**Report of the workshop on natural capital accounting for the Dutch part of the North Sea, Tuesday 13th of December (online)**

On the 13th of December a digital workshop on natural capital accounting for the Dutch part of the North Sea took place, with almost 50 participants from all across Europe. This document presents a report of that meeting.

1. **Welcome and introduction to the workshop**

Rob van der Veeren ([Rijkswaterstaat](https://www.rijkswaterstaat.nl/en)/[Dutch Ministry of Infrastructure and Water management](https://www.government.nl/ministries/ministry-of-infrastructure-and-water-management)), who chaired this meeting, welcomed all participants and introduced the scope and purpose of this meeting: Although the focus of this meeting is on the Dutch part of the North Sea, the invitation for this workshop was not only sent to the members of the team that is supervising this case study project, but to anyone else who might be interested, since the objective of today’s meeting is far broader than the Netherlands alone; it is meant to be an opportunity to share lessons, experiences, and ideas on ‘how to (and how not to)’ apply and use NCA. The results of this meeting will be used to enrich and finalize the draft reports that were sent before the workshop.



The workshop began with a word of welcome by a representative of the European Commission, who emphasized that this workshop on natural capital accounting for the marine environment is timely and relevant to support, among other things, the work that European member states are currently undertaking as part of the obligations for the [European Marine Strategy Framework Directive](https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32008L0056).

1. **Natural capital accounts for the Dutch part of the North Sea**

Patrick Bogaart and colleagues from Statistics Netherlands ([CBS](https://www.cbs.nl/en-gb/)) gave a presentation on their current work on [applying the internationally agreed System of Environmental Economic Accounting Ecosystem Accounting (SEEA-EA) framework](https://seea.un.org/ecosystem-accounting) to the Dutch part of the North Sea. The presentation started with a recent article in a Dutch newspaper illustrating the timeliness and relevancy of this research. After that, the development of the international SEEA-EA framework was illustrated, and the setup of the various accounts; the extent account, the condition account, the ecosystem services account (in physical terms and in monetary terms), and the asset account. Next to these accounts, Statistics Netherlands have been working on biodiversity accounts and pressure accounts. The presentation showed the struggles encountered, trying to find the most relevant data to present useful information: Sometimes you have several potential sources, each with their advantages and disadvantages, but how do you choose the most applicable one?



Some issues raised during the discussion:

* The **list of ecosystem services** (ES) used in the SEEA-EA framework agreed by the United Nations is (unfortunately) not identical to the [CICES list](https://cices.eu/) that is often used in European studies. The CICES list is more comprehensive, but also include ES that are outside of the scope of SEEA.
* For many **condition indicators** the available data are (unfortunately) not (detailed) enough to be able to present information on the state of individual ecosystems or ecosystem assets. Often EU wide monitoring data is the best data available. This triggered the question: Why should we fine-tune ecosystem mapping, if we don’t have condition data at the same level? But this is a chicken-egg discussion: The fact that we do not have the detailed data for the condition indicators does not necessarily mean we should reduce our efforts in describing ecosystems, but might just as well be a reason to increase our efforts in fine-tuning condition indicators, at least for those ecosystem types that are of particular relevance.
* How do you **integrate** the information of various indicators? The idea is to use a tiered approach, where you have individual indicators, and then use reference values to be able to aggregate them. But up until now, there is no agreement on a set of reference values that can be used as a common yardstick, and therefore it is not possible yet to integrate the various indicators.
* **Biodiversity** is a hot potato when it comes to valuation: Since, basically, without biodiversity there would be no ecosystem services at all. Should it therefore have an infinite value? Biodiversity has an intrinsic value that should not and cannot be expressed in monetary terms. In addition, biodiversity plays an important role in that it provides many intermediate services that are underlying the production of ecosystem goods and services. The value of biodiversity is therefore (often) included in a more indirect way. And finally, is valuation always necessary? The strength of the natural capital accounts is in the presentation of information on ecosystems, biodiversity, economic activities and their mutual relationships in one integrated framework.
1. **Potential policy use of natural capital accounts**

The second part of the meeting focused on how we can use (these) natural capital accounts to support marine policy decision-making. Wesley van Veggel gave a presentation of his draft report dealing with exactly this issue.



