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THE CONCEPT OF ECOSYSTEM SERVICES IN REGULATION OF HUMAN ACTIVITY AT SEA

Abstract

The concept of ecosystem services becomes more and more popular in regulation of the environmental protection. One of the premises of that concept is treatment of a human and human activity as an integral part of an ecosystem. Interrelations between human activity and ecosystem can be described through the concept of ecosystem services. A certain degree of commodification of natural environment which is immanently connected with the concept of ecosystem services can become useful as a tool of assessing the impact of human activities on ecosystem as well as regulating that impact. Marine protection law is a good example of attempts to introduce the interrelated concepts of ecosystem approach and ecosystem services into functioning of the regulatory schemes.

Keywords: ecosystem services, ecosystem approach, maritime environment protection, environmental law, maritime law.

INTRODUCTION

The ecosystem approach or the ecosystem services approach perspective to natural environment protection and management can be criticized due to its anthropocentricity[1]. On the one hand, we make a step forward towards more

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[1] D. McCauley, *Selling out on Nature*, Nature, 7 September 2006, No 443 p. 25; M. Sagoff, *On the economic value of ecosystem services*, Environmental Values, vol. 17 (2008), pp. 239–257. For more general critique of anthropocentricity in the legal protection of the environment see eg. J. Ciechanowicz-McLean, M. Nyka, *Human Rights and the environment,* Przegląd Prawa Ochrony

conservative approaches by treating an ecosystem as a whole in all its aspects. On the other hand, however, we apply human and, in consequence, pecuniary value to the structures which form the basis of life on earth, which cannot be replaced and thus any estimation of their value cannot be made in a fully satisfactory manner[2]. However, only the valuation can lead policy makers to making better informed decisions[3] as well as allows us to use the full potential of certain principles of environmental law, such as the 'polluters pay' principle, or the principle of precaution. Contemporary scientific knowledge on the functioning of marine ecosystems is summed up with the conclusion that the ocean is richer, more connected and more impacted by humans, and yet less explored than we had known[4]. Therefore, the ecosystem services perspective seems to be useful for regulating the rising anthropopression on the marine environment.

1. THE MEANING OF ECOSYSTEM SERVICES

In the beginning of research on ecosystems in the 1930's the ecosystems were identified as a certain type of continuum of physical systems in nature[5]. Modern research, basing on this preliminary premise, describes an ecosystem as a complex of organisms, that appear together in a given area, and their associated abiotic environment, all interacting through the flow of energy to build the biotic structure and the cycles of materials[6]. One of the most important functions of ecosystem is the provision of movement and transformation of energy and materials through some basic biological, chemical and physical processes, such as photosynthesis,

Środowiska, vol. 3 (2012), pp. 81–110,

[2] E. Gomez-Baggethun & M. Ruiz-Perez, *Economic valuation and the commodification of ecosystem services*, Progress in Physical Geography, vol. 35, issue 5 (2011), pp. 613–628 and literature referred in that article.

[3] De Groot indicates that economic valuation does not eliminate the possibility of including into the analysis also ethical, ecological or other non-monetary values. See: R. De Groot, L. Brander, S. van der Ploeg, *Global estimates of the value of ecosystems and their services in monetary units,* Ecosystem Services, vol. 1, issue 1 (2012), pp. 50-61.

[4] The First Census of Marine Life was a 10-year scientific initiative, involving a global network of researchers in more than 80 nations, engaged to assess and explain the diversity, distribution, and abundance of life in the oceans. *First Census of Marine Life 2010: Highlights of a decade of Discovery.* http://www.coml.org/highlights-2010 (18.09.2017).

[5] A. Tansley, *The use and abuse of vegetational concepts and terms*, Ecology, vol. 16 issue 3 (1935), p. 299; R. Lindeman *The trophic dynamic aspect of ecology,* Ecology, vol. 23 (1942), pp. 399–418.

[6] J. Blair, S. Collins, A. Knapp, *Ecosystems as functional units in nature*, Natural Resources & Environment, vol. 14, No 3, pp. 150–155.

the plant nutrient intake, nitrification and denitrification and many others[7]. Those processes shape the ecosystem as an area in which the whole human activity has to be enclosed, form the limits to this activities, and vulnerability of those services create one of the biggest challenges to the mankind. In order to response to this challenge the Convention on Biological Diversity in its Article 2 refers to ecosystems as a *dynamix complex of plant, animal and micro-organism communities and their nonliving interacting as functional unit*[8]. The diversity is considered a structural feature of ecosystems and the diversity between the ecosystems is considered an important feature of biodiversity[9]. The specific role of the marine ecosystem in this context is reflected by the fact that the marine ecosystem is being considered both the ecosystem in itself as well as interlocking the network of ecosystems[10] which cover 2/3 of the globe.

The flow of elements and energy in nature, which is repeated in all above mentioned definitions of the ecosystem, is a central element in the concept of ecosystem services. According to one of the first definitions of those services they consist of flows of materials, energy, and information from natural capital stocks which are combined with manufactured and human capital services to produce human welfare[11]. The authors also explained, that Ecosystem goods (e.g. food) and services (e.g. waste assimilation) represented the benefits that human populations derive, directly or indirectly, from ecosystem functions[12]. Also other representatives of environmental economy understand the ecosystem services[13] as the advantages, forces and natural processes together with the effects of their existence and functioning, which provide immaterial values required for life and development of mankind and which contribute to the economic processes but not

[7] J. Ruhl, S. Kraft, C. Lant, *The law and Policy of Ecosystem Services*, Island Press 2007, p. 15.

[8] Convention on Biological Diversity Adopted in Rio de Janeiro, Brazil on 5 June 1992 Journal of Laws of 2002 No 184 item 1532.

