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To cite this article: Bente Sundsvold & Claire W. Armstrong (2019) Found in translation: identifying ecosystem services through public consultation statements in a marine spatial planning process, *Ecosystems and People*, 15:1, 102-118, DOI: [10.1080/26395916.2019.1596982](https://doi.org/10.1080/26395916.2019.1596982)

To link to this article: <https://doi.org/10.1080/26395916.2019.1596982>



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Published online: 15 Apr 2019.



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Found in translation: identifying ecosystem services through public consultation statements in a marine spatial planning process

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ABSTRACT

There has been a widespread push to incorporate ecosystem services (ES) in research and policy-making, yet ES have remained an expert-driven discourse not well integrated into hands-on planning and management, particularly at the more local levels. We carry out a retrospective investigation of an inter-municipal marine spatial planning (MSP) process in Northern Norway, where the allocation of new aquaculture locations was a core issue. At this local/regional scale, the concept of ES is hardly known. Thus, our approach is to investigate the documents of public consultation, where different stakeholders operating at different scales respond to the proposed planning document. By analyzing and ‘translating’ the consultation statements into the ES nomenclature, we find a rich and diverse basis for ES identification especially at the local level and within cultural and supporting services. More than 208 different ecosystem services were identified, two-thirds of the total number of services at the local scale. This supports the debate in the ES-science community, which has suggested greater inclusion of plural and context-specific perspectives on people’s relationship to the environment. Our findings show that by doing so in MSP, municipal coastal planners may obtain tools that strengthen local democracy and include greater ES diversity and sustainability.

ARTICLE HISTORY

Received 12 July 2018
Accepted 12 March 2019

EDITED BY

Sarah Klain

KEYWORDS

Marine spatial planning; ecosystem services; bundling; participatory planning; Northern Norway; public consultations statements; discursive approach

1. Introduction

Since the Millennium Ecosystem Assessment (MA 2005) there has been an increasing interest in how ecosystem services (ES) may inform political decision-making in the management of natural resources. A growing number of projects, reports, and articles focus on how ES may be incorporated in marine spatial planning (MSP) (Arkema et al. 2013, 2015; McKenzie et al. 2014a; Outeiro et al. 2015; Ruckelshaus et al. 2015; Verutes et al. 2017), yet there are few examples of ES explicitly being included in MSP processes and influencing the decisions (Beaumont et al. 2017; Drakou et al. 2017a). Indeed, the ES concept is not well known outside the scientific milieu, and this is also the case in the MSP process studied here. We, therefore, carry out a retrospective investigation of an actual inter-municipal MSP process, using public consultation statements to identify ES for the purpose of understanding better if and how ES is relevant for MSP processes at the municipal level. MSP processes integrate multiple uses and interests in order to make informed and coordinated decisions regarding sustainability in marine environments. The top-down desire for ES inclusion in plans has often not trickled down to actual hands-on planning processes (Guerry et al. 2012; Arkema et al. 2015; Ruckelshaus et al. 2015). Potential reasons for this may be that the ES

approach stems from the international and national scale, and academic expertise with limited connections to local management levels, and vice versa. Within academia, there is also a critique of ES due to the emphasis on monetary valuation of ESs and the tendency to sculpt ‘nature’ into a positivistic language and understanding, very distant from laymen’s perceptions of the environment (Gómez-Baggethun and Ruiz-Pérez 2011; Sullivan 2014; Silvertown 2015). The International Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) has attempted to attend to some of these objections, for instance by suggesting the replacement of the ‘ecosystem service’ concept with ‘nature’s contribution to people’ (Díaz et al. 2018), creating more distance to the often market dominated perceptions of what services include. Fully aware of these developments, we apply the MA (2005) ‘ecosystem service’ concept in our analysis, although we incorporate the IPBES emphasis on indigenous and local knowledge in order to open up for a more ‘grounded’ and diverse perspective on nature and environment (Díaz et al. 2015; Pascual et al. 2017). The main reason for sticking to the MA (2005) service framework is the fact that it includes supporting services. We find that such services are highly relevant in our study, and the newer frameworks (TEEB 2010; CICES 2013; IPBES 2017) have largely excluded these services, presumably due to the

dangers of double counting if valued (Fu et al. 2011). We employ the local knowledge aspects recommended by IPBES, avoiding monetary valuation, but rather using stakeholders' perceptions of how the marine environments contribute to their well-being, based on their statements in an actual MSP process. We then translate these statements into ES categories. The ES identification is approached multidisciplinarily, via the collaboration of a resource economist and an anthropologist. Thus, we use the MA (2005) ES framework, but also apply the anthropological perspective of 'the local point of view' (Geertz 1993), whereby the public consultation statements give interesting vantage points related to a concrete planning process. The title 'Found in translation' refers to the act of trying to combine ideas about human-environment relations from two distinct worlds, the global expert-oriented universalism of ecosystem services through the MA (2005) approach, and the local knowledge people address in a concrete planning process. By trying to act as translators between distinct different worlds of expert in ecosystem service assessments and local people who care about their environment in a specific MSP process, we hope to shed light on the potential of ES in planning decision-making, as well as the relevance of local knowledge in ES assessments.

An MSP process settles issues of allocations in three-dimensional marine space within a framework which balances demands for economic development with the need to protect the environment (Douvere 2008). Like ES, MSP is also a supranational phenomenon which needs to be incorporated into different national legal frameworks of marine management and planning (Maes 2008). MSP relates most often to the Ocean Commons (Ehler and Douvere 2010; Drakou et al. 2017b) where scientists, national and sector authorities are the main actors, while planners have been more marginal (Retzlaff & LeBleu). In the MSP literature the challenges of stakeholder engagement are discussed (Pomeroy and Douvere 2008; St. Martin and Hall-Arber 2008) and for the coastal commons, this is even more important. While the ocean commons is distant from most people's everyday lives and is addressed by designated stakeholder groups with legitimate industrial/economic interests, the coastal areas are used by many (Pomeroy and Douvere 2008; Drakou et al. 2017b). Thus, the stakeholder group perspectives become blurred and municipal MSP requires proper attention to the participatory aspects of the planning process (Agrawal 1995; Swyngedouw 2005). The issue of such broad stakeholder interest must also be considered in developing suitable ES assessment methods (Hardin 1968; Luck et al. 2012; Ostrom 2015).

Having closely studied a public consultation process containing 76 written public consultation

statements, we find that although the specific ES nomenclature is not present in the statements, they constitute a rich source of what people value in the actual planning area. We translated the wording of the statements into ES categories, applying a discourse analytical approach. Thus, we also need to describe some of the institutional contexts and discursive themes that may have contributed to the accentuation of the statements. By translating the statements into the ES categories, our aim is not to insist on adopting ES in MSP processes, but rather to gain a better understanding of how local actors potentially may contribute to the further identification and development of an ES framework. Thereby, this study may contribute to improve existing practices of integrated ecosystem-based approaches in MSP processes at the municipal planning level.

Our research questions include: first, as ES are unknown concepts for most people involved in this planning process, how can we approach an ES assessment in a way that acknowledges people's own knowledge of and their relations to these specific planning areas? Second, what ES are identified by translating the public consultation wordings into ES? Finally, an MSP process is a multi-scale assessment, and the statements stem from local, regional, and national scales. In our inductive approach scale becomes a relevant variable, and we ask how scale may influence the identification of ES, and what potential the findings may have for future MSP processes.

The paper is organized as follows: The next section presents the background for the MSP process, followed by a description of the process itself (part 2). We present the method (part 3) and results of the ES translation of the public hearing statements (part 4). Finally, we discuss our findings and their potential relevance for MSP and for the further development of ecosystem service approaches (part 5).

