Unlocking the Potential of Ocean-related Data to Develop Insightful Blue Metrics for Financial Institutions

Key Highlights from the Making Oceans Count Initiative

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Unlocking the potential of ocean-related data to develop insightful blue metrics for financial institutions

KEY HIGHLIGHTS FROM THE MAKING OCEANS COUNT INITIATIVE

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Cover image: Created by cath@swim2birds.co.uk © WWF

About the MOC initiative

The initiative, supported by the VELUX FONDEN, has been implemented by a consortium comprising the Green Digital Finance Alliance, WWF-Denmark and Copenhagen Business School.

www.greendigitalfinancealliance.org
www.cbs.dk
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THE MAKING OCEANS COUNT INITIATIVE

The objective of the Making Oceans Count (MOC) project is to have material marine ecosystem-related risks and opportunities better accounted for by key actors within the Nordic financial sector. Financial institutions have a key role to play in ensuring the sustainability of marine environments and protecting and restoring their biodiversity.

The initiative, supported by the Danish VELUX FONDEN, has been implemented by a consortium comprising the Green Digital Finance Alliance, WWF-Denmark and Copenhagen Business School. It benefited from the participation and input of key financial institutions and data providers in the Nordic countries and internationally. This paper provides highlights on one of its key areas of focus, which has been to investigate opportunities and solutions to further integrate ocean-related data and metrics in financial decision-making.

FOREWORD

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This report was being finalized at the same time as the Biodiversity COP15 in Montreal was underway – setting the stage for a 'Paris moment' for nature with the adoption of goals to halt and reverse global biodiversity loss. The report serves as an important reminder that nature is also blue, and that targets for ocean protection are critical along those to protect terrestrial ecosytems. The past two years of collaboration on the Making Oceans Count project, led by the GDFA with asset managers and asset owners in the Nordic countries has uncovered an increasing appetite to understand how portfolio allocations impact ocean biodiversity, both negatively and positively.

Participating financial service institutions have a keen interest in understanding how they can begin to implement Target 15 of the UN Convention on Biological Diversity (CBD), whose draft text states that large businesses and financial institutions must assess their impacts and dependencies on nature.

The next step will be to scale this understanding to more financial service institutions in Northern Europe and beyond, and to start driving change in investment practice away from activities that are harmful for the ocean, and towards positive outcomes for ocean biodiversity. It's expected that the CBD will begin to incentivize such a shift by introducing a new target of no net loss by 2030, and restoration thereafter. For investors this should translate into changes in investment practice to arrive at no-net-loss portfolios by 2030. The past two years of work in the MOC project have shown that this is no easy task. Data and metrics are needed to understand the nature of the negative impacts a portfolio is financing, whether it is financing ocean eutrophication via investment into agricultural production, sea conversion via financing of offshore infrastructure, or ocean microplastic pollution via investment into cosmetics and textile companies.

Data is not available on the main drivers of ocean biodiversity loss to the same extent as it is for the economic activities which drive terrestrial biodiversity loss. In recent years governments have made open-source satellite data available in large quantities. This has enabled fintech innovations to aid financial service institutions in assessing deforestation risks in their decisions, including through advances in artificial intelligence which can automatically identify changes in forest cover before and after an investment to monitor deforestation risk in real time. For oceans, however, many negative impacts are hidden both from the human eye and from machines, particularly those that are felt beneath the surface – such as, for instance, noise pollution generated by the shipping industry. This creates a unique data challenge.

The MOC project, however, shows that there is no need for investors to wait for the perfect data layers to start accounting for ocean risks. The GDFA and partners including the WEF 4IR Centre HubOcean have developed a set of investor-ready ocean metrics based on existing data to help assess and track portfolio impacts now and over time. The MOC project has proved that investors can start a journey to better account for ocean risks and opportunities by leveraging existing datasets and methodologies, while highlighting the most pressing gaps still to be addressed.