Wesley illustrated that there is a wide international interest in natural capital accounting: The SEEA-EA framework presented above was accepted as international accounting standard by the UN in March 2021. In July 2022 a proposal was made for a [new EU Regulation](https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:52022PC0329&from=EN) that includes the mandatory provision of natural capital accounts by European member states. And [OSPAR](https://www.ospar.org/), the organisation responsible for coordination of environmental policies in the Northeast Atlantic has included as one of its strategic objectives in the most recent [North-East Atlantic Environment Strategy](https://www.ospar.org/documents?v=46337) that ‘By 2025 OSPAR will start accounting for ecosystem services and natural capital…’. In addition, there are many international projects on natural capital accounting, including [MAIA](https://maiaportal.eu/), [GOAP](https://www.oceanaccounts.org/), [MAREA](http://marea.balticseaportal.net/), [NCAVES](https://seea.un.org/content/about-ncaves-project), but also the current case study for the Dutch part of the North Sea discussed in this meeting, and the current work on the second version of the natural capital accounts for the Northeast Atlantic that will be discussed in the workshop tomorrow. Currently the accounts are mainly supply driven, but how can we actually use this information? If you look at the literature, it appears that natural capital accounting is mainly used for issue identification and monitoring of the state of the marine environment; to establish insights on trade-offs and interactions between marine ecosystems and economy; to provide a communication tool for policy makers to establish the importance of the marine environment and blue economy; to support multidisciplinary communication and cooperation between various stakeholders within (and outside) the government; to combine with other methods such as scenario analysis to provide integrated insight in cost and benefits for environmental decisions; and to serve as data input for other statistical methods that include economic-environmental evaluation. With respect to the possible applications in the Dutch context, natural capital accounts could be used to support the implementation of the European Marine Strategy Framework Directive by monitoring (changes in) the state of the marine environment ([part 1 of the MSFD](https://www.noordzeeloket.nl/publish/pages/158924/marine_strategy_part_1_main_document_2018_-_2024.pdf)), focus monitoring to those indicators that are most important to convey the relevant messages and support the realisation of the program of measures ([part 2 of the MSFD](https://www.noordzeeloket.nl/publish/pages/186558/marine_strategy_part_2_netherlands_2020.pdf)) and to contribute to cost benefit analyses and evaluate policy responses as part of the program of measures ([part 3 of the MSFD](https://www.noordzeeloket.nl/en/policy/europese/background-documents/documents-marine/%40171616/marine-strategy-1/)). In addition, [the Netherlands want to measure welfare beyond GDP](https://www.cbs.nl/en-gb/publication/2022/20/monitor-of-well-being-the-sustainable-development-goals-2022) (‘Wellbeing Economy’); Natural capital data could serve as data input for the North Sea, even though it does not include social capital and ”future generations”.

Some points raised during the discussion:

* There seems to be a mismatch between the kind of analysis one would like to be able to do with natural capital accounts (presented by Wesley), and what one can do with the accounts given the state they are currently in (with many data gaps, etc.), as presented by Patrick. Is what Wesley presented (still) wishful thinking? We might have to think about what do we need, and what do we need for that purpose, since we may not be able to use it for all the things that were mentioned.
* With respect to the possible application to the Marine Strategy Framework Directive: With natural capita accounts it will not be possible to analyses individual steps or individual policies/measures. What information do we extract from natural capital accounts to share with policy makers? It might be very interesting and relevant to include social elements in the natural capital accounts, and thus transform them into ocean accounts. That would provide the opportunity to link ecosystem services to social issues and distribution (also relevant for the wellbeing economy mentioned before). However, the SEEA-EA does not yet include social accounts, although perhaps [SEEA-Ocean](https://www.oceanaccounts.org/developing-a-seea-ocean/) will. This is therefore still a research frontier.
* The SEEA-EA framework seems to be very important for countries that do not have any monitoring in place yet. However, in Europe we have already a lot of monitoring tools and requirements that are more important and more relevant for policy makers. Nevertheless, the natural capital accounts provide a robust, consistent and more generic framework that offers the opportunity to integrate various information streams.
* Much of the information presented in the natural capital accounts for the North Sea could be very relevant for the (Dutch) report ‘[De Staat van de Noordzee](https://www.noordzeeloket.nl/publish/pages/123326/digitaal_overzicht_-_de_staat_van_de_noordzee_2015_4778.pdf)’, which describes the current state of the North Sea, and is read by policy makers.
* In order to show the usefulness of the natural capital accounts it is important to present lots of practical applications. There are already several case studies around the world in which (some elements of) natural capital accounts have been used to support marine policy (including conservation advocacy). These case studies should be used to illustrate the added value of this in itself rather complex tool.
* It was suggested to share the conclusions of this workshop with more experts.
1. **Panel discussion/reflections**