2. Municipal MSP responsibilities and inter-municipal collaboration

MSP in the Norwegian context is basically organized in two major approaches. The ocean commons are governed by the national authorities, while the coastal commons, spanning from the shore (middle low tide) to one nautical mile into the ocean from the baseline, is governed by municipal authorities through the Planning and Building Act (PBA).¹ The municipal MSP is a designated area plan within the larger municipal planning system, where it is up to the municipalities to determine the needs for planned areas based on their planning strategy. The MSP in Norwegian coastal commons is a relatively new phenomenon, which emerged from the need to regulate a growing aquaculture industry (Sørdahl et al. 2017). Through

a revision of the PBA in 2009, environmental sustainability was included in the mission statement, and inter-municipal planning was highlighted as a potential tool for this for several reasons; 1) It might strengthen environmental concerns since ecosystems do not follow municipal borders, and 2) In small municipalities' planning competence may be lacking or very limited, and by collaboration this may be mitigated. However, in inter-municipal planning, the individual municipality has the final say in the municipal decisions, as stated in PBA.

In the case of the MSP process in Troms County, aquaculture was the major topic accentuated in the inter-municipal coastal plan. In order to understand better what the public consultation statements were responding to, we will give some contextual information about the discourses on aquaculture, since national strategies for growth in this industry contributed to sculpt the planning discourse and the responses in the public consultation statements (Hajer 1995; Foucault 2002).

2.1 Allocating space for aquaculture

Coastal ecosystems are among the most productive, yet highly threatened ecosystems of the world (MA 2005). Norway has one of the longest national coastlines worldwide, spanning 57 000 km (including the myriads of islands, fjords, and islets), with a population of five million people. More than 75% of the population live in municipalities with a coastal shoreline,² and the sea has historically had a major impact on coastal livelihoods and settlements (Brøgger 1925; Kolle 2014). Along the coast combinations of fishing and small-scale farming secured subsistence in the fisher-farmer adaptation for centuries (Brox 1972; Kolle 2014; Sundsvold 2015). During the last century, new marine and coastal industries have evolved, such as industrial fishing, shipping, oil, and gas, as well as aquaculture, transforming both the national economy and coastal life. Today aquaculture is the most promising blue growth industry, which the Norwegian government hopes can secure national economic growth when the oil wells dry up (Anon 2015b; Fiskeridepartementet, 2014–2015). Norwegian aquaculture started in the 1960s, driven by a natural environment that provided sheltered localities with good circulation and advantageous climate, and by local pioneers of small-scale enterprises with public support aimed at regional and local development. In the 1990s the policy changed and aquaculture entered its industrial phase, with concentration of ownership and listed companies, largely abandoning local ownership and anchoring. Since the 1960s aquaculture has grown tremendously, and today Norway is the largest producer of farmed Atlantic salmon (Hovland et al. 2014). The ambitions

of the government are to develop the aquaculture industry further, where a five-fold increase in the farmed salmon biomass within 2050 is a stated goal (Olafsen et al. 2012; Anon 2015c). Although there are rapid technological developments in the aquaculture industry, which are expected to move the industry further offshore, most of the contemporary aquaculture activities take place within the municipal MSP areas. Thus, the government is urging the municipalities to update their coastal plans and has provided financial support for initiating municipal and inter-municipal MSP planning processes administrated through the County administrations (Sørdahl et al. 2017). For local politicians the government initiatives are welcome. Allocating space for future investments in aquaculture may provide new possibilities for local employment and economic development, thereby mitigating the depopulation threat plaguing most coastal municipalities in our case study.

Although economic growth through aquaculture may be understood as the main driver of change in this MSP process, also contributing to the discourse formation (Hajer 1995), there is nonetheless a strong counter-discourse related to environmental and biodiversity concerns. One major concern is the negative impact salmon farming has on wild salmon (*Salmo salar*), as well as other anadromous fish, such as sea trout (*Salmo trutta*) and sea char (*Salvelinus alpinus*). The main issue is the increase of salmon lice (*Lepeophtheirus salmonis*), a parasite which feeds on the skin of anadromous fish and may cause distress and deadly infections. Salmon lice is part of the wild salmon's environment, and it is the increase in its prevalence with the high density of farmed salmon along the coast which constitutes the central problem (Anon 2015c). The salmon lice prevalence serves as the main indicator for the health status of the salmon farms, and thus their abilities to grow.³ Diseases and use of medicine, as well as genetic pollution from escaped farmed salmon, are also great concerns. Norway has a particular responsibility to protect the wild stocks of Atlantic Salmon (*Salmo salar*), and substantial effort is put in place to do so (Anon, 2006–2007). National authorities have designated 29 national salmon fjords and 52 national salmon rivers, to protect the wild salmon. In our case study, one river and one fjord have national protection, while there are 28 salmon rivers in the area (Anon 2015a).

2.2. Inter-municipal MSP – a case study from Northern Norway

The MSP process we study here consisted of 13 collaborating municipalities in the middle- and southern region of Troms County (see map below in Figure 1). The municipalities vary in sea area, demography, as well as economic activities. Population-wise there are

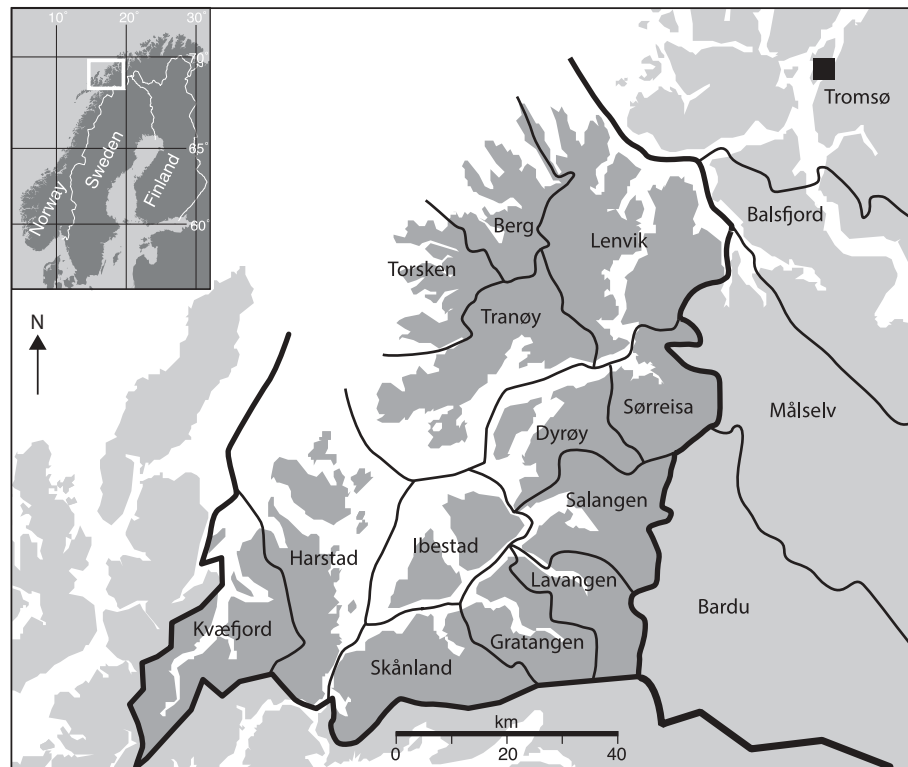


Figure 1. The planning area in Troms county, Northern Norway, consisting of 13 municipalities.

two urban municipalities, while the remainder is largely rural, with populations varying from 25 000 in the urban municipality of Harstad, to 913 in the more rural Torsken. Seven municipalities have less than 2000 inhabitants, while the rest range between 2000–3500 inhabitants.