We hope that, in the lead up to COP16, more open-source ocean data will be made available by governments, public institutions, corporates and data platforms, including finance-relevant data on ocean-exposed activities, to further accelerate fintech innovation. These advances will mean that policymakers and investors can set a much higher bar for protecting and restoring marine biodiversity, including via policy measures and portfolio allocations. May COP16 be as blue as it is green!

INTRODUCTION

SIGNIFICANT DATA FOR ACTION BUT INSUFFICIENT INVESTOR-READY DATA: THE OCEAN DATA PARADOX

Preserving and restoring ocean health is critical for financial institutions to effectively address their biodiversity and climate risks and opportunities.

70%

of the globe is covered by oceans, which are a reserve of biodiversity and natural resources

30%

of the carbon dioxide emitted since the start of the Industrial Revolution has been absorbed by the ocean

About 70% of the surface of the globe is covered by oceans, which are a significant reserve of biodiversity and natural resources. To that extent, more than 240,000 marine species are already known (World Register of Marine Species, 2022),[1] yet a significant fraction of the total number of marine species estimated to be in existence are still to be discovered and classified. Moreover, about 30% of the carbon dioxide emitted since the start of the Industrial Revolution has been absorbed by the ocean (NOAA, 2019),[2] which has also been absorbing over 90% of the excess heat in the climate system (IPCC, 2019).[3] And beyond their critical climate regulation function, oceans provide numerous vital ecosystem services ranging from provisioning services (such as food and genetic materials, minerals and water) to regulatory services (such as mass stabilization and erosion control, flood and storm protection) and cultural benefits.[4]

Yet a large fraction of the ocean's area, over 40%, is strongly affected by multiple drivers whose cumulative impacts harm the health of marine ecosystems and are increasing significantly in most of the ocean (Halpern et al., 2008, 2019).[5] The key pressures highlighted in marine environmental frameworks[6] and the scientific literature include the physical use of the sea (leading to seabed disturbance, habitat loss and changes to hydrological conditions), living resource exploitation (extraction and disturbance of species), climate change (leading to ocean warming and acidification), pollution (from nutrients and organic matter, contaminating compounds, marine litter including micro-litter, noise and energy), and the spread of non-indigenous species and pathogens.

When it comes to financial institutions' investment portfolios, exposure to these key drivers is material in financial terms. The Making Oceans Count (MOC) team conducted an analysis of the listed equity portfolios of six large Danish asset-owners: it appears that close to 40% of the value of the investments in these portfolios is exposed to activities which, directly or indirectly, have potential material dependencies and/or impacts on marine ecosystems, above and beyond climate change.[7] Even so, most financial institutions have limited awareness and understanding of the impacts and dependencies of their activities on marine environments; their potential exposures to multiple pressures and material risks across various sectors, economic activities and geographies; or of how to engage with companies operating in these areas.

>40%

of the ocean is strongly affected by multiple drivers whose cumulative impacts harm the health of marine ecosystems

40%

of the investments in these portfolios are exposed to activities which can, directly or indirectly, have material ocean dependencies and/ or impacts

There is thus an urgent need for investor action; however, there is a lack of actionable data. In fact, when it comes to better accounting for nature in financial decisions, access to sufficient and actionable data has been identified as a critical limitation for financial market participants, if not the main barrier (for 70% of investors according to a recent survey).[8] This contrasts with the fact that significant investments have been made over the past two decades to scale up platforms that can deliver extensive data on ocean ecosystems and their biological, chemical and physical characteristics,[9] to assess the magnitude of key ocean pressures and the scale of human activities driving them. Although a large part of the oceans still remain unexplored, there is already a wealth of 'public good' primary data that can be leveraged for key areas exposed to human activities, including geolocated and quantitative data time series. This is notably the case for the Baltic and the North Sea ecoregions,[10] which has been a key focus of the MOC initiative.

