**Supplementary Materials**

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| **FIGURE S1.** Structure of the Modelling Framework (MF) developed by the Joint Research Centre to support European policy decisions. In this study, we focus on the 4th model type, the Food web or higher trophic level (HTL). | | | |
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| **FIGURE S2.** Total Nitrogen (top left) and Phosphorus (top right) load changes estimated by the MF hydrological module and Total Nitrate (bottom left) and Phosphate (bottom right) concentration at sea changes estimated by the MF hydrodynamic-biogeochemical modules. Values express ratio between the MTFR and the REF scenarios on the 2005-2012 period, mean and maximum change are also provided. The analysis considers European Rivers (white lines) with flow >5m3/sec while main non-European rivers were included in the model runs but no nutrient management measures were applied (black squares, top figures). The full Pan-European assessment can be found respectively in Grizzetti et al. (2021) and Friedland et al. (2021). | | |

**Table S2. Mean change (%) for the Spawning stock biomass of a commercially important small pelagic fish (D3C2)** per GSA and per model type.

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| **# GSAs** | **GSAs** | **West\_JRC** | **West\_ICM** |
| 1 | Northern Alboran Sea | -1.51 | -0.11 |
| 2 | Alboran Island | NA | NA |
| 3 | Southern Alboran Sea | -1.28 | -0.08 |
| 4 | Algeria | -2.22 | -0.09 |
| 5 | Balearic Islands | -3.14 | -0.09 |
| 6 | Northern Spain | -1.13 | -0.18 |
| 7 | Gulf of Lion | -1.14 | -0.39 |
| 8 | Corsica | -1.62 | -0.10 |
| 9 | Ligurian and Tyrrhenian Seas | -1.32 | -0.13 |
| 10 | South and Central Tyrrhenian | -1.52 | -0.10 |
| 11.1 | Sardinia (West) | NA | NA |
| 11.2 | Sardinia (East) | -1.51 | -0.07 |
| 12 | Northern Tunisia | -0.67 | -0.07 |
| Whole Western Med | | -1.43 | -0. 14 |

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| **Whole Western:** **-0.11%**  **Shelf: -0.4%**  **Open waters: -0.006%** |
| **Whole Western:** -**0.0007%**  **Shelf: -0.002%**  **Open waters: -0.0003%** |

**FIGURE S3. Maps representing the mean change (%) for the Diversity index (D4C1)** per model type. Mean values were calculated considering the whole Western sub-region, shelves (<200m) and open waters (>200m).

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| **Whole Western: -0.009%**  **Shelf: -0.016%**  **Open waters: -0.007%** |
| **Whole Western:** +**0.002%**  **Shelf: +0.004%**  **Open waters: +0.0002%** |
| **Whole Western:** **+0.12%**  **Shelf: +0.066%**  **Open waters: +0.13%** |

**FIGURE S4.** **Maps representing the mean change (%) for Trophic Level of the Catch (TLc)** per model type. Mean values were calculated considering the whole Western sub-region, shelves (<200m) and open waters (>200m). Note that the color scale of TLc\_OSM is different from the one of TLc\_EwE\_JRC/ICM.





**FIGURE S5. Coherence map for the Mean Trophic level of the community (mTLco) and for the Trophic Level of the Catch (TLc),** whichshows where all or most models (2 out of three) agree on the relative change trend.



**FIGURE S6. Percentage of Coherence Area** with respect to increase (red) or decrease (blue) trends for small pelagic fishes biomass (D4C2), Mean Trophic level of the community (mTLco) and Trophic Level of the Catch (TLc), considering the whole Western sub-region, shelf (<200m) and open waters (>200m).