 0.449, fishing mortality F = 0.529, F/Fmsy = 1.75
Comment: Catch=landings from FishStat (Greece+Turkey), Biomass estimates standardized relative to max value. RF final 0.3; OK 04.10.16

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Species: *Nephrops norvegicus*, stock: NEPRNOR_AL
Norway lobster in Aegean Sea
Source: excel
Region: Mediterranean, Aegean Sea
Catch data used from years 1970 - 2014, abundance = CPUE
Prior initial relative biomass = 0.2 - 0.6 expert
Prior intermediate rel. biomass = 0.01 - 0.4 in year 2000 expert
Prior final relative biomass = 0.01 - 0.2 expert
Prior range for $r$ = 0.2 - 0.8 default, prior range for $k$ = 1.68 - 26.9
Prior range of $q$ = 0.364 - 1.45

Results of CMSY analysis with altogether 982 viable trajectories for 896 r-k pairs
$r = 0.387$, 95% CL = 0.258 - 0.58, $k = 8.25$, 95% CL = 6.22 - 11
MSY = 0.798, 95% CL = 0.698 - 0.913
Relative biomass last year = 0.0943 $k$, 2.5th = 0.0176, 97.5th = 0.196
Exploitation $F/(r/2)$ in last year = 1.9

Results from Bayesian Schaefer model using catch & CPUE
$r = 0.439$, 95% CL = 0.319 - 0.603, $k = 7.42$, 95% CL = 5.73 - 9.6
MSY = 0.814, 95% CL = 0.719 - 0.921
Relative biomass in last year = 0.155 $k$, 2.5th perc = 0.102, 97.5th perc = 0.215
Exploitation $F/(r/2)$ in last year = 0.902
$q = 0.562$, lcl = 0.429, ucl = 0.736

Results for Management (based on CMSY analysis)
Fmsy = 0.193, 95% CL = 0.129 - 0.29 (if B > 1/2 Bmsy then Fmsy = 0.5 $r$)
Fmsy = 0.073, 95% CL = 0.0487 - 0.109 (r and Fmsy are linearly reduced if B < 1/2 Bmsy)
MSY = 0.798, 95% CL = 0.698 - 0.913
Bmsy = 4.13, 95% CL = 3.11 - 5.48
Biomass in last year = 0.778, 2.5th perc = 0.145, 97.5 perc = 1.62
B/Bmsy in last year = 0.189, 2.5th perc = 0.0351, 97.5 perc = 0.392
Fishing mortality in last year = 0.293, 2.5th perc = 0.141, 97.5 perc = 1.57
F/Fmsy = 4.01, 2.5th perc = 1.93, 97.5 perc = 21.6

Stock status and exploitation in 2014
Biomass = 0.778, B/Bmsy = 0.189, fishing mortality F = 0.293, F/Fmsy = 4.01
Comment: Catch=landings from FishStat (Greece), Biomass estimates standardized relative to max value. RF OK 04.10.16

----------------------------------------------------------
Species: *Octopus vulgaris*, stock: OCTOVUL_AL
Common octopus in Aegean Sea
Source:
Region: Mediterranean, Aegean Sea
Catch data used from years 1990 - 2014, abundance = CPUE
Prior initial relative biomass = 0.01 - 0.4 expert
Prior intermediate rel. biomass = 0.01 - 0.4 in year 1995 expert
Prior final relative biomass = 0.01 - 0.4 expert
Prior range for \( r = 0.4 - 1 \) expert, prior range for \( k = 3.6 - 36 \)
Prior range of \( q = 0.476 - 1 \) expert

Results of CMSY analysis with altogether 1143 viable trajectories for 1067 r-k pairs
\( r = 0.703 , 95\% \text{ CL} = 0.506 - 0.976 , k = 19.5 , 95\% \text{ CL} = 15 - 25.3 \)
\( \text{MSY} = 3.42 , 95\% \text{ CL} = 2.91 - 4.02 \)
Relative biomass last year = 0.254 k, 2.5th = 0.0191 , 97.5th = 0.392
Exploitation \( F/(r/2) \) in last year = 1.07

Results from Bayesian Schaefer model using catch & CPUE
\( r = 0.824 , 95\% \text{ CL} = 0.649 - 1.05 , k = 15.8 , 95\% \text{ CL} = 12 - 20.7 \)
\( \text{MSY} = 3.25 , 95\% \text{ CL} = 2.77 - 3.81 \)
Relative biomass in last year = 0.329 k, 2.5th perc = 0.181 , 97.5th perc = 0.455
Exploitation \( F/(r/2) \) in last year = 0.932
\( q = 0.752 , \text{lcl} = 0.597 , \text{ucl} = 0.947 \)

Results for Management (based on CMSY analysis)
\( \text{Fmsy} = 0.351 , 95\% \text{ CL} = 0.253 - 0.488 \) (if \( B > 1/2 \text{Bmsy} \) then \( \text{Fmsy} = 0.5 r \))
\( \text{Fmsy} = 0.351 , 95\% \text{ CL} = 0.253 - 0.488 \) (r and \( \text{Fmsy} \) are linearly reduced if \( B < 1/2 \text{Bmsy} \))
\( \text{MSY} = 3.42 , 95\% \text{ CL} = 2.91 - 4.02 \)
\( \text{Bmsy} = 9.73 , 95\% \text{ CL} = 7.49 - 12.6 \)
Biomass in last year = 4.94 , 2.5th perc = 0.371 , 97.5 perc = 7.63
\( \text{B}/\text{Bmsy} \) in last year = 0.508 , 2.5th perc = 0.0381 , 97.5 perc = 0.784
Fishing mortality in last year = 0.403 , 2.5th perc = 0.261 , 97.5 perc = 5.37
\( F/\text{Fmsy} = 1.15 , 2.5\text{th perc} = 0.743 , 97.5 \text{perc} = 15.3 \)

Stock status and exploitation in 2014
Biomass = 4.94 , \( B/\text{Bmsy} = 0.508 \), fishing mortality \( F = 0.403 \), \( F/\text{Fmsy} = 1.15 \)
Comment: Catch=landings from FishStat (Greece+Turkey), Biomass estimates standardized relative to max value. RF OK 04.10.16

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Species: *Pagellus erythrinus*, stock: PAGEERY_AL
Common pandora in Aegean Sea
Source:
Region: Mediterranean, Aegean Sea
Catch data used from years 1970 - 2014, abundance = CPUE
Prior initial relative biomass = 0.2 - 0.6 expert
Prior intermediate rel. biomass= 0.01 - 0.4 in year 2000 expert
Prior final relative biomass = 0.01 - 0.4 expert
Prior range for r = 0.22 - 0.97 expert, prior range for k = 0.962 - 17
Prior range of q = 2.34 - 9.82

Results of CMSY analysis with altogether 1705 viable trajectories for 1369 r-k pairs
r = 0.462, 95% CL = 0.268 - 0.797, k = 5.62, 95% CL = 4.2 - 7.5
MSY = 0.648, 95% CL = 0.583 - 0.721
Relative biomass last year = 0.308 k, 2.5th = 0.0223, 97.5th = 0.398
Exploitation F/(r/2) in last year = 1.09

Results from Bayesian Schaefer model using catch & CPUE
r = 0.473, 95% CL = 0.34 - 0.657, k = 5.52, 95% CL = 4.04 - 7.53
MSY = 0.652, 95% CL = 0.58 - 0.733
Relative biomass in last year = 0.387 k, 2.5th perc = 0.217, 97.5th perc = 0.493
Exploitation F/(r/2) in last year = 0.835
q = 3.43, lcl = 2.49, ucl = 4.74

Results for Management (based on CMSY analysis)
Fmsy = 0.231, 95% CL = 0.134 - 0.399 (if B > 1/2 Bmsy then Fmsy = 0.5 r)
Fmsy = 0.231, 95% CL = 0.134 - 0.399 (r and Fmsy are linearly reduced if B < 1/2 Bmsy)
MSY = 0.648, 95% CL = 0.583 - 0.721
Bmsy = 2.81, 95% CL = 2.1 - 3.75
Biomass in last year = 1.73, 2.5th perc = 0.125, 97.5 perc = 2.23
B/Bmsy in last year = 0.615, 2.5th perc = 0.0446, 97.5 perc = 0.796
Fishing mortality in last year = 0.244, 2.5th perc = 0.188, 97.5 perc = 3.37
F/Fmsy = 1.06, 2.5th perc = 0.816, 97.5 perc = 14.6

Stock status and exploitation in 2014
Biomass = 1.73, B/Bmsy = 0.615, fishing mortality F = 0.244, F/Fmsy = 1.06
Comment: Catch=landings from FishStat (Greece), Biomass estimates standardized relative to max value. RF OK 04.10.16
Species: *Pagrus pagrus*, stock: PAGRPAG_AL
Red porgy in Aegean Sea

Region: Mediterranean, Aegean Sea
Catch data used from years 1985 - 2014, abundance = None
Prior initial relative biomass = 0.2 - 0.6 expert
Prior intermediate rel. biomass= 0.01 - 0.4 in year 2000 expert
Prior final relative biomass = 0.01 - 0.4 expert
Prior range for r = 0.27 - 0.86 expert, prior range for k = 1.35 - 17.2

Results of CMSY analysis with altogether 1531 viable trajectories for 1171 r-k pairs
r = 0.517, 95% CL = 0.381 - 0.701, k = 6.06, 95% CL = 4.53 - 8.1
MSY = 0.783, 95% CL = 0.662 - 0.927
Relative biomass last year = 0.308 k, 2.5th = 0.0486, 97.5th = 0.397
Exploitation F/(r/2) in last year = 1.26

Results for Management (based on CMSY analysis)
Fmsy = 0.258, 95% CL = 0.191 - 0.35 (if B > 1/2 Bmsy then Fmsy = 0.5 r)
Fmsy = 0.258, 95% CL = 0.191 - 0.35 (r and Fmsy are linearly reduced if B < 1/2 Bmsy)
MSY = 0.783, 95% CL = 0.662 - 0.927
Bmsy = 3.03, 95% CL = 2.27 - 4.05
Biomass in last year = 1.87, 2.5th perc = 0.295, 97.5 perc = 2.41
B/Bmsy in last year = 0.617, 2.5th perc = 0.0972, 97.5 perc = 0.795
Fishing mortality in last year = 0.337, 2.5th perc = 0.262, 97.5 perc = 2.14
F/Fmsy = 1.3, 2.5th perc = 1.01, 97.5 perc = 8.27

Stock status and exploitation in 2014
Biomass = 1.87, B/Bmsy = 0.617, fishing mortality F = 0.337, F/Fmsy = 1.3
Comment: Catch=landings from FishStat (Greece+Turkey). RF OK 04.10.16

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Species: *Palinurus elephas*, stock: PALIELE_AL
Common spiny lobster in Aegean Sea
Source:
Region: Mediterranean, Aegean Sea
Catch data used from years 1982 - 2014, abundance = None
Prior initial relative biomass = 0.5 - 0.9 expert
Prior intermediate rel. biomass = 0.1 - 0.5 in year 2000 expert
Prior final relative biomass = 0.1 - 0.5 expert
Prior range for \( r \) = 0.05 - 0.5 default, prior range for \( k \) = 0.563 - 22.5

Results of CMSY analysis with altogether 6460 viable trajectories for 1290 \( r-k \) pairs
\( r = 0.278, \ 95\% \ CL = 0.162 - 0.478, \ k = 1.76, \ 95\% \ CL = 0.926 - 3.35 \)
MSY = 0.122, 95% CL = 0.1 - 0.149
Relative biomass last year = 0.385 \( k \), 2.5th = 0.123, 97.5th = 0.496
Exploitation \( F/(r/2) \) in last year = 1.15

Results for Management (based on CMSY analysis)
\( F_{msy} = 0.139, \ 95\% \ CL = 0.0809 - 0.239 \) (if \( B > 1/2 \) Bmsy then \( F_{msy} = 0.5 \ r \))
\( F_{msy} = 0.139, \ 95\% \ CL = 0.0809 - 0.239 \) (\( r \) and \( F_{msy} \) are linearly reduced if \( B < 1/2 \) Bmsy)
MSY = 0.122, 95% CL = 0.1 - 0.149
Bmsy = 0.88, 95% CL = 0.463 - 1.67
Biomass in last year = 0.678, 2.5th perc = 0.217, 97.5 perc = 0.874
\( B/B_{msy} \) in last year = 0.77, 2.5th perc = 0.246, 97.5 perc = 0.993
Fishing mortality in last year = 0.171, 2.5th perc = 0.133, 97.5 perc = 0.535
\( F/F_{msy} = 1.23, \ 2.5th \ perc = 0.955, \ 97.5 \ perc = 3.85 \)

