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Introducing the ecosystem services concept in Norwegian coastal zone planning

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ABSTRACT

Increasing pressures on the coastal zone calls for new approaches to its governance. The ecosystem services (ES) concept has been presented as a solution for more integrated and ecosystem-based management, providing tools to categorise knowledge on ecosystems, the services they provide, and their value. This paper offers an analysis of the introduction of the ES concept into Norwegian coastal spatial planning as a new governance approach. The study is based on document analysis of relevant legal and policy documents, such as white papers, parliamentary bills, official reports, acts and regulations. Through this process this study finds that only incremental changes have been made to integrate the ES concept into the governance of the coastal zone. ES terms and methods to apply the concept in day-to-day governance have not yet been provided. The multilevel and multiscale governance system is not structured to accommodate such an intersectoral and interdisciplinary approach. The municipal planning system could however be well suited, in particular the strategic environmental assessments. The municipalities act like an integrating body, where the trade-offs between different uses or non-uses of natural resources are considered before making decisions. There is, however, a need for adapted knowledge databases, clarification of methods and training for the municipalities to be able to take on this task. If the government intends to introduce ES based management in Norway, a first step would be to designate the appropriate authority to facilitate a process of relevant authorities across sectors and/or levels to take on this task and to develop guidelines for municipal planners. The experience from Norway therefore shows that without a decision on how the concept should be implemented and who should provide the necessary tools for practitioners to apply, the ES concept will not be effectively integrated into the governance system.

1. Introduction

Coastal zones are under increasing pressure from a multitude of activities, resulting in competition for both space and resources. New ways of governance to integrate the different interests and ensure sustainable development in coastal areas are thus called for. Various approaches have suggested moving away from single-sector management towards more integrated or ecosystem-based management (Cicin-Sain and Knecht, 1998; Kay and Alder, 2005; Forst, 2009).

Over recent years, the ES concept has gained influence in environmental research and policy (Chaudhary et al., 2015; Costanza et al., 2017; Beaumont et al., 2017). Ecosystem services describe the benefits humans derive from ecosystems (MA, 2005) and aims to highlight the interconnections between society and nature and of local- and broad-scale ecosystems, which are often neglected. The ES concept provides a tool to identify the benefits that humans are dependent on in a systematic way, including the less obvious benefits (supporting and regulating services) as well as the more noticeable ones (provisioning and cultural) (MA, 2003; Díaz et al., 2015a,b). Further, application of the ES concept offers a system for valuing of these benefits, in both monetary and non-monetary terms. These valuations make the trade-offs between different uses and pressures on the ecosystems visible and can be used to inform decision-making related to the use and protection of nature (Costanza et al., 1997, 2017; Pascual et al., 2017). Advocates of the concept therefore seeks to provide a potential common language to explore social and ecological trade-offs, connections between ecological and human systems, and the variety of benefits that society obtains from healthy functioning systems (Granek et al., 2010). Despite the seemingly widespread acceptance and adoption of the ES concept, recent studies, however, find that many stakeholders find the concept very complex and with an inaccessible terminology, making it difficult to apply for practitioners (Díaz et al., 2015a,b; McKinley et al., 2019).

Conceptualisation of the benefits of ES to humans gained momentum with the UN global ecosystem study and the publication of the

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Millennium Ecosystem Assessment in 2005 (MA, 2005). Since then, much effort has been directed towards developing frameworks for the identification and valuation of the benefits that ES provide to humans. Parallel to this, we see a growing number of empirical studies applying the ES concept, including coastal governance (e.g. Guerry et al., 2012; McKenzie et al., 2014; Arkema et al., 2015; Outeiro et al., 2015). However, most efforts to utilise the ES concept have been conducted as stand-alone projects. There are limited empirical studies of the introduction of the ES concept into national policy and decision-making systems, although recent studies indicate a lack of explicit inclusion of ES terms in policies, legal frameworks and plans (Mascarenhas et al., 2014; Maczka et al., 2016; McKinley et al., 2018). Furthermore, it should be noted that several aspects of the ES frameworks in practice, if not by name, are already an integrated part of existing decision-making systems in a number of countries (Wilkinson et al., 2013; Mascarenhas et al., 2014; Schubert et al., 2017).

Analysing how governments introduce the ES concept is necessary to indicate not only its utility but also the challenges associated with its integration. Introducing new modes of coastal governance implies that existing governance institutions and practices need to change. However, how change happens or fails to happen is poorly understood, resulting in a gap between how new approaches to marine governance are conceptualised in the academic literature and the complexity of the contexts where they are practised (Kelly et al., 2018). The discussion about introducing the ES concept into national policy should thus be critically informed by detailed empirical analysis of how such an approach is (or could be) implemented in national decision-making contexts. This paper provides an analysis of how the introduction of the ES concept into Norwegian governance has been performed, particularly focusing on coastal governance and coastal zone planning, and the fit between the ES concept and the existing Norwegian system for coastal governance.

Coastal governance in Norway is undertaken by a number of established institutions, following the rules and procedures for carrying out planning and decision-making processes. In addition, the spatial planning system, as part of the national governance system, is intended to act as the main coordinating mechanism for the use, and non-use, of available resources and areas, and it is the principal arena for allocating space, both coastal and terrestrial and for weighing uses and interests. As the municipal plans are legally binding, the main authority for coastal spatial planning in Norway are the 225 coastal municipalities (reduced from 273 due to mergers in 2019).

In the process of introducing the ES concept in Norwegian governance, a 2013 Official Norwegian Report 'Natural benefits—on the values of ecosystem services' states that 'the planning system should be reviewed with a view to better demonstrating the value of ecosystem services. This is particularly relevant in relation to the national expectations of regional and municipal planning and the Regulations on Environmental Impact Assessment." (Anon., 2013: 35). Within this backdrop, we analyse how the concept is introduced into relevant legal and policy documents for Norwegian coastal governance and discuss possible implications of this introduction for new governance practices in a multiscale and multilevel governance system. In the next section, the analytical approaches and methods are presented. This is followed by a brief overview of different ES frameworks and a review of academic literature on how the ES concept is applied in practical policies. Subsequently, we describe the Norwegian policy related to the introduction of the ES concept, where we outline relevant acts, regulations and policy documents. This is followed by a discussion on conditions for introducing the ES concept within Norwegian coastal governance, and, finally, possible consequences of the way in which the concept has been introduced.

