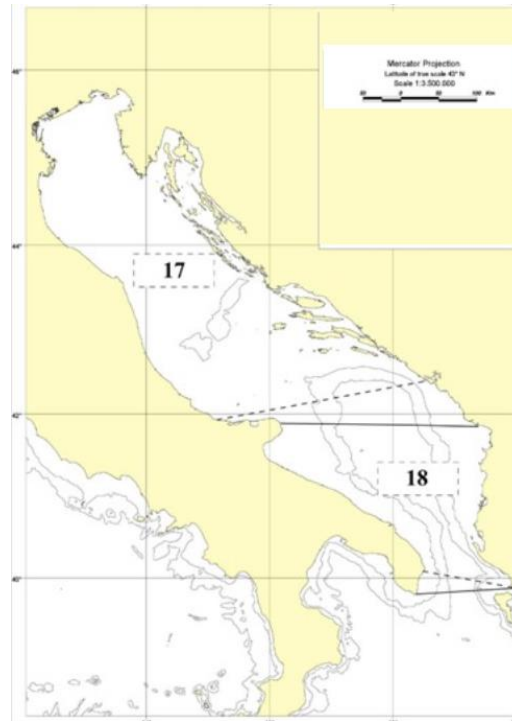


CONTRACT NUMBER - EASME/EMFF/2014/1.3.2.7/SI2.703 193

**Study on the evaluation of specific management scenarios for the preparation of
multiannual management plans in the Mediterranean and the Black Sea
CALL MARE/2014/27**

CASE STUDY ON DEMERSAL FISHERIES GSA 17 (Northern Adriatic Sea)



Authors: G. Scarcella ¹, P. Carpi¹, I.Bitetto², M.T. Facchini², P. Accadia ³, D. Pinello³,G. Lembo ², M.T. Spedicato²

1 - ISMAR CNR, Ancona

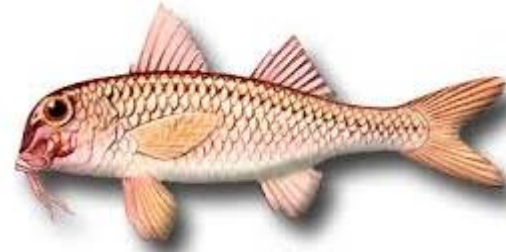
2 - COISPA Tecnologia & Ricerca

3 - NISEA

Demersal species in GSA 17

Case study species:

- Hake
- Spottail mantis shrimp
- Red mullet
- Common sole



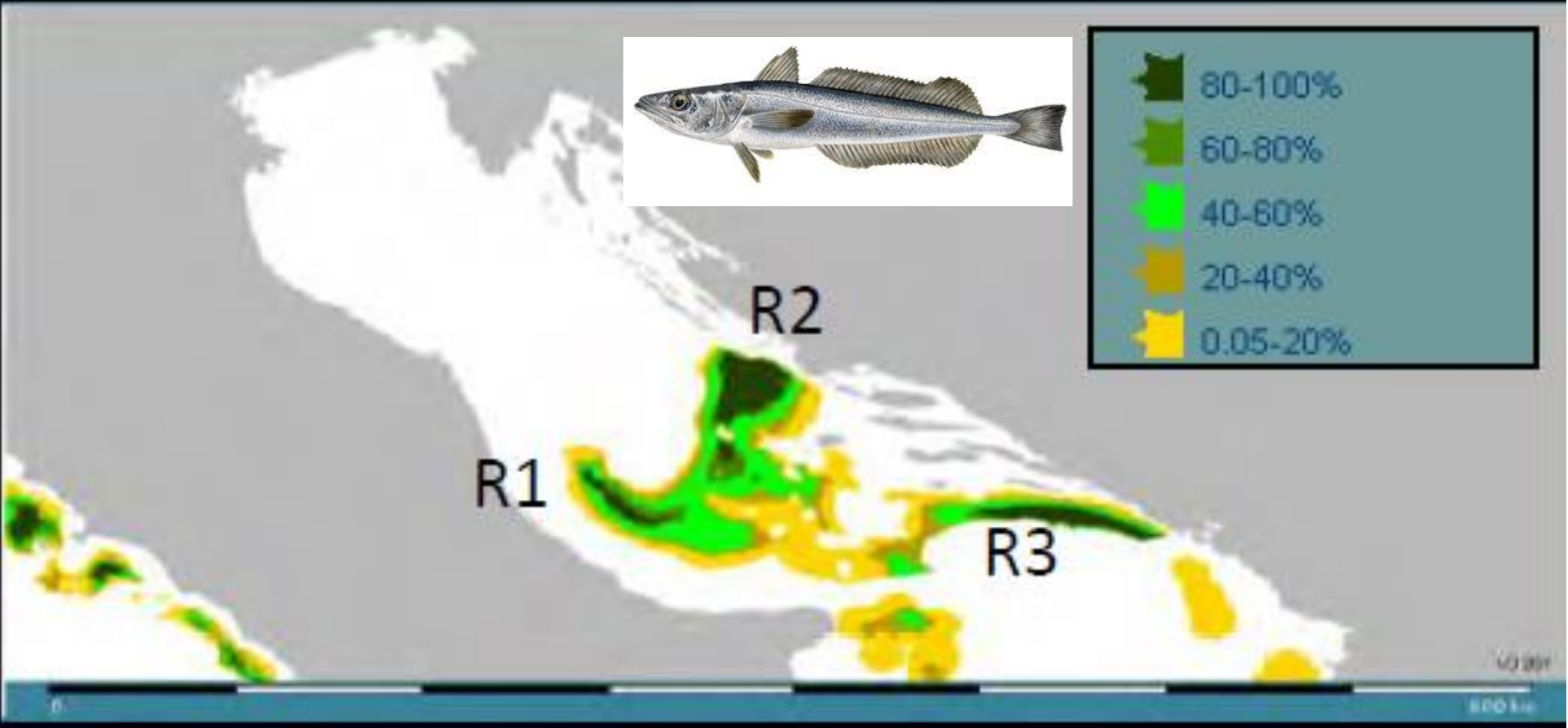
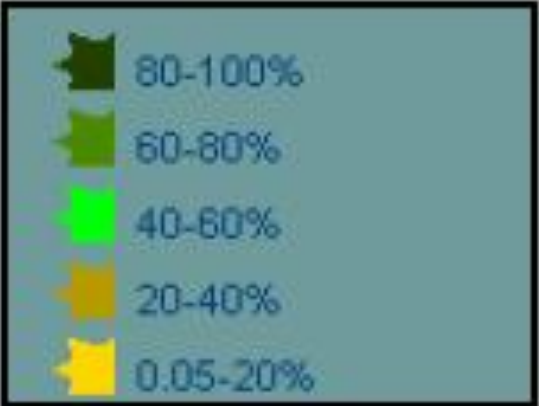
Demersal fleets in GSA 17

	Fleet name	Fleet code
1	Italian GSA17 trawlers with vessel length 6-12 m	ITA_DTS_0612
2	Italian GSA17 trawlers with vessel length 12-18 m	ITA_DTS_1218
3	Italian GSA17 trawlers with vessel length 28-24 m	ITA_DTS_1824
4	Italian GSA17 polyvalent passive gears only with vessel length 06-12 m	ITA_PGP_0612
5	Italian GSA17 beam trawlers with vessel length 12-18 m	ITA_TBB_1218
6	Italian GSA17 beam trawlers with vessel length 18-24 m	ITA_TBB_1824
7	Croatia GSA17 Drift and/or fixed netters with vessel length 06-12 m	HRV_DFN_0612
8	Croatia GSA17 trawlers with vessel length 06-12 m	HRV_DTS_0612
9	Croatia GSA17 trawlers with vessel length 12-18 m	HRV_DTS_1218
10	Croatia GSA17 trawlers with vessel length 18-24 m	HRV_DTS_1824
11	Slovenia Drift/fixed netters with vessel length 06-12 m and trawlers with vessel length 12-18 m	SVN_DFN_0612_DTS_1218