In this inter-municipal MSP process, the municipalities delegated their planning authority to an inter-municipal planning group, consisting of one representative from each municipality in one political and one administrative forum. The project organization lasted throughout the planning period, but the final political decisions concerning the specific municipalities were taken by the municipal councils themselves. The regional councils and the county administration formed a board of directors. They chose to hire a project leader to run the process in close collaboration with the regional and county councils.

The MSP process lasted for approximately three years (Figure 1). The first year (2013) was used to clarify the mandate of the plan program. The objective of the plan was expressed in line with national strategies to: ‘*provide marine industries possibilities for growth and increased production based on the principles of sustainable development*’ (Anon 2015a). All sector authorities were invited to attend early in the process, coordinated on the county level, through a Regional Plan Forum. In the program plan phase, four stakeholder groups were invited to contribute and identify their needs and views. The stakeholder groups addressed aquaculture interests; fisheries

interests; port and transport authorities and the military; tourism interests as well as outdoor recreational and leisure fishing interests (Anon 2014). Public information meetings and hearings were held during the program plan, as well as during the plan phases.⁴ The project group also encouraged each municipality to run open public meetings based on collaborative mapping methods, in order to get local inputs on peoples’ knowledge, activities, and interests related to the proposed aquaculture locations. Some municipalities organized participatory mapping meetings in both phases and used the meetings as an arena to map local use of the areas, while other municipalities did a minimum of what PBA requires; information, public town hall meetings, and public hearings. In these municipalities, *ad hoc* local protest groups organized their own public meetings, with high level of conflict and media attention. These meetings also organized petitions in the public consultation statements. The largest urban municipality, Harstad, had several such protest meetings organized by the surrounding village populations.

From the spring of 2014, the plan itself was developed. According to the PBA, all new enterprises influencing environmental and societal concerns must be assessed. Thus, the plan proposal included 125 impact assessments where 109 of these referred to new and expanded aquaculture sites, the rest to sites for dumping of gravel, and harbors for recreational vessels. Several themes were assessed, such as biodiversity issues (wild salmon rivers, nature reserves and types, red-listed species), pollution, cultural heritage,

and societal issues (recreation, jobs, fairways, Sami issues, tourism, military, etc.), as well as risk assessments.⁵

The public consultation process lasted for 6 weeks (March 12–30 April 2015). The project group received 76 statements from individuals, groups, NGOs, private firms, public authorities and sector authorities. We will present these further in part 4.3 linked to scale association. The public consultation statements came from 10 different municipalities, where Harstad accounted for approximately 30% of the statements, a further 30% were concerned with the whole area or several municipalities, and the remaining were spread over nine municipalities with less than five statements from each.

3. Analytical approach and method: identifying ES through public consultation statements

Many of the public consultation statements came from local people. They caught our attention because of their richness and the way they differed from the official MSP documents. There were long letters of concern, describing in rich detail how the area was used by the person(s) behind the statements. Another characteristic of the statements was that almost all referred to aquaculture, and to specific aquaculture locations in the vicinity of the statement sender. We decided to try to code the statements into ES categories and use these to explore the potential of ES in municipal MSP.

We apply a discourse analytical approach to the analysis and translation of the public consultation statements. A discourse analysis does not primarily emphasize what is said, done or written, but tries to understand the institutional context for what is considered relevant or meaningful to express (Hajer 1995; Järvinen and Mik-Meyer, 2005). In part 2, we have provided some contextual information and references to relevant documents and discourses in order to understand the institutional framework of municipal planning in Norway, and how aquaculture became the main driver and discursive theme of this MSP process. Thus, public consultation statements are largely confined to this specific context of relevance. If the main driver had been windmills or tourist fisheries, we expect that the wording of the statements might have been different.

The archive of the planning process was supplemented through interviews with the project leader, planners at municipal and regional level, politicians, stakeholder group members (NGOs), sector authorities, and a few of the private persons that protested the plan through the statements. In this article, these interviews are used mainly to enrich our descriptions

of the institutional context of the planning process above and to inform our analysis.

We have categorized the statement providers as private persons, NGO/group, public institutions, and private companies. These categories are as such incomparable and have also different status in the MSP process. Sector authorities may object on the basis of sector jurisdiction, and the statements are confined to the legal aspects of their jurisdiction. These objections must be negotiated before a valid decision can be made by the municipal council, while the comments can be ignored in the decision-making (Plathe and Ståvi 2012). In our exercise, we have disregarded these dimensions since our scope here is not to evaluate the influence of the statements on the decision-making. Our scope is rather to explore if and how these documents may expand the variety of identified ES of this coastal planning area. In this regard, our ambition is to link ES categories to scale. In MA (2005) the concept of *scale* refers to the physical dimensions, while *level* is used to describe the discrete levels of social organization. However, since we explore MSP processes from a social science perspective, we use a scale with reference to the planning discourse. Thus, we use local, regional, and national scale, with reference to the socio-political dimension of scale, the scale of each administrative level's 'jurisdiction' or ability to make or influence decisions. This mirrors the principles of administrative dynamics of MSP in a Norwegian context mentioned above and enlightens aspects of power, which is often overlooked in many ES assessments (Berbés-Blázquez et al. 2016). Socio-political scale may coincide with geographical scale, but not necessarily.

There are large qualitative differences among the statements. The statements amounted to approximately 500 pages and varied from short handwritten letters, emails, maps, and photos to larger statements in the shape of reports. A letter of a few sentences may contain many ESs, while a long report might only contain a few. Often the long reports address the political processes or administrative and legal issues rather than describing a situation of actual use of the area. This counts both for the sector authorities, the municipal authorities and the aquaculture companies.

Based on the written statements we have translated and coded specific phenomena mentioned into the conceptual ES framework (Dahler-Larsen 2005; Suddaby 2006; Diaz et al. 2015; Järvinen and Mik-Meyer 2017; van Oudenhoven et al. 2018). For instance; one statement says: 'This area has been and is used by local fishers, and has been used for subsistence fishing (*matauk*) for generations, and MUST be classified as a fishing and spawning ground'. In this single sentence we identify four different ecosystem services: two provisioning services

(commercial fishing and subsistence fishing), and two supporting services (fishing area and spawning ground). Every time a new service was observed, it was noted and sorted into the four MA service categories (MA 2005). This process was carried out twice for control by two researchers, in addition to several checks being made later.

In order to highlight the diversity and detailed knowledge of the statements, we have included all the species mentioned in the statements. This means that when species are related to one service, fishing for cod, halibut or seithe, each species count as a provisioning service. When the statement refers to supporting services, such as a spawning ground for cod, halibut or Norway haddock, each species counts as a supporting service. However, if one statement refers to the same concern, for instance 'cod fisheries', several times, we have only counted this *one* time, as one service, in each statement.

In the categorization, we have given weight to the emic meanings of the statements (Corbin and Strauss 1990). Some statements may refer to 'fishing for coastal cod' in a context of providing income or subsistence to the household (provisioning service), while others refer to fishing for coastal cod as a recreational activity or as aspects of nature conservation since the coastal cod is red-listed (cultural service). We have therefore added sub-categories under each ES category, in order to explore if our identification of ES based on contextual interpretation of the wording, might provide information about what was at stake in this planning process in a broader stakeholder perspective. The analysis of the subcategories was made in the NVivo software program.

4. Results

In the following, we present the output of our analysis of the wordings in the stakeholder statements.

4.1 Identified Ecosystem services by wording – input into ES diversity

In Figure 2 we have summed up the wording used in the statements that we have translated into particular ES. This figure refers thus to the diversity of identified ES based on the written statements.

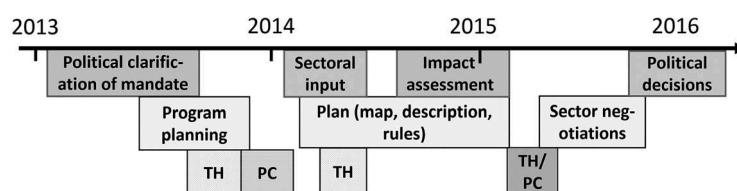


Figure 2. The marine spatial planning process, from its initiation in 2013 to final decisions in 2016. PC are public consultations, TH are town hall meetings. The public consultation studied here was carried out after the impact assessment, in 2015.

