

# DESSIN: The ESS Evaluation Framework

## Promoting innovation through the assessment of changes in ecosystem services

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### Introduction - Overall aims of DESSIN

The European water research project DESSIN demonstrates and promotes innovative solutions for water scarcity and water quality related challenges to the implementation of the EC Water Framework Directive (WFD) & demonstrates a methodology for the EVALUATION of changes in ecosystem services (ESS). While new solutions and advances in technology are necessary to meet the water quality and scarcity challenges faced in Europe, these are typically confronted with barriers to their implementation. By enabling assessments that consider broad environmental and economic aspects when evaluating the costs and benefits of investing in novel solutions, these barriers can be overcome. Therefore, the project develops a methodology for assessing changes in ESS – **the DESSIN ESS Evaluation Framework**. The overall aim of DESSIN is to demonstrate how innovative solutions in the water cycle can increase the value of services provided by freshwater ecosystems. 20 partners from universities, research centers, as well as site operators and SMEs from 7 countries work together in this 4 year FP7-Project (2014 – 2017).

### Objectives of the DESSIN ESS Evaluation Framework

Through the development of an ESS Evaluation Framework, Work Area 1 of DESSIN seeks to provide a means to **estimate and promote the potential impact of innovative technologies on freshwater ESS**. The framework testing and validation will take place in 3 mature case study sites: Emscher (Germany), Aarhus (Denmark), and Llobregat (Spain) (Fig. 1), where innovative solutions have already been implemented and data is available to test the proposed methods. Once tested, the methodology will be applied to 5 Demonstration sites around Europe where real innovations are actually under implementation.