After the presentations by Statistics Netherlands on the content and Wesley van Veggel on the potential policy applications, Serena Rivero ([North Sea Foundation](https://www.noordzee.nl/north-sea-foundation-statement-on-the-european-parliaments-vote-to-ban-the-use-of-pulsed-electric-current-for-fishing/)) and Annemie Volckaert ([Arcadis Belgium](https://www.arcadis.com/en)) gave a reflection on what they think about natural capital accounts and the applicability for marine policies.

*Some reflections by Serena Rivero (North Sea Foundation)*

* Serena is mainly working on marine nature protection, ecological risks and opportunities of offshore wind, and the interface between science and policy; both at the national and international level.
* She thinks that the amount of work done is impressive, and that it is very useful and applicable. The North Sea is the largest nature area in the Netherlands (larger than NL). It is in a degraded state (GES not reached as required by MSFD by 2020). The challenge is that the cumulative pressure must go down, restoration up, with simultaneous increasing ambitions for further use (e.g. offshore windfarms) in an already busy North Sea. We need to make choices, and this includes understanding trade-offs/pay-offs. Currently we are making decisions based on insufficient information, with large knowledge gaps relating to ecosystem services and socioeconomic factors. Large part of the puzzle is still missing.
* Natural Capital Accounts/ecosystem accounting are complicated and difficult to calculate using a standardized approach. There are still many challenges ahead; largely the same challenge as we face within many policy frameworks: scale, knowledge gaps, uncertainty and the complexities of the marine ecosystem.
* One could use natural capital accounts to provide a business case for nature protection and restoration, and the reasoning for creating MPA’s. [Investment into nature restoration adds €8 to €38 in economic value for every €1 spent](https://environment.ec.europa.eu/system/files/2022-06/Impact%20Assessment%20accompanying%20the%20proposal%20%28Part%201%29.pdf), thanks to the ecosystem services that support food security, ecosystem and climate resilience and mitigation, and human health. The cost of doing nothing is often greater than the cost of restoration. Economic valuation of active restoration efforts, for example oyster reefs in the Dutch North Sea, gives us reason to invest in nature, where there is often a funding gap, and can help us in reaching our nature goals (e.g. [Nature Restauration Law](https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM:2022:304:FIN), [MSFD](https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32008L0056), [OSPAR](https://www.ospar.org/), [N2000](https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A31992L0043), [biodiversity strategy](https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52020DC0380)).
* Natural capital accounts can be used to support policy discussions and existing platforms. In the Netherlands, the North Sea Dialogue, focuses on three transitions (energy, food and nature). Natural capital accounts can help with the interconnectivity of the three and help map possible conflicts and synergies.
* Another area where natural capital accounts can play an important role is in in Maritime Spatial Planning. The current Dutch MSP (‘[Programma Noordzee](https://www.noordzeeloket.nl/en/policy/north-sea-programme-2022-2027/)’) now has a weak description of ecosystem services. The report presented today could be used to better describe ecosystem services in upcoming revisions. Combining NCA and Cost benefit ratios and scenarios can prove useful for policy decision making, especially when deciding on use in a crowded North Sea. For example:
	+ The ability of identifying and managing protected and unprotected marine areas: due to the spatial nature of ecosystem accounting the accounts should allow the ability to inform and monitor marine areas, which offer essential services/resource provision.
	+ The ability to measure and understand the interactions of the blue economy: natural capital accounts can include non-market services provided by the marine environment that are currently not included in the blue economy. This will increase the economic and social relevance of the marine environment.
	+ Improving the understanding of users and social interactions with marine ecosystem services: by connecting social factors with marine ecosystem services a better overview of the social importance and beneficiaries can be provided (social importance is also emphasised by [SDG 14: life below water](https://sdgs.un.org/goals/goal14))

