

# Submission of 6 manuscripts

## Milestone 6

Dissemination level

**Public**

### LEAD CONTRACTOR

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30 | June | 2016



## 1. Scope

This milestone summarises the final outputs of DEVOTES WP1 on Human Pressures and Climate change, in the form of manuscripts which bring together the main findings and recommendations.

The work package addresses the following tasks:

- Task 1.1.1.: Produce/refine conceptual models for pressure-impact links on biodiversity (cumulative, synergistic, antagonistic effect);
- Task 1.1.2.: Create generic/regional sea-specific matrices of pressure-impact links and variations in biodiversity, and to assess the mechanisms of those against shifting baselines due to climatic change;
- Task 1.2.1.: Catalogue and critically review monitoring networks used by the RSC and MSs, including pressures;
- Task 1.2.2.: Use metadata analysis to identify gaps in monitoring systems, related to pressures and climate change;
- Task 1.3.2.: Impact of the likely changes due to climate change on key-species;
- Task 1.3.3.: Review existing information regarding the role of biodiversity in ecosystem functioning;
- Task 1.3.4.: Indicate where these aspects link into existing, proposed and to-be-developed criteria for defining GES for the descriptors.

The work carried out for these tasks have led directly or indirectly to 23 manuscripts being published or in press to date (June 2016), of which six are fully related to the work of this work package and 17 others take elements from the Work Package. In addition, four manuscripts directly related to WP1 have recently been submitted for publication and others are in preparation for submission before the end of the project.

References to these articles are provided below.

## 2. Publications relating directly to WP1

- Danovaro R., Cerrano C., Cardini U., Bianchelli S., Corinaldesi C., Pusceddu A. 2013 Red coral extinction risk enhanced by ocean acidification *Scientific Reports*. 3:1457, 1-7.
- Elliott M., Borja Á., McQuatters-Gollop A., Mazik K., Birchenough S., Andersen J.H., Painting S., Peck M. 2015. Force majeure: Will climate change affect our ability to attain Good Environmental Status for marine biodiversity? *Marine Pollution Bulletin*. 95: 7–27.
- Saul, R., Barnes, R., Elliott, M (in press). Is climate change an unforeseen, irresistible and external factor – a *force majeure* in marine environmental law? *Marine Pollution Bulletin* (in press).
- Sguotti C., Lynam CP., García-Carreras B., Ellis J.R., Engelhard G.H. 2016 (in press). Distribution of skates and sharks in the North Sea: 112 years of change. *Global Change Biology*.
- Strong J.A., Andonegi E., Bizsel K.C., Danovaro R., Elliott M., Franco A., Garces E., Little S., Mazik K., Moncheva S., Papadopoulou N., Patrício J., Queirós A.M., Smith C., Stefanova K., Solaun O. 2015. Marine biodiversity and ecosystem function relationships: The potential for practical monitoring applications. *Estuarine, Coastal and Shelf Science*. 161: 46-64.
- Uusitalo L., Korpinen S., Andersen J.H.A., Niiranen S., Valanko S., Heiskanen A.-S., Dickey-Collas M. 2016. Exploring methods for predicting multiple pressures on ecosystem recovery: a case study on marine eutrophication and fisheries. *Continental Shelf Research*. 121: 48-60.

### 3. Submitted manuscripts relating directly to WP1

- Patrício J., Elliott M., Mazik K., Smith C., Papadopoulou N. DPSIR in marine and coastal ecosystems: lessons from two decades of use. Submitted to *Frontiers in Marine Science*.
- Patrício J., Little S., Mazik K., Teixeira H., Uyarra M.C., Solaun O., Papadopoulou N., Zenetos A., Kaboglu G., Churilova T., Moncheva S., Bucas M., Borja A., Hoffmann H., Hoepffner N., Elliott M. European Marine Monitoring Networks: strengths, weaknesses, opportunities and threats. Submitted to *Frontiers in Marine Science*.
- Smith C.J., Papadopoulou K-N., Barnard S., Mazik K., Elliott M., Patrício J., Solaun O., Little S., Bhatia, N., Borja, A. Managing the Marine Environment, Conceptual Models and the European Marine Strategy Framework Directive. Submitted to *Frontiers in Marine Science*.
- Strong, J.A. and Elliott, M. The need for modern imaging techniques in supporting spatial extrapolation. Submitted to *Marine Pollution Bulletin*.