Stock status and exploitation in 2014
Biomass = 0.678, \( B/B_{msy} = 0.77, \ ) fishing mortality \( F = 0.171, \ F/F_{msy} = 1.23 \)
Comment: Catch=landings from FishStat (Greece). RF int 0.1-0.5, final 0.1-0.5; OK 04.10.16

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Species: Parapenaeus longirostris, stock: PARELON_AL
Pink shrimp in Aegean Sea

Source:
Region: Mediterranean, Aegean Sea
Catch data used from years 1970 - 2014, abundance = CPUE
Prior initial relative biomass = 0.5 - 0.9 expert
Prior intermediate rel. biomass = 0.01 - 0.4 in year 2000 expert
Prior final relative biomass = 0.01 - 0.3 expert
Prior range for r = 0.6 - 1.5 default, prior range for k = 0.961 - 9.61
Prior range of q = 1.15 - 3.63

Results of CMSY analysis with altogether 696 viable trajectories for 624 r-k pairs
r = 1, 95% CL = 0.808 - 1.24, k = 4.58, 95% CL = 3.78 - 5.55
MSY = 1.14, 95% CL = 1.08 - 1.21
Relative biomass last year = 0.177 k, 2.5th = 0.0195, 97.5th = 0.294
Exploitation F/(r/2) in last year = 2.09

Results from Bayesian Schaefer model using catch & CPUE
r = 0.994, 95% CL = 0.819 - 1.21, k = 4.63, 95% CL = 3.88 - 5.52
MSY = 1.15, 95% CL = 1.08 - 1.23
Relative biomass in last year = 0.301 k, 2.5th perc = 0.201, 97.5th perc = 0.378
Exploitation F/(r/2) in last year = 1.08
q = 1.72, lcl = 1.37, ucl = 2.17

Results for Management (based on CMSY analysis)
Fmsy = 0.5, 95% CL = 0.404 - 0.619 (if B > 1/2 Bmsy then Fmsy = 0.5 r)
Fmsy = 0.353, 95% CL = 0.285 - 0.437 (r and Fmsy are linearly reduced if B < 1/2 Bmsy)
MSY = 1.14, 95% CL = 1.08 - 1.21
Bmsy = 2.29, 95% CL = 1.89 - 2.77
Biomass in last year = 0.808, 2.5th perc = 0.0891, 97.5 perc = 1.35
B/Bmsy in last year = 0.353, 2.5th perc = 0.0389, 97.5 perc = 0.588
Fishing mortality in last year = 0.927, 2.5th perc = 0.557, 97.5 perc = 8.4
F/Fmsy = 2.62, 2.5th perc = 1.58, 97.5 perc = 23.8

Stock status and exploitation in 2014
Biomass = 0.808, B/Bmsy = 0.353, fishing mortality F = 0.927, F/Fmsy = 2.62
Comment: Catch=landings from FishStat (Greece), Biomass estimates standardized relative to max value. RF int 2000 0.01-0.4, final 0.01-0.3; OK 04.10.16

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Species: *Melicertus kerathurus*, stock: PENAKER_AL
Caramote prawn in Aegean Sea
Source:
Region: Mediterranean, Aegean Sea
Catch data used from years 1982 - 2014, abundance = None
Prior initial relative biomass = 0.5 - 0.9 expert
Prior intermediate rel. biomass = 0.5 - 0.9 in year 2006 default
Prior final relative biomass = 0.1 - 0.5 expert
Prior range for r = 0.2 - 0.8 default, prior range for k = 3.88 - 62.1

Results of CMSY analysis with altogether 10854 viable trajectories for 1304 r-k pairs
r = 0.566, 95% CL = 0.407 - 0.785, k = 13.7, 95% CL = 8.95 - 21
MSY = 1.94, 95% CL = 1.6 - 2.35
Relative biomass last year = 0.363 k, 2.5th = 0.121, 97.5th = 0.495
Exploitation F/(r/2) in last year = 1.17

Results for Management (based on CMSY analysis)
Fmsy = 0.283, 95% CL = 0.204 - 0.392 (if B > 1/2 Bmsy then Fmsy = 0.5 r)
Fmsy = 0.283, 95% CL = 0.204 - 0.392 (r and Fmsy are linearly reduced if B < 1/2 Bmsy)
MSY = 1.94, 95% CL = 1.6 - 2.35
Bmsy = 6.86, 95% CL = 4.48 - 10.5
Biomass in last year = 4.98, 2.5th perc = 1.66, 97.5 perc = 6.79
B/Bmsy in last year = 0.726, 2.5th perc = 0.242, 97.5 perc = 0.991
Fishing mortality in last year = 0.291, 2.5th perc = 0.213, 97.5 perc = 0.876
F/Fmsy = 1.03, 2.5th perc = 0.755, 97.5 perc = 3.1

Stock status and exploitation in 2014
Biomass = 4.98, B/Bmsy = 0.726, fishing mortality F = 0.291, F/Fmsy = 1.03
Comment: Catch=landings from FishStat (Greece). RF final 0.1-0.5; OK 04.10.16
Species: Pomatomus saltatrix, stock: POMTSAL_AL
Bluefish in Aegean Sea
Source:
Region: Mediterranean, Aegean Sea
Catch data used from years 1982 - 2014, abundance = None
Prior initial relative biomass = 0.5 - 0.9 expert
Prior intermediate rel. biomass = 0.5 - 0.9 in year 2002 default
Prior final relative biomass = 0.01 - 0.4, default
Prior range for r = 0.37 - 0.9 expert, prior range for k = 0.513 - 4.99

Results of CMSY analysis with altogether 1185 viable trajectories for 980 r-k pairs
r = 0.71, 95% CL = 0.577 - 0.873, k = 1.41, 95% CL = 1.1 - 1.81
MSY = 0.25, 95% CL = 0.23 - 0.271
Relative biomass last year = 0.185 k, 2.5th = 0.0182, 97.5th = 0.392
Exploitation F/(r/2) in last year = 1.14

Results for Management (based on CMSY analysis)
Fmsy = 0.355, 95% CL = 0.289 - 0.436 (if B > 1/2 Bmsy then Fmsy = 0.5 r)
Fmsy = 0.262, 95% CL = 0.213 - 0.323 (r and Fmsy are linearly reduced if B < 1/2 Bmsy)
MSY = 0.25, 95% CL = 0.23 - 0.271
Bmsy = 0.704, 95% CL = 0.549 - 0.903
Biomass in last year = 0.26, 2.5th perc = 0.0257, 97.5 perc = 0.552
B/Bmsy in last year = 0.37, 2.5th perc = 0.0365, 97.5 perc = 0.783
Fishing mortality in last year = 0.423, 2.5th perc = 0.199, 97.5 perc = 4.28
F/Fmsy = 1.61, 2.5th perc = 0.76, 97.5 perc = 16.3

Stock status and exploitation in 2014
Biomass = 0.26, B/Bmsy = 0.37, fishing mortality F = 0.423, F/Fmsy = 1.61
Comment: Catch=landings from FishStat (Greece). RF OK 04.10.16

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Species: Scophthalmus maximus, stock: PSETMAX_AL
Turbot in Aegean Sea
Source:
Region: Mediterranean, Aegean Sea
Catch data used from years 1982 - 2014, abundance = None
Prior initial relative biomass = 0.5 - 0.9 expert
Prior intermediate rel. biomass= 0.01 - 0.4 in year 1997 expert
Prior final relative biomass = 0.01 - 0.4 expert
Prior range for r = 0.25 - 0.82 expert, prior range for k = 0.255 - 3.35

Results of CMSY analysis with altogether 4336 viable trajectories for 1739 r-k pairs
r = 0.497, 95% CL = 0.389 - 0.634, k = 0.747, 95% CL = 0.57 - 0.978
MSY = 0.0927, 95% CL = 0.0838 - 0.102
Relative biomass last year = 0.305 k, 2.5th = 0.0344, 97.5th = 0.396
Exploitation F/(r/2) in last year = 1.24

Results for Management (based on CMSY analysis)
Fmsy = 0.248, 95% CL = 0.195 - 0.317 (if B > 1/2 Bmsy then Fmsy = 0.5 r)
Fmsy = 0.248, 95% CL = 0.195 - 0.317 (r and Fmsy are linearly reduced if B < 1/2 Bmsy)
MSY = 0.0927, 95% CL = 0.0838 - 0.102
Bmsy = 0.373, 95% CL = 0.285 - 0.489
Biomass in last year = 0.228, 2.5th perc = 0.0257, 97.5 perc = 0.295
B/Bmsy in last year = 0.611, 2.5th perc = 0.0689, 97.5 perc = 0.791
Fishing mortality in last year = 0.36, 2.5th perc = 0.278, 97.5 perc = 3.19
F/Fmsy = 1.45, 2.5th perc = 1.12, 97.5 perc = 12.8

Stock status and exploitation in 2014
Biomass = 0.228, B/Bmsy = 0.611, fishing mortality F = 0.36, F/Fmsy = 1.45
Comment: Catch=landings from FishStat (Greece). RF int 1997 0.01-0.4, final 0.01-0.4; OK 04.10.16
Species: *Raja clavata*, stock: RAJACLA_AL  
Thornback ray in Aegean Sea  
Source:  
Region: Mediterranean, Aegean Sea  
Catch data used from years 1982 - 2014, abundance = CPUE  
Prior initial relative biomass = 0.2 - 0.6 expert  
Prior intermediate rel. biomass = 0.2 - 0.6 in year 1995 expert  
Prior final relative biomass = 0.01 - 0.4 expert  
Prior range for r = 0.02 - 0.9 expert, prior range for k = 1.17 - 211  
Prior range of q = 0.546 - 7.32  

Results of CMSY analysis with altogether 10720 viable trajectories for 3744 r-k pairs  
r = 0.263, 95% CL = 0.116 - 0.596, k = 9.96, 95% CL = 3.39 - 29.2  
MSY = 0.654, 95% CL = 0.395 - 1.08  
Relative biomass last year = 0.285 k, 2.5th = 0.0241, 97.5th = 0.397  
Exploitation F/(r/2) in last year = 1.15  

Results from Bayesian Schaefer model using catch & CPUE  
r = 0.167, 95% CL = 0.085 - 0.328, k = 14.2, 95% CL = 7.63 - 26.3  
MSY = 0.592, 95% CL = 0.442 - 0.793  
Relative biomass in last year = 0.285 k, 2.5th perc = 0.173, 97.5th perc = 0.434  
Exploitation F/(r/2) in last year = 1.09  
q = 1.01, lcl = 0.64, ucl = 1.6  

Results for Management (based on CMSY analysis)  
Fmsy = 0.131, 95% CL = 0.0578 - 0.298 (if B > 1/2 Bmsy then Fmsy = 0.5 r)  
Fmsy = 0.131, 95% CL = 0.0578 - 0.298 (r and Fmsy are linearly reduced if B < 1/2 Bmsy)  
MSY = 0.654, 95% CL = 0.395 - 1.08  
Bmsy = 4.98, 95% CL = 1.7 - 14.6  
Biomass in last year = 2.84, 2.5th perc = 0.24, 97.5 perc = 3.95  
B/Bmsy in last year = 0.571, 2.5th perc = 0.0483, 97.5 perc = 0.793  
Fishing mortality in last year = 0.129, 2.5th perc = 0.0932, 97.5 perc = 1.53  
F/Fmsy = 0.986, 2.5th perc = 0.71, 97.5 perc = 11.7  

Stock status and exploitation in 2014  
Biomass = 2.84, B/Bmsy = 0.571, fishing mortality F = 0.129, F/Fmsy = 0.986  
Comment: Catch=landings from FishStat (Greece+Turkey), Biomass estimates standardized relative to max value. RF final 0.01-0.4; OK 04.10.16  

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Species: *Sardina pilchardus*, stock: SARDPIL_AL
Sardine in Aegean Sea
Source:
Region: Mediterranean, Aegean Sea
Catch data used from years 1980 - 2014, abundance = CPUE
Prior initial relative biomass = 0.2 - 0.6 expert
Prior intermediate rel. biomass = 0.2 - 0.6 in year 2000 expert
Prior final relative biomass = 0.01 - 0.4 expert
Prior range for r = 0.27 - 1.1 expert, prior range for k = 35.3 - 576
Prior range of q = 0.0674 - 0.272