In addition, it is interesting to link pressures to economic value and the concept of polluter pays. Same with valuing ecosystem degradation as part of the equation when making choices for use of the North Sea. (better cost benefit analysis, and clarity on investments needed for mitigation or compensation of activities/exploitation and environmental impact assessments).

* Natural capital accounts provide a better view of the bigger picture, and provides the opportunity to look beyond sectoral management and apply an integrative ecosystem based management. And with that, it can contribute to the communication of why a healthy North Sea is important and why increased investments are needed; since effective dissemination of results is crucial. A first small step may be only raising awareness that such ecosystem services and (potential for) NCA exist.
* Ecosystem effects of activities are often misunderstood and undervalued in decision making, where the focus is usually on protected species (and habitats).
* A concrete suggestion is to include the results of the natural capital accounts in the ‘[State of the North Sea](https://www.noordzeeloket.nl/publish/pages/123326/digitaal_overzicht_-_de_staat_van_de_noordzee_2015_4778.pdf)’ report that will come out every 2 years, and also include them in the MSFD part 1 update, to identify issues and connect to monitoring, and keep policy makers engaged. Maybe we could even set goals for ecosystem services? More concrete knowledge and arguments are also needed, but also a mind-shift that these exist and that they need to be taken into account (raising awareness).
* One of the key questions from a policy perspective is how measures related to economic activity (fishing; wind) relate to changes in biodiversity, either positive (pay offs; synergy) or negative (trade-offs). One simple approach is to compare “oranges” (economics) with “apples” (biodiversity), respecting the fundamental differences between these two. A second approach is to try to express biodiversity (changes) in monetary terms in order to arrive at similar units (euro) that allow for direct comparison. The risk of this approach is that “valuing nature” on a fundamental level cannot take the intrinsic value of nature into account. However, several less ambitious methods may be worth exploring, for example focusing on the financial risk and societal cost of biodiversity decline ([DNB and PBL, 2020](https://www.dnb.nl/en/general-news/dnbulletin-2020/indebted-to-nature/); [Dasgupta et al, 2021](https://www.gov.uk/government/publications/final-report-the-economics-of-biodiversity-the-dasgupta-review)) or restoration ([Schweppe-Kraft, B. and B. Ekinci (2022)](https://oneecosystem.pensoft.net/article/89706/))

*Some reflections by Annemie Volckaert (Arcadis Begium)*

* There is a lot of media attention, and awareness of added value of a structured/ integrated natural capital accounting framework, and there is a willingness to use it, but there is a struggle to take the next steps, beyond concepts/definitions/quick wins
* Clarity is needed on the purpose/aim: Which concrete questions can be answered now for policy makers (~MSFD, SDGs)? Outputs? Also other (business) users interested? What (geographical) scale of interest? What are our ambitions? >> Scope definition in terms of realism >> level of detail (method) >> data demand/effort needed (especially biologic components) >> centralized database
* Potential need for more pragmatism to test the maturity of the method using local / specific examples as test case prior to scaling up towards national/OSPAR level >> going beyond the ‘quick wins’ of pressures/abiotic factors >> need to integrate biodiversity (state) elements in the condition account to meet our purpose of NCA >> data available at the level of the ecosystem assets defined/possible?
* Indicator approach feasible for ecosystem condition account at country/OSPAR level? Most critical for biotic ecosystem characteristics (abiotic and pressures ok) >> availability of data + effort needed in terms of practical use of method + comparability between MS >> proxy via biological valuation maps (integrating several biotic components) or via protection status/distinctiveness of ecosystem asset elements (ecosystem type) >> semi-qualitative versus quantitative approach
* Maturity of knowledge of complexity marine ecosystem including 3-dimensional character + linking biodiversity & ecosystem services to ecosystem assets >> essential basis before accounting in monetary terms
* Pathway towards a fully operational natural capital accounting method >> stepwise approach with clear timelines + concrete questions to be answered by when
* Guideline for practical implementation summarizing the assumptions, indicators, potential data sources, challenges, etc. per step

