

How to protect natural marine resources of fish fauna in the context of sustainable development in Poland?

W jaki sposób chronić naturalne zasoby ichtiofauny w Polsce w kontekście zrównoważonego rozwoju?

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STRESZCZENIE: Opracowanie to ma na celu wskazanie przykładowych głównych celów ochronnych dla zasobów ichtiofauny jakie mogą być dedykowane dla morskiego obszaru Polski, w oparciu o klasyfikację usług ekosystemowych, dla realizacji koncepcji zrównoważonego rozwoju regionu. Opierając się na wytycznych Komisji Europejskiej oraz wielu opracowaniach naukowych opisujących właściwe zastosowanie rekomendowanego narzędzia jakim są usługi ekosystemowe, należy w Polsce położyć większy nacisk na klasyfikację oraz waloryzację usług ekosystemowych. Jest to bardzo istotne między innymi dla realizacji polityki Planowania Przestrzennego na Morzu, której jednym z priorytetowych zadań jest ochrona środowiska morskiego z jednoczesnym rozwojem gospodarczym i społecznym.

SŁOWA KLUCZOWE: zrównoważony rozwój • usługi ekosystemowe • morskie planowanie przestrzenne • ichtiofauna

SUMMARY: The aim of this essay is to demonstrate exemplary main goals for fish fauna resources that can be dedicated to Polish marine areas, based upon the classification of ecosystem services, towards the realisation of the concept of sustainable development of the region. Basing on the guidelines of the European Commission and many scientific elaborations describing the correct use of a recommended tool that is the ecosystem service, it is necessary to put a bigger emphasis on the classification and valorisation of ecosystem service. Among other things it is crucial for realisation of the Marine Spatial Planning policy, one of its priority goals being protection of the marine environment with simultaneous economic and social growth.

KEY WORDS: sustainable development • ecosystem service • marine spatial planning • fish fauna

INTRODUCTION

The concept of the European Union (EU) sustainable development [36] in relation to the protection of natural marine resources, including fish fauna, should be based not only on protecting the same resources (living matter), but also on a number of functions they play in the environment and the processes in which they participate in relation to supporting and sustaining human life, contained

in the definition of ecosystem services [12]. Ecosystem services and ecosystem management are used as a tool to implement sustainable development [7] [9] [10] [23] [28] [30] [3] [37] [4] [16].

Realizing the assumptions of the concept of sustainable development, the protection of natural resources should simultaneously be based on appropriate management [22] [15]. Management of marine natural resources of the fish

fauna in Poland is within the competence of many areas of politics, such as Nature Conservation Policy, Fishery Policy, Marine Policy, Water Policy, Marine Environmental Policy, where each of them has their own individual goals. However, the idea of sustainable development leads to the creation of one basic tool for conservation and management of marine natural resources of fish fauna in Poland, in order to integrate all aspects of maritime policy, which is Marine Spatial Planning (MSP) [13].

“Existing planning frameworks have a largely terrestrial focus and often do not address how coastal development may affect the sea and vice-versa. We must address the challenges that emerge from the growing competing uses of the sea, ranging from maritime transport, fishing, aquaculture, leisure activities, off-shore energy production and other forms of sea bed exploitation.

Maritime spatial planning is therefore a fundamental tool for the sustainable development of marine areas and coastal regions, and for the restoration of Europe’s seas to environmental health.” [6].

The purpose of this study is to identify examples of main goals for the protection of fish fauna natural resources dedicated to the Polish maritime area based on the ecosystem service classification for the implementation sustainable regional development concept.

Primary role of ecosystem service in MSP for sustainable development

According to the Millennium Ecosystem Assessment (MEA) the concept of ecosystem services is closely related to the protection and maintenance of human well-being. Bearing in mind that only fully healthy ecosystem provides the optimal service for human well-being, humans must protect the ecosystem itself[3] [33].According to the idea of sustainable development, human knowledge should be increased constantly in order to protect the environment and, as a result, protect themselves, this concept

should be guided by each MSP in accordance with the ecosystem approach[6]. Increased public awareness of ecosystem service should be helpful in resolving conflicts in context of relocation of certain activities at sea to protect certain components of the ecosystem.