Results of CMSY analysis with altogether 1860 viable trajectories for 1165 r-k pairs
r = 0.589, 95% CL = 0.415 - 0.834, k = 173, 95% CL = 129 - 232
MSY = 25.4, 95% CL = 23.1 - 27.9
Relative biomass last year = 0.332 k, 2.5th = 0.0371, 97.5th = 0.394
Exploitation F/(r/2) in last year = 0.946

Results from Bayesian Schaefer model using catch & CPUE
r = 0.512, 95% CL = 0.341 - 0.769, k = 188, 95% CL = 130 - 272
MSY = 24.1, 95% CL = 20.3 - 28.6
Relative biomass in last year = 0.111 k, 2.5th perc = 0.0738, 97.5th perc = 0.211
Exploitation F/(r/2) in last year = 3.38
q = 0.0876, lcl = 0.0686, ucl = 0.112

Results for Management (based on CMSY analysis)
Fmsy = 0.294, 95% CL = 0.208 - 0.417 (if B > 1/2 Bmsy then Fmsy = 0.5 r)
Fmsy = 0.294, 95% CL = 0.208 - 0.417 (r and Fmsy are linearly reduced if B < 1/2 Bmsy)
MSY = 25.4, 95% CL = 23.1 - 27.9
Bmsy = 86.3, 95% CL = 64.3 - 116
Biomass in last year = 57.4, 2.5th perc = 6.4, 97.5 perc = 68.1
B/Bmsy in last year = 0.665, 2.5th perc = 0.0741, 97.5 perc = 0.788
Fishing mortality in last year = 0.316, 2.5th perc = 0.266, 97.5 perc = 2.83
F/Fmsy = 1.07, 2.5th perc = 0.905, 97.5 perc = 9.63

Stock status and exploitation in 2014
Biomass = 57.4, B/Bmsy = 0.665, fishing mortality F = 0.316, F/Fmsy = 1.07
Comment: Catch=landings from FishStat (Greece+Turkey), Biomass estimates standardized relative to max value. RF int 2000, final 0.01-0.4

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Species: *Sardinella aurita*, stock: SARIAUR_AL
Round sardinella in Aegean Sea
Region: Mediterranean, Aegean Sea
Catch data used from years 1982 - 2014, abundance = None
**Prior initial relative biomass** = 0.2 - 0.6 expert
**Prior intermediate rel. biomass** = 0.4 - 0.8 in year 2008 expert
**Prior final relative biomass** = 0.1 - 0.5 expert
**Prior range for r** = 0.24 - 1.3 expert, prior range for k = 3.08 - 64.7

Results of CMSY analysis with altogether 7833 viable trajectories for 1056 r-k pairs
**r** = 0.831, 95% CL = 0.56 - 1.23, **k** = 13.4, 95% CL = 8.22 - 21.9
**MSY** = 2.78, 95% CL = 2.31 - 3.35
Relative biomass last year = 0.375 **k**, 2.5th = 0.125, 97.5th = 0.495
Exploitation **F/(r/2)** in last year = 1.03

Results for Management (based on CMSY analysis)
**Fmsy** = 0.416, 95% CL = 0.28 - 0.616 (if B > 1/2 Bmsy then Fmsy = 0.5 r)
**Fmsy** = 0.416, 95% CL = 0.28 - 0.616 (r and Fmsy are linearly reduced if B < 1/2 Bmsy)
**MSY** = 2.78, 95% CL = 2.31 - 3.35
**Bmsy** = 6.7, 95% CL = 4.11 - 10.9
Biomass in last year = 5.03, 2.5th perc = 1.68, 97.5 perc = 6.64
B/Bmsy in last year = 0.751, 2.5th perc = 0.25, 97.5 perc = 0.991
Fishing mortality in last year = 0.479, 2.5th perc = 0.363, 97.5 perc = 1.44
**F/Fmsy** = 1.15, 2.5th perc = 0.873, 97.5 perc = 3.46

Stock status and exploitation in 2014
Biomass = 5.03, B/Bmsy = 0.751, fishing mortality F = 0.479, **F/Fmsy** = 1.15
Comment: Catch=landings from FishStat (Greece+Turkey). RF int 2008 0.4-0.8, final 0.1-0.5
Species: *Sarpa salpa*, stock: SARPSAL_AL
Salema in Aegean Sea
Source:
Region: Mediterranean, Aegean Sea
Catch data used from years 1982 - 2014, abundance = None
Prior initial relative biomass = 0.5 - 0.9 expert
Prior intermediate rel. biomass = 0.01 - 0.4 in year 2000 expert
Prior final relative biomass = 0.01 - 0.3 expert
Prior range for r = 0.55 - 1 expert, prior range for k = 0.75 - 5.45

Results of CMSY analysis with altogether 268 viable trajectories for 262 r-k pairs
r = 0.736, 95% CL = 0.602 - 0.901, k = 2.49, 95% CL = 2.05 - 3.03
MSY = 0.458, 95% CL = 0.376 - 0.558
Relative biomass last year = 0.151 k, 2.5th = 0.0192, 97.5th = 0.293
Exploitation F/(r/2) in last year = 1.47

Results for Management (based on CMSY analysis)
Fmsy = 0.368, 95% CL = 0.301 - 0.45 (if B > 1/2 Bmsy then Fmsy = 0.5 r)
Fmsy = 0.223, 95% CL = 0.182 - 0.272 (r and Fmsy are linearly reduced if B < 1/2 Bmsy)
MSY = 0.458, 95% CL = 0.376 - 0.558
Bmsy = 1.25, 95% CL = 1.02 - 1.51
Biomass in last year = 0.376, 2.5th perc = 0.0478, 97.5 perc = 0.73
B/Bmsy in last year = 0.302, 2.5th perc = 0.0384, 97.5 perc = 0.587
Fishing mortality in last year = 0.478, 2.5th perc = 0.247, 97.5 perc = 3.77
F/Fmsy = 2.15, 2.5th perc = 1.11, 97.5 perc = 16.9

Stock status and exploitation in 2014
Biomass = 0.376, B/Bmsy = 0.302, fishing mortality F = 0.478, F/Fmsy = 2.15
Comment: Catch=landings from FishStat (Greece). int 2000 0.01-0.4, final 0.01-0.3; OK 04.10.16

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297
Species: *Scomber colias*, stock: SCOMPNE_AL
Atlantic chub mackerel in Aegean Sea

Source:
Region: Mediterranean, Aegean Sea
Catch data used from years 1990 - 2014, abundance = None
Prior initial relative biomass = 0.5 - 0.9 expert
Prior intermediate rel. biomass = 0.01 - 0.4 in year 2000 expert
Prior final relative biomass = 0.01 - 0.3 expert
Prior range for r = 0.31 - 1.2 expert, prior range for k = 14.4 - 218

Results of CMSY analysis with altogether 1263 viable trajectories for 1126 r-k pairs
r = 0.628, 95% CL = 0.438 - 0.9, k = 56.5, 95% CL = 41.9 - 76.1
MSY = 8.87, 95% CL = 7.64 - 10.3
Relative biomass last year = 0.132 k, 2.5th = 0.0183, 97.5th = 0.284
Exploitation F/(r/2) in last year = 1.1

Results for Management (based on CMSY analysis)
Fmsy = 0.314, 95% CL = 0.219 - 0.45 (if B > 1/2 Bmsy then Fmsy = 0.5 r)
Fmsy = 0.165, 95% CL = 0.115 - 0.237 (r and Fmsy are linearly reduced if B < 1/2 Bmsy)
MSY = 8.87, 95% CL = 7.64 - 10.3
Bmsy = 28.2, 95% CL = 20.9 - 38.1
Biomass in last year = 7.43, 2.5th perc = 1.03, 97.5 perc = 16.1
B/Bmsy in last year = 0.263, 2.5th perc = 0.0365, 97.5 perc = 0.569
Fishing mortality in last year = 0.301, 2.5th perc = 0.139, 97.5 perc = 2.17
F/Fmsy = 1.82, 2.5th perc = 0.843, 97.5 perc = 13.1

Stock status and exploitation in 2014
Biomass = 7.43, B/Bmsy = 0.263, fishing mortality F = 0.301, F/Fmsy = 1.82
Comment: Catch=landings from FishStat (Greece+Turkey). RF int 2000 0.01-0.4, final 0.01-0.3; OK 04.10.16

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Species: *Scomber scombrus*, stock: SCOMSCO_AL
Atlantic mackerel in Aegean Sea

Region: Mediterranean, Aegean Sea
Catch data used from years 1990 - 2014, abundance = None
Prior initial relative biomass = 0.5 - 0.9 expert
Prior intermediate rel. biomass= 0.01 - 0.4 in year 2000 expert
Prior final relative biomass = 0.01 - 0.2 expert
Prior range for r = 0.23 - 1 expert, prior range for k = 3.98 - 69.2

Results of CMSY analysis with altogether 2022 viable trajectories for 1864 r-k pairs
r = 0.494, 95% CL = 0.373 - 0.655, k = 14.6, 95% CL = 10 - 21.4
MSY = 1.81, 95% CL = 1.38 - 2.37
Relative biomass last year = 0.0831 k, 2.5th = 0.0124, 97.5th = 0.196
Exploitation F/(r/2) in last year = 0.599

Results for Management (based on CMSY analysis)
Fmsy = 0.247, 95% CL = 0.186 - 0.328 (if B > 1/2 Bmsy then Fmsy = 0.5 r)
Fmsy = 0.0821, 95% CL = 0.0619 - 0.109 (r and Fmsy are linearly reduced if B < 1/2 Bmsy)
MSY = 1.81, 95% CL = 1.38 - 2.37
Bmsy = 7.32, 95% CL = 5.01 - 10.7
Biomass in last year = 1.22, 2.5th perc = 0.182, 97.5 perc = 2.87
B/Bmsy in last year = 0.166, 2.5th perc = 0.0248, 97.5 perc = 0.392
Fishing mortality in last year = 0.0896, 2.5th perc = 0.038, 97.5 perc = 0.6
F/Fmsy = 1.09, 2.5th perc = 0.462, 97.5 perc = 7.31

Stock status and exploitation in 2014
Biomass = 1.22, B/Bmsy = 0.166, fishing mortality F = 0.0896, F/Fmsy = 1.09
Comment: Catch=landings from FishStat (Greece+Turkey). RF int 0.01-0.4, final 0.01-0.2, OK 04.10.16

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Species: *Sepia officinalis*, stock: SEPIOFF_AL

Common cuttlefish in Aegean Sea

Source:

Region: Mediterranean, Aegean Sea

Catch data used from years 1970 - 2014, abundance = CPUE

Prior initial relative biomass = 0.5 - 0.9 expert

Prior intermediate relative biomass = 0.2 - 0.6 in year 2003 default

Prior final relative biomass = 0.01 - 0.4 expert

Prior range for r = 0.2 - 0.8 default, prior range for k = 2.93 - 46.8

Prior range of q = 0.181 - 0.726

Results of CMSY analysis with altogether 2722 viable trajectories for 524 r-k pairs

\[ r = 0.564, \quad 95\% \ CL = 0.405 - 0.785, \quad k = 12.4, \quad 95\% \ CL = 8.35 - 18.4 \]

MSY = 1.75, 95% CL = 1.57 - 1.95

Relative biomass last year = 0.312 k, 2.5th = 0.0261, 97.5th = 0.396

Exploitation \( F/(r/2) \) in last year = 1.04

Results from Bayesian Schaefer model using catch & CPUE

\[ r = 0.554, \quad 95\% \ CL = 0.382 - 0.805, \quad k = 12.5, \quad 95\% \ CL = 9.13 - 17.1 \]

MSY = 1.73, 95% CL = 1.56 - 1.92

Relative biomass in last year = 0.35 k, 2.5th perc = 0.123, 97.5th perc = 0.485

Exploitation \( F/(r/2) \) in last year = 0.851

\[ q = 0.296, \quad lcl = 0.22, \quad ucl = 0.398 \]

Results for Management (based on CMSY analysis)

\[ F_{msy} = 0.282, \quad 95\% \ CL = 0.203 - 0.393 \] (if \( B > 1/2 B_{msy} \) then \( F_{msy} = 0.5 r \))

\[ F_{msy} = 0.282, \quad 95\% \ CL = 0.203 - 0.393 \] (\( r \) and \( F_{msy} \) are linearly reduced if \( B < 1/2 B_{msy} \))