**Closing words and next steps**

Patrick, Wesley and Rob thanked all the participants for their active contributions to the workshop. It has been very interesting and informative. The main objectives of today’s meeting was to share information on natural capital accounting for the North Sea, and to discuss the potential way ahead. The results of this workshop will be used by Statistics Netherland and Wesley van Veggel to finalize their reports, which are due in the first half of 2023. The participants of the workshop will be informed when the reports are published and where they can be downloaded.

In the Annex below, you will find a list of questions and information that was shared in the chat. The presentations by Statistics Netherlands and Wesley van Veggel are sent as separate attachments.

**Questions and information shared in the chat during the meeting on natural capital accounts for the Dutch part of the North Sea:**

1. Q(uestion): How have you prioritized the link service-user give that a user can use multiple services and not just one? A(nswer): Ecosystem services are not restricted to a single ecosystem type (for supply) or a single user. The Supply and Use tables record for each ES how much is supplied by each ecosystem type, and how much is used by each economic sectors (restricted by total supply equals total use). As individual ecosystem types may supply a basket of different ESs; economic sectors may use a basket of different ESs.
2. State indicators reflecting biotic components are often difficult to assess due to lack of data, certainly for the level of detail of ecosystem assets defined; how do you overcome this problem? A: Depending on the specific type of biota there is information on spatial pattern, e.g. benthos; sea birds etc. Biodiversity maps may be overlaid with the ecosystem type (ET) map to yield ET-specific biodiversity indicators. A similar approach can be used with other biotic ecosystem characteristics, provided the data is there. If not, all ET will be assigned the same “global” indicator value.
3. I notice mainly abiotic indicator, except the biodiversity index; do you have more info on that? Does this one cover all your ecosystem assets? We focus our current efforts on the Living Planet Index multispecies indicator, which does have some spatial detail, but not much. The topic of more spatial detail is on our research agenda.
4. For marine habitat and marine ecosystem services typologies (and an EU-level spatial assessment of pressures), see the documents highlighted in yellow in the file attached. For marine habitats, you should be ok as have used the latest [EUSeaMap](https://emodnet.ec.europa.eu/en/seabed-habitats#sbh-euseamap), which links to the marine [EUNIS](https://eunis.eea.europa.eu/) (European nature information system) level 2 review of 2016 and the MSFD habitat review of 2017, both of which divide things according to photic limit and not depth. For marine ecosystem services, you should have used the marine component of Common Classification of Ecosystem Services (CICES) version 5.1. A: Agreed on the photonic limit; we’ll check if that is explained well enough. The CICES is indeed one of the most elaborate classifications of ecosystem services. For the present study, we use the SEEA-EA framework and the associated reference list of ecosystem services, which is based upon CICES (and other ES classifications)
5. Changes are shown for PH for period 2001 to 2010; do you use then one reference year for you data collection or a period of time? A: We are mainly looking a trends, rather than absolute deviations from a pre-set reference value.
6. Do you then integrate all your indicators on pressures/state towards one condition score per ecosystem asset? A: In order to do so, reference values would be required, for which there is no consensus yet.
7. Is the condition account here only a general trend for the entire Dutch Sea or have some linkage to the extent account (e.g., have same reference as that for extent account, condition indicator for specific extent types)? A: The ideal is to have condition variables and trends for each individual ecosystem type, or even asset, but would in general not be possible due to data constraints, especially regarding spatial distribution.
8. The valuation methods are generally used in cost benefit analyses (especially the market based) but are those prices also applicable for natural capital accounts (marginal prices vs average prices). A: we base our valuation methods on the SEEA guidelines, and do explicitly consider methods using within the CBA community.