Based on the coding of the consultation statements, we identified 29 provisioning services, 6 regulating services, 86 cultural services, and 87 supporting services, a total of 208 *different* ecosystem services. Cultural and supporting services are by far the services that are mentioned the most, constituting more than 80% of all the mentioned services, equally distributed between the two services, while provisioning services constitute 17%, and regulating services are hardly mentioned (<1%).

Some services are mentioned by several stakeholders. Figure 4 shows how the different services are distributed in all the statements. The total number of mentioned ES is 651, a triplication from the diversity of services in Figure 3 (208). However, the percentage distribution between the two figures (Figures 3 and 4) is almost identical. Cultural (252) and supporting (279) services constitute more than 80%, while provisioning (112) services constitute 17% and regulating (8) services less than 1%.

Figure 5 shows what kind of themes or sub-categories the wordings of the statements entail. The sub-categories used refer to an adjusted marine version of the largely terrestrial MA (2005) overview of different services (Armstrong and Foley 2018), adjusted further to try to account for the content of the wordings.

Among the **supporting services** (green color) habitats were mentioned by far the most, 182 times. One hundred of these relate to spawning, juvenile and fishing places with reference to specific species as cod, wild salmon, Norwegian haddock, seithe, halibut, etc, and 18 of these to brooding places of specific seabirds. The rest had general references to spawning, juvenile and fishing places.

Since the relationship between wild and farmed salmon is critical for the growth of salmon farming, both from a political and a sustainability perspective, we decided to include a category for migratory routes of anadromous fish, such as salmon, sea trout and sea char. There are 14 references to migratory routes of anadromous fish in the statements, which are also included in the habitat sub-category.

The category abiotic supporting services refers to the use of the sea for traffic, harbors, anchoring, marine fish storage, cables, military use, etc., which counts a total of 61 references.

Provisioning (29)	Regulating (6)	Cultural (86)	Supporting (87)
Subsistence fishing (<i>matauk</i>)	Waste disposal sites	Coastal trail, aesthetics, outdoor life, recreational fishing, tourism, cultural landscape, bathing place, marine cultural heritage,	Spawning ground, fishing place, juvenile areas, for Norway haddock, coastal cod, shrimps, pollock, seithe, halibut, European plaice, Atlantic salmon, herring, tusk, lumpfish, trout, sea char
Coastal commercial fishing	Sewage recipient	Red-listed birds such as white-tailed eagle, golden eagle, Lesser Black-Back gull, Kittiwake, common gull, puffin, Arctic skua,	Sea transport, fairway (farled), site for disembarking, anchoring sites, fish harbors, small craft harbor, landing place (båtstø), deep water port
Specific fisheries of coastal cod, pollock, Norway haddock, haddock, seithe, shrimp, redfish, tusk, ling, halibut, mackerel, herring, wolfish, flatfish, lumpfish, lemon sole, trout, European plaice, ling	Waste absorption from salmon farming	Red-listed fishes like Norway haddock, coastal cod, flatfish, halibut, Atlantic salmon, sea trout, lobster,	Military training area
Fish farming Atlantic salmon	Seawater quality provider	Crustacean, sea urchins	Migration routes for salmon and trout, Spawning cycle of trout,
Fish farming seatrout	"Firegates" for diseases	Desire to live here (<i>bolyst</i>)	National salmon fjord
Pound net salmon fishing	Disposal sites for ammunition	Research on European plaice and lumpfish	Net pen site,
Salmon fishing at sea		Nature reserve	Brooding site for white-tailed eagle, golden eagle, gulls, wading birds, terns, common eiders, puffins, kittiwake, common gulls, Great Black-Backed gull, herring gull, Lesser Black-backed gull, oystercatcher, water birds, ducks, geese,
Seaweed farming		Recreation, pleasure cruising, adventure tourism, next generation, landscape aesthetics, seabirds, animal life, home-sea (<i>heimhav</i>), ocean/sea common, fishing landmarks (<i>méder, sette- og tilroerplasser</i>), fish tourism, Sami cultural heritage, protected coastal fort, kayaking, quality of life, well-being, visual loss, anadromous wild fishes, boat tourism, pristine nature,	Bird sanctuaries,
Mussel farming		Hunting, sailing, rowing, kiting, windsurfing, diving, whale safari, photographing, seal hunting, camping, salmon angling, coastal cod, sea trout, cormorant, otter, bird watching, protected landscape area, sports angling research, sea char, humpback whale, killer whales, arena for knowledge transmission to new generations, nature diversity, animal life, beach life, paddling, courses in paddling, national shrimp fjord,	Bathing site,
Sami fjord fisheries		Sami culture, customary use, cultural heritage,	Corals
Kelp harvesting		Endangered nature types, universal access fishing place, right to access beaches (<i>strandrett</i>), right of access from the sea (<i>tilflottrett</i>), northern light adventures.	Eelgrass fields, kelp forests,
			Estuaries, mussel fields, shellfish
			Sea water supply for industries, stabilizing quick clay areas, fjords give shelter for storms, water currents, sea-bed qualities,
			Spawning ground for herring as food for whales,
			Biodiversity
			Interim storage for cod, submarine cable areas,

Figure 3. Diversity of ecosystem services mentioned in the consultation statements.

There are 18 references to biodiversity as a supporting service. These wordings refer to specific fishes, sea birds and sea mammals, as well as to nature reserves, and time closure regulations.

Among the **cultural services** recreation such as the outdoors and boating rank highest (58), followed by biodiversity referring to different red-listed species, fish, seabirds, and mammals (46), and to tourism and tourist fisheries (32). We made a separate category for recreational fishing (29) since we saw during the analysis that fish-related activities are important in most services. Cultural heritage was referred to 26

times, and reference to aesthetic dimensions, such as wilderness qualities, landscape aesthetics, visual impact, were made 24 times, while sense of place (11) and bequest values (5) were referred to the least. Sense of place refers mostly to people describing their thriving and desire to live in a particular place.

Among the **provisioning services**, fishing activities are dominant; fisheries and subsistence fisheries (*matauk*) are mentioned 32 times. As with the supporting services, species specific fisheries were referred to 62 times. Aquaculture is mentioned 16 times, with two references to seaweed- and mussel farming.

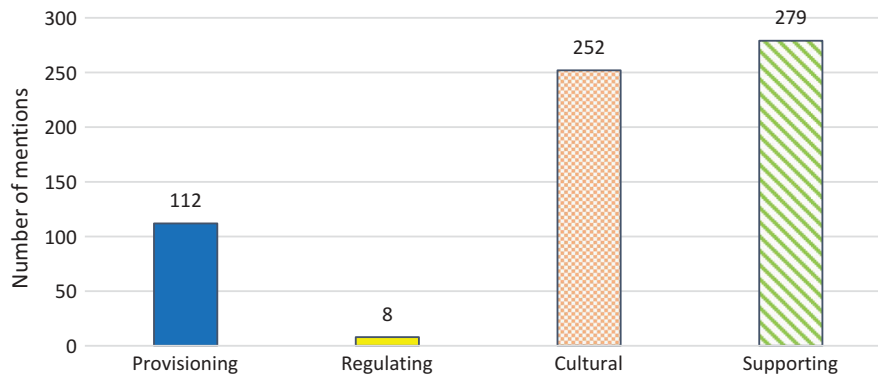


Figure 4. The number of times different ecosystem services were mentioned in the consultation statements.