2. Background

2.1. ES frameworks

As the concept of ES has increasingly entered into various policy and science discussions, different frameworks have evolved alongside. In 2005, the Millennium Ecosystem Assessment (MA) was first introduced, following a UN-led initiative and relevant international organisations. This was the first major attempt at identifying and emphasising the values of ES, their importance for human well-being, and the linkages between these aspects. In the wake of the MA, different frameworks building on, and complementing, the initial effort have been introduced. These include The Economics of Ecosystem Services and Biodiversity (TEEB, 2007), the Common International Classification of Ecosystem Services (CICES, 2010) and the Intergovernmental Platform of Biodiversity and Ecosystem Services (IPBES, 2012). Although based around the same core principles of highlighting the contribution of ecosystems and biodiversity to human well-being, the frameworks differ in certain key areas. These include how they classify the multitude of services, what knowledge base is needed to underpin decisions, and what constitutes 'value'.

The MA defines ES as 'the benefits people obtain from ecosystems' and identifies these as supporting, provisioning, regulating and cultural services (MA, 2005). Although the latter three categories have been widely used in several subsequent frameworks following the MA, 'supporting services' have been omitted in both TEEB and CICES. In TEEB, supporting services are replaced by 'habitat services' in order to 'highlight the importance of ecosystems to provide habitat for migratory species (e.g. as nurseries) and gene-pool "protectors"' (TEEB, 2012). In CICES, although still acknowledged, supporting services are 'treated as part of the underlying structures, processes and functions that characterise ecosystems' (Haines-Young and Potschin, 2011). IPBES, in contrast, represents a clear break with this standard, because it does not identify the different services as belonging to one of the four aforementioned categories. Rather, it opts for a different nomenclature, wherein these services are recognised as 'nature's benefits to people' (Díaz et al., 2015b).

To a certain extent, the frameworks also differ with respect to how services or benefits are to be valued. TEEB, responding to an expressed need in the MA for better methods to value ES, aims at highlighting the economic contribution from ES by estimating the potential cost of a loss of biodiversity and a decline in ES (Gómez-Baggethun et al., 2010; Pandeya et al., 2016). The rationale behind the focus on monetary values was that shedding light on the financial contribution of ecosystems and biodiversity would enable policy-makers to discern their importance for well-being, thus enabling better-informed management decisions (TEEB, 2010). Although the focus is on economic value, TEEB recognises that certain ES are difficult to pin economic values to, especially in 'complex situations involving multiple ecosystems and services, and/or plurality of ethical or cultural convictions' where 'simple recognition of value may be more appropriate' (TEEB, 2010: 12). Recently, the importance of this non-monetary valuation has been highlighted by several authors, especially when encountering less tangible and non-material ES (Chan et al., 2012; Pandeya et al., 2016; Kenter, 2016; Small et al., 2017).

This complexity concerning ES, stakeholders with conflicting interests and the linkages between them is the starting point of the IPBES framework. According to Díaz et al. (2015b), IPBES distinguishes itself from previous initiatives by highlighting 'the central role that institutions, governance and decision-making play on the links among these elements', with the central elements being 'nature, the benefits people derive from nature and a good quality of life'. The inclusion and recognition of multiple knowledge systems, namely indigenous and local knowledge, is one of IPBES's distinct features, along with a strong emphasis on stakeholder participation, policy implementation and knowledge creation (Díaz et al., 2015a), as well as pluralistic and

relational values (Chan et al., 2016; Pascual et al., 2017).

Although the discussion based on key sources above is by no means meant to be exhaustive, it illustrates the various understandings of the ES concept and associated methods for identification and valuation. For instance, compared with TEEB and CICES whose focus lies more on identifying and valuing services, IPBES arguably aims to have a stronger focus on implementation of the ES concept into government policy as well as contributing to knowledge production. This implies that, in theory, decision-makers have to make a choice between several alternatives, and the choice should have an impact on the type of knowledge and concepts used and hence the approach to identifying and valuing services. However, as will be shown in the following, practical applications of the ES concept rely less on following a single framework and more on an approach that contains features from various frameworks.

2.2. ES mappings in a Nordic context

There have been several initiatives in Norway to map coastal nature types and biodiversity at a Nordic, national and regional level in scientific studies: for instance, mapping and valuing ES in the Barents Sea and Lofoten area (Magnussen et al., 2013). In the latest revision of the management plan for the Barents Sea, the so-called Professional Forum took what they called a step further towards an ES approach. The Forum is made up of a dozen directorates and research institutions providing knowledge to the relevant ministries on the ocean plans. Acknowledging that there was not enough information to undertake a full ES evaluation of the Barents Sea, the Forum selected six ES to illustrate how the concept can be used to describe the basis for value creation in Norwegian seas (in line with their mandate) (Anon., 2018). Among the other recent ES evaluations is a project to identify 'Ecosystem services in the coastal zone of the Nordic countries' (Gundersen et al., 2016). The study focused on four identified ecosystems in the Nordic coastal area (kelp forests, eelgrass meadows, blue mussel beds, and shallow bays and inlets) and was based on the 'common knowledge and network of researchers' (ibid.). Later studies focused on geographical case areas and sought to identify a wide range of ES, as well as drivers and pressures affecting these, in the different areas. These studies followed an IPBES-inspired approach, using the term 'nature's contribution to people' and including local and indigenous knowledge, in addition to defining the contributions as the four categories of services from the MA and utilising classification schemes from CICES and TEEB (Belgrano, 2018; Tunón, 2018).

None of the projects conducted in Norway involved municipal planners or considered the legal/administrative boundaries of municipalities and their role in managing the coastal zone. They were either research projects or work conducted by directorates for large geographical areas, and not used in practical management. Further, the analysis below will show that these mappings to a limited degree are used in the government's work to introduce the concept into the Norwegian governance system. In this paper, the focus is on the more direct introduction of the ES concept into the coastal governance system, assessing whether and how the concept itself has found its way into relevant policy documents, to guide planning and decision-making by coastal municipalities. Keeping in mind that countries have different systems, and that the conditions for introducing the ES concept will be different in different contexts, we analyse how the ES concept has been introduced in Norway.

2.3. The ES concept in spatial planning

In the following, we give examples of studies on how ES concepts have been put to practical use in coastal planning and knowledge production. This includes studies covering various geographical areas and services as well as the attitudes of planning practitioners to the ES concept.

Various papers consider the integration of ES-based elements in planning, such as mapping and valuing services relevant to a given geographical area or topic. Examples include lobster fisheries, tourism and environmental protection in the Belize coastal zone (Arkema et al., 2015; Verutes et al., 2017), shellfish aquaculture and recreation in British Columbia, Canada (Guerry et al., 2012), salmon farming in Chile (Outeiro and Villasante, 2013), wave energy developments (Lester et al., 2013) and recreational inland fisheries in Norway (Navrud, 2001). Arguments have also been made in favour of introducing ES into impact assessments, both environmental impact assessments (EIA) and strategic environmental assessments (SEA) (Karjalainen et al., 2013; Martín-López et al., 2012; Rosa and Sánchez, 2015; Geneletti, 2011; Partidario and Gomes, 2013). Common for several of these studies is that ES concepts have been introduced in processes concerning thematic plans on either a national or a regional scale (e.g. regional plans for habitat conservation, focusing on a limited number of ES) and that the identification and valuing of ES have been carried out by scientists and experts in a given field rather than by planners.