MSY = 1.75, 95% CL = 1.57 - 1.95

\[ B_{msy} = 6.2, \quad 95\% \ CL = 4.18 - 9.21 \]

\[ B/B_{msy} = 3.87, \quad 2.5th \ perc = 0.323, \quad 97.5\% \ perc = 4.92 \]

\[ B/B_{msy} = 0.624, \quad 2.5th \ perc = 0.0521, \quad 97.5\% \ perc = 0.793 \]

\[ F/F_{msy} = 0.944, \quad 2.5th \ perc = 0.744, \quad 97.5\% \ perc = 11.3 \]

Stock status and exploitation in 2014

\[ Biomass = 3.87, \quad B/B_{msy} = 0.624, \quad fishing \ mortality \ F = 0.266, \quad F/F_{msy} = 0.944 \]

Comment: Catch=landings from FishStat (Greece). RF final 0.01-0.4; OK 04.10.16
Species: *Solea solea*, stock: SOLEVUL_AL
Common sole in Aegean Sea

Region: Mediterranean, Aegean Sea
Catch data used from years 1970 - 2014, abundance = CPUE
Prior initial relative biomass = 0.2 - 0.6 expert
Prior intermediate rel. biomass= 0.01 - 0.4 in year 2000 default
Prior final relative biomass = 0.01 - 0.3 expert
Prior range for r = 0.21 - 1 expert, prior range for k = 2.15 - 41.7
Prior range of q = 0.23 - 1.01

Results of CMSY analysis with altogether 1623 viable trajectories for 1298 r-k pairs
r = 0.497 , 95% CL = 0.319 - 0.772 , k = 10.3 , 95% CL = 7.37 - 14.4
MSY = 1.28 , 95% CL = 1.14 - 1.44
Relative biomass last year = 0.133 k, 2.5th = 0.0158 , 97.5th = 0.291
Exploitation F/(r/2) in last year = 1.63

Results from Bayesian Schaefer model using catch & CPUE
r = 0.487 , 95% CL = 0.342 - 0.692 , k = 10.7 , 95% CL = 8.24 - 13.8
MSY = 1.3 , 95% CL = 1.12 - 1.51
Relative biomass in last year = 0.222 k, 2.5th perc = 0.112 , 97.5th perc = 0.339
Exploitation F/(r/2) in last year = 0.727
q = 0.352 , lcl = 0.261 , ucl = 0.474

Results for Management (based on CMSY analysis)
Fmsy = 0.248 , 95% CL = 0.16 - 0.386 (if B > 1/2 Bmsy then Fmsy = 0.5 r)
Fmsy = 0.132 , 95% CL = 0.0849 - 0.205 (r and Fmsy are linearly reduced if B < 1/2 Bmsy)
MSY = 1.28 , 95% CL = 1.14 - 1.44
Bmsy = 5.15 , 95% CL = 3.68 - 7.21
Biomass in last year = 1.37 , 2.5th perc = 0.163 , 97.5 perc = 3
B/Bmsy in last year = 0.266 , 2.5th perc = 0.0316 , 97.5 perc = 0.582
Fishing mortality in last year = 0.307 , 2.5th perc = 0.14 , 97.5 perc = 2.58
F/Fmsy = 2.32 , 2.5th perc = 1.06 , 97.5 perc = 19.6

Stock status and exploitation in 2014
Biomass = 1.37 , B/Bmsy = 0.266 , fishing mortality F = 0.307 , F/Fmsy = 2.32
Comment: Catch=landings from FishStat (Greece). RF final 0.3; OK 04.10.16
Species: *Spicara smaris*, stock: SPICSMA_AL
Picarel in Aegean Sea

**Source:**
Region: Mediterranean, Aegean Sea
Catch data used from years 1970 - 2014, abundance = CPUE
Prior initial relative biomass = 0.2 - 0.6 expert
Prior intermediate rel. biomass = 0.01 - 0.4 in year 1995 expert
Prior final relative biomass = 0.01 - 0.3 expert
Prior range for \( r = 0.2 - 0.8 \) default, prior range for \( k = 10.2 - 163 \)
Prior range of \( q = 0.603 - 2.41 \)

**Results of CMSY analysis with altogether 1017 viable trajectories for 940 \( r-k \) pairs**
\( r = 0.407 \), 95% CL = 0.261 - 0.634, \( k = 63.1 \), 95% CL = 45.8 - 86.9
MSY = 6.41, 95% CL = 5.47 - 7.53
Relative biomass last year = 0.107 \( k \), 2.5th = 0.0156, 97.5th = 0.284
Exploitation \( F/(r/2) \) in last year = 1.01

**Results from Bayesian Schaefer model using catch & CPUE**
\( r = 0.417 \), 95% CL = 0.283 - 0.614, \( k = 62.4 \), 95% CL = 43.2 - 90.3
MSY = 6.51, 95% CL = 5.66 - 7.48
Relative biomass in last year = 0.17 \( k \), 2.5th perc = 0.0424, 97.5th perc = 0.338
Exploitation \( F/(r/2) \) in last year = 0.574
\( q = 1.01 \), lcl = 0.742, ucl = 1.37

**Results for Management (based on CMSY analysis)**
Fmsy = 0.203, 95% CL = 0.13 - 0.317 (if \( B > 1/2 \text{Bmsy} \) then \( Fmsy = 0.5 \ r \))
Fmsy = 0.0868, 95% CL = 0.0557 - 0.135 (\( r \) and \( Fmsy \) are linearly reduced if \( B < 1/2 \text{Bmsy} \))
MSY = 6.41, 95% CL = 5.47 - 7.53
Bmsy = 31.6, 95% CL = 22.9 - 43.5
Biomass in last year = 6.74, 2.5th perc = 0.982, 97.5 perc = 17.9
\( B/\text{Bmsy} \) in last year = 0.214, 2.5th perc = 0.0311, 97.5 perc = 0.568
Fishing mortality in last year = 0.189, 2.5th perc = 0.071, 97.5 perc = 1.3
\( F/\text{Fmsy} \) = 2.18, 2.5th perc = 0.818, 97.5 perc = 15

**Stock status and exploitation in 2014**
Biomass = 6.74, \( B/\text{Bmsy} \) = 0.214, fishing mortality \( F = 0.189 \), \( F/\text{Fmsy} = 2.18 \)
Comment: Catch=landings from FishStat (Greece). RF int 1995 0.01-0.4, final 0.01-0.3; OK 04.10.16

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307
Species: *Spondyliosoma cantharus*, stock: SPODCAN_AL
Black seabream in Aegean Sea
Source:
Region: Mediterranean, Aegean Sea
Catch data used from years 1972 - 2014, abundance = None
Prior initial relative biomass = 0.5 - 0.9 expert
Prior intermediate rel. biomass= 0.01 - 0.4 in year 2000 expert
Prior final relative biomass = 0.01 - 0.3 expert
Prior range for r = 0.24 - 1.0 expert, prior range for k = 0.442 - 7.74

Results of CMSY analysis with altogether 1630 viable trajectories for 1113 r-k pairs
r = 0.517, 95% CL = 0.301 - 0.887, k = 2.27, 95% CL = 1.68 - 3.08
MSY = 0.294 , 95% CL = 0.269 - 0.321
Relative biomass last year = 0.115 k, 2.5th = 0.0145 , 97.5th = 0.286
Exploitation F/(r/2) in last year = 1.38

Results for Management (based on CMSY analysis)
Fmsy = 0.258 , 95% CL = 0.151 - 0.443 (if B > 1/2 Bmsy then Fmsy = 0.5 r)
Fmsy = 0.118 , 95% CL = 0.0691 - 0.203 (r and Fmsy are linearly reduced if B < 1/2 Bmsy)
MSY = 0.294 , 95% CL = 0.269 - 0.321
Bmsy = 1.14 , 95% CL = 0.839 - 1.54
Biomass in last year = 0.26 , 2.5th perc = 0.033 , 97.5 perc = 0.65
B/Bmsy in last year = 0.229 , 2.5th perc = 0.029 , 97.5 perc = 0.572
Fishing mortality in last year = 0.307 , 2.5th perc = 0.123 , 97.5 perc = 2.43
F/Fmsy = 2.59 , 2.5th perc = 1.04 , 97.5 perc = 20.5

Stock status and exploitation in 2014
Biomass = 0.26 , B/Bmsy = 0.229 , fishing mortality F = 0.307 , F/Fmsy = 2.59
Comment: Catch=landings from FishStat (Greece). RF int 2000 0.01-0.4, final 0.01-0.3; OK 04.10.16
Species: *Squalus acanthias*, stock: SQUAACA_AL
Picked dogfish in Aegean Sea
Source:
Region: Mediterranean, Aegean Sea
Catch data used from years 1982 - 2014, abundance = CPUE
Prior initial relative biomass = 0.5 - 0.9 expert
Prior intermediate rel. biomass = 0.01 - 0.4 in year 2008 expert
Prior final relative biomass = 0.01 - 0.4 expert
Prior range for r = 0.05 - 0.5 default, prior range for k = 0.49 - 19.6
Prior range of q = 5.25 - 33.2

Results of CMSY analysis with altogether 4115 viable trajectories for 1009 r-k pairs
r = 0.258 , 95% CL = 0.142 - 0.469 , k = 2.1 , 95% CL = 1.13 - 3.91
MSY = 0.135 , 95% CL = 0.11 - 0.166
Relative biomass last year = 0.275 k, 2.5th = 0.0225 , 97.5th = 0.395
Exploitation F/(r/2) in last year = 1.14

Results from Bayesian Schaefer model using catch & CPUE
r = 0.195 , 95% CL = 0.109 - 0.349 , k = 2.62 , 95% CL = 1.74 - 3.95
MSY = 0.128 , 95% CL = 0.0967 - 0.169
Relative biomass in last year = 0.292 k, 2.5th perc = 0.124 , 97.5th perc = 0.448
Exploitation F/(r/2) in last year = 1.38
q = 9.32 , lcl = 6.44 , ucl = 13.5

Results for Management (based on CMSY analysis)
Fmsy = 0.129 , 95% CL = 0.0709 - 0.234 (if B > 1/2 Bmsy then Fmsy = 0.5 r)
Fmsy = 0.129 , 95% CL = 0.0709 - 0.234 (r and Fmsy are linearly reduced if B < 1/2 Bmsy)
MSY = 0.135 , 95% CL = 0.11 - 0.166
Bmsy = 1.05 , 95% CL = 0.564 - 1.96
Biomass in last year = 0.577 , 2.5th perc = 0.0473 , 97.5 perc = 0.829
B/Bmsy in last year = 0.549 , 2.5th perc = 0.045 , 97.5 perc = 0.789
Fishing mortality in last year = 0.178 , 2.5th perc = 0.124 , 97.5 perc = 2.18
F/Fmsy = 1.38 , 2.5th perc = 0.963 , 97.5 perc = 16.9

Stock status and exploitation in 2014
Biomass = 0.577 , B/Bmsy = 0.549 , fishing mortality F = 0.178 , F/Fmsy = 1.38
Comment: Catch=landings from FishStat (Greece), Biomass estimates standardized relative to max value. RF int 2008 0.01-0.4, final 0.01-0.4; OK 04.10.16
Species: *Trachurus mediterraneus*, stock: TRACHMED_AL
Mediterranean horse mackerel in Aegean Sea
Source:
Region: Mediterranean, Aegean Sea
Catch data used from years 1975 - 2014, abundance = CPUE
Prior initial relative biomass = 0.2 - 0.6 expert
Prior intermediate rel. biomass= 0.2 - 0.6 in year 1995 expert
Prior final relative biomass = 0.01 - 0.4 expert
Prior range for r = 0.2 - 0.8 default, prior range for k = 12.1 - 194
Prior range of q = 0.0526 - 0.21

Results of CMSY analysis with altogether 1720 viable trajectories for 1526 r-k pairs
r = 0.438 , 95% CL = 0.303 - 0.634 , k = 70.7 , 95% CL = 49.6 - 101
MSY = 7.75 , 95% CL = 6.47 - 9.29
Relative biomass last year = 0.174 k, 2.5th = 0.0213 , 97.5th = 0.384
Exploitation $F/(r/2)$ in last year = 0.753

Results from Bayesian Schaeffer model using catch & CPUE
r = 0.481 , 95% CL = 0.328 - 0.707 , k = 64.8 , 95% CL = 44.8 - 93.8
MSY = 7.8 , 95% CL = 6.81 - 8.94
Relative biomass in last year = 0.261 k, 2.5th perc = 0.0666 , 97.5th perc = 0.446
Exploitation $F/(r/2)$ in last year = 0.423
q = 0.0839 , lcl = 0.062 , ucl = 0.114