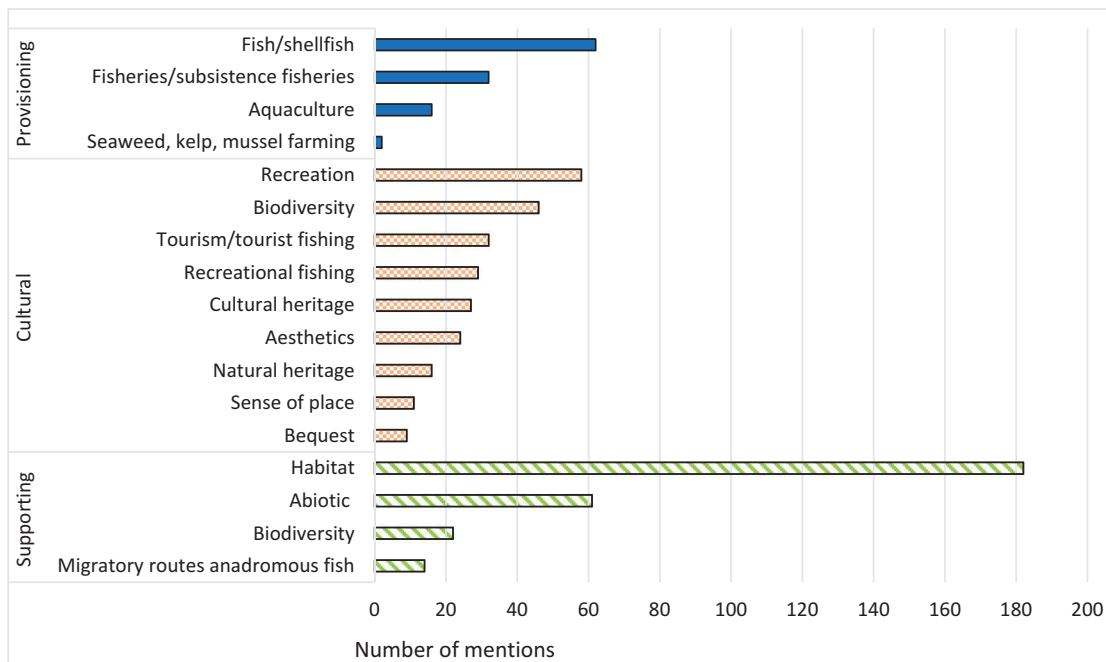


Figure 5. Sub-categories of ecosystem service wordings – number of mentions.

Regulating services are hardly mentioned in the statements, so we did not subcategorize them. From one perspective this might not be very surprising, since regulating services often refer to life-processes one needs to be an expert to address. There are many references in the statements to the polluting effects of aquaculture (salmon lice, feces, medicine use, spill of fodder, etc.), which could be categorized as disservices and with connotations to regulating services. However, we decided to count them only if these concepts are mentioned directly in relation to nature's ability to reduce their disservices.

4.2 Stakeholder groups and their associated scale

In the introduction, we ask whether or potentially how, a public consultation may retain information that on the one hand can inform the very expert oriented discussions on ecosystem services, and at the same time contribute to finding ways of securing

a more sustainable and stakeholder grounded MSP – process at the municipal planning level. In this regard, getting a better understanding of who the stakeholders behind the statements are, and how they are distributed on different scales, is worth exploring. By scale, we mean the socio-political scale of local, regional, and national relevant for the planning system (see part 2). We have therefore divided the respondents into three groups depending on whether they operate at a local, regional or national scale, where the distribution of statements is as shown in Figure 6.

Figure 6 shows that 70% of the statements stem from the local scale (53), while regional (11) and national (12) scale are represented with 15% each. In addition, the respondents at each scale have been identified to be (1) private persons, (2) ad hoc groups/NGOs (Non-Governmental Organizations), (3) public institutions, or (4) companies. Figure 7 shows how the statements are distributed for each stakeholder category on the three scales. We use

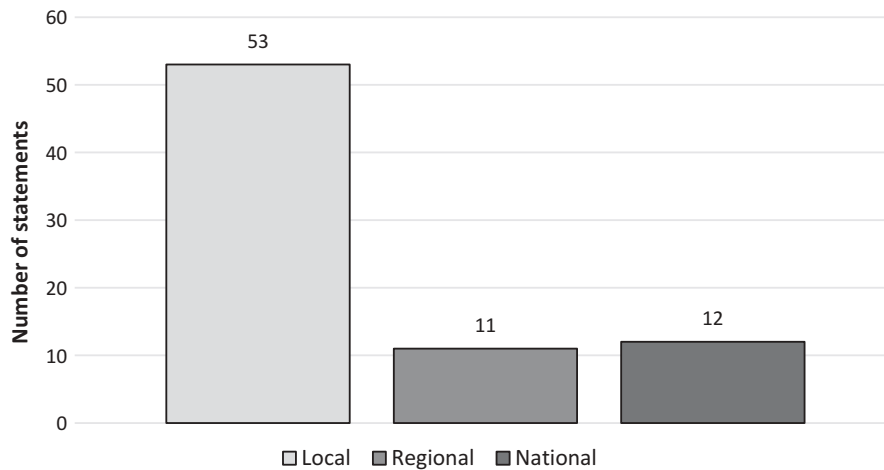


Figure 6. The distribution of delivered statements according to scale.

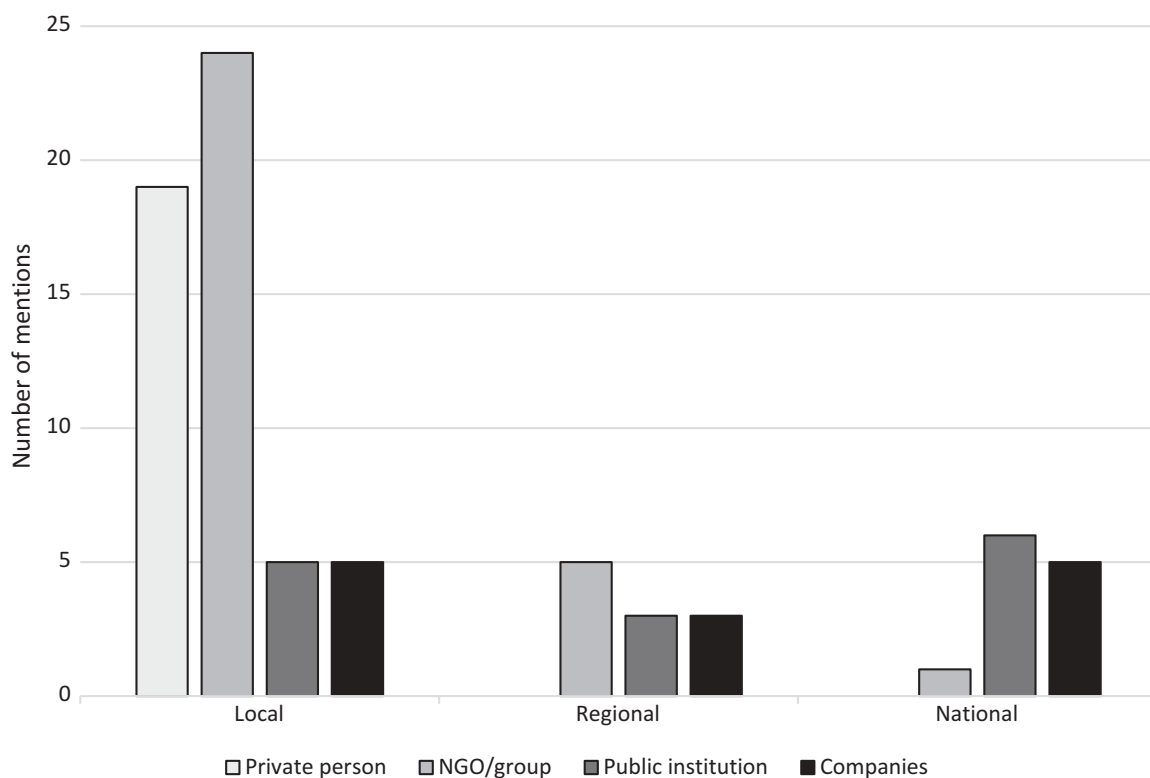


Figure 7. Number in each respondent category according to scale.