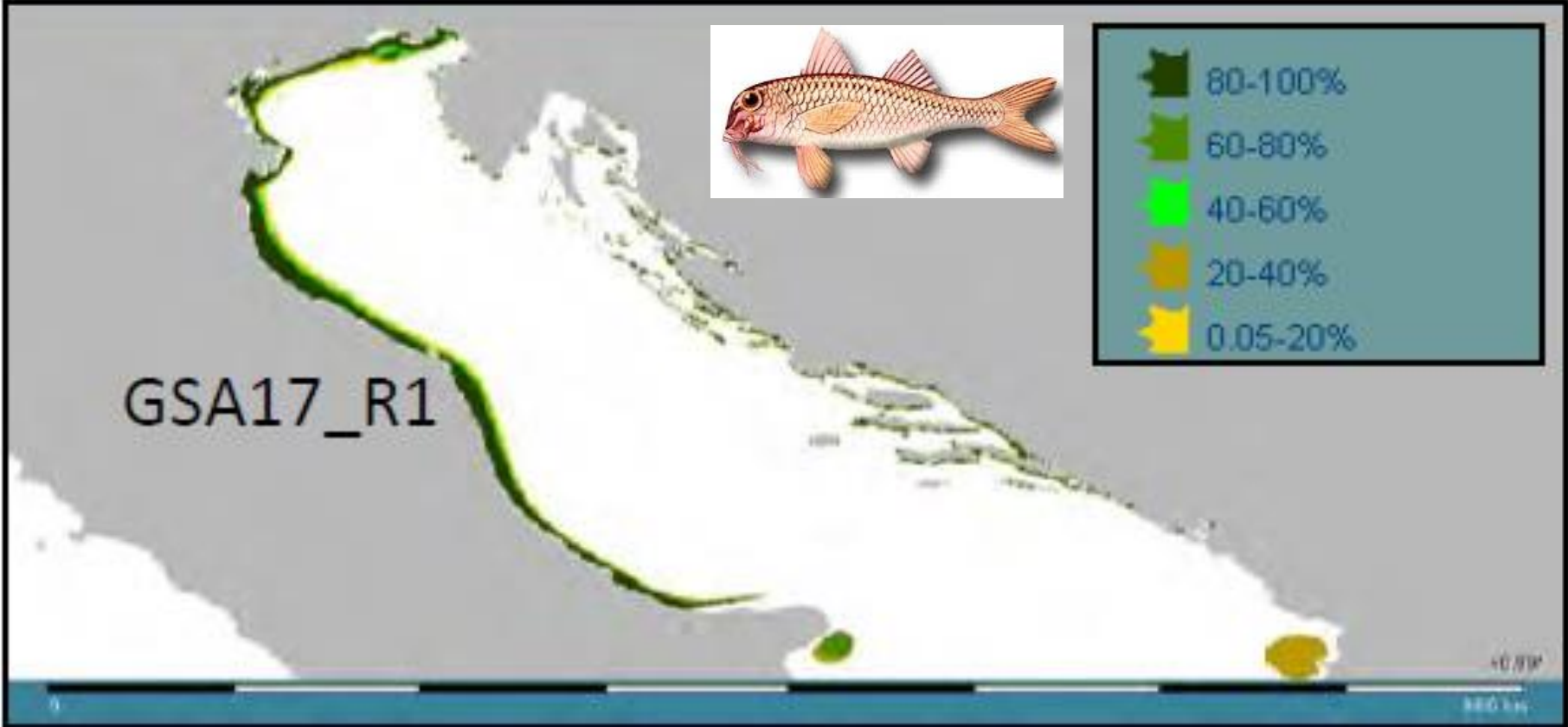
Management scenarios

	Demersal GSA17
Scenario 1	Status quo to 2020;
Scenario 2	Linear reduction towards upper Fmsy of the most heavily exploited species in 2018 applied on both activity and capacity, up to 2017 included, then on the activity only. Application differentiated by fleet.
Scenario 4	Adaptive reduction towards upper Fmsy of the most heavily exploited species in 2020 applied only to activity from 2018 to 2020. Application differentiated by fleet.
Scenario 6	Improving selectivity, delaying the size at first capture

Hake nursery



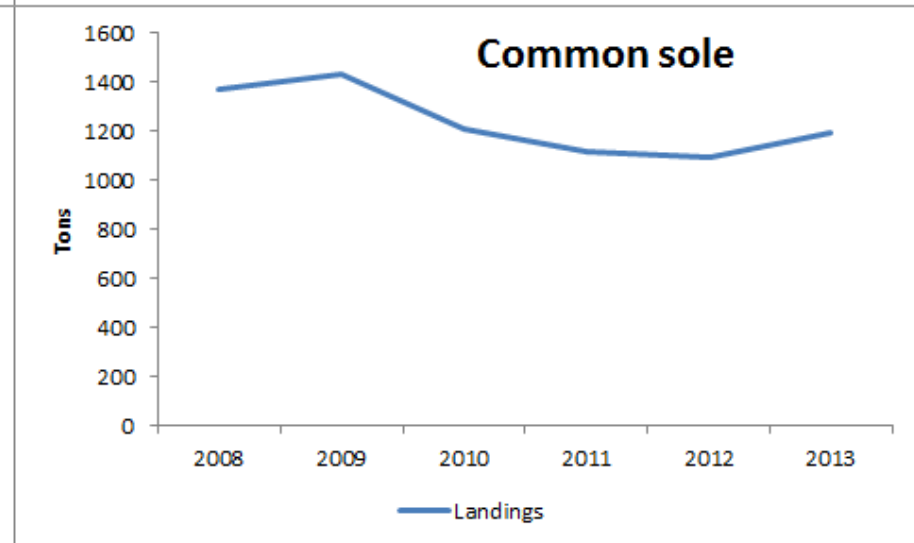
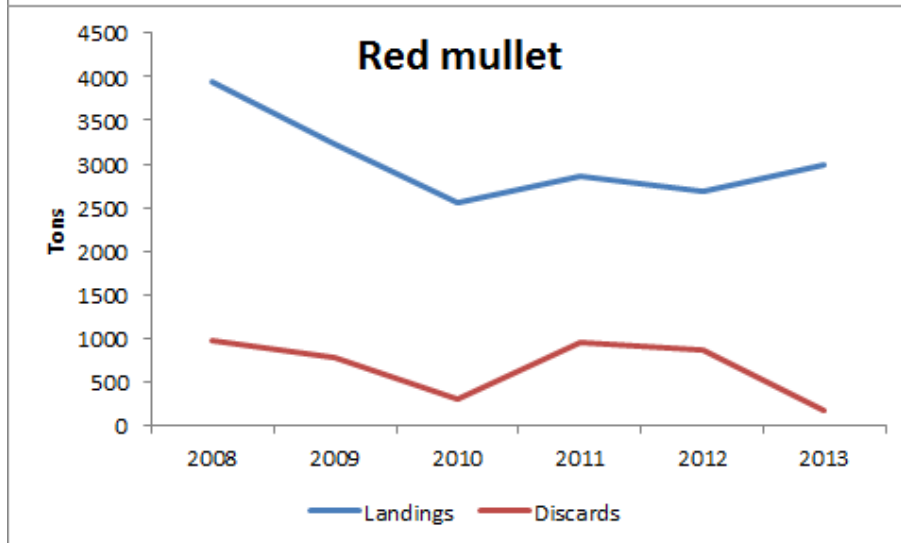
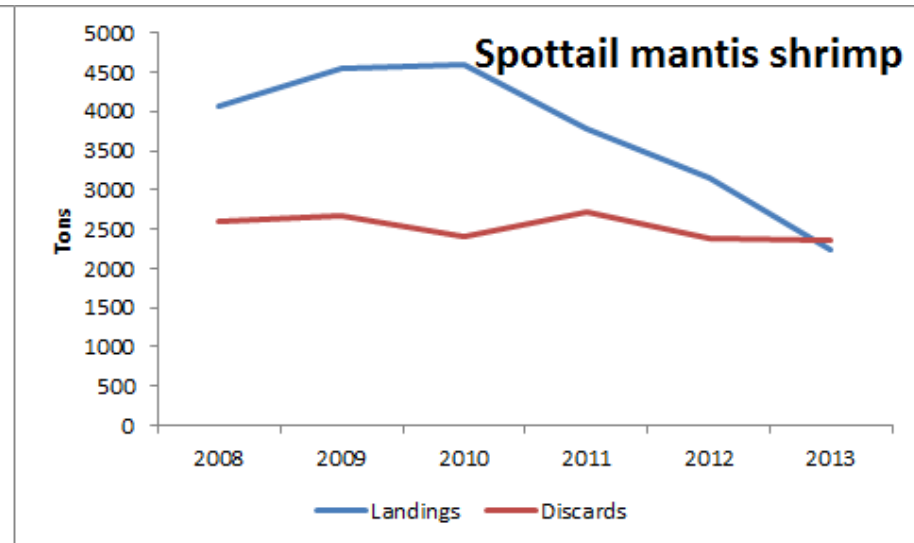
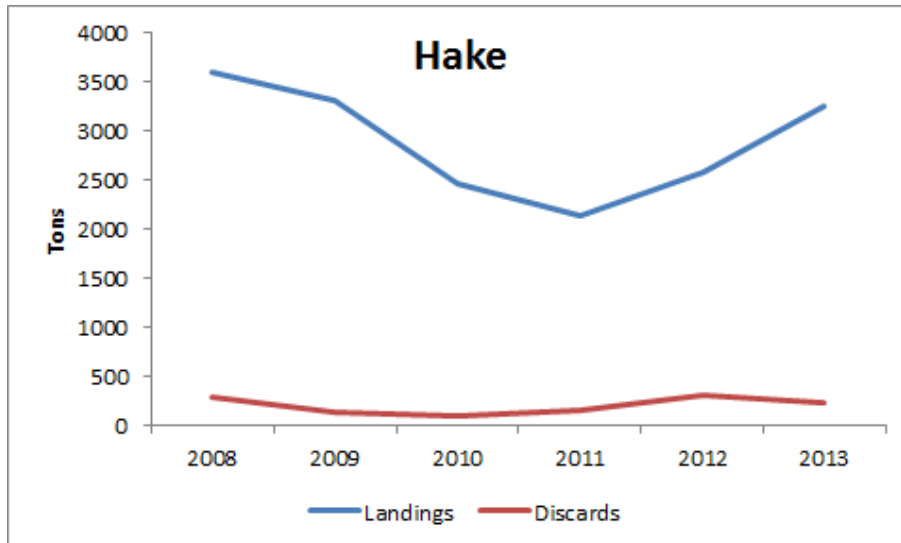
Red mullet nursery