[9] *Ecosystems and Human Well-being. A Framework for Assessment. A Report of the Conceptual Framework Working Group of the Millennium Ecosystem Assessment* Island Press 2003, p. 51.

[10] R. Long, *Legal Aspects of Ecosystem-based Marine Management in Europe*, Ocean Yearbook, vol. 26 (2010), p. 422.

[11] R. Costanza, R. d'Arge, R. de Groot, S. Farber, M. Grasso, B. Hannon, K. Limburg, S. Naeem, R. O'Neill, J. Paruelo, R. Raskin, P. Sutton, & M. van den Bel, *The Value of the World's Ecosystem Services and Natural Capital*, Nature, vol. 387 (1997), p. 256.

[12] R. Costanza, R. d'Arge, R. de Groot, S. Farber, M. Grasso, B. Hannon, K. Limburg, S. Naeem, R. O'Neill, J. Paruelo, R. Raskin, P. Sutton, & M. van den Bel, *The Value of the World's Ecosystem Services and Natural Capital*, Nature, vol. 387 (1997), p. 255.

[13] In original work, *The Value of the World's Ecosystem Services and Natural Capital*, R. Constanza et al. refer to environmental goods and services however, in order to simplify the analysis he proposes to analyse those two categories under the common name of services.

participating in those processes physically[14]. B. Poskrobko mentions the existence of at least two perspectives of ecosystem services – the biologically-ecological and socio-economical[15]ones. For the author of this analysis, as a lawyer, the second perspective is more understandable, however, what will be presented further, the constant dialogue between those two perspectives seems to determine the legal analysis of ecosystem services.

2. ECOSYSTEMS ASSESSMENT

While the preparation of the Millennium Development Goals in 2000 at the Earth Summit a discussion was held on the influence of ecosystems on the future achievement of development goals. The United Nations Secretary-General Kofi Annan initiated in 2001 the Millennium Ecosystem Assessment. The objective of the analysis was to assess the consequences of the ecosystem change for human well-being and the scientific basis for the action needed to enhance the conservation and sustainable use of those systems and their contribution to human well-being[16]. One of the results of the analysis prepared by more than 1,360 experts worldwide in five technical volumes and six synthesis reports was the ascertainment that 2/3 of ecosystems have been changed by human activity which results in loss of ability of those ecosystems to provide humankind with the full spectrum of ecosystem services. The ecosystem services approach to the analysis of human impact on the ecosystems has become a popular approach after the Millennium Ecosystem Assessment[17].

The Millennium Ecosystem Assessment has also introduced some basic taxonomy of the ecosystem services, grouping them as:

a) Regulating services;
b) Provisioning services;
c) Supporting services;
d) Cultural services.

The pecuniary value of those services, according to Costanza, was $ 33 trillion a year[18]. This number shows the amount of profits made available to the contem-

[14] B. Poskrobko, *Usługi środowiska jako kategoria ekonomii zrównoważonego rozwoju,* Ekonomia i Środowisko, No 1 (37) (2010), p. 20.

[15] *Ibidem.*

[16] https://www.millenniumassessment.org/en/About.html (15.09.2017).

[17] *Ecosystems and Human Well-being. A Framework for Assessment.* A Report of the Conceptual Framework Working Group of the Millennium Ecosystem Assessment Island Press 2003, p. 51.

[18] R. Costanza, R. d'Arge, R. de Groot, S. Farber, M. Grasso, B. Hannon, K. Limburg, S. Naeem,

porary generation by the fact that the ecosystems are in the condition described above. Further devastation of the environment apart from aesthetical, ethical, ecological costs can lead us to suffering great economic losses which the world economy will not be able to cover[19].

The main advantage of the ecosystem services and also the main problem connected with their existence is that, despite the rising awareness of the profits which stem from the ecosystem services, they are in fact common goods, which makes them vulnerable to various uncooperative behaviours described often as the tragedy of the commons. For this reason, Aichi biodiversity targets refer to the concept of the ecosystem services setting a goal that *by 2020, ecosystems that provide essential services, including services related to water, and contribute to health, livelihoods and well-being, are restored and safeguarded, taking into account the needs of women, indigenous and local communities, and the poor and vulnerable*[20]. What can be surprising, considering the critique of some researchers of trends towards commodification of natural environment by the ecosystem services perspective, Aichi targets set also a following goal to be achieved *by 2020, at the latest, biodiversity values have been integrated into national and local development and poverty reduction strategies and planning processes and are being incorporated into national accounting, as appropriate, and reporting systems*[21]. The evaluation does not mean that the evaluated goods have to become an element of the market exchange.

3. MANAGEMENT AND PROTECTION OF ECOSYSTEM SERVICES AS AN ELEMENT OF ECOSYSTEM APPROACH – THE MARINE ECOSYSTEMS PERSPECTIVE

Maritime law refers to ecosystem services in two ways. First of them, is connected with the concept of sustainability in management of natural resources. A good example of such approach can be found in the UNCLOS Convention[22].

R. O'Neill, J. Paruelo, R. Raskin, P. Sutton, & M. van den Bel, *The value of ecosystem services: putting the issues in perspective*, Ecological Economics, vol. 25 (1998), p. 70.

[19] The total value of world's economy for the year 2017 is estimated to be around 74 trillion$. Data after World Development Indicator Database, World Bank, 1 February 2017. https://data.worldbank.org/data-catalog/world-development-indicators (13.09.2017).

[20] Target 14 of Aichi biodiversity targets COP 10 Decision X/2 Strategic Plan for Biodiversity 2011–2020.