Figure 7 to present some nuances of the respondent/stakeholder groups since they are quite diverse, and how they link to scale.

We observe that the private persons and NGO/group respondents were largely local, while the public institutions and companies were relatively equally spread across the local, regional and national scale. All private persons stem from the local scale. By private persons, we refer to individuals or couples in single households. These statements come from seven municipalities, and they are all concerned with issues at the local scale. Based on the wording of the statements we can infer that private persons have strong connections to the place they address. The private persons comment for the most part

directly upon a proposed aquaculture location's vicinity to their homes or holiday cottages, and how the planned aquaculture location will affect their activities at sea or on the shore. Although we cannot check their social background, the project leader has informed that the majority of the people involved in the planning process and the consultations are men above the age of 50.

The 'ad hoc group and NGO' category is the largest (31 statements), submitting more than 40% of all statements. Eighty percent of the NGO/group statements stem from the local level (25). Among these, we find 10 property associations (*grunneierlag*), who speak on behalf of their affected neighborhood, local organizations of four political left-wing parties, and

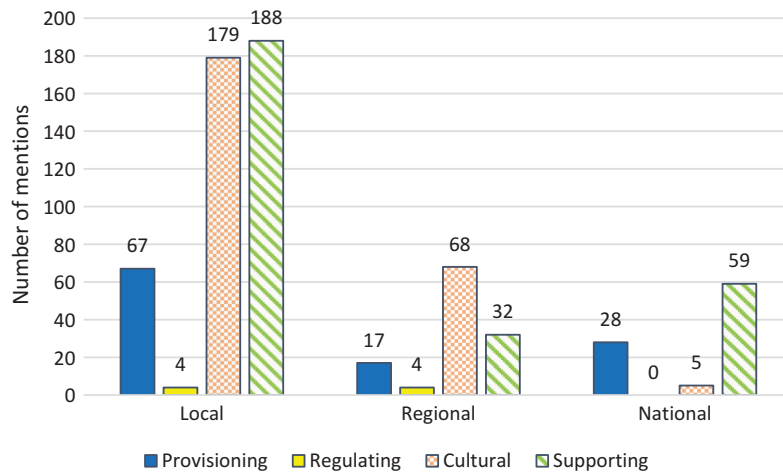


Figure 8. Number of ecosystem services that are found at each scale.

four protest groups reporting from *ad hoc* public meetings in their parishes/villages. These statements are signed by more than 200 persons in total. Three of them concern the biggest municipality, Harstad, but relate to different villages in the municipality. The remaining 13 statements stem from what one usually thinks of as NGOs, i.e. organizations that work for a common goal for their members. Among these are fishers' and aquaculture organizations, both operating on a regional level, and three environmental organizations that all operate at the regional or national scale. The largest group segment relates to different kinds of recreational fishing activities; boating clubs (2), local organizations for the management of specific salmon rivers and anglers (4), interest organizations for physically disabled (1), and outdoor life (1).

The 'public institutions and authorities' category consists of nine sector authorities all on a regional or national level, such as the Norwegian Directorate of Fisheries, the County Governor's office, the County administration, the Norwegian Coastal Administration, the Norwegian Water Resources and Energy Directorate, the Norwegian Public Roads Administration, the Norwegian Defense Estate Agency, the Sami Parliament of Norway, and the Tromsø University Museum. At the local scale, there are four municipal authorities and one local port authority.

In the company category, there are basically two different groupings. Eight consultation statements come from four aquaculture companies. Three of them operate on a regional scale, while one is national and delivered statements to five different municipalities. The other grouping in this category relates to marine and fishing tourism (five statements), all of which act on a local level.

Since the four respondent categories are so diverse and comment on the plan from very different interests and positions, thus hardly comparable, we will focus on their relations to scale in the further analysis of how the ES are distributed.

4.3 Identification of ES according to scale

As we saw above, 70% of the statements stem from the local scale (Figure 6). In Figure 8 we find a similar distribution when counting the services expressed at the different scales. The total number of services identified by stakeholders on the local level amounts to 438, which constitutes 67.5% of all statements. This means two-thirds of all the statements address concerns which may be identified as ES from a local point of view. The number at the regional level amounts to 18.5% (a total of 121 ES), while 14% are at the national level (a total of 92 ES).

Concerning the distribution of the specific services on each scale, we see that 67 provisioning services are identified at the local scale. This equals 60% of all the identified provisioning ES, as shown in Figure 9. But the most significant finding is the high numbers of cultural and supporting services identified at the local scale. We identified 179 references to cultural services at the local scale, which constitutes 71% of all the cultural service references. Mentions of supporting services are found 188 times, which constitutes 67% of all supporting service references. This is largely based on the fact that most statements come from local scale responses, but it also illustrates that the focus is very different between the three scales.

5. Discussion

Democracy, knowledge, and sustainability are key issues in contemporary planning theory (Aarsæther et al. 2012). These three are also keys to our discussion. We see the public consultation statements as inputs in the debate about coastal planning, related to these three concepts, but the statements also emphasize the necessity of accentuating place in MSP in the coastal commons (Healey 2016). In the revision of the PBA in 2009 sustainable development was introduced in the mission

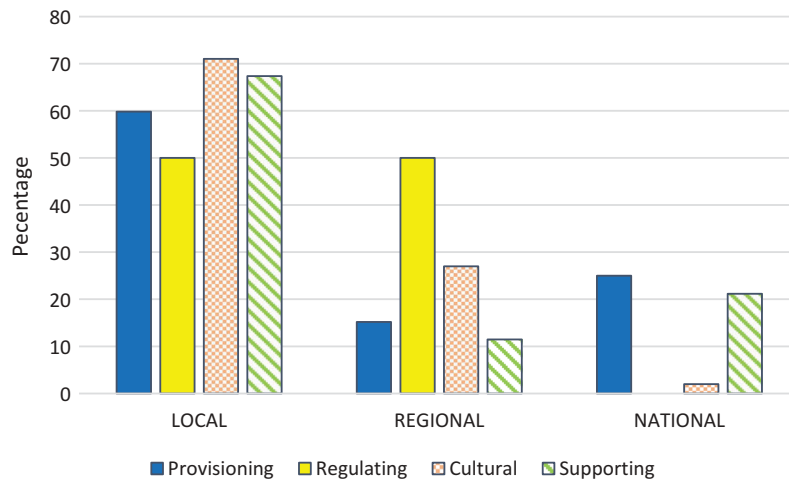


Figure 9. The percentage distribution of each ecosystem services category at different scales.