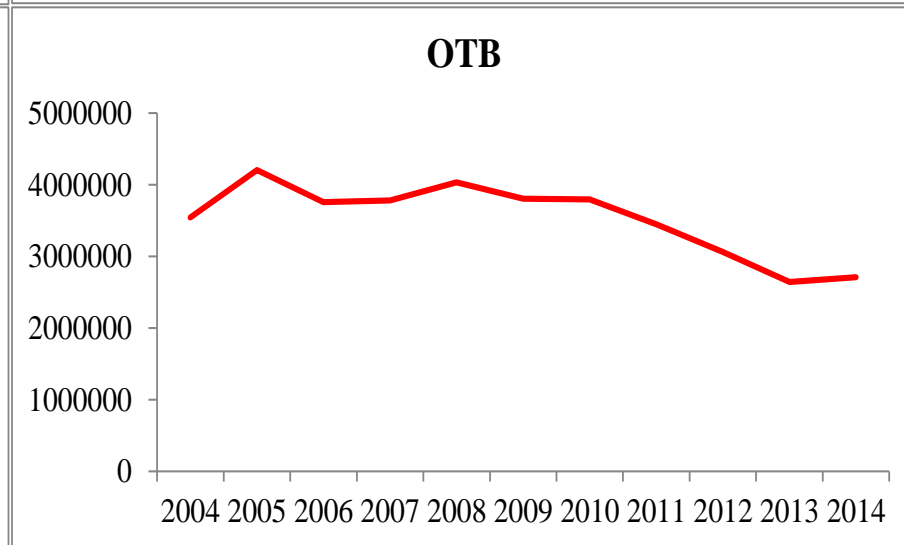
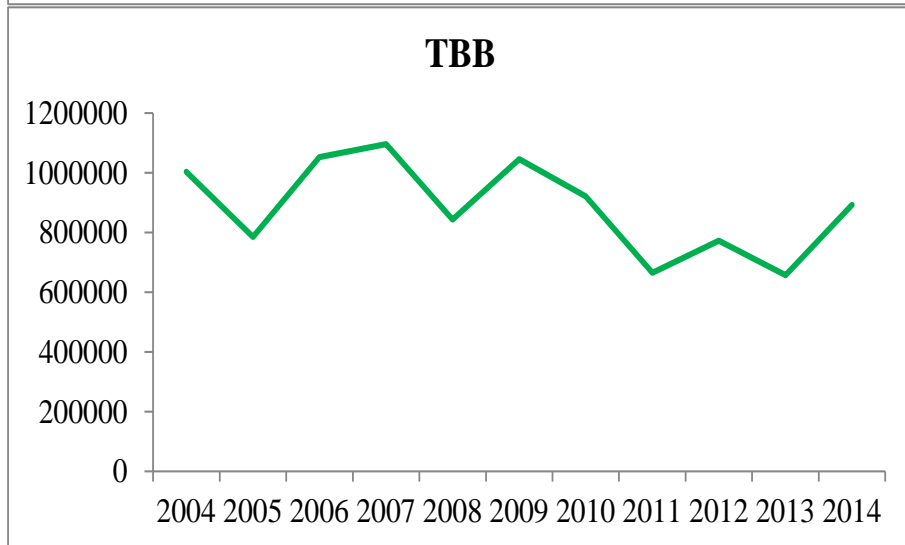
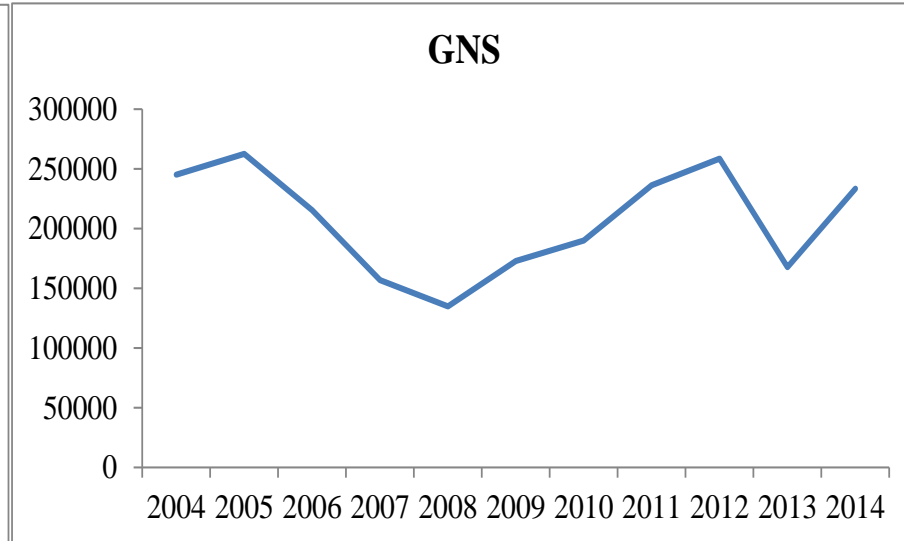
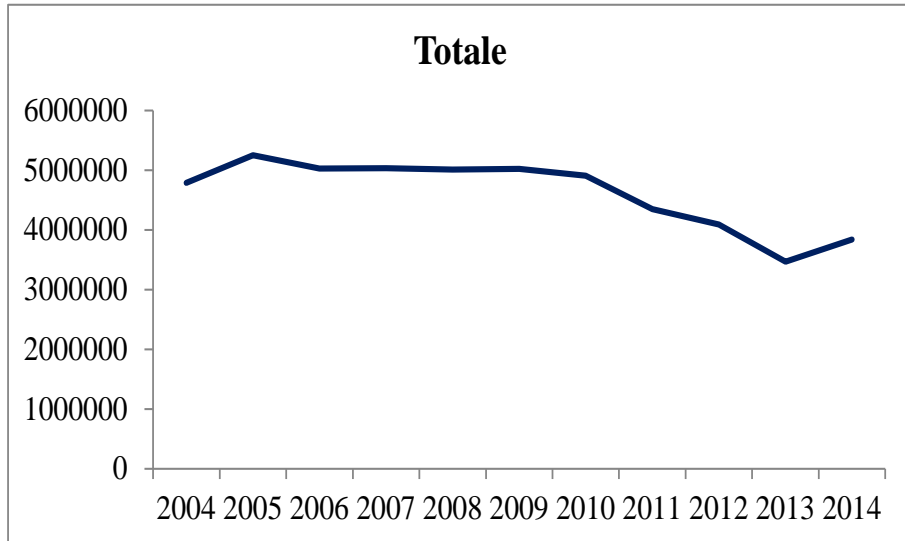
Common sole nursery



Trend of landings/discards



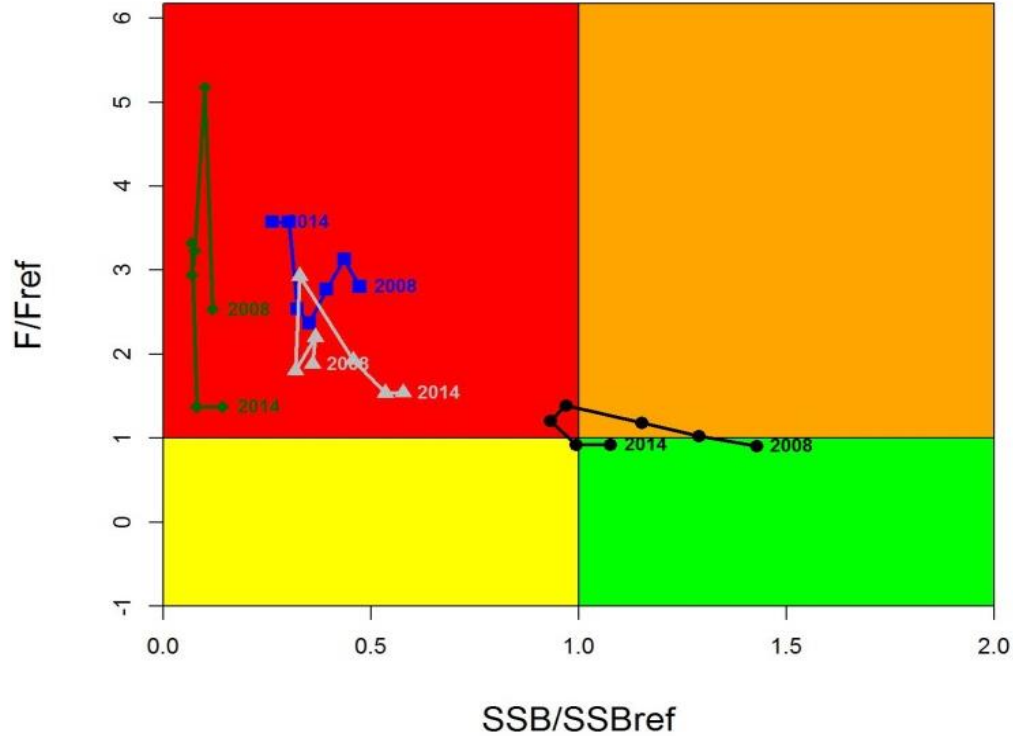
Trend of effort (GT x Days) - Italy



KOBE plot

GSA17_DEM simulation [2008-2014]

- M. mer
- S. man
- ▲ M. bar
- ◆ S. sol



Kobe plot

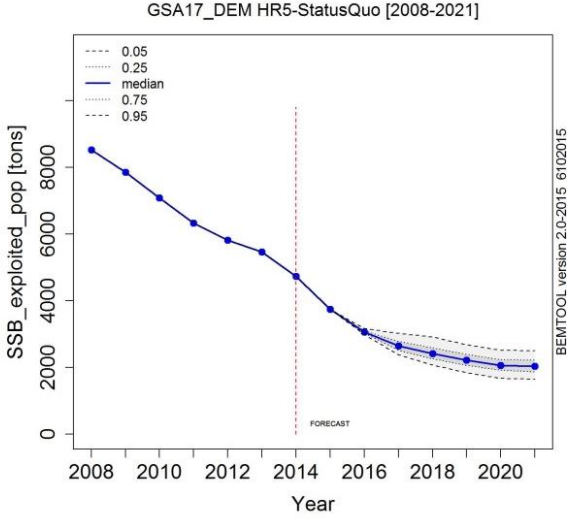
BEMTOOL version 2.0-2015_6102015

Stock	% reduction (last year) of F according to F upper
M. merluccius	62
S. mantis	
M. barbatus	
S. solea	