However, to be actionable, this environmental data needs to be related to the invested activities of the financial institutions, and **the main issue faced by the finance sector is rather the ability to connect and translate extensive nature-related data into applicable data for its investment activities.** Eventually financial institutions need to be able to relate the data to specific issuers or financial instruments, their underlying activities and physical assets. In particular, this issue is amplified by the relatively poor state of corporate disclosures on their ocean-exposed activities, including geolocated data and environmental metrics that can be used to assess companies' contribution or exposure to ocean pressures and the ultimate impacts they have on the state of nature in the oceans. Currently, quantitative methodologies developed to measure financial portfolios' impact on biodiversity are mainly land-based,[11] and pressure and impact estimations are still limited when it comes to oceans.

Data opportunities which can be addressed to tackle the issue:

CREATING DATA LINKAGES AND LEVERAGING ASSET-LEVEL GEOLOCATED DATA

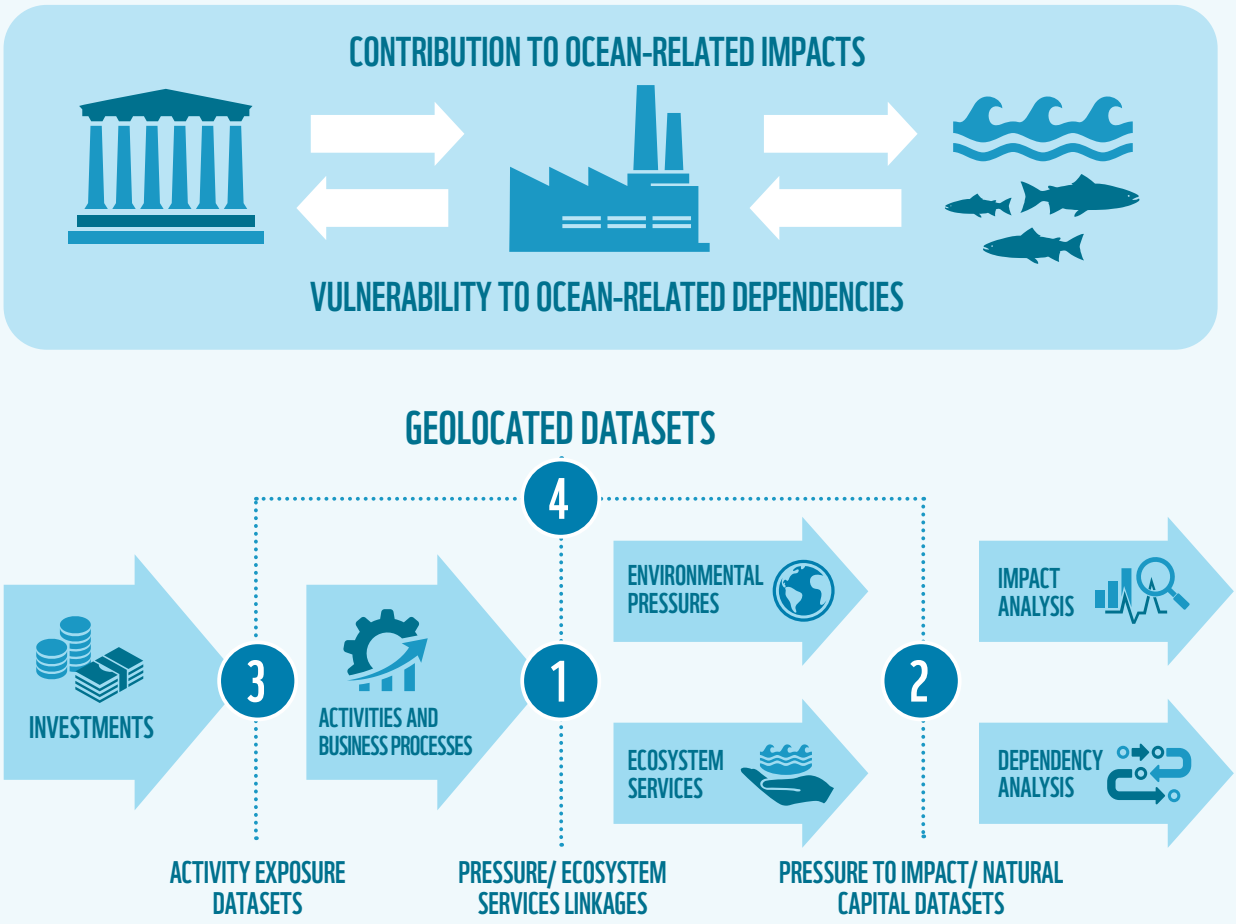
As part of the MOC initiative, a mapping of data resources which can be used to link ocean-exposed investment activities to ocean-related pressures, ecosystem services and ultimately impacts and dependencies was conducted. More than 200 metadata and data platform resources were reviewed, and specific resources for marine-exposed sectors were identified.

