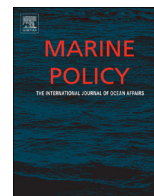




ELSEVIER

Contents lists available at ScienceDirect

Marine Policy

journal homepage: www.elsevier.com/locate/marpol

The maintenance costs of marine natural capital: A case study from the initial assessment of the Marine Strategy Framework Directive in France



Harold Levrel^{a,*}, Céline Jacob^a, Denis Bailly^b, Mahe Charles^d, Olivier Guyader^a, Schéhérazade Aoubid^e, Adeline Bas^b, Alexia Cujus^e, Marjolaine Frésard^c, Sophie Girard^a, Julien Hay^c, Yann Laurans^f, Jérôme Paillet^d, José A. Pérez Agúndez^a, Rémi Mongruel^a

^a IFREMER, UMR AMURE, Marine Economics Unit, Centre de Brest, ZI Pointe du Diable, 29280 Plouzané, France

^b Université de Brest, UMR AMURE, IFREMER, Centre de Brest, ZI Pointe du Diable, 29280 Plouzané, France

^c Université de Brest, UMR AMURE, 29334 Quimper Cedex, France

^d Marine Protected Area Agency, 16 Quai de la Douane CS 42932, 29229 Brest Cedex 2, 29200 Brest, France

^e ECOWHAT, 99 Rue Duhesme, F-75018 Paris, France

^f Institut du Développement Durable et des Relations Internationales, 41, rue du Four 75006 Paris, France

ARTICLE INFO

Article history:

Received 5 August 2013

Received in revised form

18 March 2014

Accepted 19 March 2014

Keywords:

Maintenance cost

Marine ecosystems

Marine Strategy Framework Directive

Economic analysis

ABSTRACT

There are two ways of assessing the costs of environmental degradation: as the costs associated with the loss of benefits resulting from the degradation of natural capital, and as the maintenance costs required to compensate for the actual or potential degradation of natural capital. The first of these methods is based on the Total Economic Value (TEV) of benefits forgone because of the depletion of ecosystem services delivered by marine biodiversity. The second method is based on the costs required to maintain a good state of marine biodiversity, one which makes it possible to deliver ecosystem services.

This paper gives an illustration of this second approach. It details how these maintenance costs have been calculated in the initial assessment of the Marine Strategy Framework Directive (MSFD) in France. It addresses nine problem areas – corresponding to nine sources of environmental degradation – from non-native invasive species to oil spills. It gives a total figure for these degradation costs (around 2 billion Euros). The results are compared with those of other Member States who have taken similar approaches in the context of the MSFD. One key conclusion is that it is not really possible to make meaningful comparisons at this stage, since the methods of data collection and the nature of the costs are very different. The need to develop such assessments in a standardised way is noted.

© 2014 Elsevier Ltd. All rights reserved.

1. Introduction

This paper discusses the assessment of the cost of environmental degradation, in the policy context of the Marine Strategy Framework Directive (MSFD). The MSFD represents the environmental component of the European integrated marine approach (2008/56/EC) and establishes a legislative framework for community action in the area of marine environmental policy. The ultimate aim is to design a programme of environmental measures to achieve a good environmental status (GES) by 2020. The MSFD is founded on an initial assessment of the current environmental status of national marine waters and a socio-economic analysis of human activities in these waters (carried out in 2012). The initial

socio-economic assessment includes an analysis of the costs of degradation of the marine environment.

There are two ways of assessing the costs of environmental degradation [1]: as the costs associated with the loss of benefits resulting from the degradation of natural capital [2,3], and as the maintenance costs required to compensate for the actual or potential degradation of natural capital [4,5]. The first method for assessing the costs of environmental degradation is based on the Total Economic Value (TEV) of benefits forgone because of the depletion of ecosystem services delivered by marine biodiversity. The second method is based on the costs required to maintain a good state of marine biodiversity which makes it possible to deliver ecosystem services.

The expert group of economists charged with assessing the cost of degradation of the marine environment in France recognised the limits and difficulties of capturing the TEV of the environmental

* Corresponding author.

E-mail address: Harold.Levrel@ifremer.fr (H. Levrel).

benefits discussed in the literature (see Section 2), and decided to use the maintenance costs method.

This paper presents the results of this assessment, and attempts to describe the challenges, strengths and limits of the maintenance cost assessment method.

The paper is organised as follows: the method and the data used to assess the costs of degradation in the French case study are described and discussed; next, the results of the assessment are detailed; finally, the results are discussed and compared with those of other Member States who have taken similar approaches in the context of the MSFD. In conclusion, the strengths, limits and prospects of these types of assessment are discussed.

2. Materials and method

2.1. Context

In France, the economic analysis of the costs of degradation has been assigned to an expert group of economists, specialists in marine economics who belong to the Centre for the Law and Economics of the Sea (UMR AMURE¹), working closely with the Ministry of Ecology, Sustainable Development and Energy² and with the Marine Protected Area Agency.³ To carry out the work two full-time agents were recruited, and three part-time external consultants were involved in the assessment process.⁴ It was decided, in accordance with the MSFD, that this analysis had to be based on available data and carried out on a sub-regional scale. The analysis took four marine sub-regions into account: the Occidental Mediterranean Sea (OMS), the Channel-North Sea (CNS), the Bay of Biscay (BOB) and the Celtic Sea (CS) (Fig. 1). Contributions for the Celtic Sea have sometimes been included in Channel-North Sea, or not included if data were not available. This analysis did not take French Overseas Territories into account.