When it comes to integrating ES concepts into national policies, several studies report a lack of explicit inclusion (Beery et al., 2016; Maczka et al., 2016; McKinley et al., 2018). Maczka et al. (2016) identified two major categories of obstacles to the integration of ES into environmental policy. The first concerns the relatively weak comprehension and acknowledgement of the term ES, which the authors relate to an ambiguous definition of ES and to challenges of going from an abstract term to practical application. The second group of obstacles relates to structural challenges, in particular to fragmented and sectoral management, which may result in a slow spread of ES terminology across institutions (Maczka et al., 2016). Bouwma et al. (2018) found that regarding EU policies, the ones that have gone far in incorporating ES concepts are strategic in nature: that is, it is easier to achieve policy coherence in the use of ES concepts when it comes to general strategic goal statements rather than in detailed specific legislation. The authors argue that the moderate inclusion of ES concepts must be seen as an incremental change of policy, resulting in policy layering (ibid.). Further, the inclusion of ES concepts is likely to be contested by sectors that have conflicting goals and may encounter path dependencies because EU policy-making follows a sectoral approach whose role division maintains itself. Thus, they argue that there is a gap in addressing the system-interdependence idea that is central to the ES concept (ibid.: 221).

Numerous studies that have attempted to investigate the views of planning practitioners on the integration of ES in planning and their knowledge of the concept arrive at similar conclusions. A 2014 study on Portuguese regional spatial planners' views and perceptions on the ES concept and its integration in spatial plans indicated that planners were somewhat knowledgeable about the concept but were not that aware of initiatives aimed at pushing the ES concept into the political agenda (e.g. MA) (Mascarenhas et al., 2014). Planners see the concept as important and consider it as being integrated into existing plans. The paper, however, concludes that 'if the ES concept is already integrated in plans, it is implicitly so in the planning documents, or there is a gap between planners' perceptions and the real level of integration'. Similar results were also found in studies of the Swedish municipal planning system, where Schubert et al. (2017) found that ES-related themes were considered, but more implicitly rather than explicitly. This finding is supported by Beery et al. (2016), who added that familiarity with the ES concept and its broad definition was quite high among municipal planners, but there was a low awareness of specific ways of using the concept as a tool in planning and decision-making. Delshammar (2015), in a similar study, remarked that 'usage of it [ES] in planning documents is still limited. When it is used (explicitly or implicitly) it is mostly in the municipal comprehensive plans.' (Delshammar, 2015: 12, Table 1).

Although this overview is by no means exhaustive, it provides an indication of the practical application of ES into spatial planning. As

Table 1
The ES concept in spatial planning.

Main focus	Case studies/major findings	Literature
Mapping and valuing services	Lobster fisheries, tourism and environmental protection in the Belize coastal zone; shellfish aquaculture and recreation in British Columbia, Canada; salmon farming in Chile; wave energy developments; recreational inland fisheries in Norway	Arkema et al., 2015; Verutes et al., 2017; Guerry et al., 2012; Outeiro and Villasante, 2013; Lester et al., 2013; Navrud 2001
Impact assessments	Use of ES perspectives in environmental impact assessments (EIAs) and strategic impact assessments (SEAs)	Karjalainen et al., 2013; Martín-López et al., 2012; Rosa and Sánchez, 2015; Geneletti 2011; Partidario and Gomes 2013
Barriers to integrating ES in national- and international policy	Lack of explicit inclusion in policy frameworks; weak comprehension and acknowledgement of the term; ambiguous definition of ES; fragmented and sectoral management.	Beery et al., 2016; Maczka et al., 2016; McKinley et al., 2018; Bouwma et al., 2018
Planning practitioner capacity and knowledge	Lack of awareness of initiatives aimed at introducing ES in policy; implicit inclusion rather than explicit	Mascarenhas et al., 2014; Schubert et al., 2017; Beery et al., 2016; Delshammar, 2015

shown above, there are few examples of ES being an integrated part of a municipal planning system similar to what is in place in Norway. Rather, the majority of instances where ES have been used in practice have been stand-alone projects, often focusing on a selection of ES and indicators, which have been conducted on a regional or national scale. Here, we investigate how the ES approach is used in a Norwegian context.

3. Analytical approaches to understanding the introduction of ES in Norwegian coastal governance

The ES concept represents a new approach in Norwegian coastal governance, and new approaches have to become embedded in policies and legislation before being implemented across governance levels. Changing coastal governance practices therefore involves changing institutions. Institutions are here understood in an instrumental way, as the multifaceted rules and regulations that guide decision-making (Scott, 2008).

Changing institutions is, however, not straightforward. Institutions are found to be relatively resistant to change (Jepperson, 1991), especially changes that do not fit well into existing legal and organisational structures and practices (March and Olsen, 1998). Understanding how the ES concept fits with the existing institutions is therefore crucial to understanding its introduction. Further, and related to the above, changes in public policy seldom involve large, overarching alterations, but rather adjustments and additions to the existing ones (ibid.) Such gradual changes may be characterised by processes such as path dependency and policy layering (Kelly et al., 2018). Path dependency is often used to account for institutional persistence (Vergne and Durand, 2010), where formal and informal structures constrain future choices and make it difficult to bring about fundamental changes (March and Olsen, 1998; Bäcklund and Mäntysalo, 2010). The government is bound or limited by established practices and regulations, the result being incremental changes, where one builds on existing policies and makes small changes. This may lead to policy layering: that is, situations where existing institutions are not replaced, but where new institutional layers (for instance, rules, policy processes or actors) are added to the existing ones. Thus, the new does not replace the old, but comes in addition (van der Heijden, 2011; Mahoney and Thelen, 2010). Bäcklund and Mäntysalo (2010) warn that this may result in new approaches becoming paradigm shifts in theory alone, where shallow practical reforms are imposed on top of existing institutional structures. This may lead to institutional ambiguities and a widening gap between theory and practice.

To analyse how the ES concept has been introduced in the context of Norway's coastal management, we have screened relevant Norwegian acts, regulations and policy documents related to coastal zone planning for the explicit use of the ES concept. The aim has been to track the implementation of the ES concept from the first public reports to regulations and guidelines, bearing in mind the novelty of this concept in Norwegian governance. We have considered recommendations regarding ES in background documents and national strategies and sought to follow these recommendations through to implementation in regulations and guidelines. The majority of acts and regulations concerning coastal zone planning predate the introduction of the ES concept in Norwegian policy making. Hence, we find that the concept is not applied in most central acts such as the Planning and Building Act of 2008, the Nature Diversity Act of 2009 and the Regulation on the framework for water management. However, in a more recent, specific regulation relevant for municipal spatial planning, the concept is included. The question then is how the concept found its way into this specific regulation and how the concept is introduced.