As part of the MOC initiative, a mapping of data resources which can be used to link ocean-exposed investment activities to ocean-related pressures, ecosystem services and ultimately impacts and dependencies was conducted. More than 200 metadata and data platform resources were identified and reviewed, including specific resources for the blue economy and marine-exposed sectors.

While these primary data sources are not necessarily finance-ready, what emerged from the analysis is that there is an opportunity to create a data chain to combine them, using datasets that can link investment portfolios to specific activities and physical assets in specific geolocations, which can then be linked with environmental pressures and ecosystem services to conduct impact and dependency analysis (see Illustration 1). Moreover, to augment such analysis it is critical to harvest geolocated data for analysing impacts on marine sensitive zones and dependencies on marine ecosystem services, along with qualitative and quantitative data.

There are already a number of opportunities that financial institutions can explore for: 1) assessing their exposure to material ocean impacts and dependencies; 2) conducting ‘deep dives’ and granular risk assessments of the most material sector risks and opportunities; and 3) using asset-level data and assessing geolocated exposures to marine sensitive zones.

Illustration 1: *Data opportunities and linkages for ocean impact and dependency assessment*



As a starting point, a major source of data which can be explored today relates to datasets which help assess the impact and dependency of certain human activities on oceans, and which can specifically connect and relate specific invested activities and business processes to specific pressures, ecosystem services, impacts and physical dependencies (1-2). Mapping these connection points can be a turning point for financial institutions to identify the actual risks they may be exposed to, from physical to transition risks, and assess their exposures. Eventually this will help institutions grasp the complexity they are facing when it comes to accounting for nature, but also to prioritize areas for action and further data collection. For this, it is important for financial institutions to access sufficient granular data on the underlying activities and business processes of their investments (3). In particular, this type of analysis can be augmented with data to analyse the indirect exposures companies may have via value chains (e.g. food supply chain, downstream impact of product waste).[12]

Unpacking data at sector level is a way to address the complexity of ocean-related analysis and generate applicable data insights.

For specific industries, ocean-focussed materiality maps can be developed, and methodologies can be explored to estimate activities' contribution to ocean pressures and potential impacts. In this regard, the UNEP FI Sustainable Blue Economy guidance (such as 'Turning the Tide' or 'Diving Deep')[13] is a key resource to be explored when analysing blue economy industries.

Beyond the opportunity to analyse linkages between investments, activities, pressures and marine ecosystems, the use of geolocated and asset-level data (4) is critical to go to the next stage of quality and granularity in risk assessments, given the specific ecosystem components and vulnerabilities intrinsic to each location. There are extensive geolocated datasets that can be used to assess exposure to marine protected areas (MPAs) and sensitive zones, provided the asset location is known. This geo-specific data can be overlayed with data on physical assets and observational or estimated data on the pressures originating from these assets, as well as financial ownership data. This can already be explored for several material ocean-based industries such as offshore renewables, marine transportation, ports and coastal infrastructure, as well as offshore extractives (see Table 1).