[21] Target 2 of Aichi biodiversity targets COP 10 Decision X/2 Strategic Plan for Biodiversity 2011–2020.

[22] R. Long, *Legal Aspects of Ecosystem-based Marine Management in Europe*, Ocean Yearbook,

The second reference to the ecosystem services in maritime law is being made through the rising number of references in international (and national) legal acts to the concept of the ecosystem approach in marine ecosystem governance.

The United Nations Conference on the Law of the Sea is considered one of the most complex and advanced international agreements concerning management of natural resources. Despite the fact that works on this agreement started more than a decade before the Brundtland Commission's works, some elements of sustainability, understood as ability of continuously satisfying the needs of contemporary and future generations for certain types of marine ecosystem services, have been included in the text of the Convention. The Convention uses, a well-recognised in many environmental agreements, notion of wise[23]/optimal utilization/ rational management[24]/sustainable use[25]. Article 119 of the Convention states that: *In determining the allowable catch and establishing other conservation measures for the living resources in the high seas, States shall: (a) take measures which are designed, on the best scientific evidence available to the States concerned, to maintain or restore populations of harvested species at levels which can produce the maximum sustainable yield, […] b) take into consideration the effects on species associated with or dependent upon harvested species with a view to maintaining or restoring populations of such associated or dependent species above levels at which their reproduction may become seriously threatened.*

In the similar manner the EU manages its fish stock. The common fishery policy interlinks sustainability in use of the fish stock with the ecosystem approach. *Fisheries management is about ensuring goods and services from the living aquatic resources for the present and future generations within the meaningful ecological boundaries. Such fisheries management will strive to ensure that benefits from the living marine resources are high while the direct and indirect impacts of fishing operations on marine ecosystems are low and not detrimental to the future functioning, diversity and integrity of these ecosystems*[26].

Having above in mind, it is not surprising that the International Council for the Exploration of the Sea links the ecosystem approach with sustainable development by saying that *the Ecosystem Approach is embedded in the concept of sustainable development, which requires that the needs of future generations are not*

vol. 26 (2010), p. 417; The United Nations Convention on the Law of the Sea (UNCLOS), done at Montego Bay on 10 December 1982; Journal of Laws of 2002, item 543.

[23] The Ramsar Convention speaks of wise use of 'migratory stocks of waterfowl' (art. 2) and of 'wetlands' (art. 3).

[24] Both expressions are used in UNCLOS, in Article 62 and Article 67, respectively.

[25] Article 1 Convention on Biological Diversity; Journal of Laws of 2002, No 184, item 1532.

[26] European Commission, *The role of the CFP in implementing an ecosystem approach to marine management*, COM (2008) 187 final, 3.

compromised by the actions of people today. The Ecosystem Approach puts emphasis on a management regime that maintains the health of the ecosystem alongside appropriate human use of the marine environment, for the benefit of current and future generations[27].

The ecosystem approach is one of those notions which are not fully defined in the international or European legal systems[28]. In the legal theory there are even theses which say that there are different trends of the ecosystem approach which differ among each other in the specific types of ecosystems[29]. Such thesis is legitimate at least to the extent in which we can observe that research on the ecosystem approach focuses on and concentrates around different types of ecosystems with marine ecosystems very often being chosen as an example[30]. What can be surprising, is that the lack of an exact legal definition of the ecosystem approach doesn't affect adversely the application of this concept in environmental law[31]. Much of research work on the ecosystem approach is interdisciplinary in its characteristics and involves a wide range of physical and life sciences and precise understanding of the definitions, being in effect, of such research requires knowledge in those areas[32].

Tracking back in the history of use of the ecosystem approach in the legal regulation of marine environment the Convention on the Conservation of Antarctic Marine Living Resources (CCAMLR) adopted in 1980[33] has to be mentioned. In

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[27] J. Rice, V. Trujillo, S. Jennings, K. Hylland, O. Hagstrom, A. Astudillo, J. Nørrevang Jensen, *Guidance on the Application of the Ecosystem Approach to Management of Human Activities in the European Marine Environment* ICES Cooperative Research Report Rapport des Recherches Collectives No 273 ICES 2005, p. 4, http://www.ices.dk/sites/pub/Publication%20Reports/Cooperative%20Research%20Report%20(CRR)/crr273/crr273.pdf (15.09.2017).

[28] R. Long, *Marine Resource Law,* Dublin 2007, pp. 46-51; R. Long, *Legal aspects of Ecosystem-Based Marine Management in Europe*, Ocean Yearbook, vol. 26 (2012) pp. 417-484; H Österblom et al., Making the ecosystem approach operational-Can regime shifts in ecological-and governance systems facilitate the transition?, Marine Policy, vol. 34 (2010) pp. 1290–1299; S. Murawski, *Ten myths concerning ecosystem approaches to marine resource management*, Marine Policy, vol. 31 (2007), pp. 681–690; A. Hemphill, G. Shillinger, Casting the Net Broadly: Ecosystem-Based Management Beyond National Jurisdiction, Sustainable Development Law & Policy, vol. 7 (2006), pp. 56–59.

[29] V. de Lucia, *Competing Narratives and Complex Genealogies: The Ecosystem Approach in International Environmental Law*, Journal of Environmental Law, vol. 27(1) (2015) p. 97.

[30] F. Platjow, *Environmental Law and the Ecosystem Approach: Maintaining ecological integrity through consistency in law*, Routledge 2016, p. 50.

[31] United Nations Open-Ended Informal Consultative Process on Oceans and the Law of the Sea UN Doc. A/61/156), par. 6.

[32] R. Long, *Legal aspects of Ecosystem-Based Marine Management in Europe*, Ocean Yearbook, vol. 26 (2012) p. 421.