To assess this, we have examined higher-level policy documents on the introduction of the ES concept into Norwegian governance. We conducted a search in the Norwegian database *Lovdata* for legal resources using the term ecosystem service* (økosystemtjeneste*). The search resulted in more than one hundred documents, including parliamentary bills, acts and regulations, white papers and official reports, as well as background documents, academic books and book chapters. We considered the majority of these to be false positives, because they only mention the ES concept in passing and were not found to relate to the concept or its content, or to coastal governance. Examples include yearly versions of the national budget and EU-related documents not relevant to coastal governance. Through an initial screening process, we selected only those public documents relevant to the introduction of ES into Norwegian governance and our study of coastal zone planning, implying that we excluded documents relating to the Norwegian offshore marine management plans, as these are not directly relevant for the municipal planning. This reduced the number to eight documents; two public reports, one proposition to the Parliament, two officially appointed expert group reports, one white paper, the mentioned regulation and the public comment on the regulation. The low level of documents identified illustrates the non-familiarity of the ES concept in Norwegian hands-on management, where other phrases or terms are used to describe the relationship between humans and nature (Hersoug et al., 2019; Sundsvold & Armstrong, 2019).

The documents were reviewed and examined for key themes which provided insights into how ES has been adopted within Norwegian coastal management. The themes assessed were the use of the term; explanation of the concept; reference to coastal zone or municipal spatial planning; recommendations on practical application, like identification of structures or practices that need to change, identification of relevant authorities and/or rules and regulations. Only explicit mentions of the ES term were included in the analysis. Descriptions of different services without using ES terms (e.g. fisheries, cultural heritage or recreation), were left out, as were descriptions of the different services and the status of different ecosystems (e.g. forests or wetlands), as the topic under scrutiny was the introduction of the very concept (Table 2).

Several of the documents refer to spatial planning and the role of

Table 2
Relevant public documents on ES.

Year	Policy or legal documents	Reference
2002	Public pilot study «Nature's values and services, an assessment of Norwegian nature at the turn of the millennium. DN-rapport 2002–1	Anon. 2002
2004	Official Norwegian Report "The Act on preserving nature, landscape and biodiversity (Nature Diversity Act)" (NOU 2004:28)	Anon. 2004
2009	Proposition to the Parliament "On the Act on preserving nature, landscape and biodiversity (Nature Diversity Act)". (Ot.prp. nr. 52 (2008 – 2009)).	Anon. 2009
2013	Expert group report «Nature's benefits- on values of ES» (NOU 2013:10)	Anon. 2013
2014	Public comment on the regulation on impact assessments	Anon. 2014
2015	White Paper «Nature for life. Norwegian action plan for biological diversity» (Meld. St. no. 14 (2015–2016)	Anon. 2015
2017	New expert report «Assessment system for determination of good ecological condition»	Nybø and Evju, 2017
2017	Regulation on impact assessents	Anon. 2017a

municipalities, and the purpose of the study is to follow this introduction of the ES concept as a new management tool or method into Norwegian coastal zone governance. The paper offers a qualitative, in depth content analysis of the relevant documents. The aim has not been to evaluate to what degree or which aspects of the ES frameworks are already an integrated part of the governance system, but rather how the government embraces the concept itself. Hence, the focus is on introducing a new mode of governance, by analysing how the introduction of the ES as a mode of governance is presented and introduced, as well as the changes or adjustments made to relevant rules and regulations. Analysing how this new concept is incorporated into the relevant rules and regulations, provides necessary insights to understand how or to what degree new approaches to environmental governance are implemented at the practical level of governance. It also provides a ground for discussing challenges and necessary steps to facilitate changes.

4. The Norwegian case

4.1. Setting the scene—the Norwegian coastal zone planning system

Planning in Norway is regulated through the 'Planning and Building Act' (PBA) of 2008 (PBA, 2008), which states that the main goal of planning is to secure sustainable development. The 'Nature Diversity Act' (NDA) of 2009 is also of utmost importance. The NDA provides principles for public decision-making that apply to municipal planning as well, including, among others, utilising both scientific and local knowledge as well as applying a precautionary approach. Although all three levels of government (state, county and municipal) have designated roles in the planning system, the main planning authority is vested in the municipalities. The state and county levels mainly formulate guidelines and expectations to be integrated in municipal planning; however, the state is also chiefly responsible for issues of national importance (e.g. offshore marine spatial plans and marine protected areas). Thus, the responsibility of allocating space to different uses and non-uses, both coastal and terrestrial, lies with Norway's 356 municipalities, 225 of which have a coastline as of 2020. The municipalities' jurisdiction covers an area extending out to one nautical mile beyond the baseline. The baseline is a jurisdictional line drawn between the outermost spots of dry land visible at low tide. As the Norwegian coast is scattered with islands and islets, and the baseline is drawn across fjords, the size of the coastal planning area can vary greatly, with some municipalities having rather large areas of sea space to plan for (cf. Fig. 1). The area beyond the municipalities' jurisdiction is governed by the state through management plans covering entire seas (the Barents Sea, the Norwegian Sea, and the North Sea and Skagerrak) (Norwegian Environmental Agency, 2018). Contrary to what is the case for coastal zone plans, these management plans are based on top-down processes involving dedicated directorates (Table 3).

The municipal planning process consists of several formalised requirements that the planning authority must adhere to. These include drafting a planning programme describing the purpose of the plan and relevant issues to be treated, measures taken to ensure participation

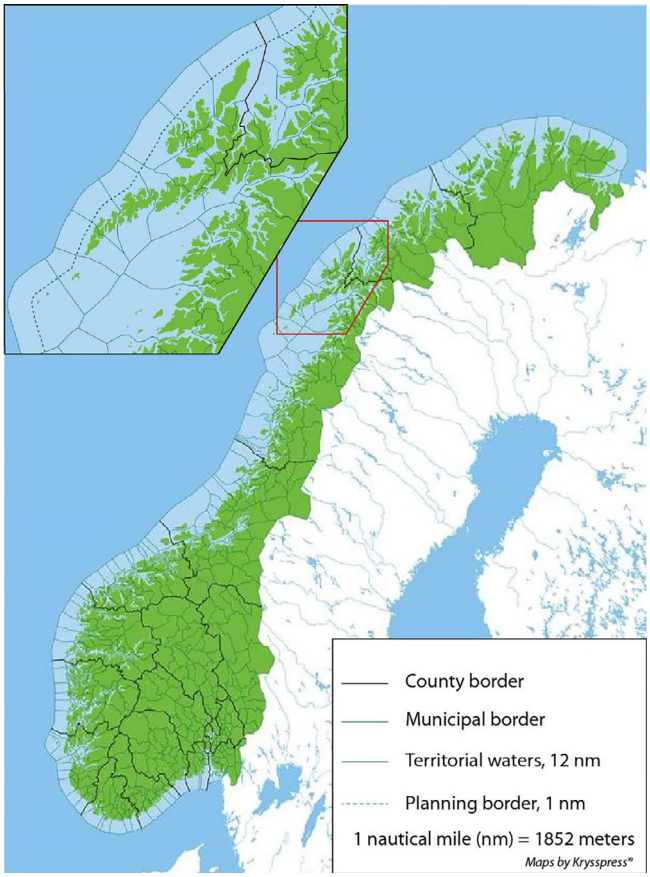

Fig. 1. Map showing the Norwegian municipalities and their variation in sea space (source: Norwegian mapping authority).