Table 1: *Geolocated data opportunities for selected key sectors*

BLUE SECTORS	PRIMARY DATA READINESS*	DATA OPPORTUNITIES (ABOVE AND BEYOND CORPORATE DISCLOSURES)
OFFSHORE WIND AND EXTRACTIVES	RELATIVELY HIGH	Asset-level data on sites, licences, operators and equipment accessible through national agencies, regional and industry portals, which can be linked to companies; availability of key environmental datasets (e.g. Marine Protected Areas, marine ecologically sensitive areas); intermediate coverage of key pressures/impacts (e.g. habitats, seabed disturbance, noise, pollutants)
MARINE TRANSPORTATION	RELATIVELY HIGH	Vessel/AIS data – dynamic and static – widely available; needs to be connected to the relevant activities, companies and investments, availability of protected (MPA) and sensitive areas (IMO PSSA); coverage of key pressures and incidents (e.g. air emissions, contaminating compounds and litter, noise, invasive species)
PORTS AND COASTAL INFRASTRUCTURE	INTERMEDIATE	Accessible data on key ports and activities can be leveraged (e.g. EMODnet, Eurostat), however not fully comprehensive. Shipping data connected to ports can also be leveraged. Need to increase data on the pressures/impact of specific ports' operations (e.g. dredging, water pollutants, emissions, noise); MPA and key biodiversity area datasets for surrounding areas

*Data dimensions being considered: 1. Availability and quality of asset level data (static and dynamic), including geolocation and key asset attributes 2. Coverage of key asset-level pressures and impacts on marine ecosystems 3. Industry-relevant environmental datasets for marine ecologically sensitive zones and protected areas 4. Ability to link asset level data with relevant financial data .

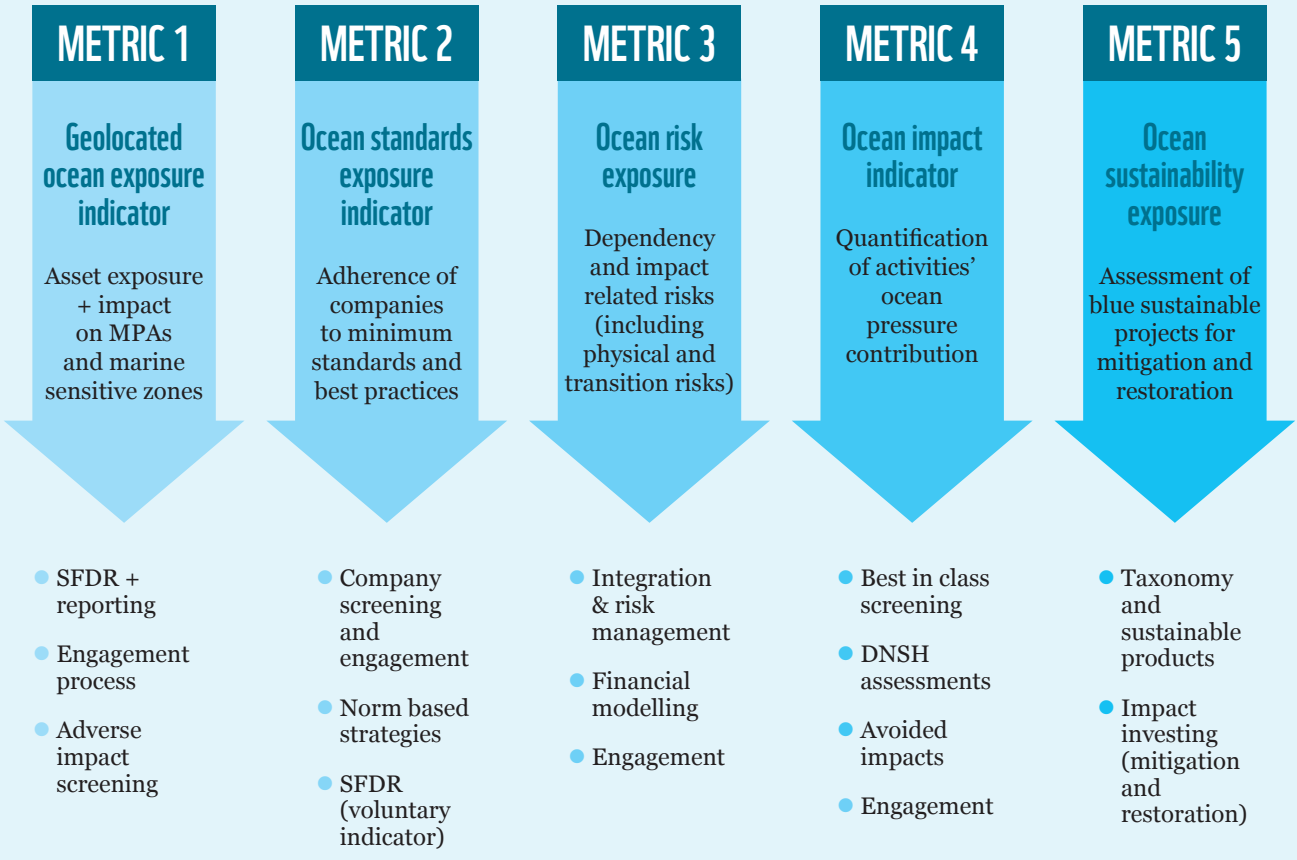
Overall assessment: High/ Rel. High/ Intermediate/ Rel. Low/ Low (e.g. High= all 4 dimensions well covered; low= none well covered)