[33] The Communication from the Commission to the Council and the European Parliament, *The role of the CFP in implementing an ecosystem approach to marine management*, COM(2008)187

the preamble to the Convention, there is a direct recognition of *the importance of safeguarding the environment and protecting the integrity of the ecosystem of the seas surrounding Antarctica,* whereas one of the most important conservation principles of the Convention focuses on *maintenance of the ecological relationships between harvests, dependent and related populations of Arctic marine living resources* (art. II(3)(b))[34]. The novelty of the approach towards the conservation of marine environment in the Convention comes from the fact that this legal act addresses the harvested species only indirectly expanding the regulatory focus on various components of the marine ecosystem, recognising the role of ecosystem interrelationships as the main conservatory target. Through this, it incorporates to the act of law, the basic principles of ecosystem ecology and enables the use of an extremely broad spectrum of conservatory measures[35].

The Convention on Biodiversity, despite the fact of being one of the most important cornerstones of the ecosystem approach, does not define that notion. The definition was developed in 2003 by the V Conference of Parties to the Convention, basing on the holistic ('integrated') transposition of Article 8 of the Convention. As mentioned in the Malawi Principles on the implementation of the ecosystem approach to biodiversity conservation *Ecosystem functioning and resilience depends on a dynamic relationship within species, among species and between species and their abiotic environment, as well as the physical and chemical interactions within the environment. The conservation and, where appropriate, restoration of these interactions and processes is of greater significance for the long-term maintenance of biological diversity than simply protection of species*[36].

The decision of the Conference of Parties of the Biodiversity Convention defines the ecosystem approach in the following way: *The ecosystem approach is a strategy for the integrated management of land, water and living resources that promotes conservation and sustainable use in an equitable way. Thus, the application of the ecosystem approach will help to reach a balance of the three objectives of the Convention: conservation; sustainable use; and the fair and equitable sharing of the benefits arising out of the utilization of genetic resources*[37]. The International Council for the Exploration of the Sea (ICES) defines the Ecosystem Approach

final p. 3.

[34] The scope of the Convention embraces the entire Antarctic marine ecosystem, understood as *the complex of relationships of Antarctic marine living resources with each other and with their physical environment* (art. I(2))

[35] C. Redgwell, *Protection of Ecosystems under International Law: Lessons from Antarctica* [in:] International Law and Sustainable Development. Past Achievements and Future Challenges. A. Boyle, D. Freestone (ed.), Oxford 1999, pp. 205-208.

[36] Principle 5 UNEP/CBD/ COP/4/Inf.9.

[37] UNEP/CBD/COP/5/23.

as *a comprehensive integrated management of human activities based on the best available scientific knowledge about the ecosystem and its dynamics, in order to identify and take action on influences which are critical to the health of the marine ecosystems, thereby achieving sustainable use of ecosystem goods and services and maintenance of ecosystem integrity*[38].

This description clearly places humans as part of natural ecosystems, and stresses that human activities in these ecosystems must be managed so that they do not compromise ecosystem components that contribute to the structural and functional integrity of the ecosystem. It also links the ecosystem approach with a goal of achieving the sustainable use of ecosystem services. In line with this way of thinking the ecosystem approach is identified by the United Nations Division for Ocean Affairs and Law of the Sea (DOALOS). The ecosystem approach, according to it, encompass *management of human activities, based on the best understanding of ecological interactions and processes, so as to ensure that ecosystems' structures and functions are sustained for the benefit of present and future generations*[39]. DOALOS seems to understand the ecosystem's functions as a source of ecosystem services, access to which is to be preserved having in mind the intergenerational perspective.

4. THE ECOSYSTEM APPROACH IN REGIONAL COOPERATION IN HELSINKI CONVENTION ON THE PROTECTION OF THE MARINE ENVIRONMENT OF THE BALTIC SEA AREA (HELSINKI CONVENTION)

The unique and sensitive nature of the Baltic Sea, coupled with the fact that the sea is a valuable resource for the coastal countries, resulted in the Baltic coastal states acknowledging that sustainability and well-being of the Baltic Sea depend on the coordinated efforts and joint regional environmental standards[40]. Only

[38] Guidance and the Application of the Ecosystem Approach to Management of Human Activities in the European Marine Environment. ICES Cooperative Research Report No 273 http://www.ices.dk/sites/pub/Publication%20Reports/Cooperative%20Research%20Report%20(CRR)/crr273/crr273.pdf; in this context see also W. Radecki (ed.) *Podstawy teoretyczne zintegrowanej ochrony prawnej środowiska*, Wrocław 2010, p. 105.

[39] DOALOS *Developing and Implementing an Ecosystem Approach to Oecan-related Activities.* New York 2008 http://www.un.org/depts/los/ecosystem_approaches/ecosystem_approaches.htm (18.09.2017).

[40] M. Pyhala, *HELCOM Baltic Sea Action Plan: An Ecosystem Approach to the Management of Human Activities* [in:] Climate Impacts on the Baltic Sea: From Science to Policy. M. Reckermann,

ten of the 24 marine ecosystem services identified in the Baltic Sea are operating properly and seven are under severe threat. The seven threatened ecosystem services are: the food web, biodiversity, habitats, the Baltic Sea resilience (the capacity of the sea to resist and recover from the disturbances), food, genetic resources, and aesthetic values[41].