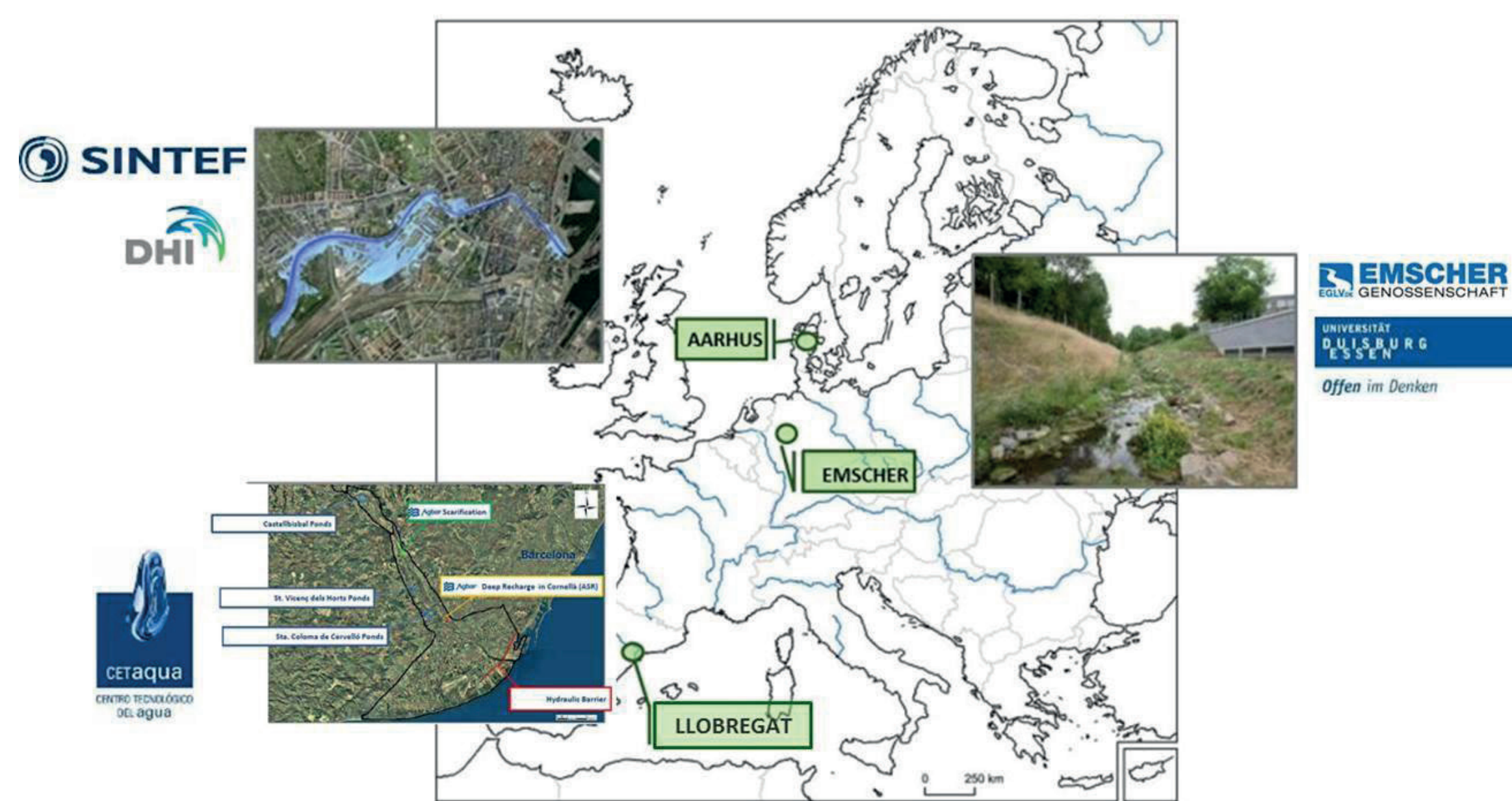


Figure 1: Mature sites of DESSIN

### Components and foundations of the DESSIN ESS Evaluation Framework

The DESSIN ESS Evaluation Framework is being developed on the basis of the Common International Classification of Ecosystem Services (CICES) and the DPSIR adaptive management cycle. The former is a standardised system for the classification of ESS developed by the European Union to enhance the consistency and comparability of ESS assessments. The latter is a well-known concept to disentangle the biophysical and social aspects of a system under study. Furthermore, the framework is accompanied by methodologies to assess governance and sustainability aspects which can be used in parallel to provide a holistic perspective to the evaluation (Fig. 2).