TRANSLATING THESE DATA OPPORTUNITIES INTO ACTIONABLE BLUE METRICS FOR THE FINANCE SECTOR

Ultimately, financial institutions should be able to leverage decision-grade metrics as part of their investment and engagement process.

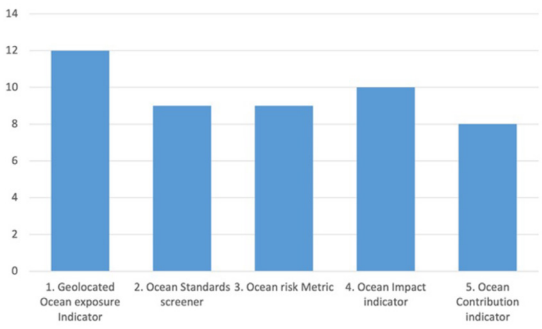
There is an opportunity to translate the primary data into metrics and analytics with transparent methodologies which can be used as part of the risk management process, investment screening, due diligence, valuation and sustainable investment process. To that extent, as part of the MOC initiative, a review of financial institutions' needs was conducted, and a set of blue metric concepts was explored with ESG data providers and financial institutions (see Illustration 2). The metrics were conceptualized using different analytical angles and with consideration of their potential applications for investors.

Illustration 2: *Blue metric concepts*



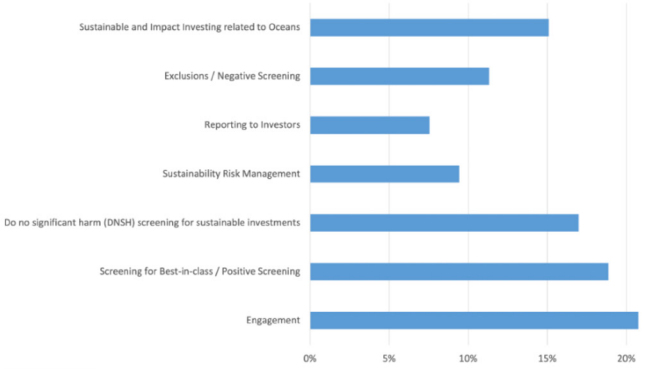
Investor engagement on blue metrics

Figure 1: Which type of blue metrics and indicators could be instrumental in supporting investors' objectives?



Response count (number)
N=14 respondents

Figure 2: Which of the following applications in the investment process would be most useful to have blue metrics for (up to 4 choices)?