Results for Management (based on CMSY analysis)
Fmsy = 0.219 , 95% CL = 0.151 - 0.317 (if B > 1/2 Bmsy then Fmsy = 0.5 r)
Fmsy = 0.152 , 95% CL = 0.105 - 0.22 (r and Fmsy are linearly reduced if B < 1/2 Bmsy)
MSY = 7.75 , 95% CL = 6.47 - 9.29
Bmsy = 35.4 , 95% CL = 24.8 - 50.4
Biomass in last year = 12.3 , 2.5th perc = 1.5 , 97.5 perc = 27.2
B/Bmsy in last year = 0.348 , 2.5th perc = 0.0425 , 97.5 perc = 0.768
Fishing mortality in last year = 0.14 , 2.5th perc = 0.0633 , 97.5 perc = 1.14
$F/Fmsy$ = 0.918 , 2.5th perc = 0.416 , 97.5 perc = 7.51

Stock status and exploitation in 2014
Biomass = 12.3 , B/Bmsy = 0.348 , fishing mortality $F$ = 0.14 , $F/Fmsy$ = 0.918
Comment: Catch=landings from FishStat (Greece+Turkey), Biomass estimates standardized relative to max value; RF OK 04.10.16

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Species: *Trachurus trachurus*, stock: TRACTRA_AL
Atlantic horse mackerel in Aegean Sea
Source:
Region: Mediterranean, Aegean Sea
Catch data used from years 1982 - 2014, abundance = CPUE
Prior initial relative biomass = 0.2 - 0.6 expert
Prior intermediate rel. biomass = 0.01 - 0.4 in year 2000 expert
Prior final relative biomass = 0.01 - 0.4 expert
Prior range for r = 0.22 - 0.98 expert, prior range for k = 2.55 - 45.4
Prior range of q = 0.516 - 2.18

Results of CMSY analysis with altogether 1206 viable trajectories for 616 r-k pairs
r = 0.66, 95% CL = 0.458 - 0.953, k = 9.8, 95% CL = 6.57 - 14.6
MSY = 1.62, 95% CL = 1.46 - 1.8
Relative biomass last year = 0.306 k, 2.5th = 0.0284, 97.5th = 0.397
Exploitation F/(r/2) in last year = 0.911

Results from Bayesian Schaefer model using catch & CPUE
r = 0.643, 95% CL = 0.436 - 0.947, k = 10.4, 95% CL = 7.29 - 14.9
MSY = 1.68, 95% CL = 1.53 - 1.84
Relative biomass in last year = 0.416 k, 2.5th perc = 0.277, 97.5th perc = 0.517
Exploitation F/(r/2) in last year = 0.502
q = 0.822, lcl = 0.607, ucl = 1.11

Results for Management (based on CMSY analysis)
Fmsy = 0.33, 95% CL = 0.229 - 0.476 (if B > 1/2 Bmsy then Fmsy = 0.5 r)
Fmsy = 0.33, 95% CL = 0.229 - 0.476 (r and Fmsy are linearly reduced if B < 1/2 Bmsy)
MSY = 1.62, 95% CL = 1.46 - 1.8
Bmsy = 4.9, 95% CL = 3.28 - 7.31
Biomass in last year = 3, 2.5th perc = 0.278, 97.5 perc = 3.89
B/Bmsy in last year = 0.613, 2.5th perc = 0.0567, 97.5 perc = 0.793
Fishing mortality in last year = 0.233, 2.5th perc = 0.18, 97.5 perc = 2.52
F/Fmsy = 0.706, 2.5th perc = 0.546, 97.5 perc = 7.63

Stock status and exploitation in 2014
Biomass = 3, B/Bmsy = 0.613, fishing mortality F = 0.233, F/Fmsy = 0.706
Comment: Catch=landings from FishStat (Greece+Turkey), Biomass estimates standardized relative to max value. RF OK 04.10.16

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Species: *Umbrina cirrosa*, stock: UMBRCIR_AL
Shi drum in Aegean Sea
Source:
Region: Mediterranean, Aegean Sea
Catch data used from years 1982 - 2014, abundance = None
Prior initial relative biomass = 0.5 - 0.9 expert
Prior intermediate rel. biomass = 0.01 - 0.4 in year 2007 default
Prior final relative biomass = 0.01 - 0.3 expert
Prior range for r = 0.59 - 1.2 expert, prior range for k = 0.0461 - 0.375

Results of CMSY analysis with altogether 700 viable trajectories for 647 r-k pairs
r = 0.963, 95% CL = 0.777 - 1.19, k = 0.18, 95% CL = 0.148 - 0.219
MSY = 0.0434, 95% CL = 0.0398 - 0.0472
Relative biomass last year = 0.128 k, 2.5th = 0.0162, 97.5th = 0.293
Exploitation F/(r/2) in last year = 1.62

Results for Management (based on CMSY analysis)
Fmsy = 0.482, 95% CL = 0.389 - 0.597 (if B > 1/2 Bmsy then Fmsy = 0.5 r)
Fmsy = 0.247, 95% CL = 0.199 - 0.305 (r and Fmsy are linearly reduced if B < 1/2 Bmsy)
MSY = 0.0434, 95% CL = 0.0398 - 0.0472
Bmsy = 0.09, 95% CL = 0.0739 - 0.11
Biomass in last year = 0.023, 2.5th perc = 0.00291, 97.5 perc = 0.0527
B/Bmsy in last year = 0.256, 2.5th perc = 0.0323, 97.5 perc = 0.585
Fishing mortality in last year = 0.608, 2.5th perc = 0.266, 97.5 perc = 4.81
F/Fmsy = 2.46, 2.5th perc = 1.08, 97.5 perc = 19.5

Stock status and exploitation in 2014
Biomass = 0.023, B/Bmsy = 0.256, fishing mortality F = 0.608, F/Fmsy = 2.46
Comment: Catch=landings from FishStat (Greece). RF final 0.3; OK 04.10.16
Species: *Zeus faber*, stock: ZEUSFAB_AL

John Dory in Aegean Sea

Source:

Region: Mediterranean, Aegean Sea

Catch data used from years 1982 - 2014, abundance = CPUE

Prior initial relative biomass = 0.5 - 0.9 expert

Prior intermediate relative biomass = 0.2 - 0.6 in year 1995 expert

Prior final relative biomass = 0.01 - 0.4 expert

Prior range for \( r = 0.29 - 1 \) expert, prior range for \( k = 0.483 - 6.67 \)

Prior range of \( q = 1.67 - 6.2 \)

Results of CMSY analysis with altogether 1280 viable trajectories for 1056 r-k pairs

\( r = 0.769 \), 95% CL = 0.602 - 0.982, \( k = 1.61 \), 95% CL = 1.16 - 2.23

MSY = 0.31, 95% CL = 0.264 - 0.363

Relative biomass last year = 0.238 \( k \), 2.5th = 0.021, 97.5th = 0.392

Exploitation \( F/(r/2) \) in last year = 1.89

Results from Bayesian Schaefer model using catch & CPUE

\( r = 0.736 \), 95% CL = 0.544 - 0.996, \( k = 1.71 \), 95% CL = 1.33 - 2.2

MSY = 0.315, 95% CL = 0.281 - 0.353

Relative biomass in last year = 0.406 \( k \), 2.5th perc = 0.29, 97.5th perc = 0.491

Exploitation \( F/(r/2) \) in last year = 1.05

\( q = 2.31 \), lcl = 1.81, ucl = 2.95

Results for Management (based on CMSY analysis)

Fmsy = 0.385, 95% CL = 0.301 - 0.491 (if \( B > 1/2 \) Bmsy then Fmsy = 0.5 \( r \))

Fmsy = 0.365, 95% CL = 0.286 - 0.467 (\( r \) and Fmsy are linearly reduced if \( B < 1/2 \) Bmsy)

MSY = 0.31, 95% CL = 0.264 - 0.363

Bmsy = 0.805, 95% CL = 0.581 - 1.11

Biomass in last year = 0.382, 2.5th perc = 0.0337, 97.5 perc = 0.632

B/Bmsy in last year = 0.475, 2.5th perc = 0.0419, 97.5 perc = 0.785

Fishing mortality in last year = 0.703, 2.5th perc = 0.426, 97.5 perc = 7.98

\( F/Fmsy = 1.92 \), 2.5th perc = 1.17, 97.5 perc = 21.8

Stock status and exploitation in 2014

Biomass = 0.382, B/Bmsy = 0.475, fishing mortality F = 0.703, F/Fmsy = 1.92

Comment: Catch=landings from FishStat (Greece+Turkey), Biomass estimates standardized relative to max value. RF OK 04.10.16
Cyprus (analyzed with CMSY_O_7m.R; see Comment for data sources)

Species: *Boops boops*, stock: BOOPBOO_CY
Bogue in Cypriot waters
Source: excel
Region: Mediterranean, Cyprus
Catch data used from years 1990 - 2014, abundance = None
Prior initial relative biomass = 0.2 - 0.6 expert
Prior intermediate rel. biomass = 0.01 - 0.4 in year 2003 default
Prior final relative biomass = 0.01 - 0.3 expert
Prior range for r = 0.31 - 1.1 expert, prior range for k = 0.257 - 3.65

Results of CMSY analysis with altogether 1251 viable trajectories for 873 r-k pairs
r = 0.715, 95% CL = 0.48 - 1.07, k = 1.34, 95% CL = 0.967 - 1.86
MSY = 0.24, 95% CL = 0.213 - 0.27
Relative biomass last year = 0.17 k, 2.5th = 0.0175, 97.5th = 0.295
Exploitation F/(r/2) in last year = 1.2

Results for Management (based on CMSY analysis)
Fmsy = 0.358, 95% CL = 0.24 - 0.533 (if B > 1/2 Bmsy then Fmsy = 0.5 r)
Fmsy = 0.244, 95% CL = 0.164 - 0.363 (r and Fmsy are linearly reduced if B < 1/2 Bmsy)
MSY = 0.24, 95% CL = 0.213 - 0.27
Bmsy = 0.67, 95% CL = 0.484 - 0.929
Biomass in last year = 0.228, 2.5th perc = 0.0234, 97.5 perc = 0.396
B/Bmsy in last year = 0.341, 2.5th perc = 0.035, 97.5 perc = 0.591
Fishing mortality in last year = 0.486, 2.5th perc = 0.28, 97.5 perc = 4.73
F/Fmsy = 2, 2.5th perc = 1.15, 97.5 perc = 19.4

Stock status and exploitation in 2014
Biomass = 0.228, B/Bmsy = 0.341, fishing mortality F = 0.486, F/Fmsy = 2
Comment: Catch=landings from FishStat Based on Cypriot catches only. RF final 0.3. GS OK

----------------------------------------------------------
Species: *Dentex dentex*, stock: DENTDEN_CY

Common dentex in Cypriot waters

Source:

Region: Mediterranean, Cyprus

Catch data used from years 1972 - 2014, abundance = None

Prior initial relative biomass = 0.2 - 0.6 expert

Prior intermediate rel. biomass = 0.01 - 0.4 in year 2010 default

Prior final relative biomass = 0.01 - 0.2 expert

Prior range for \( r = 0.15 - 0.73 \) expert, prior range for \( k = 0.0598 - 1.16 \)

Results of CMSY analysis with altogether 2033 viable trajectories for 1801 \( r \)-\( k \) pairs

\( r = 0.335 \), 95% CL = 0.238 - 0.469, \( k = 0.328 \), 95% CL = 0.224 - 0.481

MSY = 0.0274, 95% CL = 0.0213 - 0.0354

Relative biomass last year = 0.0886 \( k \), 2.5th = 0.0143, 97.5th = 0.196

Exploitation \( F/(r/2) \) in last year = 1.23

Results for Management (based on CMSY analysis)

\( F_{msy} = 0.167 \), 95% CL = 0.119 - 0.235 (if \( B > 1/2 \) \( B_{msy} \) then \( F_{msy} = 0.5 \) \( r \))

\( F_{msy} = 0.0593 \), 95% CL = 0.0423 - 0.0832 (\( r \) and \( F_{msy} \) are linearly reduced if \( B < 1/2 \) \( B_{msy} \))

