

Identification of indicators to evaluate the effects of the landing obligation on high level policy environmental and socioeconomic objectives

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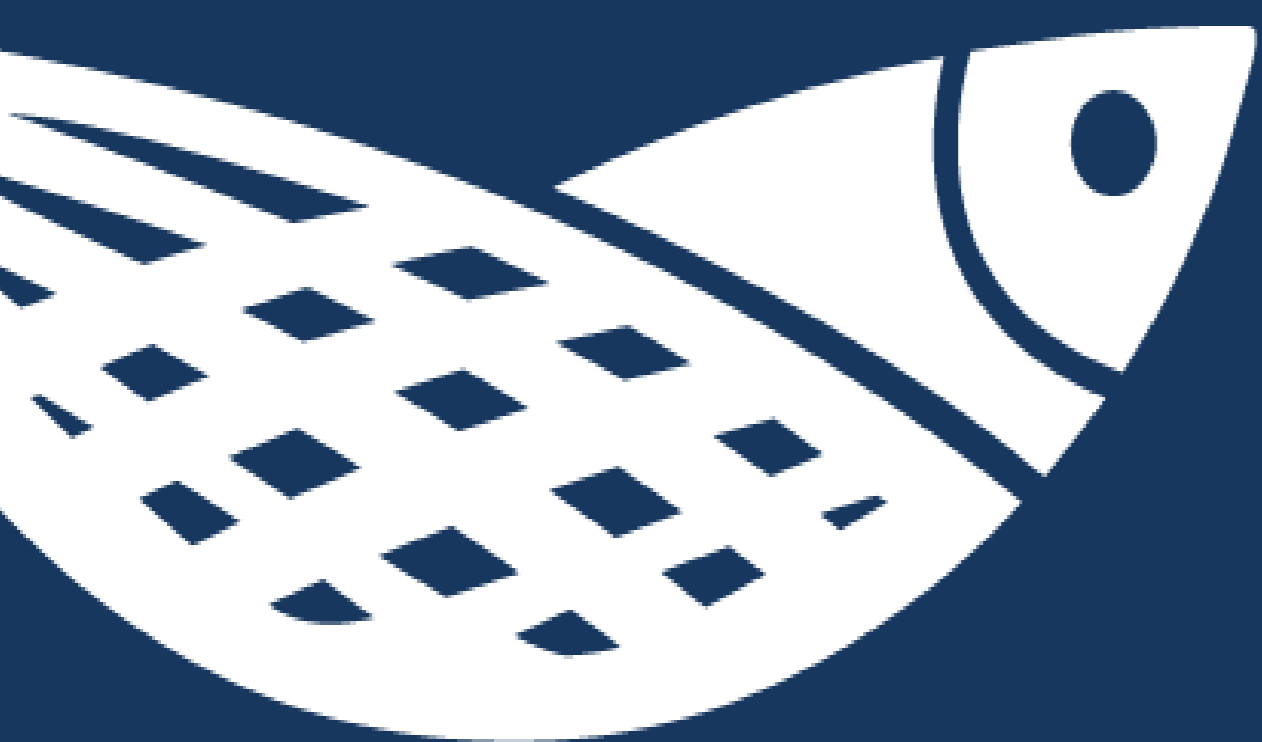
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Introduction:

The Landing Obligation (LO) is a requirement to land all catches of regulated fish species, introduced as part of the EU's Common Fisheries Policy; it will be fully enforced by January 1st 2019 (Article 15, EU regulation 1380/2013). As the LO is likely to bring multi-dimensional impacts, a suite of indicators to inform of potential changes on the short, medium, and long-term is needed. This study aims to identify suitable indicators that capture the effects of the LO on the health of marine ecosystems, following Marine Strategy Framework Directive and Good Environmental Status (GES) objectives, as well as on the socio-economic viability of the fishery sector.

Methods:

A desk review was conducted to collect and synthesize available information related to the social, economic and ecological dimensions of fishery systems using evidence-based quality criteria (Figure 1). Then, a dedicated expert-knowledge survey was completed by experts of the MINOUW consortium who were asked to evaluate the effectiveness and potential direction of change, of each indicator to reflect LO effects. Furthermore, experts' opinions were gathered on the possible integration of certain socioeconomic and environmental targets affected by the LO. Experts' views on the objectives that contribute towards the achievement of GES and socioeconomic sustainability under the LO were analyzed using multi-criteria decision analysis (Lembo et al., 2017).

Results:

Outcomes suggest that the identification of sensitive and informative indicators capturing LO effects is a demanding task. A suite of indicators that shed light on different properties of the discarding process and LO impacts have been proposed to enlighten managers about key attributes of the LO implementation. A ranking of the objectives which contribute more to the goal was also enabled (Table 1).

Table 1. Ranking of the objectives which contribute more to the goal (i.e. to achieve GES and socio-economic sustainability under the LO) using multi-criteria decision analysis.