(such as organising public hearings) and conducting impact assessments. The knowledge base in municipal planning mainly consists of official sources, such as reports, and databases maintained by national bodies (e.g. dedicated directorates), in addition to local knowledge. Although these are mandatory requirements, neither the PBA nor the NDA specify *how* they are to be carried out. The municipalities thus have considerable freedom regarding the way in which they approach these formal requirements, including whether or not they choose to use an ES-based approach to planning. Given the number of municipalities, practices in coastal zone planning thus vary considerably (Sørdahl et al., 2017).

The municipalities' planning authority is restricted by several sector agencies who can object to a proposed spatial plan if it conflicts with sector interests or legislation. As they hold authority on areas such as fisheries, aquaculture, marine traffic and environmental protection, sector authorities both provide input to and have great influence on the approval of municipal spatial plans (Kvalvik and Robertsen, 2017). These institutions, along with their corresponding rules and

Table 3
Most relevant rules and regulations for coastal zone planning.

Year	Policy or legal document	Published by
2006	Regulation on the framework for water management	Ministry of Climate and Environment and Ministry of Oil and Energy
2008	Planning and Building Act	Ministry of Municipalities and Modernization
2009	Nature Diversity Act	Ministry of Climate and Environment
2017	Regulation on impact assessments	Ministry of Municipalities and Modernization and Ministry of Climate and Environment

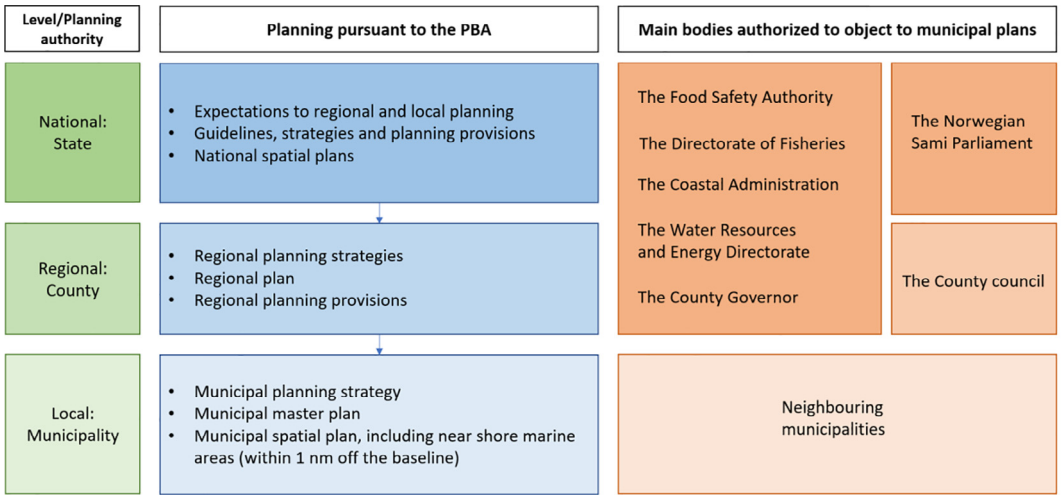

Fig. 2. Levels of planning in Norway. Legally binding coastal zone planning is performed by the municipalities, yet is influenced by provisions in national and regional plans and strategies. State authorities, the National Sami (indigenous) political body, counties and municipalities can make formal objections to municipal spatial plans.

regulations, add a multiscale and multilevel governance aspect to the introduction of an ES concept in Norway. This implies that in order to integrate the ES concept into Norwegian coastal zone planning, a number of rules, regulations, actors (such as government bodies) and practices need to undergo changes (Fig. 2).

4.2. Introducing the ES concept into Norwegian policy and the decision-making system

Much of the work done in Norway relating to biodiversity, ES and valuation of the said services has its foundation in the Convention of Biological Diversity (CBD) and the so-called Aichi targets adopted in 2010, as part of the Strategic Plan for Biodiversity 2011–2020. The targets are set to secure well-functioning ecosystems and to stop the loss of biodiversity by 2020 (CBD, 2010). Norway is a party to the CBD and has therefore committed herself to implementing the decisions made in national policy.

The Aichi targets consist of 20 targets, split between five strategic goals, several of which are relevant for coastal zone planning in Norway. The first strategic goal is to address the underlying causes of biodiversity loss by mainstreaming biodiversity across government and society (Strategic Goal A). To achieve this, parties to the CBD should, among others, (i) take action to make people aware of the values of biodiversity and the steps they can take to conserve and use it sustainably (target 1) and (ii) integrate biodiversity values into national and local development (…) and planning processes (…) (target 2). Target 11 stipulates that at least 17 per cent of terrestrial and inland water, and 10 per cent of coastal and marine areas, especially those of particular importance for biodiversity and ES, are conserved as protected areas or the like by 2020. The remaining targets are more general, where Strategic Goal E addresses the enhancement of implementation through participatory planning, knowledge management and capacity building. To achieve this, four targets are defined: by 2015, each member state has developed and started to implement a national biodiversity strategy and action plan (target 17); by 2020, traditional knowledge and practices, and indigenous and local participation are fully integrated into relevant legislation and policy processes at all relevant levels (target 18); by 2020, knowledge, the science base related to biodiversity, its values, functioning, status and trends and the consequences of its loss are improved, widely shared and transferred, and applied (target 19); and, finally, the necessary mobilisation of resources to implement the above is allocated (target 20).

Several of the Aichi targets have already been met and are an integrated part of the Norwegian national and local development and planning processes: for instance, when it comes to mapping biodiversity. The work on the Millennium Ecosystem Assessment (MA, 2005) inspired the Norwegian Ministry of Environment to commission a pilot study to consider whether there was a need for a full-scale assessment in Norway, parallel to the MA (*Document 1 in* Table 4). The pilot study recommended a full-scale assessment and stated that for many of the parameters needed for an MA-type analysis, Norway already has adequate data, even though the data sets would have to be reorganised and detailed in a different manner (Anon., 2002).