of the act. Aarsæther and Buanes (2016) question if this could be understood as the national authorities' mistrust in the municipalities' ability to balance environmental concerns with the need for new local job possibilities and economic development. The Norwegian rural battle against depopulation often becomes a core issue of municipal planning and politics at the sacrifice of the environment (Ibid). This may be so, at the political municipal level, but our findings show local understanding for environmental concerns and dependencies related to the high numbers of identified supporting services. Aarsæther and Buanes (2016) also link their discussion to participation, and they claim smaller municipalities may have better possibilities to engage the inhabitants in area planning and debates about sustainable development. Our study of the MSP process in Northern Norway confirms this. The minimum of public information and involvement as decreed by PBA was carried out in all municipalities. However, several of the smaller municipalities also invited to participatory mapping meetings, while the largest municipality, which did not, faced a situation of protest meetings, media headlines and also petitions against specific aquaculture locations. The participation approaches carried through in the smaller municipalities in this MSP process may well be coined 'best practices', in which we see the potential for applying the relevance of our findings based on a translation of the public consultation statements into an ES language. We saw that 70% of the statements and two-thirds of the identified ESs stem from the local scale. What was particularly interesting was the high level of diversity identified in the statements. We were surprised by the richness of the wordings, and how elaborate stakeholders with connections to the localities were in their description of their home environments. More than 200 *different* ecosystem services and a total of 651 ecosystem services were identified among the different stakeholders. Compared to other ES studies (Klain et al. 2014), this is a high number of services, particularly

since there was no ES prompting and these services were identified based on concerns and interests that different stakeholders had to the suggested coastal plan document and the impact assessments. One explanation for the large number of identified services at the local level could be the way the public consultation meetings were carried out. In an invitation to one of the public consultation meetings the planners exemplified themes they wanted the participants to reflect upon: (1) fishing places with specific local characteristics (specific fish species as well as fishing equipment), (2) nature and animal life (brooding places, important habitats, salmon mobility routes), (3) recreational areas (beaches and bathing places, slopes of naked rocks, diving, boating, etc.), (4) cultural heritage (old homesteads and environments, landscape, war relics), and (5) aquaculture locations (where aquaculture preferably should be located). Thus, themes of very elaborate local knowledge. We cannot say for sure to what extent the planning group's initiative may have influenced the wording of the statements, which were, after all, formulated later as a repose to the impact assessment. However, we suggest that these initiatives may have opened up for the relevance of local knowledge contributions in this particular planning discourse.

Nevertheless, the most surprising and significant finding was the high number of identified cultural and supporting services in the statements, both as regards the diversity of services as well as the frequency of identified services in the statements. We observed that cultural and supporting services constituted more than 80% of all identified services, equally divided between the two. In the following, we will first discuss the cultural services.

5.1 Cultural services

Related to scale, we observed that almost all the cultural services were identified on a local and regional scale, with 188 and 68 references, respectively, while almost

none (5) at the national scale. Given that the public consultation statements address the plan proposal including the impact assessments, it is particularly interesting to note the high numbers of identified cultural services. The planners we interviewed complained about the limited information available for doing a proper impact assessment concerning cultural heritage and indigenous Saami issues, especially related to the marine domain. The available databases from the Directorate of Cultural Heritage (*Riksantikvaren*) focus mostly on tangible heritage and material culture. In a similar vein, the statement made by a regional museum addresses solely the lack of registers of marine cultural relics, such as shipwrecks along the county's coast, and the county administration comments on the need for special consideration regarding an abandoned coastal military fortress in one of the outer islets. Both address tangible heritage and monuments acknowledged by national authorities. However, at the local level there are few references to the need for conserving this military fort, while of the 26 identified references to cultural heritage, most of them emphasize the value of cultural landscapes linked to family and village history. This implies a need for a broader, multiscale approach to cultural heritage in planning practices. The broadening relates to the interrelations between tangible and intangible heritage, and how this connects to place-making and identity (Healey 2016; Gee et al. 2017). National and regional monuments may, of course, have credibility and importance for place and local identity, but without local use and storytelling practices, they easily become uninteresting relics, at least from a local perspective.

In the ES literature, several authors highlight the short-comings of ES assessments particularly related to cultural ES (Chan, Klain and Chan 2012; Chan et al. 2012a, 2012b; Hernández-Morcillo et al. 2013; Plieninger et al. 2013; Fish et al. 2016). Fish et al. (2016) sum up this critique as on the one side concern for the intangibility of cultural ecosystem services and on the other side the concern for participatory and ethnographic approaches. The critique is mostly focused on the academic aspects of the discussion, requiring the development of suitable analytical and methodological approaches in order to assess a baseline for cultural dimensions of an area, to apply in the trade-offs of impact assessments of a proposed plan (Gee et al. 2017). Under ideal circumstances of information and funding opportunities, professional assistance to make a baseline might be a solution, as we have seen in regional MSP assessments undertaken for instance in the Baltic Sea, North Sea and British Columbia (Drakou et al., 2017a; McKenzie et al. 2014a; Veidemane et al. 2017), but in municipal planning this is most likely an unrealistic ideal. Our contribution here is to highlight the potential of participatory methods

undertaken by the planners themselves. Before we conclude on this point, we need to discuss the supporting services in this study.

5.2 Supporting services

A second significant finding in the statements is the high number of identified supporting services, constituting 43% of all services, and in particular, the many habitats mentioned. References to habitats (182) and migratory routes for anadromous fish (14) constitute more than 30% of all identified services. The fact that supporting services are given the degree of attention shown here, points to their importance, and the public awareness of them. It also raises questions about how we include supporting services in ES assessments, especially as they are far less prominent in most of the newer frameworks, such as TEEB (2010), CICES (2013) and IPBES (2017). It seems that in a setting of ES identification, supporting services are important, even if the monetary valuation of these services alongside the other services involves double counting. The supporting services are perceived as providing benefits, needing to be taken into account in area-based planning such as MSP, in order to secure the final provisioning, regulating and cultural services. Furthermore, although supporting services were identified in the statements on all scales (national: 59, regional: 32, local: 188); local scale agents clearly provide important input to supporting services.

Much emphasis has been put on the usefulness and challenges of including local, traditional, and indigenous ecological knowledge into different management regimes (Neis and Felt 2000; Gómez-Baggethun et al. 2013; Ruiz-Mallén and Corbera 2013; Johnsen et al. 2014; Brattland and Eythórsson 2016). For planning practices, and particularly MSP in populated coastal areas, the most dominant contemporary method seems to be participatory mapping practices (Smith and Brennan 2012). One issue that has been thoroughly investigated previously is the validation of fishers' experiential and local knowledge of fishing, spawning and juvenile areas, which is well integrated in the Norwegian Directorate of Fisheries databases, where there is a clear distinction between local, regional and national important spawning and fishing areas (Brattland 2013; Johnsen et al. 2014). Our study shows that there may be good reasons for incorporating local knowledge from a broader set of stakeholders, both concerning cultural aspects, but also because of the high diversity the statements contain concerning socio-ecological knowledge linked to supporting services.

5.3 Bundling of services and its potential for MSP

Trade-offs in relation to aquaculture, a provisioning service, was the core issue that the statements addressed. Thus, we expected to find a high number

of references to provisioning ES in order to balance the prospects of aquaculture, in particular related to fisheries, since conflicts between fisheries and aquaculture have often been the main issue in municipal coastal planning (Brattland and Eythórsson 2016). Such conflicts were not expressed in this MSP case, and no professional fishers submitted statements at this stage of the planning process. Some plausible reasons for this may be that the fishery interests were taken care of earlier in the process, through the stakeholder group meetings, and that fishers perceive their interests to be taken care of by their respective organizations. This finding can also be linked to a decrease in the number of professional fishers in recent decades.⁶ But it may also be due to common interests between fisheries and aquaculture related to land-based processing of fish, where aquaculture contributes to stabilizing the seasonal variations of wild fish processing and its implication for local employment. Despite the stakeholders in the professional fisheries having a low profile at this stage in the planning process, we saw that many statements referred extensively to the fisheries and their provisioning services, especially related to specific fish species. References to fishing as a provisioning service were made 94 times including reference to specific fishes. This tendency was apparent both concerning cultural as well as supporting services.

Klain et al. (2014) address the critique of the assessment of cultural ES in an interesting way. They refer to the bundling of services, benefits, and values based on semi-structured interviews with residents of coastal communities in British Columbia, Canada. They state that ‘people rarely spoke of only one service, value, and benefit in response to the CES (*cultural ecosystem services*) prompts; they generally mentioned an array of them’ (Ibid: 316). Their claim is that there is no one-to-one relationship between services and benefits. Rather, the interviewees tended to describe the interconnected and interdependent qualities of ES, values, and benefits when they addressed the cultural ES prompts given.