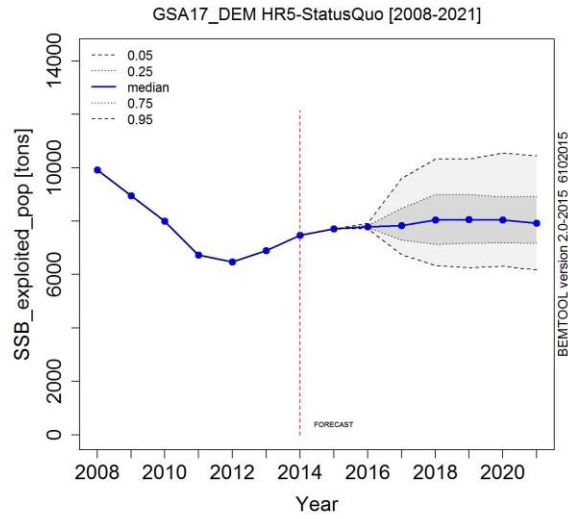
Year	ITA_DTS_0612	ITA_DTS_1218	ITA_DTS_1840	HRV_DFN_0612
2013	0.62	14.15	50.65	1.42
Year	HRV_DTS_0612	HRV_DTS_1218	HRV_DTS_1840	
2013	4.47	13.79	14.9	