9. Do you couple the Ecosystem services account to the extent account? as they also depend on the condition of a specific ecosystem asset Q: Ideally, yes, but in practice in individual cases data limitations may prevent this yet.
10. For carbon sequestration by marine ecosystems, see the marine part here <https://www.eea.europa.eu/publications/carbon-stocks-and-sequestration-rates/carbon-stocks-and-sequestration-in/carbon-stocks/view> And for some marine/beach litter statistics <https://www.eea.europa.eu/themes/water/europes-seas-and-coasts/assessments/marine-litterwatch/data-and-results/marine-litterwatch-data-viewer> Q: Thanks for the suggestion.
11. From the ecosystem description we have seen that biodiversity is important in the North Sea. And from experience we know that people attach a relatively high economic value to biodiversity. The value of biodiversity is not included in the analysis (due to uncertainty of valuation techniques?). In your opinion how should natural capital accounting account for the value of biodiversity (or not)? A: We have been looking into this topic, and it will be addressed in the final version of the report.
12. Two questions: (1) based on the state of play presented here, with (coherent) "disaggregation" (within building blocks) and connection/causal relationship (between blocks) challenges, maybe clarify how what has been presented could be used/for what? Characterising and "summarising", yes. Supporting where to act in priority (MSFD-like) or where best to develop activities (MSPD-like), clearly not... or? Some reflexions on how this can be used for "policy" at this stage usefull. and (2) maybe I missed it but a practical operational question: has [MAES](https://ec.europa.eu/environment/nature/knowledge/ecosystem_assessment/index_en.htm) been relevant and/or useful in the assessments presented? Or is this experience an input to MAES? Or... A: (1) Potential policy applications of the (marine) ecosystem accounts is a topic that we are looking into ourselves as well, and will be addressed in the final version. (2) MAES was an EC initiative to support the EU Biodiversity Framework. The EU work on ecosystem services and has now been taken over by the Eurostat proposal on ecosystem accounts, which is based on the experiences from MAES and is strongly aligned with SEEA-EA.
13. practical illustrations of how the applications are effectively supporting thinking and decisions... and the added-value of the NCA versus what is available out there as a way to keep policy makers interested. A: This would definitively we would consider in the dissemination stage.
14. The question what the added value of NCA is, in addition to existing (EU) reporting frameworks, is a relevant one. A: Consistency; otherwise you're risking combining independent information sources that are not consistent with each other in terms of concept and coverage.
15. But maybe there is a bit of work in "translating" into a nice format the examples that will be in the report - so they can be easily disseminated
16. In relation to MPAs: indeed, an issue of better capturing benefits but also costs and "negative" impacts of MPA (and MPA managed...).... but not sure that NCA (apart its reference to [DAPSIR](https://www.researchgate.net/publication/339543001_A_Model_for_Disentangling_Dependencies_and_Impacts_among_Human_Activities_and_Marine_Ecosystem_Services), or to a list of ecosystem services) will be relevant at an MPA scale (as compared to a systematic analysis of negative and positive impacts at scales relevant to sectors imposing pressures and to ecosystems...). A: The value of NCA is partly in the simultaneous and consistent reporting of ecosystems/biodiversity and economic use. For MPA where there is no use at all of any ecosystem services, the added value of NCA would be limited indeed, but most if not all MPA will provide some ecosystem services, and are still subject to environmental pressures, so there will be a use case for NCA, we believe.
17. MAES has been more 'assessment' than 'accounting' so far. A: Indeed. Within the EU, ecosystem accounting has been the topic of the INCA project.
18. NCA does not have the same analytical power to enlight causality links. A: Agreed, but that is not the purpose of NCA. However, known causality links can be used to guide the compilation of the accounts.
19. You can use the [DPSIR (invented by the EEA](https://www.eea.europa.eu/publications/TEC25) all those years ago) in many ways, you don't need NCA to apply it. A: It was not claimed that NCA is needed to apply DPSIR. We simply use DPSIR (especially the DAPSIR extension) to e.g. frame the pressures account part.