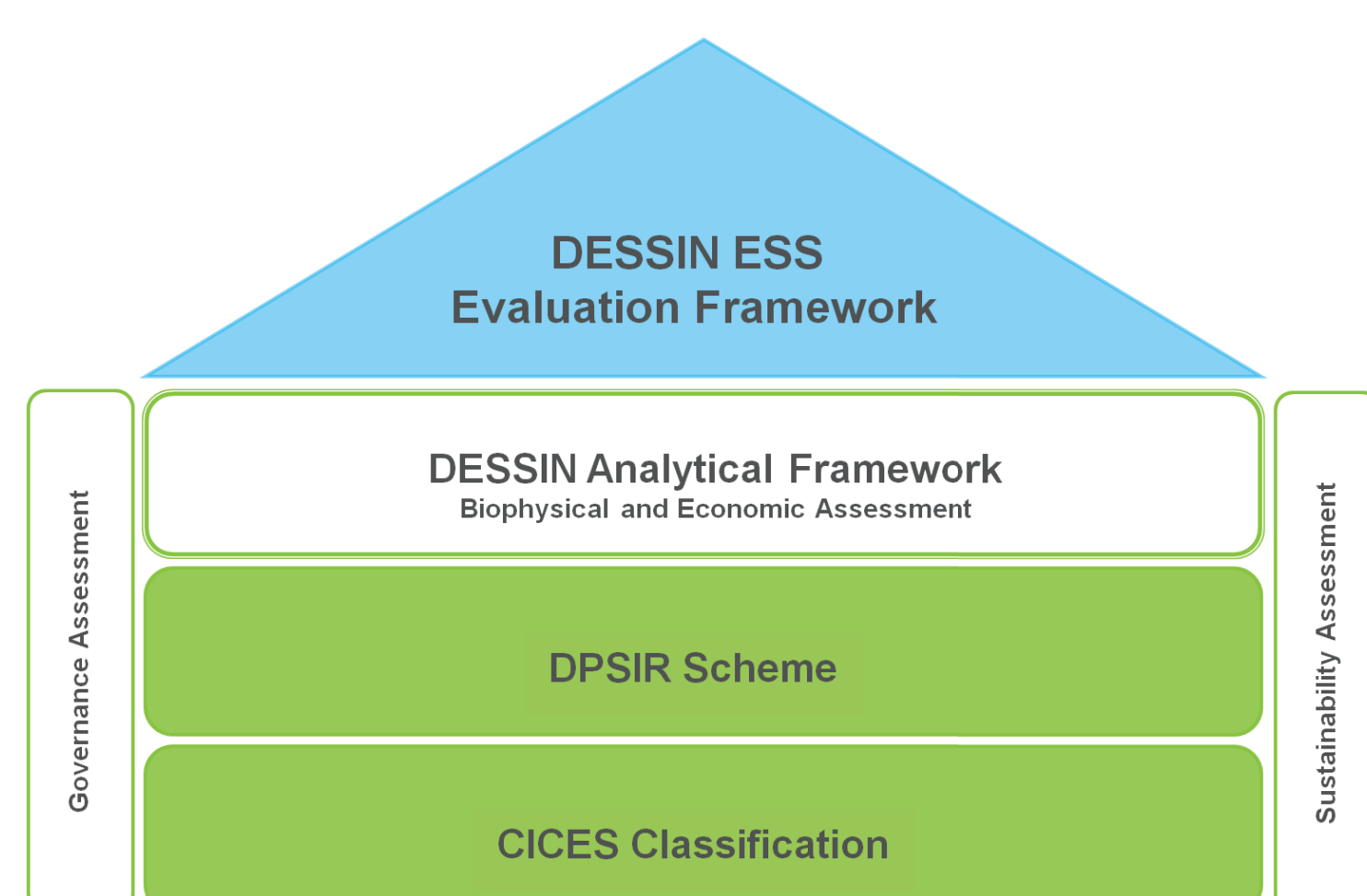


Figure 2: Components and foundations of the DESSIN ESS Evaluation Framework

### Conceptual approach of the DESSIN ESS Evaluation Framework

Figure 3 outlines the DPSIR scheme as applied in DESSIN. In it, the innovative technologies to be trialed within the project are considered *Responses* that may have influence on Drivers (anthropogenic activities with environmental effects), *Pressures* (the direct effects of such activities) and *States* (the conditions of the ecosystems under study). From the resulting changes in ecosystem state, the changes in ESS (*Impact I*) will be estimated. An economic assessment of the subsequent changes in the benefits perceived by society and in the value of the goods and services derived from ecosystems (*Impact II*) will follow. Finally, this estimated change in the level of human well-being will inform policy and decision-making (further *Responses*).