Our data support these findings, although configured differently. We did not interview respondent about ES, and did not apply any prompts, but still, based on identifying ES from the statements, there seems to be a ‘bundling aspect’ that cuts across *different* services; cultural, provisioning, and supporting. Among the supporting services, habitats (spawning, juvenile, and fishing places, including migratory routes of anadromous fish) were mentioned 196 times. Among the provisioning services, fishing activities were dominant and mentioned 94 times (including references to specific fishes). Among the cultural services, recreational fishing, and tourism fisheries were referred to 61 times. A total of 351 references,

that is, more than half of all the references focus on fisheries of different kinds. This is quite surprising especially since there were hardly any professional fishers represented in the statements (only one fisher’s interest organization and the Directorate of Fisheries). Thus, there seems to be something more at stake than solely the interests of the legitimate stakeholder group of fishers in these concerns. How should these concerns be understood? One suggestion is to look upon the bundling of services with reference to fisheries as aspects of concerns related to coastal lifestyle and culture, constituted by a broad set of linked services.

Hicks et al. (2016) call attention to ‘place attachment’ as one important and available indicator of culture in assessments (Ibid: 39), while terrestrial planning literature speaks of place as a blind spot in planning (Cruickshank 2014; Healey 2016). Our findings confirm this linked to the coastal realm. Although there were few references we identified as specified to ‘sense of place’ in Figure 4, the bundling character relates to knowledge accommodated from belonging to the place. People care about the place they live, the environment they depend upon to uphold the activities and quality of rural living.

However, there are reasons to stress that both the strong focus on aquaculture and the request from the planning group to highlight local knowledge in the previous public mapping meeting may have influenced the rich descriptions in the public consultation statements, particularly on the local level. Values, whether held as individuals or as those we associate with as members of a wider political community, express what we care about (Healey 2016). Healey (ibid) sees values as embedded in discursive frames and emotional attachments, as part of our identities and sense of self. ‘they are not fixed quantum of preferences, but instead continually evolve and revolve in our thinking as some challenges calls them to mind’ (ibid:72). In this case, aquaculture could be seen not only as a threatening driver for change, but also a catalyzer of awareness for what people care for at the place they live and roam, aspects otherwise often taken for granted in local modes of living (Armitage et al. 2017). The MSP planning process may have contributed to this awareness, both by its focus on aquaculture and by requesting local knowledge in the mapping exercises at the public meetings.

In interviews, the planners expressed a lack of data regarding cultural aspects for the impact assessment, although they through the public mapping processes had access to substantial local knowledge. Our analysis of the statements could encourage planners to place greater trust in the relevance of their own methods and role in relation to local knowledge inclusion and validation in the planning process

(Tengö et al. 2014). The planners are in a position to connect different knowledge systems across different scales. They inhabit the ‘betwixt and between’ position, which can be unpleasant and challenging (Mouffe 1999), but which also may be the way forward for a multi-evidence based approach to MSP in the messy intertidal zone of the transforming coastal commons (Tengö et al. 2014; Armitage et al. 2017).

5.4 Public consultation statements as input into an emerging paradigm for nature management

There is a growing recognition of changes in the perception of and goals for nature conservation (Gómez-Baggethun et al. 2010; Mace 2014). Mace (2014) depicts a historical framework for changing paradigms related to nature conservation, for instance, shifts from species to ecosystems, and changing relations between people and the environment. She claims that the trend of this past decade is linked to seeing biodiversity and nature conservation framed by ideas of a two-way, dynamic relationship between people and nature, while ecosystem services build more on a utilitarian and one-way perspective of ‘nature’s contributions to people’ (Pascual et al. 2017). This perspective is very interesting in light of the ongoing and quite heated debate whether IPBES’s conception of nature’s contribution to people (NCP) nurtures a paradigm shift away from the concept of ecosystem services (Braat 2018; Díaz et al. 2018; Peterson et al. 2018). Díaz et al. (ibid) argue for a context-specific perspective which recognizes multiple ways of understanding and categorizing relationships between people and nature. There is a need to recognize the relationship between humans and their environment since humans are also co-producers of ecosystems (Outerio et al. 2017). The era of the Anthropocene is characterized by an earth system shaped by human action. Human actions also seem to be the only way to reverse the contemporary alarming environmental situation. It might be naïve to point at local knowledge to address a global crisis, but without a multi-scale approach, it would only be the sound of a one hand clapping. Thus, a global framework is needed (Ostrom 2009). Díaz et al. (2015) use the Rosetta Stone as a metaphor for the role of IPBES as a ‘translator’ between different worlds and knowledge systems, between different ontologies and epistemologies. Whether IPBES is a suitable framework for these tasks is yet to be seen, but we believe this study shows there are good reasons for plural and context-specific perspectives to be noticed, in order to recognize processes for articulating, translating, and discussing different angles to people’s relationship with nature (Peterson et al. 2018). An inter-municipal or municipal MSP process may be a good opportunity to do so.

6. Conclusion

Our analysis of an MSP public consultation process has shown that the public can identify a large variety of ES in the coastal domain. The analysis also shows the prevalence of supporting and cultural services identified, particularly on the local scale, and thereby highlighting services often not included in MSP, where provisioning services largely dominate. We also find a large degree of bundling across services, where consultation statements especially focused on fisheries, both within a service type and across services, despite fishers largely not being present amongst the stakeholders submitting statements. We suggest that the bundling is related to the character of local knowledge related to place. If the specificities of place are to be incorporated in MSP of coastal commons, the planners have an important role to play in the realization of multi-evidence based approaches (Tengö et al. 2014). Including participatory practices in an MSP process may be costly, both money-wise, time-wise, and for the planners, it may also be a burden to be in the nexus of conflicting interests. However, not including such practices may also involve costs such as conflicts and unidentified, undesirable, and sometimes irreparable ecosystem service trade-offs or losses. Sustainability, be it environmental, economic, societal or cultural, cannot be handled through legislation alone. Our research highlights the need for policy and planning practices that integrate place-based perspectives linked to local knowledge.

Notes

1. The PBA (*Plan og bygningsloven*) can be found at <https://lovdata.no/dokument/NL/lov/2008-06-27-71>.
2. Statistics Norway’s population statistics from 1 January 2016.
3. In 2017 a new system, the ‘traffic-light system’ for designating salmon aquaculture growth has been implemented by the government, based on the status of salmon lice density in different regional production areas.
4. GIS (Geographical Information Systems) was introduced as mapping and assessment methods in the MSP process. A GIS expert was hired to create an open-access GIS database, where both sectorial databases and local knowledge were included.
5. It should be noted that MPAs are planned by national authorities, and their impact in municipal MSPs are related to the impact assessments. Usually, they cannot be negotiated on. However, there are examples of conflicts between aquaculture and MPA although this was not a main issue here.
6. In the whole area, there were less than 490 fishers in 2015. In some of these municipalities, there are hardly any fishermen left. In others the proportion of fishers relative to total employment is modest. However, there are communities where fishing is still important. The overall statistics, therefore, do not give the whole picture. Although fishers constitute less than 1% of the population in the area, some communities still depend on the fisheries.

Acknowledgments

The authors are grateful for comments on an earlier draft from Jahn Petter Johnsen, and acknowledge funding from the Research Council of Norway via the project COREPLAN. The authors also acknowledge constructive input from anonymous referees and journal editors.

Disclosure statement

No potential conflict of interest was reported by the authors.

Funding

This work was supported by the Norges Forskningsråd [255767] and by the Fram Center Flagship “Climate Change Effects on Fjord and Coast” Grant No 2019147470 81201.

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