The Convention on the Protection of the Marine Environment of the Baltic Sea Area aims at restoration and safeguarding of the ecological balance of the Baltic Sea[42]. After several decades of addressing threats to the marine environment on a sector by sector basis, in the early 2000s HELCOM began working towards adopting a more holistic approach to protecting the Baltic Sea environment[43]. The protection of the Baltic Seas' ecosystem services by the Convention is so important for achieving its goals that the Convention decides to allow for use of measures based on, sometimes contested in the international legal order, principle of precaution[44] in order to protect *the legitimate uses of the sea*[45]. The Convention also recognises the importance of ensuring sustainable use of marine natural resources as well as protects the Baltic Sea ecosystems (including coastal ecosystems) by protecting ecological processes in the Baltic Sea Area[46].

One important feature of implementation of the ecosystem approach to the protection of the Baltic Sea by the Helsinki Convention is the fact, that HELCOM is active in the field of the regional cooperation with other international organisations in that respect. One of the examples of this feature can be the fact that the Helsinki Convention cooperates eagerly with the European Union being one of the vehicles of implementation of the ecosystem approach by the EU in the Baltic Sea Area. Another example can be the close cooperation with OSPAR[47]. The effect of this cooperation is a number of political decisions among which the most important in promotion of the ecosystem approach was the Statement on the

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K. Brander, B. MacKenzie, B. Omstedt (ed.) Springer 2012, p. 47.

[41] HELCOM *Ecosystem Health of the Baltic Sea 2003–2007 HELCOM Initial Holistic Assessment* Baltic Sea Environment Proceedings No 122 HELCOM 2010, p. 5.

[42] Article 3 (1) of the Convention.

[43] M. Pyhala, *HELCOM Baltic Sea Action Plan: An Ecosystem Approach to the Management of Human Activities* [in:] Climate Impacts on the Baltic Sea: From Science to Policy. M. Reckermann, K. Brander, B. MacKenzie, B. Omstedt (ed.) Springer 2012, p. 46.

[44] A. Trouwborst, *Evolution and Status of the Precautionary Principle in International Law*, Kluwer Law International 2002.

[45] Article 3 (2) of the Convention on the Protection of the Marie Environment of the Baltic Sea Area, Journal of Laws of 2000 No 28 item 346.

[46] R. Long, *Legal Aspects of Ecosystem-based Marine Management in Europe*, Ocean Yearbook vol. 26 (2010), p. 449.

[47] Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR).

Ecosystem Approach to the Management of Human Activities issued by the First Joint Ministerial Meeting of the Helsinki and the OSPAR Commission. In that document both organisations decided to develop a common methodology for the implementation of the ecosystem approach, being defined through the notion of ecosystem services, with the view of maintaining and where practicable, restoring the ecosystem health, integrity and services[48].

Another HELCOM initiative aiming at implementation of the ecosystem approach to the protection of the Baltic Sea is the Baltic Sea Action Plan, adopted during the HELCOM Extraordinary Ministerial Meeting on 15 November 2007 in Kraków. The BSAP is the first attempt, by a regional seas convention, to incorporate the ecosystem-based approach to the management of human activities into the protection of the marine environment[49]. The Baltic Sea Action Plan brings together indicators, targets and deadlines in order to achieve a good ecological status of the Baltic marine environment by the year 2021. The plan has been prepared in acknowledgment of the fact that the *ecosystem approach is based on an integrated management of all human activities impacting on the marine environment and, based on best available scientific knowledge about the ecosystem and its dynamics, identifies and leads to actions improving the health of the marine ecosystem thus supporting sustainable use of ecosystem goods and services*[50]. According to the BSAP Baltic Sea should be used as a type of a raw model of good, cross-sectoral and integrated management of human activities with the ecosystem approach being one of the instruments of this environmentally sound management. The BSAP aim is supposed to be an overarching instrument which has, as its vision and the main target, the achievement, by 2021, of the Baltic Sea in a good ecological condition – the sea with the diverse biological components functioning in balance and supporting a wide range of sustainable economic and social activities. This vision is supported by four main strategic goals addressing issues of a particular concern for the Baltic marine environment, namely eutrophication, hazardous substances, maritime activities and biodiversity[51].

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[48] Pt 5 of Statement on the Ecosystem Approach to the Management of Human Activities issued by the First Joint Ministerial Meeting of the Helsinki and OSPAR Commission https://www.ospar.org/site/assets/files/1232/jmm_annex05_ecosystem_approach_statement.pdf (18.09.2017).

[49] M. Pyhala, *HELCOM Baltic Sea Action Plan: An Ecosystem Approach to the Management of Human Activities* [in:] Climate Impacts on the Baltic Sea: From Science to Policy. M. Reckermann, K. Brander, B. MacKenzie, B. Omstedt (ed.) Springer 2012, p. 50.

[50] Preamble to the Baltic Sea Action Plan.

[51] M. Pyhala, *HELCOM Baltic Sea Action Plan: An Ecosystem Approach to the Management of Human Activities* [in:] Climate Impacts on the Baltic Sea: From Science to Policy. M. Reckermann, K. Brander, B. MacKenzie, B. Omstedt (ed.) Springer 2012, p. 51.

5. ECOSYSTEM SERVICES IN EU MARITIME REGULATION

Since the beginning of the 21st century the ecosystem approach has become a dominant perspective for the protection of the environment in the European Union[52]. One argument for this, is the close connection between the ecosystem approach and the principle of integration of environmental policies with other EU policies which can be found in Article 11 TFUE[53]. Most visible elements of the ecosystem approach concept in the EU law are connected with the holistic and intersectoral approach towards the environment and the nature protection, as well as the will to establish various forms of taking advantage of the ecosystem services while supporting sustainability of the whole ecosystems[54]. This can be very well seen in the model of regulation of NATURA 2000 areas[55].