Trend of SSB assuming status quo

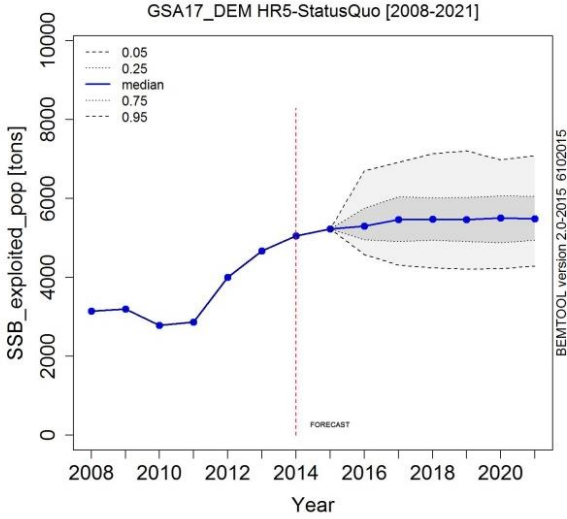
SSB_exploited_pop - M. mer



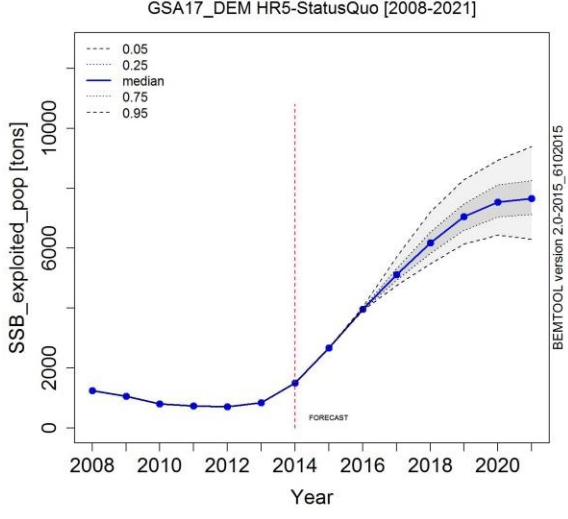
SSB_exploited_pop - S. man



SSB_exploited_pop - M. bar

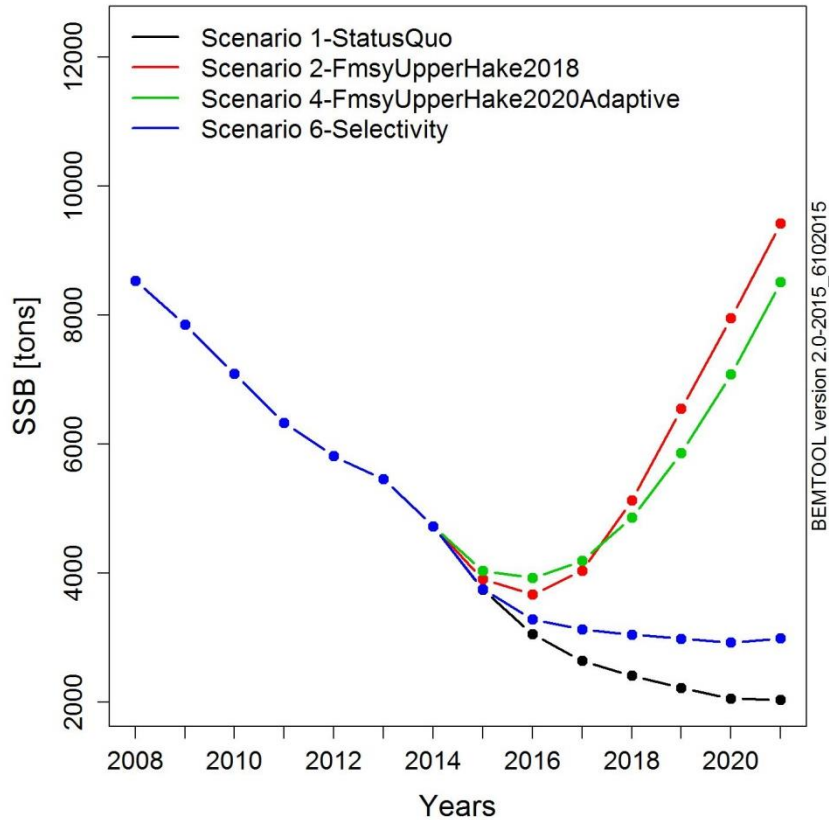


SSB_exploited_pop - S. sol

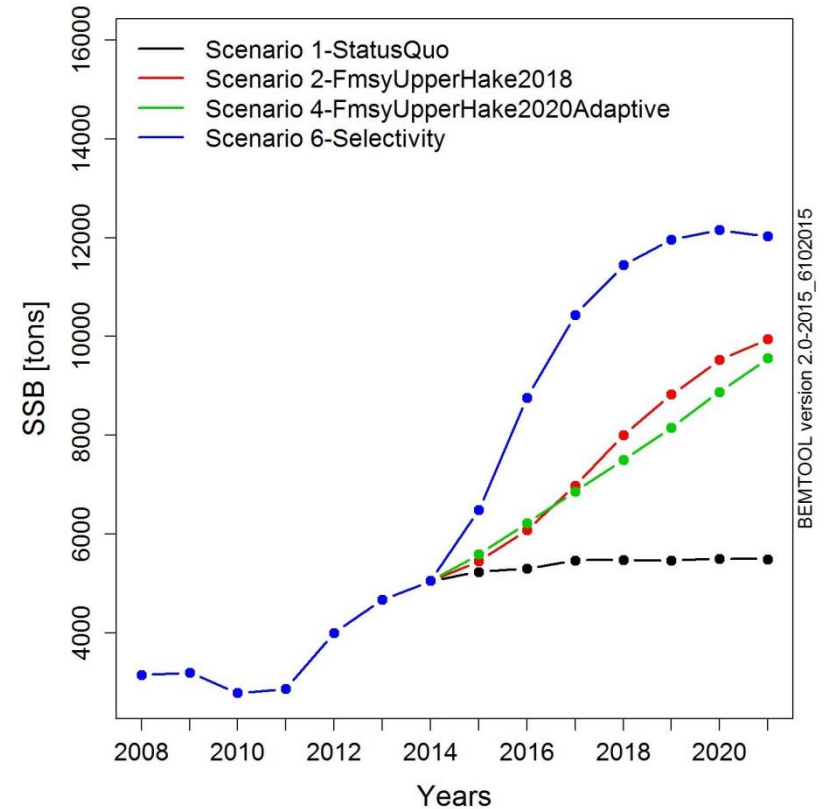


Main biological results

M. mer - SSB

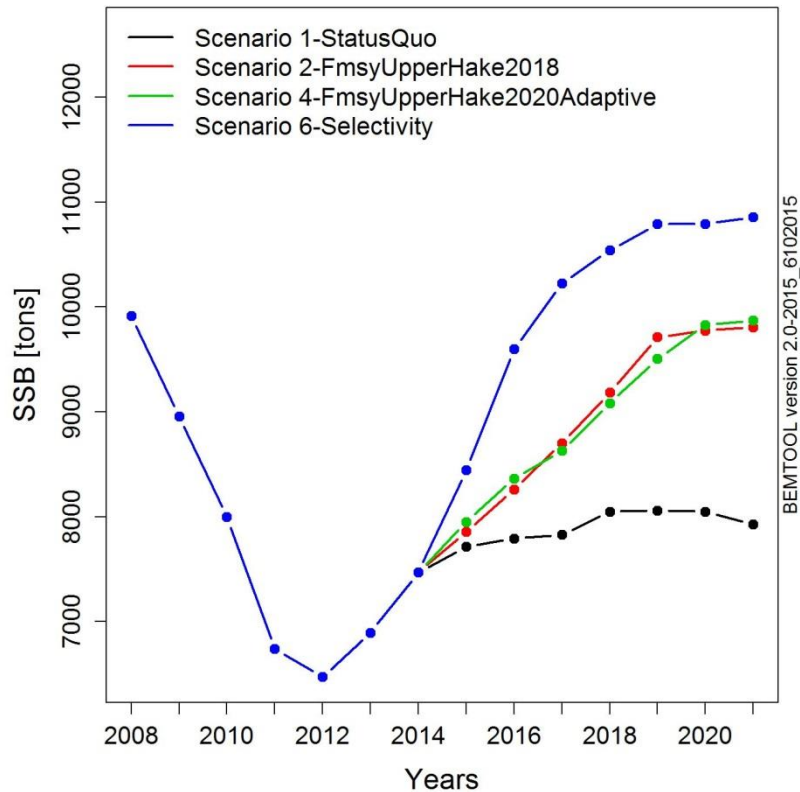


M. bar - SSB

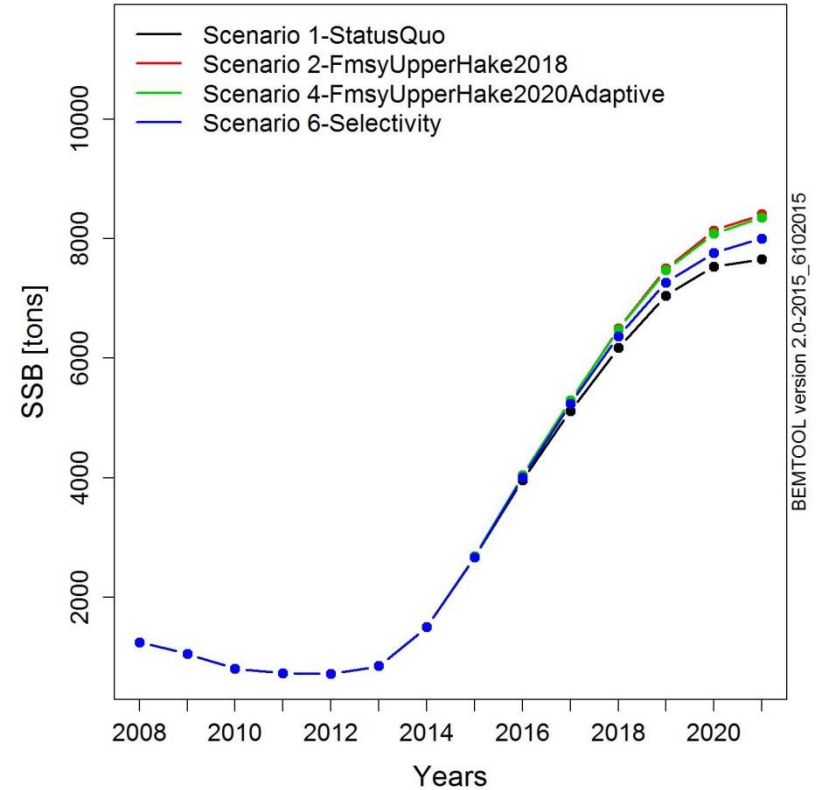


Main biological results

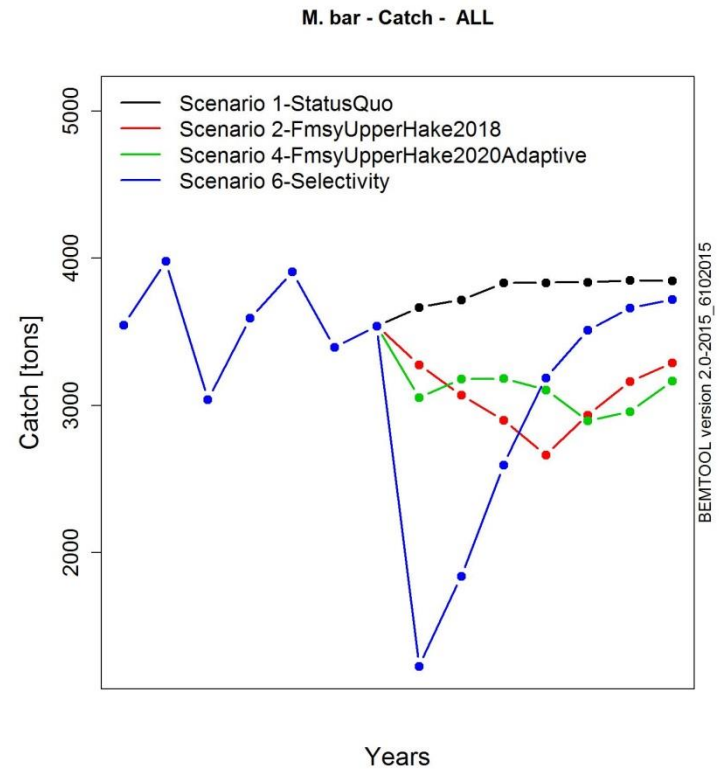
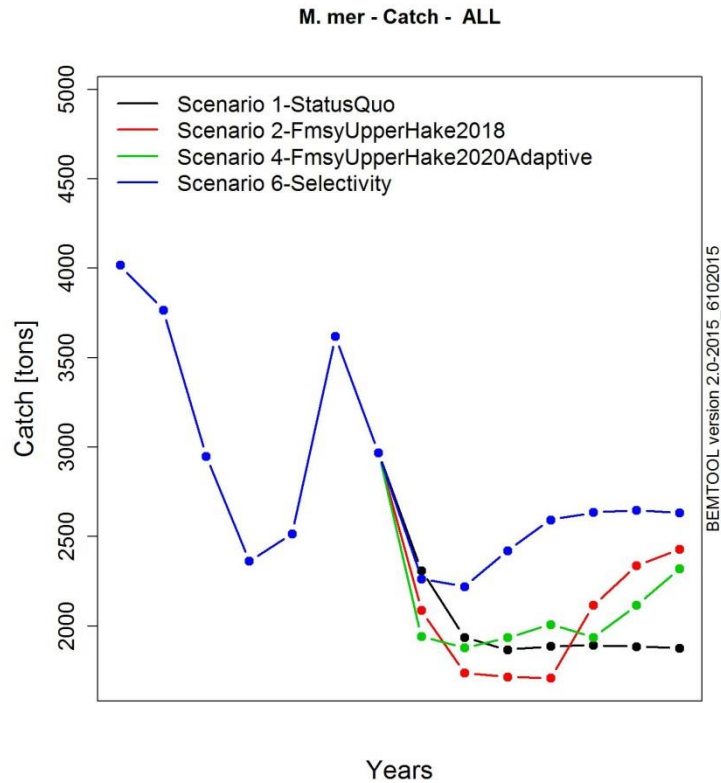
S. man - SSB