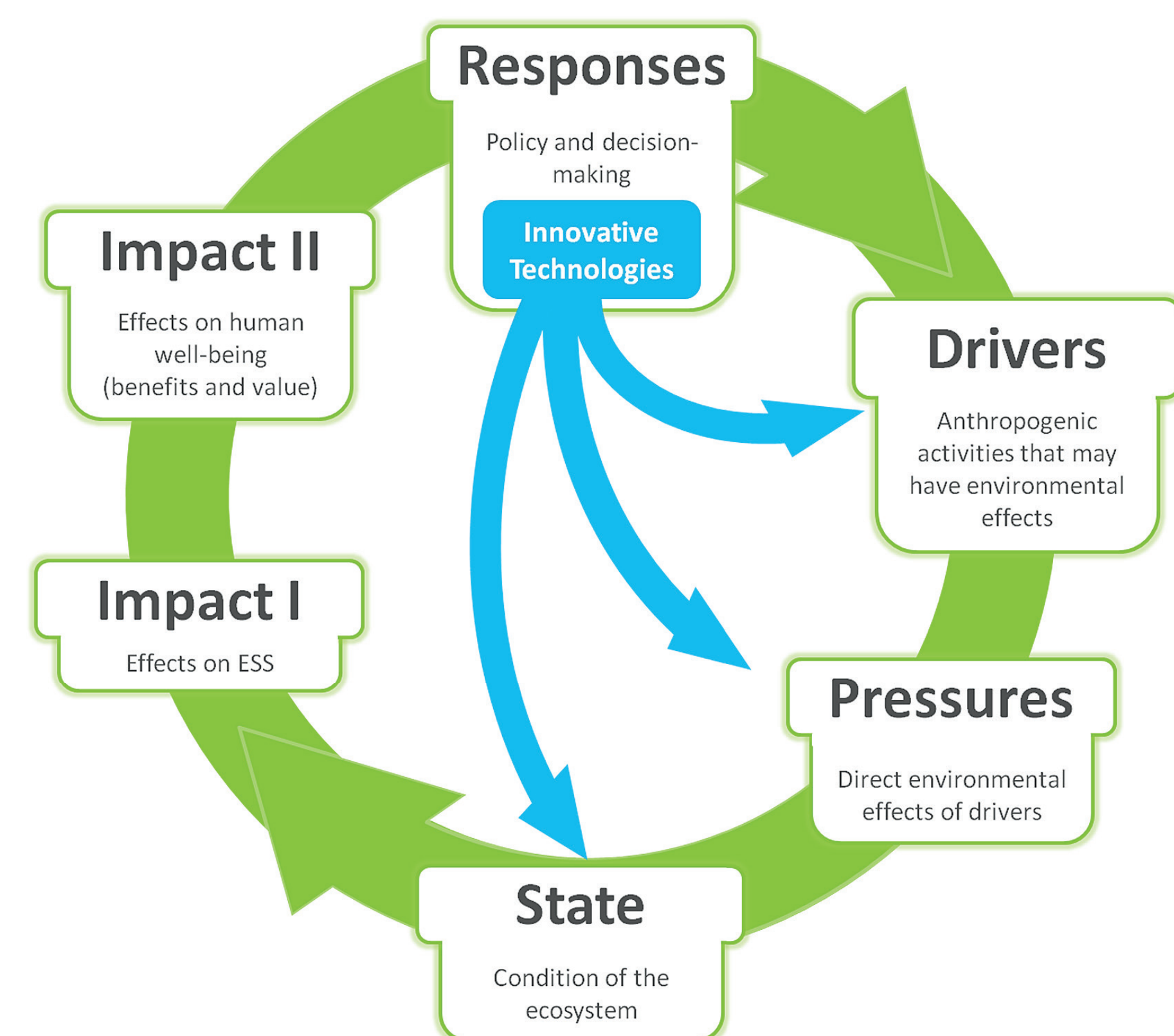


Figure 3: Conceptual approach of the DESSIN ESS Evaluation Framework (based on Müller and Burkhard, 2012, Van Oudenhoven et al., 2012 and Haines-Young and Potschin, 2010; 2013).

### Example: DPSIR analysis of the Emscher mature case study

A DPSIR analysis of the Emscher re-conversion shows that it affects a high number of *Drivers* and *Pressures*, resulting in an altered *State*, which then links to the *Impact*. The changes in ESS resulting from the Emscher re-conversion activities will be appraised as *Impact I* using biophysical indicators, followed by assessing their benefits, *Impact II*, via valuation methods.

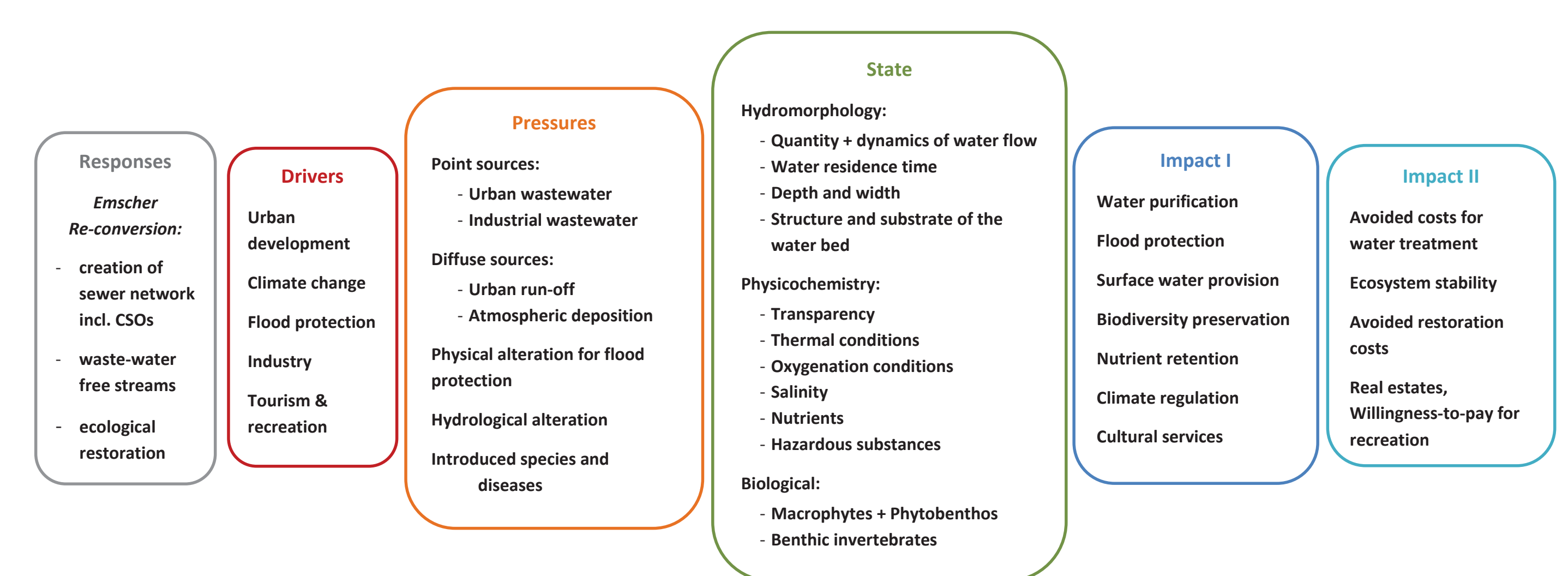


Figure 4: DPSIR analysis of the Emscher re-conversion

### References

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