This pilot study is then referred to in the official report from the Committee on Biodiversity, which developed the first draft of the Norwegian Nature Diversity Act (Anon., 2004) (*Document 2 in* Table 4). The official report uses the term ES four times, but it is never used in the Act itself (Document 6 in Table 4). The proceedings to the Act show that this is a deliberate choice (*Document 5 in* Table 4). The Ministry of Environment discussed whether the term ES should be included in the Act and concluded that it would be superfluous. As long as biodiversity is preserved, nature should be able to deliver ES. In addition, the Ministry states that it is unfortunate to manage biodiversity based on the ES known or valued at any given time (Anon., 2009). Still, the Ministry concedes, the term might be a useful tool in management according to the law, as it may contribute to more awareness of the values [nature] diversity provides, as well as of how to contribute to its conservation, and of who benefits from the services (ibid.).

Table 4
Relevant policy and legal documents on ES and coastal zone management.

	Year	Policy or legal document	ES concept mentioned	Treatment of the concept
1	2002	Public pilot study «Nature's values and services, an assessment of Norwegian nature at the turn of the millennium"	Yes	Identified data for ES assessment, pointed at need for a reorganization of data
2	2004	Official Norwegian Report «The Act on preserving nature, landscape and biodiversity (Nature Diversity Act) (NOU 2004:28)	Yes, 4 times	One explanation of the concept, mentioned three more times in general terms
3	2006	Regulation on the framework for water management	No	
4	2008	Planning and Building Act	No	
5	2009	Proposition to the Parliament: On the Act on preserving nature, landscape and biodiversity (Nature Diversity Act). (Ot.prp. nr. 52 (2008 – 2009)).	Yes	Discussed whether to include in the Act. Decision not to. Seen as redundant, as long as biodiversity is preserved nature should be able to deliver ES.
6	2009	Nature Diversity Act	No	
7	2013	Expert group report «Nature's benefits- on values of ES»	Yes	Highlight the need to integrate ES in the planning system and the role of municipalities a central spatial planning authority. Nothing concrete on how to change practices
8	2014	Public comment on the regulation on impact assessments	Yes	Statement that the ES assessment cannot be required until "easy and practicable guidelines exist
9	2015	White Paper «Nature for life. Norwegian action plan for biological diversity»	Yes	Describes the different kinds of services, but focus on ecosystems and habitats. Points at the need for methods development, but nothing concrete on how to do it
10	2015	Guidelines for applying §12 in the water management framework regulation	No	
11	2017	New expert report «Assessment system for determination of good ecological condition»	Yes	Not including social or cultural services
12	2017	Regulation on impact assessents	Yes	Listed together with what would be considered different ES, an add-on concept

The decision not to include the ES concept in the Nature Diversity Act did not mean that the concept was left behind. Several relevant ES aspects have been addressed and incorporated into the Norwegian decision-making system: among others, new ways of identifying and valuing ES. To facilitate this, an expert group was established in 2011, tasked with making recommendations concerning terminology, knowledge, economic instruments as well as qualitative, quantitative and economic valuation methods, with TEEB as its foundation. This was, to a large degree, a response to the commitment made under the conference of the parties to the CBD in 2010 (CBD, 2010). The expert group delivered its report 'Nature's benefits—on values of ecosystem services' (Anon., 2013: 10) in 2013 (*Document 7 in* Table 4). Generally, the report operates at a macrolevel and discusses the development of methods to assess total impact and more integrated management at a national level: for instance, mapping of the value of the Norwegian forests or wetlands. The group also highlighted the need to include ES in the planning system and pointed at the role of the municipalities as the main actor in spatial planning, but without going into detail on how this should be done. The expert group argued that the value of the benefits from nature must be visible or acknowledged by everyone who makes decisions on the use of these benefits—including in the coastal zone—but did not provide a tool or method for doing so in concrete cases. As such, the report contributes to the debate about introducing the ES concept in Norwegian governance by identifying the role of spatial planning and the role of municipalities, but it falls short in contributing with any analysis of how this should be achieved, for instance by pointing out the need to amend or replace a rule or regulation or provide training.

One suggestion from the expert group was using payments as compensation for the use of ES. This suggestion was followed up in another official report 'Value the environment—report from the commission on green taxes' (Anon. 2015c: 15). The expert group behind the 2015 report states that the use of natural resources and ES should come at a cost and argues that a fee should be introduced on larger technical developments in areas of untouched nature. Although several of the suggestions on green taxes have been implemented, the suggested fee on nature use has not been adopted (Borge et al., 2016). Further, the expert group recommended that ongoing work on the valuation of nature should continue, and this should be based on Norwegian and Nordic valuation studies where the methods are most developed (ibid.: 127). As will be evident below, the question of methods development and choice of framework is still not addressed by the government.

On the basis of the 2013 report, the Norwegian Parliament in May 2016 adopted the white paper 'Nature for life. Norwegian action plan for biological diversity' (Anon., 2015) (*Document 9 in* Table 4). The action plan is the Norwegian implementation of the CBD strategic plan and aims defined in the Aichi targets, in particular target 17. The Aichi targets are further reflected in the three overarching national targets for biodiversity, which state that: (1) the ecosystems shall be in good condition and deliver important ecosystem services; (2) no species or habitats shall be eradicated, and the condition for threatened and close to threatened species and habitats shall be improved; and (3) a representative selection of Norwegian nature shall be conserved for future generations. The focus is therefore twofold: the ability of the ecosystem to deliver ES beneficial for humans, and the protection of biological diversity independent of these benefits (i.e. its intrinsic value). As for the use of the ES concept, the white paper includes a description and illustration of the four main categories of ES: supporting, provisioning, regulating and cultural. However, most of the identification of ES is focused on the actual habitats and species, and not so much on the services they provide. Identification is also mainly based on existing knowledge in public databases, which as mentioned have not been reorganised or adapted to accommodate an ES evaluation. The action plan tends to see the human use, and particularly the cultural category, as distinct and not an integrated part of the identification and valuation of biological diversity and ES. Hence, the focus is on the identification

of biodiversity based on nationally identified habitats and species and not on the different kind of services they produce, in particular ignoring the provisioning and cultural services from the identification. Therefore, we see no effort in introducing the ES concept in the report, but rather an ecosystem and habitats mapping.

There are, however, some considerations of how to value the benefits from nature. The action plan states that 'both national and international efforts are being made to develop better methods to visualise both valued and unvalued benefits of ES in various types of decisions and documents. With the continuation of ongoing work, the government considers it to be achieved by 2020.' (p. 53). The plan also states that the government will 'stimulate the development of methods, indicators and models to reveal the value of biodiversity and ecosystem services in a macro-economic perspective'. This should include both monetised and nonmonetised values and should be used in socio-economic analysis and in decision-making processes at different levels (p. 71). There are no reflections on who should be granted the responsibility of methods development, and no action taken to delegate the responsibility to decide on this.