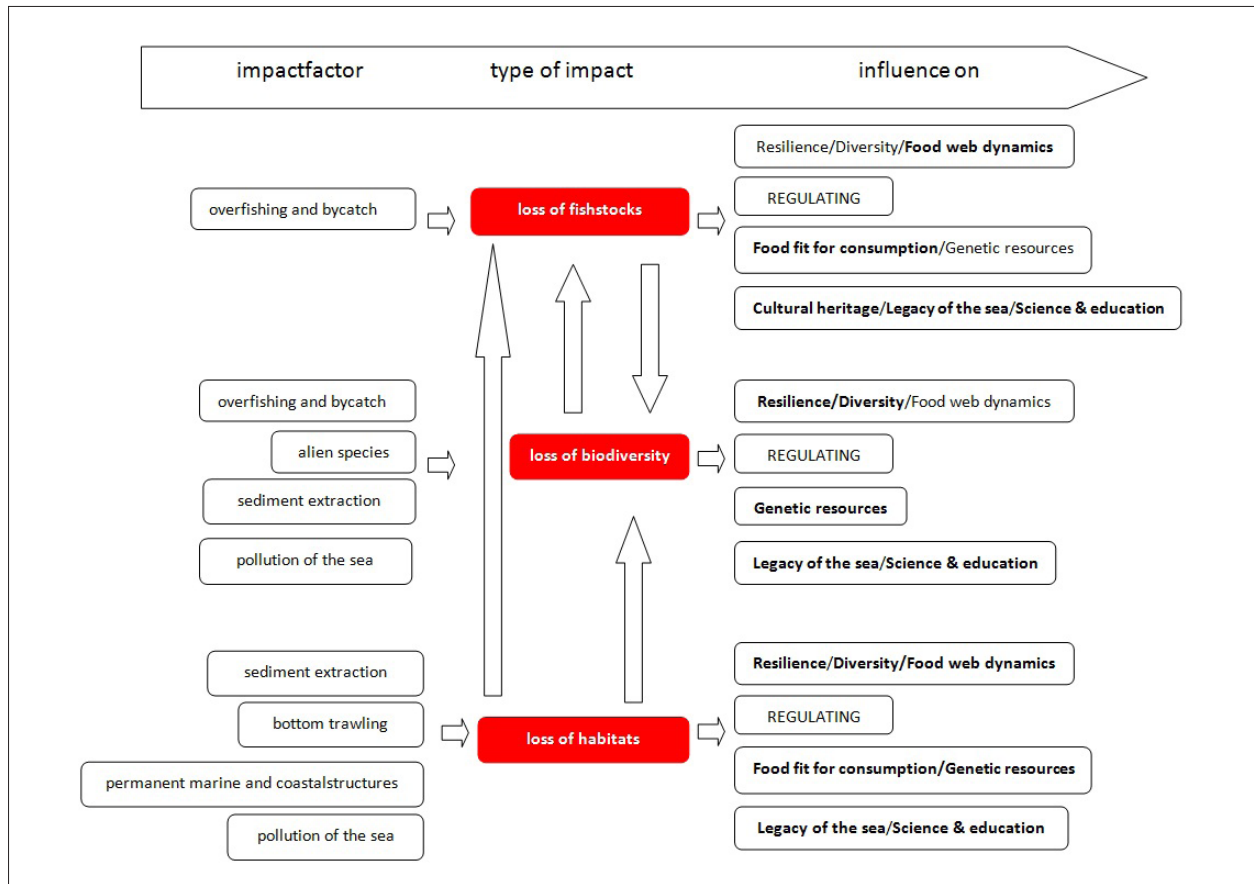
One of the most important aspects contributing to the ecosystem service and planning space in general, is to provide easily understandable facts about complicated ecosystem relations [26].The most affordable information is necessary for understanding of the planning process, importance and value of natural resources to public opinion, politicians, officials, and various stakeholders. Moreover, the ecosystem service provides an opportunity to implement decision supporting systems for integrated management goals, for example: officials and politicians, deciding on the final form of the plan [27]. However it is a vision that may take a long time to implement in case of Poland. The simple reason for this, is that no one in Poland has conducted an analysis of ecosystem services for MSP planning process.

As briefly mentioned above, the main task of MSP is the integration of various policies, economic sectors and nature conservation. Sustainable development, which is MSP’s primary tool, aims to integrate a number of issues that are often mutually exclusive in a given place and time. The last of the quoted roles is concerned with the protection of natural resources in multidimensional use of marine space by using the ecosystem service. With the introduction of the ecosystem approach to marine spatial planning, protection of natural resources should start being interpreted as the management of them at a very complex level [8]. In case of ichthyofauna, proper management is very difficult, due to increasing demand for these resources observed globally with simultaneous noticeable overfishing [17] [2] [19]. The problem arises with the spatial planning in the Baltic sea, for example the use of fishing areas for wind farms and gravel exploitation fields [41]. The question arises, how to protect ichthyofauna resources to implement a policy of sustainable development in MSP using the ecosystem service?