The European Union implements the ecosystem approach to the management of the marine environment through the system of the regional seas conventions[56]. The ecosystem services are also an important element of the regional strategies for the conservation of the Baltic Sea. The EU Strategy for the Baltic Sea Region is based on the objectives closely connected with the concept of ecosystem services. The strategy is the first Macro-regional Strategy in Europe. It was approved by the European Council in 2009 following the communication from the European Commission. The Strategy is divided into three objectives, which represent the three key challenges of the Strategy: saving the sea, connecting the region and increasing prosperity. Each objective relates to a wide range of policies and has an impact on other objectives. The ecosystem services seem to be the core of all three objectives. Saving the sea objective is connected with achieving a good environmental status of certain elements of the sea ecosystem. It can be assumed that it refers mostly to the supporting services of the Baltic ecosystem[57]. The "connect the

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[52] J. Rice (ed.) *Science dimensions of an Ecosystem Approach to Management of Biotic Ocean Resources (SEAMBOR)* European Science Foundation Position Paper 14 April 2010, p. 19.

[53] W. Radecki (ed.), *Podstawy teoretyczne zintegrowanej ochrony prawnej środowiska,* Wrocław 2010, p. 224. Some representatives of the doctrine describe it even as a "legal duty" of the European Union and its Member States to implement the ecosystem approach. R. Long, *Legal aspects of Ecosystm-Based Marine Management in Europe*, Ocean Yearbook vol. 26 (2012) p. 432.

[54] See D. Pyć, *Prawo Oceanu Światowego. Res usus publicum*, Gdańsk 2011, p. 100 and ff.

[55] S. Apitz, *European Environmental Management: Moving to an Ecosystem Approach,* Integrated Assessment and Management, vol. 2 (1) (2006), p. 80, A. Farmer, L. Mee, O. Langmead, P. Cooper, A. Kannen, P. Jershaw, V. Cherrier, *The Ecosystem Approach in Marine Environment,* EU FP7 KNOWSEAS Project. http://www.msfd.eu/knowseas/library/PB2.pdf (27.08.2017).

[56] R. Long, *Legal aspects of Ecosystem-Based Marine Management in Europe*, Ocean Yearbook vol. 26 (2012) p. 440.

[57] VASAB/HELCOM guideline for the implementation of ecosystem-based approach in Maritime Spatial Planning (MSP) in the Baltic Sea Area states that Achieving the 'Save the Sea' objective

region" objective, through its focus on the transport and energy, deals with providing services. Finally the "increase prosperity" seems to refer to all four identified types of ecosystem services available in the Baltic Sea[58].

The EU Strategy for the Baltic Sea Region is an important EU policy, which is supported by a number of other legal instruments. Among them, the most important for the regulation of human activity at sea are the Marine Strategy Framework Directive[59] and the EU Maritime Spatial Planning Framework Directive[60]. The main aim of the Marine Strategy Framework Directive is to achieve a good environmental status of marine waters by 2020. This goal is to be achieved *by applying an ecosystem-based approach to the management of human activities while enabling a sustainable use of marine goods and services*[61]. Sustainability in use of the marine goods and services is to be ensured by application into the marine strategies of *an ecosystem-based approach to the management of human activities, ensuring that the collective pressure of such activities is kept within levels compatible with the achievement of good environmental status and that the capacity of marine ecosystems to respond to human-induced changes is not compromised, while enabling the sustainable use of marine goods and services by present and future generations*[62]. This means that the features of productivity and resilience of ecosystems are to pose limits to use of marine goods. The regulatory functions of marine

will *require direct environmental measures, along with consideration of the functions and structure of ecosystems and the limiting carrying capacity of ecosystems when developing the potential for sustainable growth in the maritime sectors.* See the Guideline for the implementation of ecosystem-based approach in Maritime Spatial Planning (MSP) in the Baltic Sea area Adopted by the 72nd meeting of VASAB CSPD/BSR on 8 June 2016 and approved by HELCOM HOD 50-2016 on 15-16 June 2016, p. 4 http://www.helcom.fi/Documents/Action%20areas/Maritime%20spatial%20planning/Guideline%20for%20the%20implementation%20of%20ecosystem-based%20approach%20in%20MSP%20in%20the%20Baltic%20Sea%20area_June%202016.pdf (15.09.2017).

[58] Huge importance in those objectives is being given to the maritime spatial planning process. The EU Baltic Sea Region Action Plan describes maritime spatial planning as *an important tool and process for improved decision making. It helps various users to balance sectoral interests that compete for marine space, and contributes to achieving sustainable use of marine areas to the benefit of economic and social development as well as the marine environment. The establishment and implementation of MSP by applying an ecosystem-based approach is required by the EU MSP Directive.* The EU Baltic Sea Region Action Plan COM(2009) 248 p. 173.

[59] Directive 2008/56/EC of the European Parliament and of the Council of 17 June 2008 establishing a framework for community action in the field of marine environment policy OJ L 164, 25.6.2008, pp. 19-40.

[60] Directive 2014/89/EU of the European Parliament and of the Council of 23 July 2014 establishing a framework for maritime spatial planning OJ L 257, 28.8.2014, pp. 135–145.

[61] Preamble of the Directive 2008/56/EC of the European Parliament and of the Council of 17 June 2008 establishing a framework for community action in the field of marine environment policy.

[62] Article 1 (3) of the Directive 2008/56/EC.

strategies are to be performed based on knowledge from non-legal disciplines, such as oceanology, marine biology and others. The ability of taking advantage of the ecosystem services is identified, in the Marine Strategy Directive, as one of the elements which characterise both pollution[63] as well as the good environmental status of waters[64].