### 4. Other publications rising partly from WP1

- Borja A., Elliott M., Andersen J. H., Cardoso A.C., Carstensen J., Ferreira J.G., Heiskanen A.S., Marques J.C., Neto J.M., Teixeira H., Uusitalo L., Uyarra M.C., Zampoukas N. 2013. Good Environmental Status of marine ecosystems: What is it and how do we know when we have attained it? *Marine Pollution Bulletin*. 76: 16-27.
- Boyes S.J., Elliott M., Murillas-Maza A., Papadopoulou N., Uyarra M.C. 2016 (in press). Is existing legislation fit-for-purpose to achieve Good Environmental Status in European seas? *Marine Pollution Bulletin*.
- Caruso G., La Ferla R., Azzaro M., Zoppini A., Marino G., Petochi T. et al. 2015. Microbial assemblages for environmental quality assessment: Knowledge, gaps and usefulness in the European Marine Strategy Framework Directive. *Critical Reviews in Microbiology*. 1-22.
- Cavallo M., Elliott M., Touza-Montero J., Quintino V. 2016. The ability of regional coordination and policy integration to produce coherent marine management: implementing the Marine Strategy Framework Directive in the North-East Atlantic. *Marine Policy*. 68: 108-116.
- Chust G., Albaina A., Aranburu A., Borja Á., Diekmann O.E., Estonba A., Franco J., Garmendia J.M., Iriondo M., Muxika I., Rendo F., Rodríguez J.G., Ruiz-Larrañaga O., Serrão E.A., Valle M. 2013. Connectivity, neutral theories and the assessment of species vulnerability to global change in temperate estuaries. *Estuarine, Coastal and Shelf Science*. 131: 52-63
- Elliott M., Cutts N. D., Trono A. 2014. A typology of marine and estuarine hazards and risks as vectors of change: A review for vulnerable coasts and their management. *Ocean & Coastal Management*. 93: 88-99.
- Fang Q., Elliott, M. 2016. Avoid misuse of eco-compensation. Correspondence, 19<sup>th</sup> May 2016. *Nature*. 533: 321.
- Ferrera I., Sebastian M., Acinas S.G., Gasol J.M. 2015. Prokaryotic functional gene diversity in the sunlit ocean: Stumbling in the dark. *Current Opinion in Microbiology*. 25: 33-39.
- Fraschetti S., Guarnieri G., Gambi C., Bevilacqua S., Terlizzi A., Danovaro, R. 2016. Impact of offshore gas platforms on the structural and functional biodiversity of nematodes. *Marine Environmental Research*. 115: 56-64.

- Grant, D. & Elliott, M. 2016. A proposed framework for managing environmental causes and consequences of ocean traffic and ports. European Decision Sciences Institute (EDSI2016), 7<sup>th</sup> Annual Conference: The Water Footprint in Decision Sciences, Helsinki May 24-27 2016, Conference Proceedings, Aalto University School of Business, p 204-217, ISBN 978-952-60-1102-8.
- James A., Plank M.J., Rossberg A.G., Beecham J., Emmerson M., Pitchford J.W. 2015. Constructing Random Matrices to Represent Real Ecosystems. *The American Naturalist*. 185: 680-692.
- Mora C., Danovaro R., Loreau M. 2014. Alternative hypotheses to explain why biodiversity-ecosystem functioning relationships are concave-up in some natural ecosystems but concave-down in manipulative experiments. *Scientific Reports*. doi:10.1038/srep05427.
- Pusceddu A., Bianchelli S., Danovaro R. 2015. Quantity and biochemical composition of particulate organic matter in a highly trawled area (Thermaikos Gulf, Eastern Mediterranean Sea). *Advances in Oceanography and Limnology*. 6: 1-2.
- Rastelli E., Corinaldesi C., Dell'Anno A., Amaro T., Queirós A.M., Widdicombe S., Danovaro R. 2015. Impact of CO<sub>2</sub> leakage from sub-seabed carbon dioxide capture and storage (CCS) reservoirs on benthic virus-prokaryote interactions and functions. *Frontiers in microbiology*. 6: 935. doi: 10.3389/fmicb.2015.00935
- Scharin H., Ericsson S., Elliott M., Turner R.K., Niiranen S., Rockström J., Blenckner T., Hyytiäinen K., Ahlvik L., Heini Ahtiainen H., Artell J., Hasselström L., Söderqvist T. 2016. Processes for the sustainable stewardship of marine environments. *Ecological Economics*. 128: 55-67.
- Yasuhara M., Doi H., Wei C. L., Danovaro R., Myhre S.E. 2016. Biodiversity-ecosystem functioning relationships in long-term time series and palaeoecological records: deep sea as a test bed. *Philosophical Transactions of the Royal Society Series B*, 371(1694), 20150282.
- Zeppilli D., Pusceddu A., Trincardi F., Danovaro R. 2015. Seafloor heterogeneity influences the biodiversity-ecosystem functioning relationships in the deep sea. *Scientific Reports* 2016. 6: 26352.