S. sol - SSB

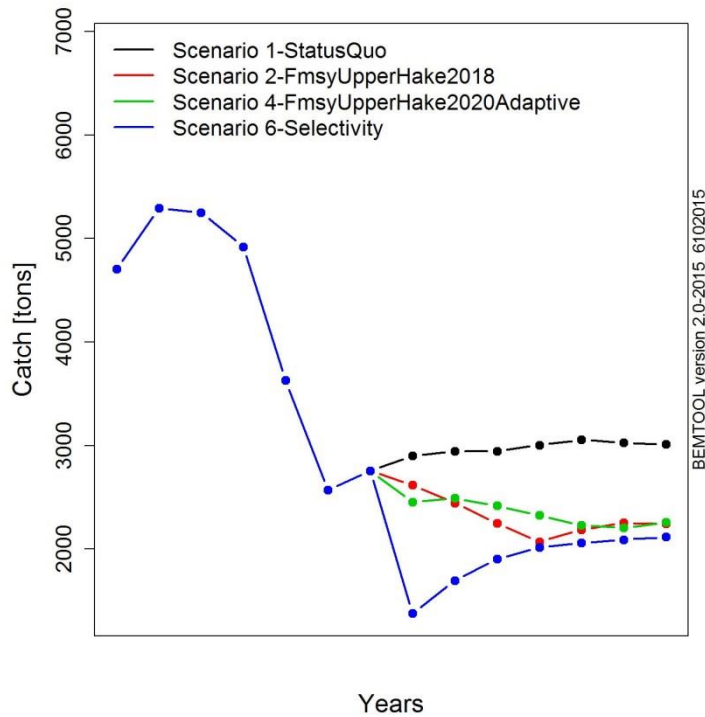


Main biological results – hake and red mullet

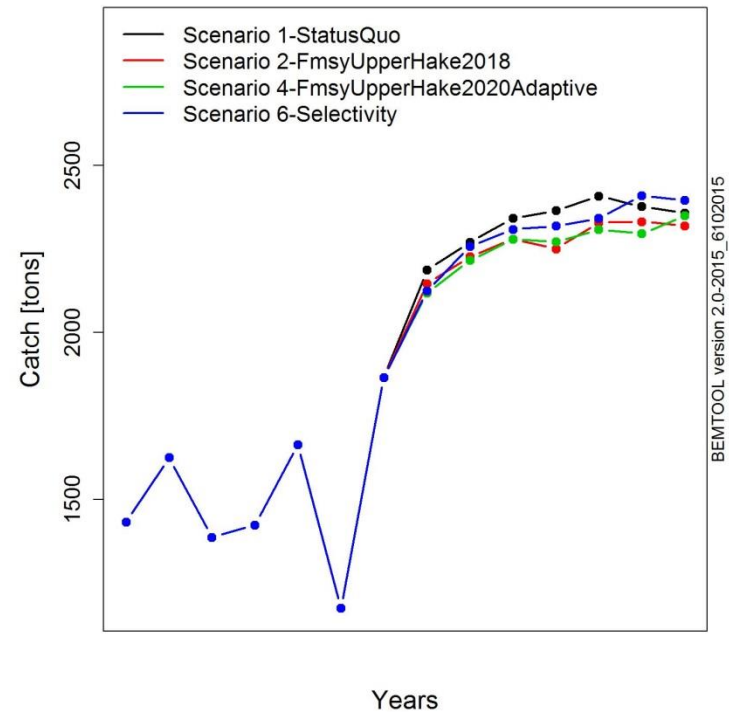


Main biological results – spottail mantis and common sole

S. man - Catch - ALL

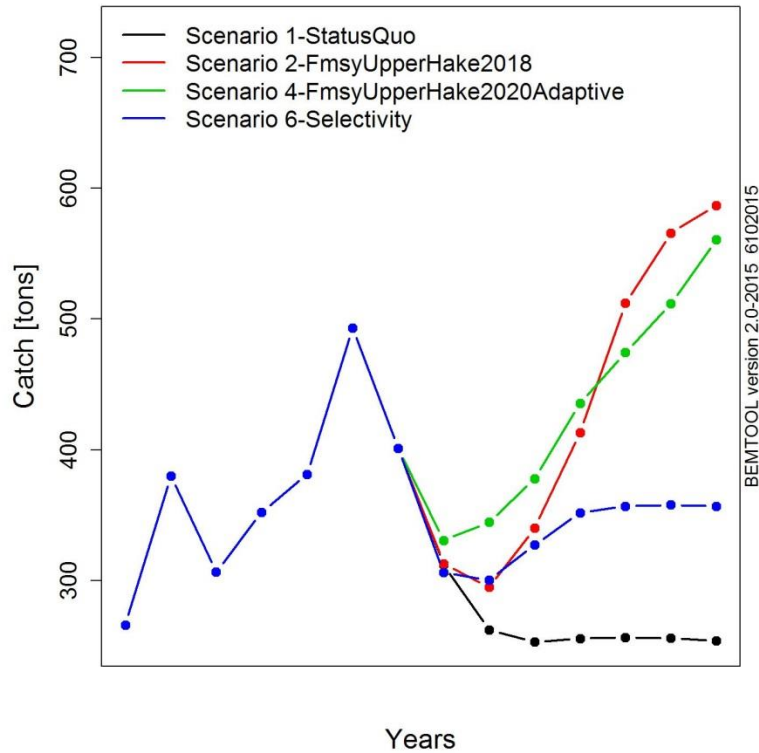


S. sol - Catch - ALL

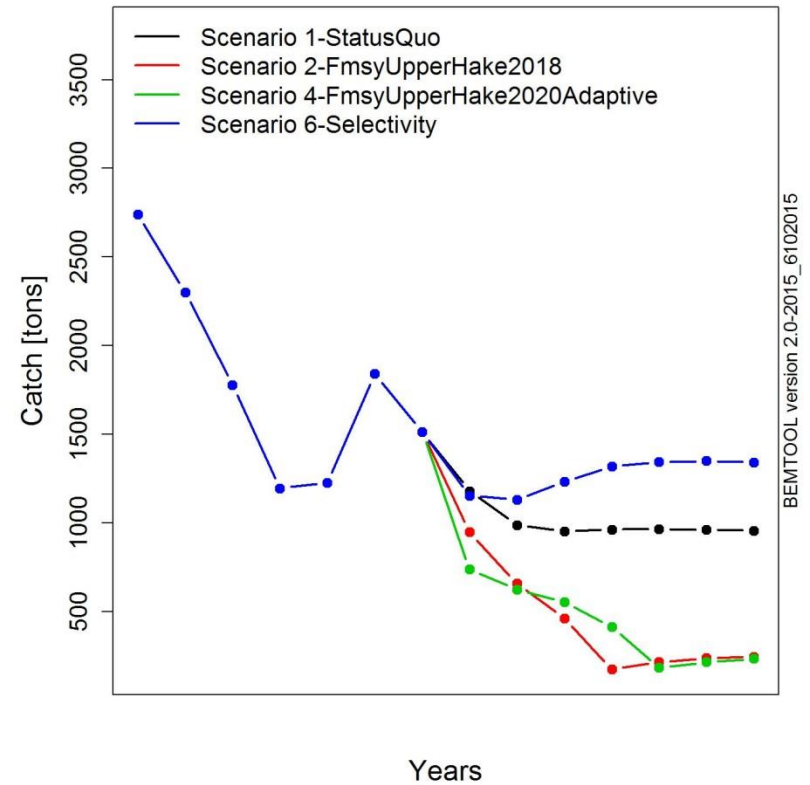


Main biological results

M. mer - Catch - HRV_DTS_1218

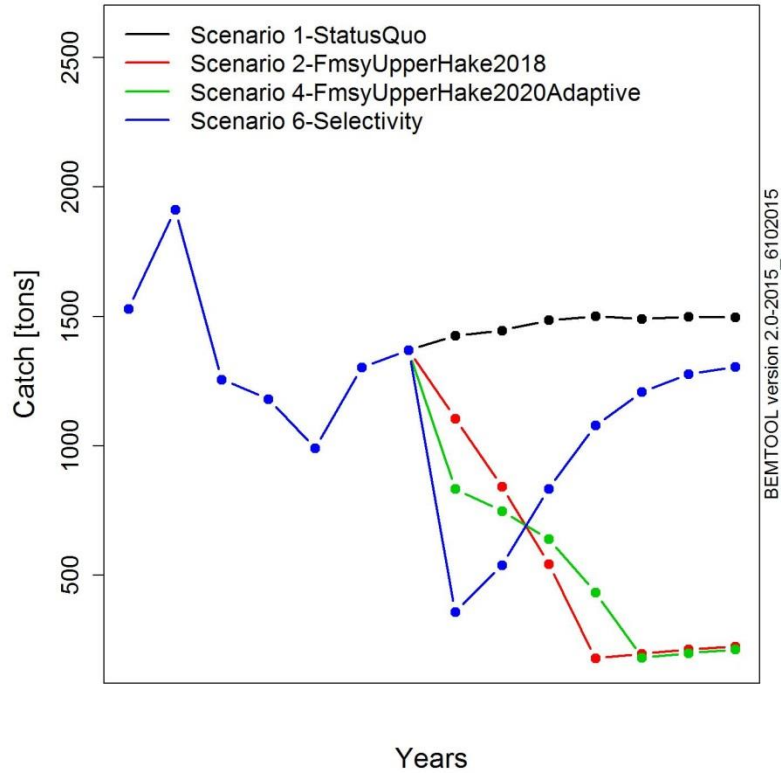


M. mer - Catch - ITA_DTS_1840

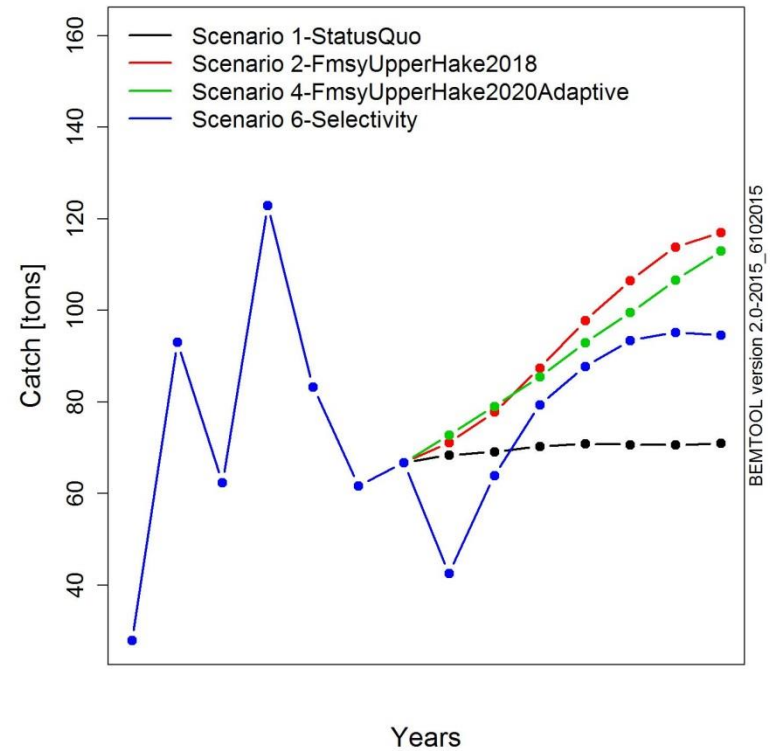


Main biological results

M. bar - Catch - ITA_DTS_1840

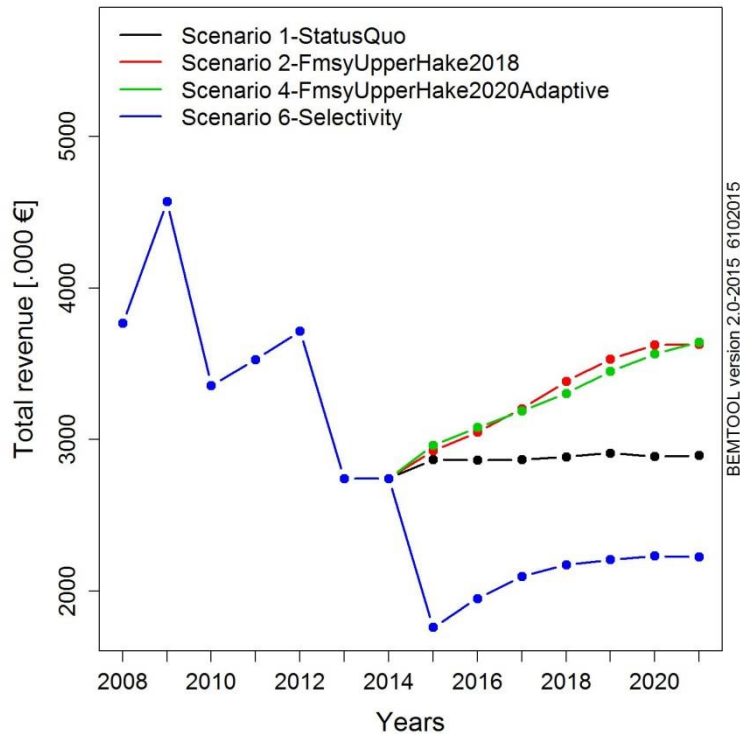


M. bar - Catch - ITA_DTS_0612

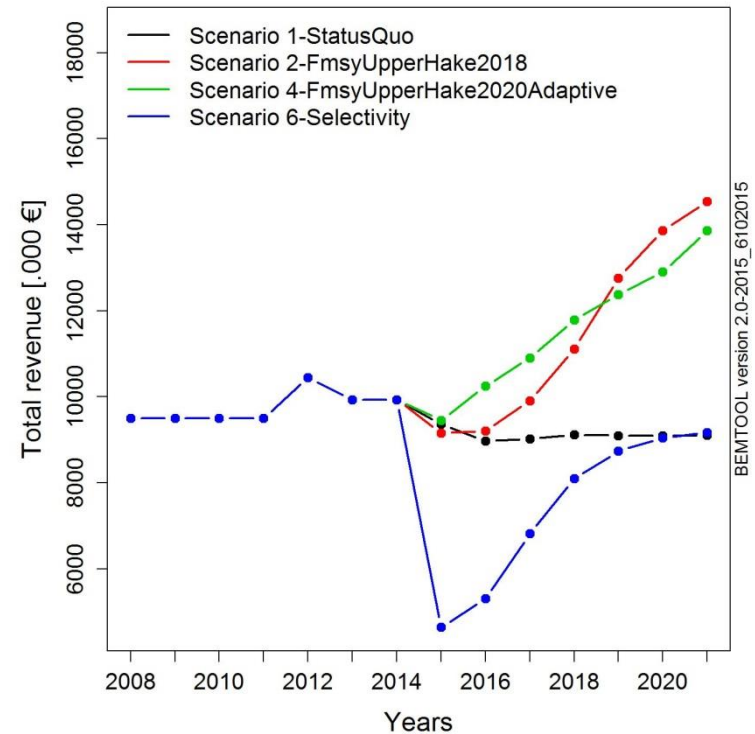


Main economic results – Total revenues

Total revenue - ITA_DTS_0612

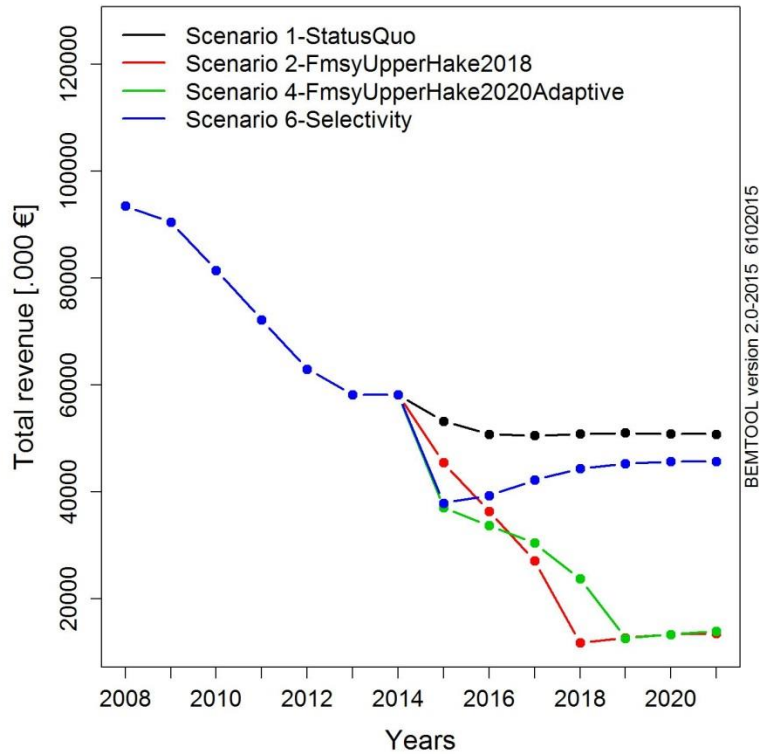


Total revenue - HRV_DTS_1218

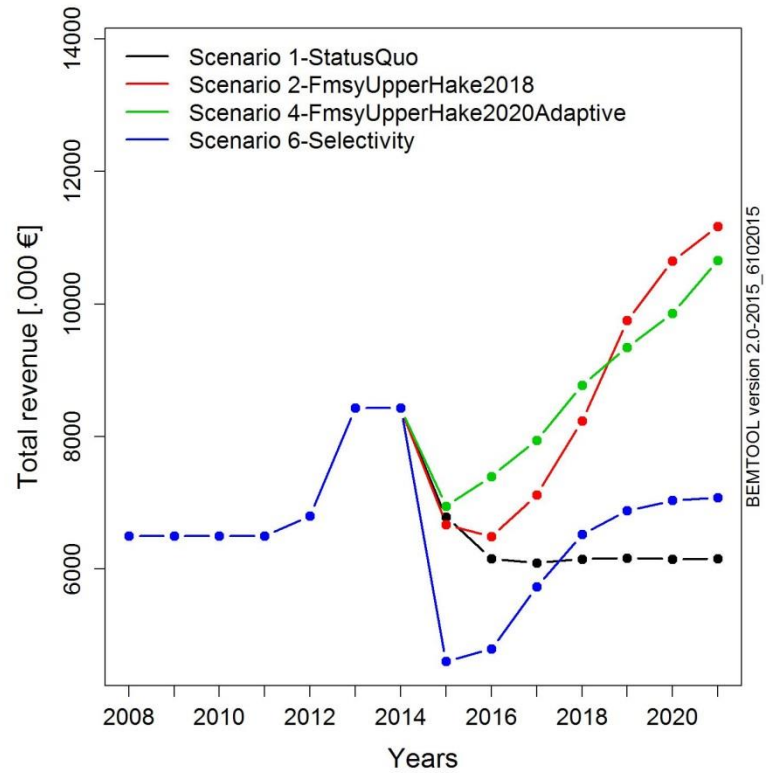


Main economic results – Total revenues

Total revenue - ITA_DTS_1840

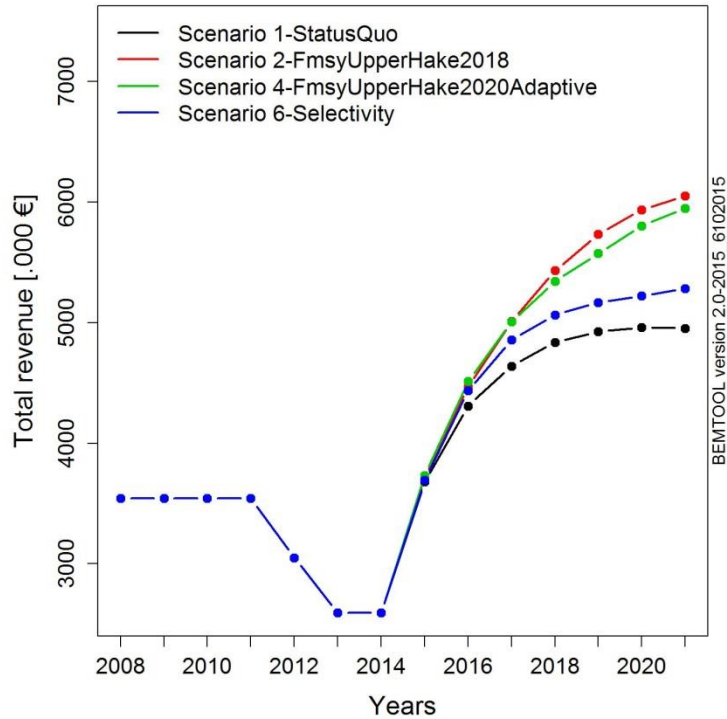


Total revenue - HRV_DTS_1840

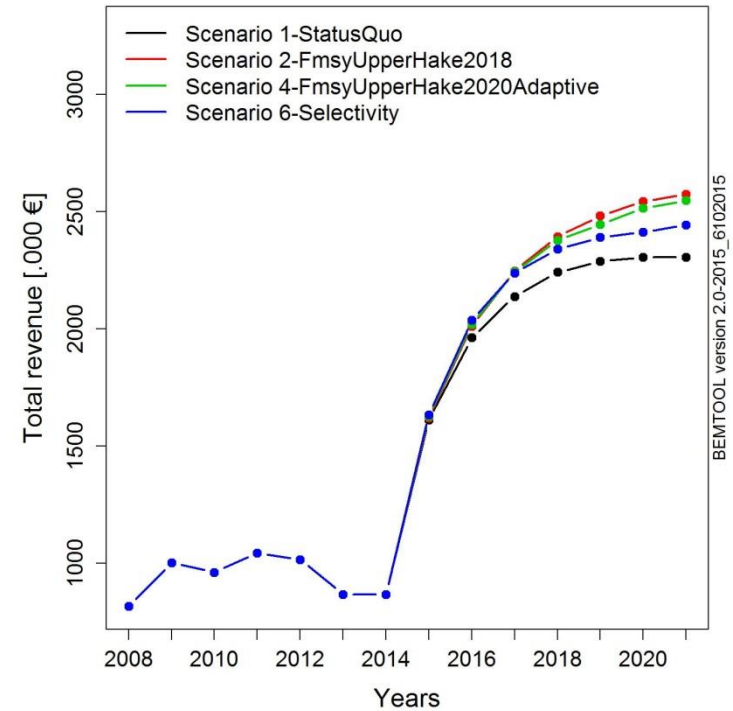