The Marine Spatial Planning Framework Directive is an example of practical use of the ecosystem approach and ecosystem services support in the regulation of human activity at sea[65]. Despite the rising number of references to the ecosystem based approach or ecosystem services, in national and international legislation, there are still just a few practical examples of application of this concept at a larger scale[66]. Some representatives of the doctrine see the EU regional seas regulations, especially the ones relating to the Baltic Sea, as a good opportunity to serve as a vanguard of this modern approach[67]. Marine spatial planning is considered one of the most fundamental tools for implementation of ecosystem management of the marine resources[68]. The Directive links sustainability with the application of the ecosystem approach by stating, that *in order to promote the sustainable growth of maritime economies, the sustainable development of marine areas and the sustainable use of marine resources, maritime spatial planning should apply an ecosystem-based approach as referred to in Article 1(3) of Directive 2008/56/EC with the aim of ensuring that the collective pressure of all activities is kept within levels compatible with the achievement of good environmental status and that the capacity of marine ecosystems to respond to human-induced changes is not compromised,*

[63] See art. 3 (8) of Marine Strategy Directive, '*pollution' means the direct or indirect introduction into the marine environment, as a result of human activity, of substances or energy, including human-induced marine underwater noise, which results or is likely to result in deleterious effects such as harm to living resources and marine ecosystems, including loss of biodiversity, hazards to human health, the hindering of marine activities, including fishing, tourism and recreation and other legitimate uses of the sea, impairment of the quality for use of sea water and reduction of amenities or, in general, impairment of the sustainable use of marine goods and services.*

[64] See art. 3(5) Marine Strategy Directive - *'good environmental status' means the environmental status of marine waters where these provide ecologically diverse and dynamic oceans and seas which are clean, healthy and productive within their intrinsic conditions, and the use of the marine environment is at a level that is sustainable, thus safeguarding the potential for uses and activities by current and future generations.*

[65] S. Katsanevakis et. al., *Ecosystem-based marine spatial management: review of concepts, policies, tools and critical issues*, Ocean & Coastal Management, vol. 54 (2011), pp. 807-820.

[66] R. Sardà, T. O'Higgins, R. Cormier, A. Diedrich, and J. Tintore, *A proposed ecosystem-based management system for marine waters: linking the theory of environmental policy to the practice of environmental management*, Ecology and Society, vol. 19 issue 4 (2014) p. 51.

[67] *Ibidem.*

[68] F. Douvere, *The importance of marine spatial planning in advancing ecosystem-based sea use management,* Marine Policy, vol. 32 (2008), pp. 762–771.

while contributing to the sustainable use of marine goods and services by present and future generations[69]. Such perspective is important for some reasons. First, it ensures integrity of ecosystems by treating human activity as inherently connected with the marine ecosystem as one of its elements. Secondly, it puts limits on this activity in a form of an obligation of sustaining a good environmental status of the marine ecosystem, linking this good environmental status with the ability of providing goods and services in an intergenerational perspective.

The Directive's main focus is on the four objectives closely connected with provision of the ecosystem services: environment, fisheries, maritime sectors and energy. Further sectors may be added by the Member States accordingly. The date of transposition of the Directive – by creation of marine spatial plans by the Member States is due until 31 March 2021.

6. ECOSYSTEM SERVICES IN POLISH MARITIME LAW

In Polish maritime law the concept of ecosystem approach to the management of marine resources was introduced in 2015 on the occasion of implementation of the Marine Spatial Planning Framework Directive. The Polish Maritime Policy, up to the year 2020, puts an ecosystem approach in the centre of marine spatial planning by stating that the ecosystem approach is a main principle of marine spatial planning in Poland[70]. According to the amended Act of 21 March 1991 on the marine areas of the Republic of Poland and the maritime administration the ecosystem-based approach is understood as meaning *that in the management of human activities, the following conditions shall be satisfied cumulatively:*

1) an impact of the planned human activities on the ecosystem shall be maintained at a level enabling to achieve and maintain a good environmental status;

2) both the ability for the proper functioning of the ecosystem, as well as resilience to environmental changes, arising from human activities, shall be maintained;

3) the sustained and at the same time sustainable use of the marine goods and services by the present and future generations shall be enabled.[71]

Three conditions set upon the human activity by the Polish Act seem to be in line and sum up efficiently the above mentioned definitions from international

[69] Preamble to Directive 2014/89/EU of the European Parliament and of the Council.

[70] *Polityka Morska Rzeczypospolitej Polskiej do roku 2020 (z perspektywą do 2030)*, Warszawa 2015, p. 51.

[71] Article 37b (1a) Act of 21 March 1991 on the Marine Areas of the Republic of Poland and the Maritime Administration Journal of Laws of 1991 No 32, item 131.

(global and regional) as well as the European legal regulations. The relation with the ecosystem services seems to be kept by reference to the good environmental status of marine waters, by reference to the goal of maintaining the ability to the ecosystem to function properly and finally, by the requirement of sustainability in use of marine goods and services. The test, so constructed, for the ecosystem based approach application can be applied in practice to certain aspects of management of human activity at sea within Polish jurisdiction.

Similarly to EU Law, also in Polish law, marine spatial planning seems to be one of the best examples of implementation of management of human activity from the perspective of the holistic protection of marine ecosystems as well as warranting sustainability in access to ecosystem services. The Act of 21 March 1991 on the Marine Areas of the Republic of Poland and the Maritime Administration sets certain conditions on the draft of the marine spatial plan by stating that *[t]he draft plan shall be drawn up by a territorially competent director of the maritime office, using the ecosystem-based approach and taking into consideration:*

1) supporting sustainable development in the maritime sector, taking into account the economic, social and environmental aspects, including the improvement of the environment and the resilience to climate change impacts;
2) defence and national security;
3) coordination of actions by relevant parties and the methods of using the sea[72].