To follow up on the action plan, however, the government appointed a new expert group. They were tasked to develop concrete tools to reach the Aichi targets, and delivered their report 'Assessment system for determination of good ecological condition' in 2017 (Nybø and Evju, 2017) (*Document 11 in* Table 4). According to the report, the assessments should form the basis for decision-makers' considerations of the trade-offs between societies' need for nature in good ecological condition and the safeguarding of biological diversity, including taking into account nature's ability to deliver important ES (p. 12). The targets developed are however based solely on natural science knowledge and do not include social or cultural services. The assessment system is therefore a continuation of the 'traditional' approach, without the integration of natural and social science knowledge called for in an ES approach, similar to the case with the 2016 action plan.

Empirically, Nybø and Evju (2017) developed a system to assess the terrestrial environment. The reason for this was that environmental quality targets were already developed for the oceans through the integrated management plans for the Barents Sea, the Norwegian Sea and the North Sea. Further, they argued that for the coastal zone and freshwaters, environmental targets and indicators are developed through the Norwegian implementation of the EU water framework directive: 'Regulation on the framework for water management' (Anon., 2006) (*Document 3 in* Table 4). The regulation is managed by the County Councils and covers freshwater and the coastal zone, one nautical mile from the baseline. The water regulation was already adopted in 2006, before the CBD action plan and targets and the ES approach were widely adopted. Neither the term ES nor any of the concepts related to the approach are therefore used in the regulation. It is based on ecological classification with biological and chemical indicators and rating of their condition. The regulation affects coastal governance and municipal spatial planning, because the identified ecological condition will heavily influence whether an activity will be allowed in an area or not. The regulation states that (i) when considering new activities, the sector authority must weigh the benefit to society (e.g. production of food or electricity) against the loss of environmental quality (e.g. loss of biodiversity in the water) and (ii) the social benefit of a new activity should be larger than the loss of environmental quality. The accompanying guidelines for § 12, adopted in 2015, however emphasise that (i) it is not necessary to quantify the pros and cons of the activity, (ii) unified methods for the valuation of ES and the loss of such services do not exist, and (iii) valuation, to a great degree, has to be based on common judgement or discretion (Anon., 2015b) (*Document 9 in* Table 4). As such, the guideline do not incorporates the ES concept or adopts the principles of the ES approach, something that could be expected given the work on ES in the government in 2015.

As mentioned, ES is only mentioned in one legally binding instrument relevant for the regulation for coastal zone planning; the 'Regulation on impact assessments' (Anon., 2017a) (*Document 12 in* Table 4). The PBA requires that for municipal spatial plans and area zoning proposals that 'might have substantial effects on the environment and society', an impact assessment should be carried out. The purpose of the assessment is to ensure that environmental and societal aspects are taken into account. The most recent version of the impact assessment regulation was implemented in 2017 and encompasses both strategic and environmental impact assessments (SEA/EIA), in accordance with the revised EU directive on EIA. However, even though the regulation does mention the term 'ES', it is not given any emphasis. Rather, 'ES' is listed along with 17 other factors that should be taken into account. These include landscape, aquatic environment, pollution, cultural heritage, etc. (art. 21): that is, different stressors, nature benefits and services. These would all be a part of an ES evaluation but are here treated on equal terms as the whole ES concept. Based the public comments on the regulation, ministries responsible for the regulation specified that no such assessment could be a requirement until 'easy and practicable guidelines exist' (Anon., 2014) (*Document 8 in* Table 4). Hence, the government introduces the concept, but acknowledges that it cannot be implemented effectively. The very same regulation that should provide municipalities and other public bodies with guidelines for doing impact assessments, does not provide these guidelines. The regulation does, however, require that the value of an area or service be considered for both biological/ecological and socioeconomic factors, as well as its importance and the effect of the new area use for each factor, which is then to be considered as a whole. How this should be done has not yet been clarified, and neither methods nor different ES categories have been mentioned. Yet, together these two regulations represent a first step towards implementing the ES approach into regulations pertaining to coastal zone planning.

In practice however, the clearest example of initiatives to include ES into the municipal planning system is found in the 2016 action plan (*Document 9 in* Table 4). The action plan suggested that municipalities develop nonbinding subplans for biodiversity to register and map locally important natural environments, so that environmental areas that are important from a local perspective can be identified for preservation. The municipalities should also identify and take into account ES of national, regional and local importance. It is argued that more targeted work to determine biodiversity values at the municipal level will contribute to a more holistic and predictable management of nature, and that it would strengthen the municipalities' implementation capacity in spatial planning, as well as supplement the government's work on valuing and protecting the environment (Anon., 2015, pp. 148–149). A pilot project involving five municipalities was launched in 2016, with five additional municipalities joining in 2017 (Anon., 2017b). As of late 2018, six out of ten municipalities have adopted the subplans, and the remaining four are expected to approve their plan by mid-2019. As for the use of the ES concept, only two of the approved plans mention ES explicitly and in some detail. Like the reports mentioned above, the municipalities have mapped nature types and areas. There was no use of developed frameworks to identify and value ES, as in the Nordic studies, nor any attempt to explore the connections between ecological and human systems. Based on the review above, it is reasonable to conclude that this could not be expected as no guidelines have been provided to the municipalities.

5. Discussion and conclusion

The review of relevant Norwegian official reports, acts, regulations and background papers demonstrates how the ES concept has been introduced into Norwegian environmental and spatial planning policy documents. We find that the introduction has been gradual. The policy documents provide information about the concept and empirical descriptions of nature types. The work is, however, based solely on biodiversity considerations. Even when acknowledging the need to integrate environmental and socioeconomic knowledge, as well as

scientific and local knowledge, there are very few examples of this actually being done in policy processes, as opposed to some of the scientific assessments. So far, introduction of the ES concept in Norway has not captured the system interdependence that is at the heart of the concept. Hence, documents aimed at introducing the concept into Norwegian environmental policy fail to provide the necessary tools for practitioners to undertake ES analysis or implement an ES based approach to coastal zone management, as evident by its inclusion in the regulation on impact assessments and the encouragement for municipalities to develop subplans for biodiversity. We therefore find that the ES concept has not really been effectively integrated into national policy in a coastal context. The term is mentioned in relevant regulations, and much effort has been devoted to map and consider biodiversity at a national level; however, ES terms and methods to apply the concept in day-to-day environmental and coastal zone governance have not yet been provided. When it comes to regulations, adoption of the ES concept is carried out in a very general manner, more as an appendage to established criteria than as a new way of identifying and valuing, as well as making decisions on the use and protection of natural resources and the environment. So even though the concept is moving down the implementation ladder, starting with official and expert reports, via parliamentary reports into specific regulations and guidelines, the practical implementation and application of the concept is to a very limited degree clarified, as is the understanding of the term itself. Hence, the use of the concept leaves much to be desired. The question, then, is whether a transformation towards a real integration of the ES concept into governance will take place in Norway, or whether it will merely end up as a shallow practical reform? Related to this is a further question as to whether there are structural challenges to introduce the concept in Norwegian coastal governance and coastal zone planning in particular.