MSY = 0.0274, 95% CL = 0.0213 - 0.0354

\( B_{msy} = 0.164 \), 95% CL = 0.112 - 0.24

Biomass in last year = 0.0291, 2.5th perc = 0.00469, 97.5 perc = 0.0643

\( B/B_{msy} \) in last year = 0.177, 2.5th perc = 0.0286, 97.5 perc = 0.392

Fishing mortality in last year = 0.138, 2.5th perc = 0.0622, 97.5 perc = 0.852

\( F/F_{msy} = 2.32 \), 2.5th perc = 1.05, 97.5 perc = 14.4

Stock status and exploitation in 2014

Biomass = 0.0291, \( B/B_{msy} = 0.177 \), fishing mortality \( F = 0.138 \), \( F/F_{msy} = 2.32 \)

Comment: Catch=landings from FishStat Based on Cypriot catches only. RF final 0.2. GS OK

----------------------------------------------------------
Species: *Mullus barbatus*, stock: MULLBAR_CY
Red mullet in Cypriot waters
Source: Colloca et al 2013
Region: Mediterranean, Cyprus
Catch data used from years 1980 - 2014, abundance = CPUE
Prior initial relative biomass = 0.2 - 0.6 expert
Prior intermediate rel. biomass= 0.01 - 0.4 in year 1995 expert
Prior final relative biomass = 0.01 - 0.3 expert
Prior range for r = 0.22 - 1.2 expert, prior range for k = 0.123 - 2.8
Prior range of q = 0.0311 - 0.148

Results of CMSY analysis with altogether 1905 viable trajectories for 1587 r-k pairs
r = 0.599, 95% CL = 0.4 - 0.897, k = 0.792, 95% CL = 0.535 - 1.17
MSY = 0.119, 95% CL = 0.103 - 0.137
Relative biomass last year = 0.125 k, 2.5th = 0.0134, 97.5th = 0.294
Exploitation F/(r/2) in last year = 0.913

Results from Bayesian Schaefer model using catch & CPUE
r = 0.614, 95% CL = 0.371 - 1.02, k = 0.771, 95% CL = 0.489 - 1.21
MSY = 0.118, 95% CL = 0.106 - 0.132
Relative biomass in last year = 0.149 k, 2.5th perc = 0.0282, 97.5th perc = 0.335
Exploitation F/(r/2) in last year = 0.91
q = 0.0531, lcl = 0.0367, ucl = 0.0768

Results for Management (based on BSM analysis)
Fmsy = 0.307, 95% CL = 0.185 - 0.508 (if B > 1/2 Bmsy then Fmsy = 0.5 r)
Fmsy = 0.182, 95% CL = 0.11 - 0.302 (r and Fmsy are linearly reduced if B < 1/2 Bmsy)
MSY = 0.118, 95% CL = 0.106 - 0.132
Bmsy = 0.385, 95% CL = 0.245 - 0.607
Biomass in last year = 0.115, 2.5th perc = 0.0218, 97.5 perc = 0.258
B/Bmsy in last year = 0.297, 2.5th perc = 0.0564, 97.5 perc = 0.67
Fishing mortality in last year = 0.279, 2.5th perc = 0.124, 97.5 perc = 1.47
F/Fmsy = 1.53, 2.5th perc = 0.679, 97.5 perc = 8.06

Stock status and exploitation in 2014
Biomass = 0.115, B/Bmsy = 0.297, fishing mortality F = 0.279, F/Fmsy = 1.53
Comment: Catch=landings from FishStat Based on Cypriot catches only, CPUE from MEDITS. GS final 0.3

----------------------------------------------------------
Species: *Mullus surmuletus*, stock: MULLSUR_CY

Surmullet in Cypriot waters
Source: excel
Region: Mediterranean, Cyprus
Catch data used from years 1980 - 2014, abundance = CPUE
Prior initial relative biomass = 0.01 - 0.4 expert
Prior intermediate rel. biomass= 0.01 - 0.4 in year 1995 expert
Prior final relative biomass = 0.01 - 0.4 expert
Prior range for r = 0.46 - 1.6 expert, prior range for k = 0.144 - 1.98
Prior range of q = 0.0033 - 0.0122

Results of CMSY analysis with altogether 34 viable trajectories for 34 r-k pairs
r = 0.622, 95% CL = 0.445 - 0.87, k = 1.16, 95% CL = 0.975 - 1.37
MSY = 0.18, 95% CL = 0.157 - 0.207
Relative biomass last year = 0.125 k, 2.5th = 0.0147, 97.5th = 0.373
Exploitation F/(r/2) in last year = 0.718

Results from Bayesian Schaefer model using catch & CPUE
r = 0.888, 95% CL = 0.607 - 1.3, k = 0.816, 95% CL = 0.58 - 1.15
MSY = 0.181, 95% CL = 0.167 - 0.197
Relative biomass in last year = 0.105 k, 2.5th perc = 0.0129, 97.5th perc = 0.425
Exploitation F/(r/2) in last year = 0.921
q = 0.00545, lcl = 0.00398, ucl = 0.00747

Results for Management (based on BSM analysis)
Fmsy = 0.444, 95% CL = 0.304 - 0.649 (if B > 1/2 Bmsy then Fmsy = 0.5 r)
Fmsy = 0.186, 95% CL = 0.127 - 0.272 (r and Fmsy are linearly reduced if B < 1/2 Bmsy)
MSY = 0.181, 95% CL = 0.167 - 0.197
Bmsy = 0.408, 95% CL = 0.29 - 0.575
Biomass in last year = 0.0857, 2.5th perc = 0.0105, 97.5 perc = 0.347
B/Bmsy in last year = 0.21, 2.5th perc = 0.0258, 97.5 perc = 0.85
Fishing mortality in last year = 0.409, 2.5th perc = 0.101, 97.5 perc = 3.32
F/Fmsy = 2.19, 2.5th perc = 0.542, 97.5 perc = 17.8

Stock status and exploitation in 2014
Biomass = 0.0857, B/Bmsy = 0.21, fishing mortality F = 0.409, F/Fmsy = 2.19
Comment: Catch=landings from FishStat Based on Cypriot catches only, CPUE from MEDITS. GS OK
Species: *Pagellus acarne*, stock: PAGEACA_CY

Axillary seabream in Cypriot waters

Source:

Region: Mediterranean, Cyprus

Catch data used from years 1972 - 2014, abundance = CPUE

Prior initial relative biomass = 0.01 - 0.4 expert

Prior intermediate rel. biomass = 0.01 - 0.4 in year 1995 expert

Prior final relative biomass = 0.01 - 0.4 expert

Prior range for $r$ = 0.28 - 1.1 expert, prior range for $k$ = 0.0364 - 0.562

Prior range of $q$ = 0.0789 - 0.31

Results of CMSY analysis with altogether 1387 viable trajectories for 1138 $r$-$k$ pairs

$r$ = 0.613, 95% CL = 0.442 - 0.85, $k$ = 0.179, 95% CL = 0.134 - 0.239

MSY = 0.0274, 95% CL = 0.0253 - 0.0297

Relative biomass last year = 0.291 $k$, 2.5th = 0.0369, 97.5th = 0.396

Exploitation $F/(r/2)$ in last year = 2.21

Results from Bayesian Schaefer model using catch & CPUE

$r$ = 0.587, 95% CL = 0.377 - 0.913, $k$ = 0.188, 95% CL = 0.132 - 0.269

MSY = 0.0276, 95% CL = 0.0243 - 0.0313

Relative biomass in last year = 0.291 $k$, 2.5th perc = 0.0119, 97.5th perc = 0.463

Exploitation $F/(r/2)$ in last year = 1.62

$q$ = 0.134, lcl = 0.0968, ucl = 0.185

Results for Management (based on BSM analysis)

$F_{msy}$ = 0.293, 95% CL = 0.189 - 0.456 (if $B > 1/2 B_{msy}$ then $F_{msy}$ = 0.5 $r$)

$F_{msy}$ = 0.293, 95% CL = 0.189 - 0.456 ($r$ and $F_{msy}$ are linearly reduced if $B < 1/2 B_{msy}$)

MSY = 0.0276, 95% CL = 0.0243 - 0.0313

$B_{msy}$ = 0.0941, 95% CL = 0.0658 - 0.135

Biomass in last year = 0.0548, 2.5th perc = 0.00223, 97.5 perc = 0.0872

$B/B_{msy}$ in last year = 0.583, 2.5th perc = 0.0237, 97.5 perc = 0.927

Fishing mortality in last year = 0.474, 2.5th perc = 0.298, 97.5 perc = 11.6

$F/F_{msy}$ = 1.62, 2.5th perc = 1.02, 97.5 perc = 39.6

Stock status and exploitation in 2014

Biomass = 0.0548, $B/B_{msy}$ = 0.583, fishing mortality $F$ = 0.474, $F/F_{msy}$ = 1.62

Comment: Catch=landings from FishStat Based on Cypriot catches only, CPUE from MEDITS. GS OK

----------------------------------------------------------
Species: *Pagellus erythrinus*, stock: PAGEERY_CY

Common pandora in Cypriot waters

Source:
Region: Mediterranean, Cyprus
Catch data used from years 1970 - 2014, abundance = CPUE
Prior initial relative biomass = 0.2 - 0.6 expert
Prior intermediate rel. biomass= 0.01 - 0.4 in year 1995 expert
Prior final relative biomass = 0.01 - 0.4 expert
Prior range for r = 0.22 - 0.97 expert, , prior range for k = 0.0732 - 1.29
Prior range of q = 0.0547 - 0.23

Results of CMSY analysis with altogether 349 viable trajectories for 336 r-k pairs

\[ r = 0.382, 95\% \text{ CL } = 0.32 - 0.456, k = 0.532, 95\% \text{ CL } = 0.392 - 0.722 \]
\[ \text{MSY} = 0.0508, 95\% \text{ CL } = 0.0396 - 0.0652 \]
Relative biomass last year = 0.224 k, 2.5th = 0.0346, 97.5th = 0.36
Exploitation \( F/(r/2) \) in last year = 0.557

Results from Bayesian Schaefer model using catch & CPUE

\[ r = 0.467, 95\% \text{ CL } = 0.281 - 0.776, k = 0.425, 95\% \text{ CL } = 0.266 - 0.68 \]
\[ \text{MSY} = 0.0496, 95\% \text{ CL } = 0.0407 - 0.0605 \]
Relative biomass in last year = 0.114 k, 2.5th perc = 0.0182, 97.5th perc = 0.391
Exploitation \( F/(r/2) \) in last year = 1.06
\[ q = 0.0787, \text{lcl} = 0.0569, \text{ucl} = 0.109 \]

Results for Management (based on BSM analysis)

\[ \text{Fmsy} = 0.233, 95\% \text{ CL } = 0.14 - 0.388 \text{ (if B > 1/2 Bmsy then Fmsy = 0.5 r)} \]
\[ \text{Fmsy} = 0.107, 95\% \text{ CL } = 0.0642 - 0.178 \text{ (r and Fmsy are linearly reduced if B < 1/2 Bmsy)} \]
\[ \text{MSY} = 0.0496, 95\% \text{ CL } = 0.0407 - 0.0605 \]
\[ \text{Bmsy} = 0.213, 95\% \text{ CL } = 0.133 - 0.34 \]
Biomass in last year = 0.0487, 2.5th perc = 0.00776, 97.5 perc = 0.166
\[ \text{B/Bmsy in last year} = 0.229, 2.5th perc = 0.0365, 97.5 perc = 0.781 \]
Fishing mortality in last year = 0.246, 2.5th perc = 0.0722, 97.5 perc = 1.55
\[ \text{F/Fmsy} = 2.31, 2.5th perc = 0.676, 97.5 perc = 14.5 \]

Stock status and exploitation in 2014

\[ \text{Biomass} = 0.0487, \text{B/Bmsy} = 0.229, \text{fishing mortality} F = 0.246, F/Fmsy = 2.31 \]
Comment: Catch=landings from FishStat Based on Cypriot catches only, CPUE from MEDITS. GS OK

----------------------------------------------------------
Species: Pagrus pagrus , stock: PAGRPAG_CY
Red porgy in Cypriot waters
Source:
Region: Mediterranean , Cyprus
Catch data used from years 1972 - 2014 , abundance = None
Prior initial relative biomass = 0.2 - 0.6 expert
Prior intermediate rel. biomass= 0.5 - 0.9 in year 1994 default
Prior final relative biomass   = 0.01 - 0.3 expert
Prior range for r = 0.27 - 0.86 expert, , prior range for k = 0.0849 - 1.08

Results of CMSY analysis with altogether 2175 viable trajectories for 1662 r-k pairs
r = 0.537 , 95% CL = 0.369 - 0.78 , k = 0.27 , 95% CL = 0.204 - 0.357
MSY = 0.0362 , 95% CL = 0.032 - 0.041
Relative biomass last year = 0.122 k, 2.5th = 0.0149 , 97.5th = 0.292
Exploitation F/(r/2) in last year = 0.947