Main economic results – Total revenues Italy

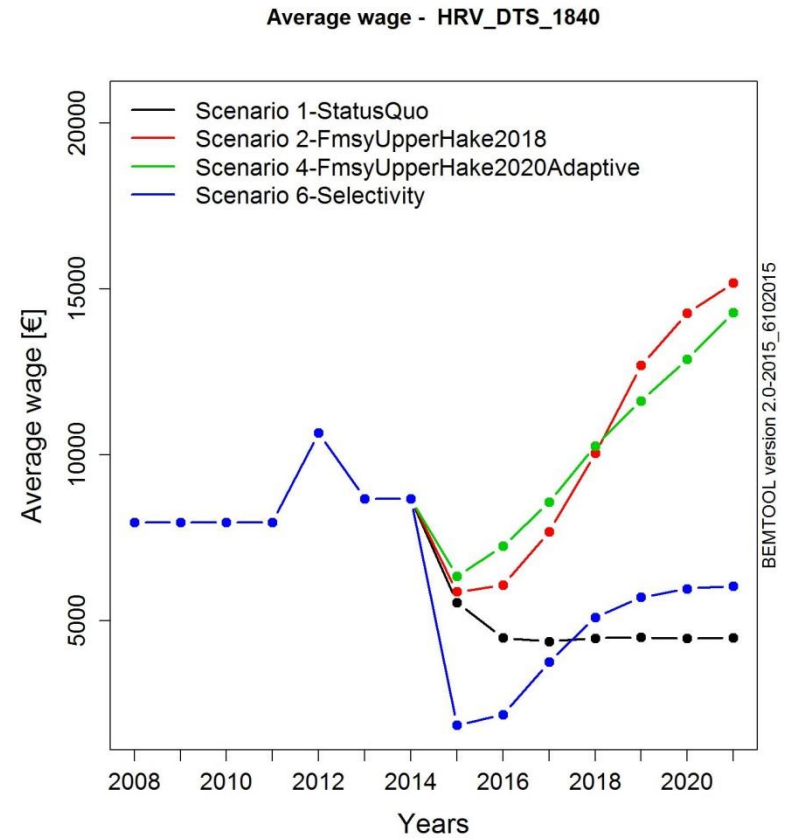
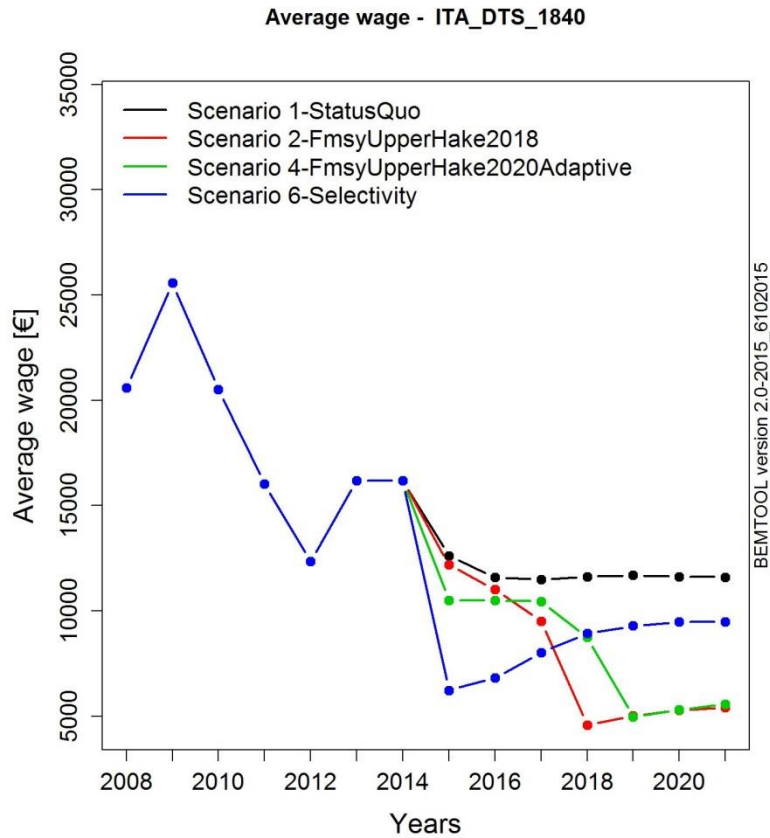
Total revenue - HRV_DFN_0612



Total revenue - SVN_DFN_0612_DTS_1218

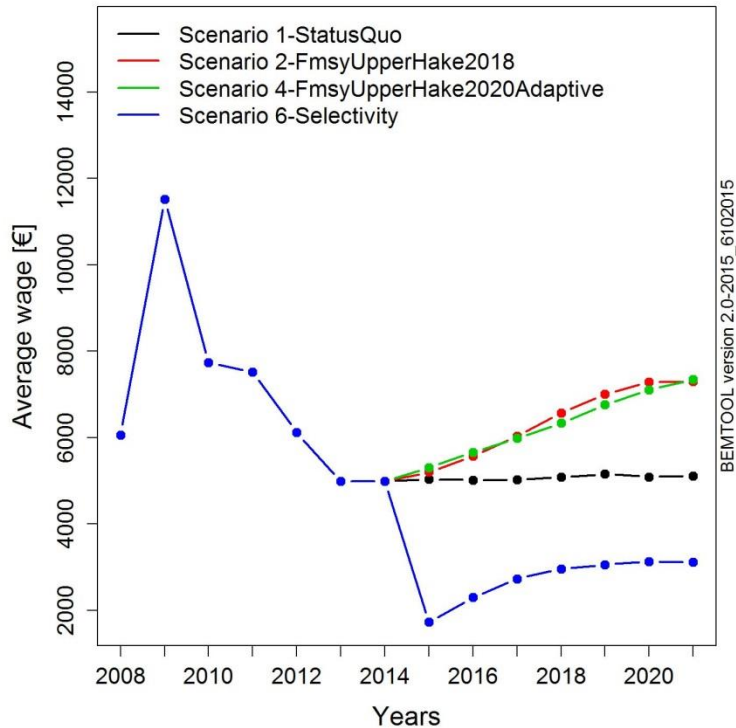


Main economic results – Average salary

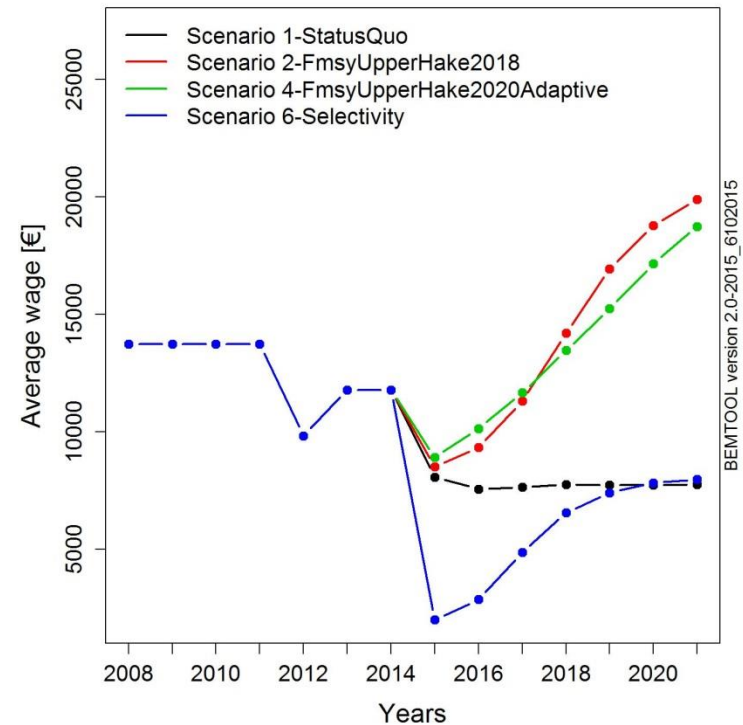


Main economic results – Average salary

Average wage - ITA_DTS_0612



Average wage - HRV_DTS_0612

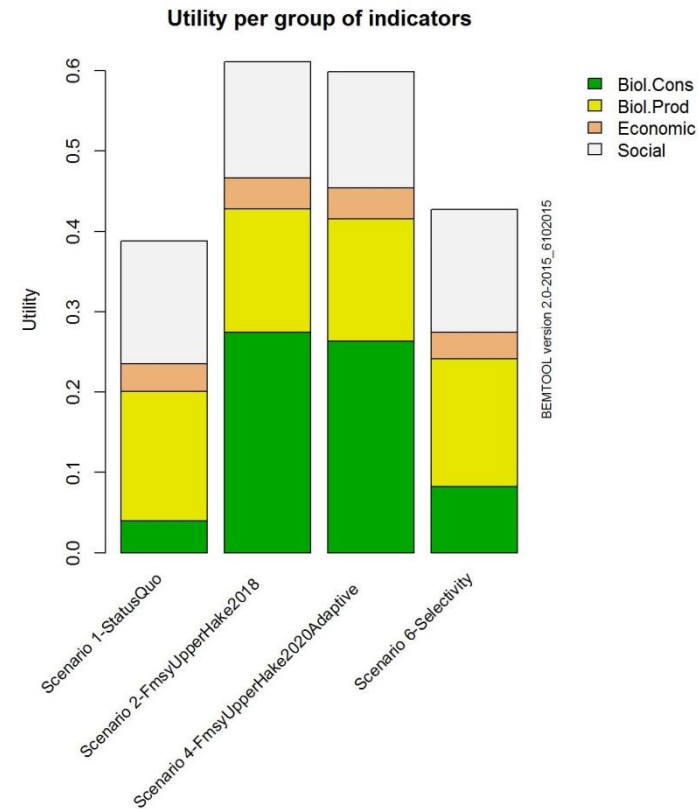


Traffic light approach

	Demersal species in GSA 17 ALL fleets											
Scenario, year 2021	Salary	CR.BER	Rev.	Employ.	SSB hake	SSB spottail mantis	SSB red mullet	SSB sole	Catch hake	Catch spottail mantis	Catch red mullet	Catch sole
Scenario 2	31.3	27.0	-8.3	-2.3	81.1	363.7	23.7	9.9	29.5	-25.7	-14.4	-1.9
Scenario 4	29.4	25.4	-8.6	-2.3	74.1	319.0	24.5	9.2	23.8	-25.1	-17.8	-0.4
Scenario 6	1.8	-6.4	-4.1	0.0	119.1	119.1	47.0	36.9	40.5	-30.3	-3.4	1.8

Multi-Criteria Decision Analysis

According to MCDA the scenarios that allows to reach the highest overall utility are scenarios 2 and 4, while the lowest utility is given by Scenario 1, the status quo. This result is in agreement with the traffic light table.



Conclusions

- All the performed scenarios allow to obtain a benefit on the SSB of the 4 stocks under consideration in respect to the status quo.
- The best performance for SSB is showed by Scenario 2, whilst the worse result is observed in the status quo.
- Adaptive scenario (Scenario 4) shows a reduced short term benefit for SSB compared to scenario 2, but also a reduced decrease in landing of the overall catch of all stocks in the short term.
- Management Strategy Evaluation (MSE) applied on hake showed that moving to MSY will result in considerable fluctuation in catches in the short-term though they will increase and stabilise over the longer-term. The probability of being below Blim decreases over the time of management.
- The projections performed with BEMTOOL model showed that all the performed scenarios with the exception of scenario 6, allow to obtain a benefit in terms of salary and CR.BER.