As can be seen from the above, application of the ecosystem approach which, what has been mentioned above, is also defined by that legal act, is one of the main material requirements of the draft of a marine spatial plan. This satisfies the demands to shift the marine policy in Poland to such that would enable sustainable and the ecosystem approach based use of marine resources[73].

Some doubts can be raised whether such a multidimensional concept, as the use of the ecosystem services or ecosystem approach, can be subject to verification in the process of establishing the marine spatial plans. The Act of 21 March 1991 on the Marine Areas of the Republic of Poland and the Maritime Administration in Article 37b (2) provides that *[f]or a draft maritime spatial plan of the marine internal waters, the territorial sea and the exclusive economic zone, an environmental impact assessment shall be made.* The Polish Act on the Access to Environmental Information, Public Participation in Environmental Decision-making and Environmental Impact Assessment in a list of impacts, to be analysed in the environmental impact assessment of plans and programmes, includes the impact

[72] Article 37b(1) of the Act of 21 March 1991 on the Marine Areas of the Republic of Poland and the Maritime Administration.

[73] A. Cieślak, *Matitime Spatial Planning in the Baltic Sea,* Informationen zur Raumentwicklung, 8/9 (2009) pp. 607-612.

on humans, animals, biodiversity, material goods and other elements[74]. Such an analysis includes also an impact on the ecosystem services that the above listed elements are dependent on, which complies with the modern trends in the environmental impact assessment[75]. It can be hence stated, that the analysis of the impact of the marine spatial plans on marine ecosystem services is an obligatory element of a scoping phase of the environmental impact assessment analysis.

CONCLUSIONS

Management of human activities at sea is a need in a world of rising anthropopression on the marine environment. The marine ecosystems, despite of the fact that they are negatively affected by human activities, are still crucial for the support of biological life on Earth. The ecosystem services perspective and, implied by this concept, the ecosystem service and adaptive management of the marine environment are the ways in which the decision makers try to achieve sustainability in management of human activities at sea. Reasonable use of ecosystem services, with perspective of sustaining them in the proper quality and amount for future generations, can prove to be beneficial for mankind. The increase of forms and quantities of uses of marine environment services raises the question of finding ways to create and establish a more rational use of marine services and the interactions among the uses thereof, to balance demands for development with the need to protect the environment, and to deliver social and economic outcomes in an open and planned way. One of instruments of finding that point of equilibrium seems to be marine spatial planning.

The concept of the ecosystem services becomes more and more popular in the regulation of environmental protection. One of the premises of this concept is treatment of human and human activity as an integral part of the ecosystem. The interrelations between human activity and the ecosystem can be described through the concept of ecosystem services. A certain degree of commodification of the natural environment, which is immanently connected with the concept of the ecosystem services, can become useful as a tool of assessing an impact of human activities on the ecosystem as well as regulating that impact. Marine protection law is a good example of attempts to introduce the interrelated concepts of

[74] Polish Act of 3 October 2008 on Access to Environmental Information, Public Participation in Environmental Decision-making and Environmental Impact Assessment, art. 51 (2).

[75] T. Karjalainen, M. Marttunen, S. Sarkki, A. Rytkönen *Integrating ecosystem services into environmental impact assessment: An analytic–deliberative approach*, Environmental Impact Assessment Review, vol. 40 (2013) pp. 54–64.

the ecosystem approach and ecosystem services into functioning of regulatory schemes. Using the marine ecosystem as a regulatory model for the diversity and the impact of human activity on the environment is justified by the scale and interdependence of marine ecosystems, their importance due to their life supporting functions, the fact that despite the pressures they are still preserved in the majority of their coverage of the full and intact spectrum of the ecosystem services they can provide. The Baltic Sea is important for analysis of the ecosystem services regulation for many reasons. One of them is the vulnerability of its ecosystem, second a high number of people dependant on the ecosystem services provided by the relatively small marine ecosystem. The solutions implemented for the regulation of the marine ecosystem services access in the Baltic Sea can become models for other regional seas as well as for the whole Global Ocean.

KONCEPCJA USŁUG EKOSYSTEMOWYCH W REGULACJI DZIAŁALNOŚCI CZŁOWIEKA NA MORZU

Słowa kluczowe: usługi ekosystemowe, podejście ekosystemowe, ochrona środowiska morskiego, prawo ochrony środowiska, prawo morza.

Abstrakt

Koncepcja usług ekosystemowych staje się coraz bardziej popularna w obszarze regulacji ochrony środowiska. Jednym z założeń tej koncepcji jest traktowanie człowieka i jego działań jako integralnego elementu ekosystemu. Współzależności pomiędzy człowiekiem a ekosystemem są opisywane przez koncepcję usług ekosystemowych. Obszar prawnej ochrony środowiska morskiego, może być przykładem wprowadzania i funkcjonowania koncepcji usług ekosystemowych i koncepcji pokrewnych do prawnej regulacji środowiska. Bałtyk jest istotny dla rozwoju stosowania koncepcji usług ekosystemowych w regulacji morskiej działalności człowieka z wielu powodów. Jednym z nich może być, wrażliwość ekosystemu tego akwenu, innym intensywność korzystania z tego akwenu dla potrzeb pozyskiwania dostępu do usług ekosystemowych, a jeszcze innym liczba ludności bezpośrednio zależnych od dostępu do usług tego systemu. Rozwiązania przyjęte dla regulacji i ochrony dostępu do usług ekosystemowych Morza Bałtyckiego, mogą stanowić model regulacyjny do potencjalnego wykorzystania także w innych rejonach świata.