Results for Management (based on CMSY analysis)
Fmsy = 0.268 , 95% CL = 0.185 - 0.39 (if B > 1/2 Bmsy then Fmsy = 0.5 r)
Fmsy = 0.13 , 95% CL = 0.0898 - 0.19 (r and Fmsy are linearly reduced if B < 1/2 Bmsy)
MSY = 0.0362 , 95% CL = 0.032 - 0.041
Bmsy = 0.135 , 95% CL = 0.102 - 0.178
Biomass in last year = 0.0328 , 2.5th perc = 0.00402 , 97.5 perc = 0.0789
B/Bmsy in last year = 0.243 , 2.5th perc = 0.0298 , 97.5 perc = 0.585
Fishing mortality in last year = 0.274 , 2.5th perc = 0.114 , 97.5 perc = 2.24
F/Fmsy = 2.1 , 2.5th perc = 0.875 , 97.5 perc = 17.2

Stock status and exploitation in 2014
Biomass = 0.0328 , B/Bmsy = 0.243 , fishing mortality F = 0.274 , F/Fmsy = 2.1
Comment: Catch=landings from FishStat Based on Cypriot catches only. RF final 0.3. GS OK

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Species: *Sepia officinalis*, stock: SEPIOFF_CY

Common cuttlefish in Cypriot waters

Source:
Region: Mediterranean, Cyprus
Catch data used from years 1970 - 2014, abundance = None
Prior initial relative biomass = 0.2 - 0.6 expert
Prior intermediate rel. biomass = 0.01 - 0.4 in year 2010 default
Prior final relative biomass = 0.01 - 0.3 expert
Prior range for r = 0.2 - 0.8 default, prior range for k = 0.227 - 3.63

Results of CMSY analysis with altogether 2475 viable trajectories for 1377 r-k pairs
r = 0.533, 95% CL = 0.374 - 0.758, k = 0.797, 95% CL = 0.553 - 1.15
MSY = 0.106, 95% CL = 0.0948 - 0.119
Relative biomass last year = 0.116 k, 2.5th = 0.0138, 97.5th = 0.29
Exploitation F/(r/2) in last year = 0.906

Results for Management (based on CMSY analysis)
Fmsy = 0.266, 95% CL = 0.187 - 0.379 (if B > 1/2 Bmsy then Fmsy = 0.5 r)
Fmsy = 0.124, 95% CL = 0.087 - 0.176 (r and Fmsy are linearly reduced if B < 1/2 Bmsy)
MSY = 0.106, 95% CL = 0.0948 - 0.119
Bmsy = 0.398, 95% CL = 0.276 - 0.575
Biomass in last year = 0.0926, 2.5th perc = 0.011, 97.5 perc = 0.231
B/Bmsy in last year = 0.232, 2.5th perc = 0.0277, 97.5 perc = 0.581
Fishing mortality in last year = 0.238, 2.5th perc = 0.0951, 97.5 perc = 1.99
F/Fmsy = 1.92, 2.5th perc = 0.768, 97.5 perc = 16.1

Stock status and exploitation in 2014
Biomass = 0.0926, B/Bmsy = 0.232, fishing mortality F = 0.238, F/Fmsy = 1.92
Comment: Catch=landings from FishStat Based on Cypriot catches only. RF final 0.3. GS OK

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335
Species: *Seriola dumerili*, stock: SERIDUM_CY
Greater amberjack in Cypriot waters

Source:
Region: Mediterranean, Cyprus
Catch data used from years 1970 - 2014, abundance = None
Prior initial relative biomass = 0.2 - 0.6 expert
Prior intermediate rel. biomass = 0.01 - 0.4 in year 1989 default
Prior final relative biomass = 0.01 - 0.3 expert
Prior range for r = 0.44 - 0.84 expert, prior range for k = 0.0472 - 0.361

Results of CMSY analysis with altogether 347 viable trajectories for 341 r-k pairs
r = 0.617, 95% CL = 0.49 - 0.778, k = 0.129, 95% CL = 0.106 - 0.157
MSY = 0.0199, 95% CL = 0.017 - 0.0233
Relative biomass last year = 0.145 k, 2.5th = 0.0154, 97.5th = 0.293
Exploitation F/(r/2) in last year = 1.68

Results for Management (based on CMSY analysis)
Fmsy = 0.309, 95% CL = 0.245 - 0.389 (if B > 1/2 Bmsy then Fmsy = 0.5 r)
Fmsy = 0.179, 95% CL = 0.142 - 0.225 (r and Fmsy are linearly reduced if B < 1/2 Bmsy)
MSY = 0.0199, 95% CL = 0.017 - 0.0233
Bmsy = 0.0645, 95% CL = 0.0531 - 0.0784
Biomass in last year = 0.0187, 2.5th perc = 0.00199, 97.5 perc = 0.0379
B/Bmsy in last year = 0.289, 2.5th perc = 0.0308, 97.5 perc = 0.587
Fishing mortality in last year = 0.428, 2.5th perc = 0.211, 97.5 perc = 4.02
F/Fmsy = 2.4, 2.5th perc = 1.18, 97.5 perc = 22.5

Stock status and exploitation in 2014
Biomass = 0.0187, B/Bmsy = 0.289, fishing mortality F = 0.428, F/Fmsy = 2.4
Comment: Catch=landings from FishStat Based on Cypriot catches only. RF final 0.3. GS OK

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Species: *Spicara smaris*, stock: SPICSMA_CY
Picarel in Cypriot waters
Source: excel
Region: Mediterranean, Cyprus
Catch data used from years 1980 - 2014, abundance = None
Prior initial relative biomass = 0.2 - 0.6 expert
Prior intermediate rel. biomass = 0.01 - 0.4 in year 2010 default
Prior final relative biomass = 0.01 - 0.3 expert
Prior range for r = 0.2 - 0.8 default, prior range for k = 1.08 - 17.2

Results of CMSY analysis with altogether 2552 viable trajectories for 2039 r-k pairs
r = 0.487, 95% CL = 0.339 - 0.698, k = 5.34, 95% CL = 3.79 - 7.51
MSY = 0.649, 95% CL = 0.576 - 0.732
Relative biomass last year = 0.115 k, 2.5th = 0.0136, 97.5th = 0.287
Exploitation F/(r/2) in last year = 0.691

Results for Management (based on CMSY analysis)
Fmsy = 0.243, 95% CL = 0.17 - 0.349 (if B > 1/2 Bmsy then Fmsy = 0.5 r)
Fmsy = 0.112, 95% CL = 0.0779 - 0.16 (r and Fmsy are linearly reduced if B < 1/2 Bmsy)
MSY = 0.649, 95% CL = 0.576 - 0.732
Bmsy = 2.67, 95% CL = 1.9 - 3.75
Biomass in last year = 0.613, 2.5th perc = 0.0727, 97.5 perc = 1.53
B/Bmsy in last year = 0.23, 2.5th perc = 0.0273, 97.5 perc = 0.573
Fishing mortality in last year = 0.178, 2.5th perc = 0.0713, 97.5 perc = 1.5
F/Fmsy = 1.59, 2.5th perc = 0.638, 97.5 perc = 13.4

Stock status and exploitation in 2014
Biomass = 0.613, B/Bmsy = 0.23, fishing mortality F = 0.178, F/Fmsy = 1.59
Comment: Catch=landings from FishStat Based on Cypriot catches only. GS final 0.3
Black Sea (analyzed with CMSY_O_7l.R)

Species: Sprattus sprattus, stock: Spr_BS

Black Sea sprat
Region: Mediterranean, Black Sea
Catch data used from years 1995-2014, abundance = CPUE
Prior initial relative biomass = 0.2 - 0.6 default
Prior intermediate rel. biomass = 0.5 - 0.9 in year 2010 default
Prior final relative biomass = 0.2 - 0.6, default
Prior range for r = 0.2 - 1.2 expert, prior range for k = 85.1 - 2025
Prior range of q = 1.48 - 7.22

Results of CMSY analysis with altogether 12726 viable trajectories for 1974 r-k pairs
r = 0.76 , 95% CL = 0.498 - 1.16 , k = 347 , 95% CL = 194 - 619
MSY = 65.9 , 95% CL = 48.5 - 89.6
Relative biomass last year = 0.459 k, 2.5th = 0.214 , 97.5th = 0.596
Exploitation F/(r/2) in last year = 0.665

Results from Bayesian Schaefer model using catch & CPUE
r = 0.797 , 95% CL = 0.587 - 1.08 , k = 322 , 95% CL = 247 - 421
MSY = 64.3 , 95% CL = 53.4 - 77.3
Relative biomass in last year = 0.549 k, 2.5th perc = 0.422 , 97.5th perc = 0.654
Exploitation F/(r/2) in last year = 0.827
q = 2.31 , lcl = 1.73 , ucl = 3.1

Results for Management (based on BSM analysis)
Fmsy = 0.399 , 95% CL = 0.294 - 0.542 (if B > 1/2 Bmsy then Fmsy = 0.5 r)
Fmsy = 0.399 , 95% CL = 0.294 - 0.542 (r and Fmsy are linearly reduced if B < 1/2 Bmsy)
MSY = 64.3 , 95% CL = 53.4 - 77.3
Bmsy = 161 , 95% CL = 124 - 210
Biomass in last year = 177 , 2.5th perc = 136 , 97.5 perc = 211
B/Bmsy in last year = 1.1 , 2.5th perc = 0.843 , 97.5 perc = 1.31
Fishing mortality in last year = 0.33 , 2.5th perc = 0.277 , 97.5 perc = 0.429
F/Fmsy = 0.827 , 2.5th perc = 0.695 , 97.5 perc = 1.08

Stock status and exploitation in 2014
Biomass = 177 , B/Bmsy = 1.1 , fishing mortality F = 0.33 , F/Fmsy = 0.827
Comment: Landings. RF OK

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Species: *Mullus barbatus barbatus*, stock: RMullet_BS

Red mullet in Black Sea


Region: Mediterranean, Black Sea

Catch data used from years 1990 - 2014, abundance = CPUE

Prior initial relative biomass = 0.2 - 0.6 default
Prior intermediate rel. biomass = 0.1 - 0.5 in year 2007 expert
Prior final relative biomass = 0.01 - 0.3 expert
Prior range for r = 0.56 - 1.3 expert, prior range for k = 3.38 - 31.6
Prior range of q = 0.455 - 1.39

Results of CMSY analysis with altogether 416 viable trajectories for 405 r-k pairs

r = 0.958, 95% CL = 0.724 - 1.27, k = 12.8, 95% CL = 9.89 - 16.7
MSY = 3.08, 95% CL = 2.65 - 3.57
Relative biomass last year = 0.237 k, 2.5th = 0.0378, 97.5th = 0.298
Exploitation F/(r/2) in last year = 2.26

Results from Bayesian Schaefer model using catch & CPUE

r = 0.854, 95% CL = 0.712 - 1.02, k = 15, 95% CL = 12.8 - 17.6
MSY = 3.21, 95% CL = 2.76 - 3.73
Relative biomass in last year = 0.278 k, 2.5th perc = 0.235, 97.5th perc = 0.322
Exploitation F/(r/2) in last year = 2.19
q = 0.628, lcl = 0.555, ucl = 0.711

Results for Management (based on BSM analysis)

Fmsy = 0.427, 95% CL = 0.356 - 0.512 (if B > 1/2 Bmsy then Fmsy = 0.5 r)
Fmsy = 0.427, 95% CL = 0.356 - 0.512 (r and Fmsy are linearly reduced if B < 1/2 Bmsy)
MSY = 3.21, 95% CL = 2.76 - 3.73
Bmsy = 7.5, 95% CL = 6.42 - 8.78
Biomass in last year = 4.17, 2.5th perc = 3.53, 97.5 perc = 4.83
B/Bmsy in last year = 0.556, 2.5th perc = 0.471, 97.5 perc = 0.644
Fishing mortality in last year = 0.935, 2.5th perc = 0.807, 97.5 perc = 1.1
F/Fmsy = 2.19, 2.5th perc = 1.89, 97.5 perc = 2.58

Stock status and exploitation in 2014
Biomass = 4.17, B/Bmsy = 0.556, fishing mortality F = 0.935, F/Fmsy = 2.19
Comment: SSB/Catch - RF Comment: OK