Objective	Weight	Rank
Safeguard the biological abundance, biomass and biodiversity	26.30%	2
Achieve healthy stocks/ Accurate stock assessments/ Sustainable catches	23.10%	3
Maintain ecosystem functioning	29.00%	1
Achieve economic viability of the fishing sector	8.60%	4
Improve fleet efficiency	5.20%	6
Provision of work/Livelihood enhancement/ Social viability and wellbeing	7.80%	5

geometric consistency index= 0.01

The impact of the LO on GES and socioeconomic sustainability

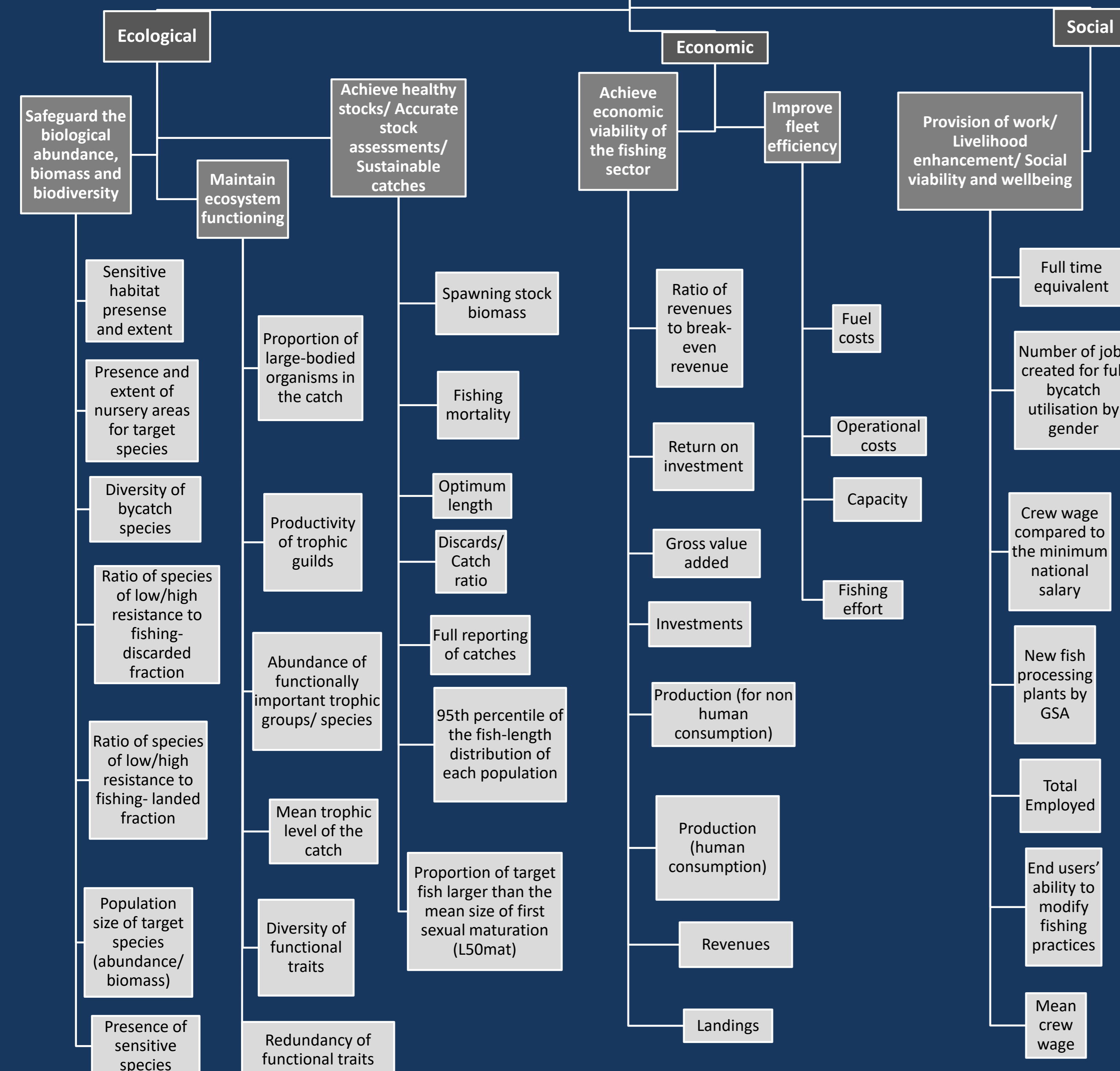


Figure 1. Hierarchical tree of the goal, objectives and indicators of the LO impact on GES and socio-economic sustainability

Discussion:

The set of indicators that has emerged and the prioritization of objectives by a group of experts could contribute to the elaboration of a solid methodological framework that could be applied to assess the effects of the LO on the ecological and socio-economic objectives. The impact of the LO on European fisheries will depend critically on its successful full implementation and the proposed list of indicators is a tool to monitor that implementation. Yet, further research is needed to elucidate specific aspects associated to ecosystem mechanisms and behavioral interventions related to the minimization of unwanted catches.

References:

Lembo, G., Bellido, J.M., Bitetto, I., Facchini, M.T., García-Jiménez, T., Stithou, M., Vassilopoulou, V.C., Spedicato, M.T., (2017) Preference Modeling to Support stakeholder Outreach toward the Common Fishery Policy Objectives in the North Mediterranean Sea. *Front. Mar. Sci.* 4:328.

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