5.1. Challenges when it comes to institutional fit, ES and municipal coastal zone planning

The ES concept provides tools to categorise knowledge on ecosystems, the services they provide and their value. Even though the government with the pilot project on the subplans for biodiversity has taken an initiative to make municipalities participate in the identification of important natural environments in their communities, the collection and compilation of data on nature types and biodiversity take place at the national or regional level, or not at all. This task is allocated to directorates and subordinate units, each with a distinct responsibility for a sector or issue area. It is therefore reasonable to state that the Norwegian legal and institutional system is not arranged so as to apply the ES concept in coastal governance, with its dedicated sector agencies and sectoral knowledge production. The existing governance system is not currently *fit* to integrate the ES concept, because the multilevel and multiscale governance system is not structured to accommodate such an intersectoral and interdisciplinary approach. Sector authorities operating under different Ministries with their own mandate and rationale are not necessarily inclined to undertake changes or adjustments that do not fit into existing practices. Further, there seems to be no political will to make the necessary changes to facilitate or demand such intersectoral and multi-level coordination.

The municipal planning system, in contrast, should be very well suited to take on this task. As the main actor in spatial planning, where all the relevant interests should be considered before allocating space for different uses and non-uses, the municipality acts like an integrating body, responsible for ensuring that changes in spatial use are ecologically, economically and socially sustainable. However, there are several challenges. Municipal coastal zone planning is based on existing knowledge. As mentioned, there are established institutions for obtaining different kinds of information and making it available to municipal planners (and others) in public databases. These databases provide a great deal of information needed for ES considerations; at the same time, the information is not tailored to make ES valuations. The knowledge available for municipal planners is therefore not produced or presented as ES, and there is very limited capacity to produce new knowledge during a coastal zone planning process in the municipality. Our finding from Norway therefore supports that of Bouwma et al. (2018), which states that environmental governance is so sector driven that it prevents integration of the valuation of the different services that nature provides, as called for in the ES concept. The exception might be the mandatory municipal SEAs, where the trade-offs between different uses or non-uses of natural resources are considered before making decisions. However, even though impact assessments seem to fit with the integrative idea of the ES concept, there is a need for adapted knowledge, clarification of methods and training.

5.2. Incremental changes—gradual change or shallow reform?

No radical changes to established practices have been made in Norway so far to integrate the ES concept into environmental or coastal zone governance. Through this review, we rather identified what can be termed an incremental change. Recalling the argument from Mahoney and Thelen (2010: 3), gradual changes can be of great significance. Gradually unfolding changes may indicate to what degree we see a situation where the new replaces the old over time, or whether we are simply witnessing a process of policy layering where (owing to path dependency and institutional inertia) a term is introduced without any real practical implications.

It is too early to decide whether the slow progress of introducing the ES concept into Norwegian policy is due to institutional resistance or rather an institutional inertia where it takes time to internalise new concepts and consequently change practices. Support for the latter can be found in the latest revision of management plans for the oceans, mentioned above, where the rationale for applying an ES approach was that it would make the non-commercial value visible. According to the report from the Forum (Anon., 2018), this exercise was useful because research and management institutions cooperated to transform a complex and academic term into a management tool. The experience was, however, that (i) there was a need for natural and social sciences to work even closer together and (ii) if the concept was going to be used in the management plans of the seas, there would be a need to revise existing practices of collection of knowledge, cooperation and organisation of the work. Again, there seems to be a lack of discussion on how the concept should be used, how it should be implemented, and who should provide or decide on which tools to undertake environmental governance based on the ES concept. While the methods used in the Forum report (Anon., 2018) for identifying services and benefits might potentially provide a basis for future guidelines aimed at municipal planning, certain issues remain. An important difference between the management plans for the seas and the municipal spatial planning, besides the huge difference in geographical scope of the plans, is the distinct top-down processes of the ocean plans and the much more multi-level structure and diverse user interests of the coastal zone. This comes in addition to the aforementioned issues related to the existing knowledge not being in an ES-format and the limited capacity for carrying out assessments and mappings in the municipal planning process. Applying an ES approach to coastal zone planning would clearly require a revision of existing practices, in both municipalities and sector agencies.

Continuing down the same path with no clarification on the practical use of the concept will prevent the concept from being fully integrated into Norwegian coastal zone governance, basically keeping it on shallow ground. Effective coastal governance requires, among other, clear direction through precision in articulations, coordination of the roles, functions and mandates of different bodies, and active development of capacity, including skills and resources (Bennett and Satterfield, 2018). To apply an ES approach, there is a need to develop practical guidelines to consider the services, values and trade-offs

between the different uses or non-uses of natural resources. To do this, the municipalities need tailored tools, adapted to the multilevel and multiscale governance system in Norway, i.e. clearer directions. Further, providing concrete tools or methods will ensure a standardised integration of ES-based governance rather than different practices being developed in the many coastal municipalities in Norway, thus improving coordination, and contributing to capacity-building through improving skills (ibid.).

Whether the ES concept is useful for decision- and policy-makers is a key question for McKinley et al. (2018), who argue that the ES concept has been framed as a tool to create a common language and communication that supports more effective dialogue between diverse stakeholders. Yet, they find that there is a lack of explicit ES content across environmental regulations in their study of the management of saltmarshes in Wales. Whether this is a case of a knowledge–governance gap (i.e. a gap between the science and its inclusion in policy) or a case of ES as a concept being too complex for explicit inclusion in national-level governance instruments is unclear (ibid.). As the review above demonstrates, these questions are central in Norwegian coastal governance as well. Thompson et al. (2016) pointed out that the term ES should be treated as technical jargon that is not common knowledge. To a certain degree, this finds support in the Norwegian experience. According to planners and bureaucrats in Norway, the term is too theoretical and needs to be operationalised and made understandable through specific examples if the concept is to be used in municipal planning processes (Hersoug et al., 2019). Thus, including the term ES in the regulation on impact assessments without any guidelines as to how it is to be understood seems highly premature at this point. As Bäcklund and Mäntysalo (2010) warn against, adding new policy layers to institutions that are not adept at undertaking the actions required by the new concept may even constitute a source of institutional ambiguities if the result is a shallow practical reform that widens the gap between planning theory and practice. However, we should acknowledge the relative novelty of the concept and the time it takes to transform a theoretical concept (via the scientific development of methods and frameworks to undertake such analysis) into practical implementation in policy processes.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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