2.2. Economic assessment methods

As mentioned in the Introduction, there are two ways to assess the cost of environmental degradation: through the loss of benefits or through the cost of compensating for this degradation.

From the point of view of standard economic theory the first approach is more robust, since it is in accordance with the welfare optimisation analysis [6]. However, there are at least six major practical issues which have to be addressed when considering monetary valuation of non-use values, indirect use values, and even simple non-market use values such as recreational activities [2,7–9]: the lack of data on interactions between biological entities, ecological functions, ecosystem services production, and changes in well-being [10–13]; the high level of uncertainty regarding some of the values based on support services or cultural services [14,15]; the controversies around the benefit-transfer method for extrapolating local values to a regional or national scale [16,17], [1]; the controversies around the stated preferences analysis for capturing non-use, indirect use, and non-market use values [18–20]; ethical issues regarding the commensurability and monetisation of nature [21,22]; and the limits of the TEV as a source of relevant information when the analysis is used in a policy framework in which certain strong sustainability goals are fixed [23,24].

Recognising these limits, Pearce [8] has proposed paying attention to the real costs borne by society to provision and maintain ecosystem services – that is, the costs of conservation policies. Bartelmus [4] also

suggests paying attention to the maintenance costs of a given environmental state.⁵

The maintenance cost assessment has, until now, mainly been used in specific environmental policies for the calculation of the environmental restoration costs associated with environmental damage following a pollution event [25–27]. In this context, the assessment is carried out to determine how much the polluters have to pay to restore what they have damaged and to reach a “no net loss” goal of ecosystem services, acting in accordance with a strong sustainability principle [26,28]. Concretely, in the MSFD the maintenance costs can be understood as the real expenditures that a socio-economic system needs in order to maintain the level of natural capital required to deliver a certain level of ecosystem services.

This method does not take the economic welfare theory into account but draws on a basic accountability theory. Maintenance costs can therefore be disproportionate with respect to the measurable benefits resulting from the expenditures required to maintain the level of natural capital [3] (Table 1). This is clearly one of the main limits of this method; but it is also one of the strengths of the maintenance cost approach.

Thus, the maintenance costs assessment makes sense only within a policy framework in which some environmental standards have been adopted, reflecting the level of natural capital that a society agrees to maintain through a specific level of investment. This policy framework is a product of compromise over the formulation of the environmental problem, the norms and rules which are necessary to tackle this issue, and the effort (measured in terms of changes in use and/or restoration programmes) required to achieve them. The MSFD includes a clear environmental normative reference (the GES), reflecting a strong sustainability goal, which will be the product of a number of negotiation processes and political trade-offs.

In this context, it is inappropriate to provide a TEV resulting from individual aggregated preferences,⁶ since that would be based on a different normative principle from the GES, namely the maximum of welfare. But it might seem meaningful to know the current maintenance costs devoted to marine environmental ecosystem management, considering the gap between the present situation and the GES goal. Indeed, to achieve the GES will require improving and complementing existing marine environmental management measures, which will generate additional costs. From this perspective, the maintenance cost approach will also provide the basis for a future cost-effectiveness analysis of the complex management system which will result from the Programme of Measures recommended by the MSFD. It is for these reasons, in addition to those mentioned in the introduction, that the team of experts believed that this approach was the best to use for assessing the costs of environmental degradation.

The costs of environmental degradation discussed in this paper are the real expenditures devoted to conservation of the marine environment in 2010.⁷ However, even though the problems have been defined on the basis of the GES descriptors, it has not been possible to use the

⁵ “Maintenance cost is applied to environmental degradation. The SEEA reviews maintenance costing critically as the hypothetical cost of avoiding pollution or restoring the polluted environment ([5], chap. 10D). Maintenance cost can be seen, however, as the weights for actual environmental impacts “according to society’s obligation and capacity for dealing with environmental concerns” ([4], p. 145); “Such costing is indeed more practical than the assessment of elusive damage effects from environmental impacts” ([4], p. 1851).

⁶ Assuming that it is impossible to set an aggregation rule that would make it possible to sum individual preferences within a TEV in a way that would be in accordance with the norms that society as a whole agrees to be essential, as noted long ago by Kenneth Arrow (1950), the maintenance cost assessment seems to be more suited to the MSFD in which some normative environmental goals have already been adopted.

⁷ This was the last year of available data at the time the study was carried out.

¹ <http://www.umr-amure.fr/index2.php>.

² <http://www.developpement-durable.gouv.fr/>.

³ <http://www.aires-marines.com/>.

⁴ The experts, consultants, and agents recruited for this task are listed as co-authors.

Download English Version:

<https://daneshyari.com/en/article/7491073>

Download Persian Version:

<https://daneshyari.com/article/7491073>

[Daneshyari.com](https://daneshyari.com)