Supporting		
Biogeochemical cycling Primary production <u>Food web dynamics</u> Diversity Habitat Resilience		
Regulating	Provisioning	Cultural
Climate & atmospheric regulation Sediment retention Mitigation of eutrophication Biological regulation Regulation of hazardous substances	Food fit for consumption Inedible resources <u>Genetic resources</u> Chemical resources Ornamental resources Energy <u>Space and waterways</u>	Recreation Scenery <u>Science & education</u> <u>Cultural heritage</u> Inspiration <u>Legacy of the sea</u>

Rysunek 1. Usługi ekosystemowe świadczone przez Morze Bałtyckie za Grape (2008) [18]

Figure 1. Services provided by the ecosystem of the Baltic Sea based on Grape (2008) [18].



The indicated method of initial classification of ichthyofauna ecosystem service for MSP in Polish marine area for understanding the real needs of conservation.

Ecosystem services by basic definition can be divided according to the directions of magnetic interactions and addressed: inside the system, necessary for the functioning of the internal arrangement of the ecosystem; outside the system, necessary for other ecosystems functioning; and consumer products of the system used by the society [3]. The Millennium Ecosystem Assessment (MEA) has also provided us with a useful classification of ecosystem services: supporting, provisioning, regulating, and cultural. This basic classification depending on the character of the natural resource and ecosystem undergoes various modifications [35] [31]. For each of the defined ecosystems a separate analysis of ecosystem services under local conditions must be performed [5] [29] [31]. Taking into account that a comprehensive analysis of ecosystem service in Polish maritime areas has not been performed yet, and there is no development methodology that could be used, this study suggests to base on the method proposed by Grape (2008) [18], dedicated to marine ecosystems in the Baltic Sea (Figure 1). This approach is also indicated by HELCOM VASAB [41].

For the purpose of analysis, the most important ecosystem services were selected (underline in the table) with reference

to urgent, most significant problems of the natural resources of ichthyofauna in Polish marine waters. However, these problems are not clearly indicated in the MSP field in Poland and require serious verification. Therefore initial problems have been chosen, based on activities and indications of HELCOM, mentioned in [39] [24] and the most important problems superimposed with other parts of the world [19] [2] [17]:

- loss of fish stocks,
- loss of fish biodiversity,
- loss of fish habitats,

Identified problems and risks can be assigned to various human activities, from identified threats to problems that can easily occur in relation to the ecosystem service (most important in relation to loss are bolded).

With this simplified example we can see how these initial problems relate to various types of human activity and how much of an effect they have on the ecosystem service. By using ecosystem services as a method of classifying the impact of human activities on different components of ecosystem functioning, we have a chance to deeply analyze the problem [18]. This is the basis of the ecosystem approach to sustainable development policy. For example: the loss of fish resources is a direct result of not only overfishing, but the loss of biodiversity and habitats as well. It turns out that a lot of direct factors causing the loss of biodiversity and habitats have an indirect impact on the loss of fish stocks.

The next step is understanding the individual impact of human activities on the various ecosystem service, and being aware of what we have to lose by performing certain actions in the sea. For the purpose of improving awareness of loss of ecosystem services their monetary value is used [25] [32] [1].

Ichthyofauna ecosystem service in practical use for MSP in Poland

In Polish marine areas a pilot plan for western part of the Gulf of Gdansk was created in 2008 [39], and transboundary pilot plans with Sweden, Denmark and Germany were developed in 2010 – 2012 for the Middle Bank [38] and for the Pomeranian Bight [20]. All of these plans based on the ecosystem approach and good practice in accordance with the EU guidelines, and were aimed at maintaining the good status of marine ecosystems and the protection of the marine environment [40]. However, because these were only pilot plans, only basic analysis of threats was conduc-

ted, from the impact factor to their influence on the ecosystem service. A lot of effort was put into assigning various areas of human activity in the Polish Economic Zone including transboundary waters. On several occasions the lack of knowledge based on fragmentary scientific data, that made it difficult to reach some conclusions, was pointed out [39]. However, considering future work on MSP for Polish Maritime regions, a key aspect, for sustainable development, of the analysis directed at specific ecosystem service must be kept in mind, and that is supporting, provisioning, regulating, cultural, etc., for human well-being.

CONCLUSION

In order to realize sustainable development policy, methodology for classification of ecosystem service for Polish maritime areas, based on “good practice” in accordance with EU guidelines, must be developed and ecosystem service must be classified and valorized.

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