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Species: *Squalus acanthias*, stock: PDogfish_BS
Picked dogfish in Black Sea
Region: Mediterranean, Black Sea
Catch data used from years 1989 - 2014, abundance = CPUE
Prior initial relative biomass = 0.2 - 0.6 default
Prior intermediate rel. biomass = 0.01 - 0.2 in year 2001 expert
Prior final relative biomass = 0.01 - 0.1 expert
Prior range for r = 0.05 - 0.2 expert, prior range for k = 30.8 - 493
Prior range of q = 0.197 - 0.788

Results of CMSY analysis with altogether 4619 viable trajectories for 3876 r-k pairs
r = 0.141, 95% CL = 0.101 - 0.195, k = 79.6, 95% CL = 37.2 - 171
MSY = 2.8, 95% CL = 1.2 - 6.56
Relative biomass last year = 0.0471 k, 2.5th = 0.0116, 97.5th = 0.0978
Exploitation F/(r/2) in last year = 0.288

Results from Bayesian Schaefer model using catch & CPUE
r = 0.0652, 95% CL = 0.0378 - 0.112, k = 97.5, 95% CL = 74.8 - 127
MSY = 1.59, 95% CL = 0.886 - 2.85
Relative biomass in last year = 0.0125 k, 2.5th perc = 0.011, 97.5th perc = 0.0166
Exploitation F/(r/2) in last year = 1.88
q = 0.493, lcl = 0.391, ucl = 0.621

Results for Management (based on CMSY analysis)
Fmsy = 0.0704, 95% CL = 0.0507 - 0.0977 (if B > 1/2 Bmsy then Fmsy = 0.5 r)
Fmsy = 0.0133, 95% CL = 0.00956 - 0.0184 (r and Fmsy are linearly reduced if B < 1/2 Bmsy)
MSY = 2.8, 95% CL = 1.2 - 6.56
Bmsy = 39.8, 95% CL = 18.6 - 85.3
Biomass in last year = 3.75, 2.5th perc = 0.92, 97.5 perc = 7.79
B/Bmsy in last year = 0.0942, 2.5th perc = 0.0231, 97.5 perc = 0.196
Fishing mortality in last year = 0.02, 2.5th perc = 0.00963, 97.5 perc = 0.0815
F/Fmsy = 1.51, 2.5th perc = 0.725, 97.5 perc = 6.14

Stock status and exploitation in 2014
Biomass = 3.75, B/Bmsy = 0.0942, fishing mortality F = 0.02, F/Fmsy = 1.51
Comment: SSB/Landings. RF OK

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Species: *Scophthalmus maximus*, stock: Tur_BS
Turbot in Black Sea
Region: Mediterranean, Black Sea
Catch data used from years 1980 - 2014, abundance = CPUE
Prior initial relative biomass = 0.5 - 0.9 expert
Prior intermediate rel. biomass = 0.01 - 0.4 in year 1986 expert
Prior final relative biomass = 0.01 - 0.3 expert
Prior range for r = 0.31 - 0.65 expert, prior range for k = 6.79 - 57
Prior range of q = 0.614 - 1.78

Results of CMSY analysis with altogether 2657 viable trajectories for 1936 r-k pairs
r = 0.459, 95% CL = 0.357 - 0.59, k = 17, 95% CL = 14 - 20.6
MSY = 1.95, 95% CL = 1.71 - 2.23
Relative biomass last year = 0.203 k, 2.5th = 0.0238, 97.5th = 0.295
Exploitation F/(r/2) in last year = 1.85

Results from Bayesian Schaefer model using catch & CPUE
r = 0.411, 95% CL = 0.334 - 0.506, k = 19.1, 95% CL = 15.6 - 23.5
MSY = 1.97, 95% CL = 1.66 - 2.34
Relative biomass in last year = 0.118 k, 2.5th perc = 0.0912, 97.5th perc = 0.147
Exploitation F/(r/2) in last year = 2.5
q = 0.86, lcl = 0.732, ucl = 1.01

Results for Management (based on BSM analysis)
Fmsy = 0.206, 95% CL = 0.167 - 0.253 (if B > 1/2 Bmsy then Fmsy = 0.5 r)
Fmsy = 0.0969, 95% CL = 0.0787 - 0.119 (r and Fmsy are linearly reduced if B < 1/2 Bmsy)
MSY = 1.97, 95% CL = 1.66 - 2.34
Bmsy = 9.57, 95% CL = 7.8 - 11.7
Biomass in last year = 2.25, 2.5th perc = 1.75, 97.5 perc = 2.81
B/Bmsy in last year = 0.236, 2.5th perc = 0.182, 97.5 perc = 0.294
Fishing mortality in last year = 0.514, 2.5th perc = 0.412, 97.5 perc = 0.664
F/Fmsy = 5.31, 2.5th perc = 4.25, 97.5 perc = 6.86

Stock status and exploitation in 2014
Biomass = 2.25, B/Bmsy = 0.236, fishing mortality F = 0.514, F/Fmsy = 5.31
Comment: Landings+IUU. RF OK

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Species: *Trachurus mediterraneus*, stock: MHMackerel_BS
Mediterranean horse mackerel in Black Sea
Region: Mediterranean, Black Sea
Catch data used from years 1950 - 2014, abundance = CPUE
Prior initial relative biomass = 0.5 - 0.9 default
Prior intermediate rel. biomass = 0.2 - 0.6 in year 1988 expert
Prior final relative biomass = 0.01 - 0.2 expert
Prior range for r = 0.35 - 1.6 expert, prior range for k = 72.5 - 1293
Prior range of q = 0.613 - 2.59

Results of CMSY analysis with altogether 157 viable trajectories for 156 r-k pairs
r = 0.563, 95% CL = 0.468 - 0.677, k = 476, 95% CL = 388 - 583
MSY = 66.9, 95% CL = 59.5 - 75.4
Relative biomass last year = 0.0716 k, 2.5th = 0.022, 97.5th = 0.163
Exploitation F/(r/2) in last year = 2

Results from Bayesian Schaefer model using catch & CPUE
r = 0.605, 95% CL = 0.445 - 0.823, k = 441, 95% CL = 362 - 537
MSY = 66.8, 95% CL = 57.9 - 77
Relative biomass in last year = 0.0553 k, 2.5th perc = 0.0445, 97.5th perc = 0.0734
Exploitation F/(r/2) in last year = 1.67
q = 0.745, lcl = 0.611, ucl = 0.908

Results for Management (based on BSM analysis)
Fmsy = 0.303, 95% CL = 0.223 - 0.411 (if B > 1/2 Bmsy then Fmsy = 0.5 r)
Fmsy = 0.0669, 95% CL = 0.0492 - 0.091 (r and Fmsy are linearly reduced if B < 1/2 Bmsy)
MSY = 66.8, 95% CL = 57.9 - 77
Bmsy = 221, 95% CL = 181 - 269
Biomass in last year = 24.4, 2.5th perc = 19.6, 97.5 perc = 32.4
B/Bmsy in last year = 0.111, 2.5th perc = 0.089, 97.5 perc = 0.147
Fishing mortality in last year = 0.507, 2.5th perc = 0.382, 97.5 perc = 0.629
F/Fmsy = 7.57, 2.5th perc = 5.7, 97.5 perc = 9.4

Stock status and exploitation in 2014
Biomass = 24.4, B/Bmsy = 0.111, fishing mortality F = 0.507, F/Fmsy = 7.57
Comment: SSB/Landings. RF OK

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Species: *Merlangius merlangus*, stock: Whiting_BS

Whiting in Black Sea

Region: Mediterranean, Black Sea

Catch data used from years 1994 - 2014, abundance = CPUE

Prior initial relative biomass = 0.2 - 0.6 default
Prior intermediate rel. biomass = 0.01 - 0.4 in year 2004 default
Prior final relative biomass = 0.01 - 0.4 expert
Prior range for r = 0.22 - 1 expert, prior range for k = 14.5 - 266
Prior range of q = 0.383 - 1.64

Results of CMSY analysis with altogether 2329 viable trajectories for 1501 r-k pairs
r = 0.586, 95% CL = 0.379 - 0.906, k = 76.2, 95% CL = 47.5 - 122
MSY = 11.2, 95% CL = 8.07 - 15.4
Relative biomass last year = 0.296 k, 2.5th = 0.0365, 97.5th = 0.397
Exploitation F/(r/2) in last year = 1.18

Results from Bayesian Schaefer model using catch & CPUE
r = 0.566, 95% CL = 0.414 - 0.774, k = 78, 95% CL = 55.5 - 110
MSY = 11, 95% CL = 8.92 - 13.6
Relative biomass in last year = 0.27 k, 2.5th perc = 0.182, 97.5th perc = 0.37
Exploitation F/(r/2) in last year = 1.49
q = 0.627, lcl = 0.476, ucl = 0.826

Results for Management (based on BSM analysis)
Fmsy = 0.283, 95% CL = 0.207 - 0.387 (if B > 1/2 Bmsy then Fmsy = 0.5 r)
Fmsy = 0.283, 95% CL = 0.207 - 0.387 (r and Fmsy are linearly reduced if B < 1/2 Bmsy)
MSY = 11, 95% CL = 8.92 - 13.6
Bmsy = 39, 95% CL = 27.7 - 54.8
Biomass in last year = 21.1, 2.5th perc = 14.2, 97.5 perc = 28.8
B/Bmsy in last year = 0.541, 2.5th perc = 0.363, 97.5 perc = 0.739
Fishing mortality in last year = 0.42, 2.5th perc = 0.307, 97.5 perc = 0.625
F/Fmsy = 1.49, 2.5th perc = 1.09, 97.5 perc = 2.21

Stock status and exploitation in 2014
Biomass = 21.1, B/Bmsy = 0.541, fishing mortality F = 0.42, F/Fmsy = 1.49
Comment: SSB/Landings. RF OK
Species: *Engraulis encrasicolus*, stock: BS_anch

Black Sea anchovy


Region: Mediterranean, Black Sea

Catch data used from years 1995 - 2014, abundance = CPUE

Prior initial relative biomass = 0.5 - 0.9 expert

Prior intermediate rel. biomass= 0.01 - 0.4 in year 2005 default

Prior final relative biomass = 0.01 - 0.4 expert

Prior range for r = 0.32 - 1.4 expert, prior range for k = 286 - 4820

Prior range of q = 0.926 - 3.8

Results of CMSY analysis with altogether 1395 viable trajectories for 627 r-k pairs

\[ r = 0.937, \quad 95\% \text{ CL} = 0.669 - 1.31, \quad k = 1125, \quad 95\% \text{ CL} = 763 - 1659 \]

MSY = 264, 95% CL = 238 - 291

Relative biomass last year = 0.279 k, 2.5th = 0.0419, 97.5th = 0.393

Exploitation \( F/(r/2) \) in last year = 1.48

Results from Bayesian Schaefer model using catch & CPUE

\[ r = 0.577, \quad 95\% \text{ CL} = 0.394 - 0.847, \quad k = 1757, \quad 95\% \text{ CL} = 1271 - 2429 \]

MSY = 254, 95% CL = 217 - 297

Relative biomass in last year = 0.253 k, 2.5th perc = 0.125, 97.5th perc = 0.44

Exploitation \( F/(r/2) \) in last year = 1.23

\[ q = 1.86, \quad lcl = 1.39, \quad ucl = 2.49 \]

Results for Management (based on BSM analysis)

\[ F_{msy} = 0.289, \quad 95\% \text{ CL} = 0.197 - 0.424 (\text{if } B > 1/2 \text{ Bmsy then } F_{msy} = 0.5 \text{ r}) \]

\[ F_{msy} = 0.289, \quad 95\% \text{ CL} = 0.197 - 0.424 (r \text{ and } F_{msy} \text{ are linearly reduced if } B < 1/2 \text{ Bmsy}) \]

MSY = 254, 95% CL = 217 - 297

Bmsy = 878, 95% CL = 635 - 1214

Biomass in last year = 445, 2.5th perc = 219, 97.5 perc = 773

B/Bmsy in last year = 0.507, 2.5th perc = 0.25, 97.5 perc = 0.88

Fishing mortality in last year = 0.354, 2.5th perc = 0.204, 97.5 perc = 0.718

\[ F/F_{msy} = 1.23, \quad 2.5\text{th perc} = 0.706, \quad 97.5 \text{ perc} = 2.49 \]

Stock status and exploitation in 2014

Biomass = 445, B/Bmsy = 0.507, fishing mortality F = 0.354, F/F_{msy} = 1.23

Comment: SSB/Landings - RF Comment: OK

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