% of total answers for each category (sums to 100%)
N=14 respondents

As part of the MOC initiative, a set of Nordic and global financial institutions (asset owners and managers) were engaged in a dialogue and questionnaire on their needs in terms of blue metrics. Most financial institutions are looking to integrate more data through either an external solution, or a combination of internal and external expertise. The questionnaire (14 respondents) revealed an interest from financial institutions in covering a wider set of pressures (GHG emissions followed by waste and plastics are seen as the most important pressures, but awareness of the other pressures is also growing, such as living resource exploitation and physical damage to the seafloor); along with a number of key sectors such as offshore renewables, marine infrastructure and marine transportation. In addition to these, financial institutions see it as critical to address seafood, offshore oil and gas, and also some land-based industries such as the pharmaceutical industry or supporting industries such as the banking sector for its financing of ocean exposed activities.

In terms of blue metrics, these financial institutions have expressed a strong general interest in getting enhanced data insights on geolocated exposures, ocean risk and ocean impact indicators (see Figure 1 above). As far as use cases go, financial institutions see engagement with investees as the main area of practice when it comes to applying them (see Figure 2 above). Using blue metrics for a positive screening and Do No Significant Harm is also of interest to financial institutions. Although regulation has an influence, reporting and disclosures are not the primary driver – using metrics to allocate sustainable investment for oceans is also a rising topic.

As part of the initiative, **a proof of concept (POC) has been developed to demonstrate the opportunity for geolocated metrics**. The aim is to measure the geolocated exposures and environmental impacts of ocean-material activities, and assess to what extent they may negatively impact sensitive marine ecosystem areas. To that extent, in the context of the EU Sustainable Finance Disclosure Regulation (SFDR), financial institutions need to report a specific biodiversity adverse impact indicator (Principal Adverse Impact 7), which discloses the "Share of investments in investee companies with sites/operations located in or near to biodiversity-sensitive areas where activities of those investee companies negatively affect those areas."

To implement the POC, asset-level data layers (using Marine Protected Areas as a start) have been overlaid with geolocated environmental sensitivity data layers, integrating pressure and ownership data (see Illustration 3).

Illustration 3: *Overlaying geolocated and asset-level data*

The POC has been tested on the marine transportation sector: the MOC initiative has been partnering with HubOceans and S&P Global as key platforms and leading data providers for this industry. The project developed a mapping functionality, a portfolio analysis interface and the ability to derive metrics on geolocated exposure to marine sensitive zones, assess risky assets and quantify pressure contributions, using estimation modelling focused on air emissions. The POC has been able to implement the following functionalities: 1) the ability to derive asset-level data from company-level information, through financial ownership and operational relationship datasets (using a model portfolio of eight shipping companies and S&P global data); 2) the ability to derive geolocated exposure analytics for the identified assets (vessels) and drill down into hotspots/exposed areas to investigate exposures and generate risk-level information; and 3) the ability to generate pressure-specific data (air emissions) for company/assets, and to deep-dive into pressure-specific data at geolocated level for a given company and its assets.

Illustration 4: *POC application developed with HubOcean platform for the shipping sector, using S&P Global ship ownership and characteristics data*

DYNAMIC DASHBOARD TOOL

Portfolio performance measured by 2 key indicators: Risk Exposure and CO2 Emissions
"Select companies and choose relevant benchmark for comparison"

In addition to the geolocated metric, the MOC project has assessed the feasibility of developing ocean-specific risk metrics and conducting assessments of companies' standards. In particular, in the context of the Taskforce on Nature-related Financial Disclosures (TNFD) and the ongoing regulatory drive (such as the SFDR), financial institutions are looking for metrics that can enable them to better assess their transition and physical risk exposure related to nature, and improve their ability to better assess adverse environmental impacts and identify best practices in ocean-exposed industries.

In terms of ocean-related risk, the MOC initiative has assessed the design and feasibility of a metric to better assess the marine ecosystem risk exposure of investors' portfolios, engaging with key nature-relaated data providers.[14] This has included a framework to potentially measure 1) the direct or indirect dependencies on marine ecosystems and associated physical risks; and 2) the impact and transition risk embedded in a portfolio's direct or indirect pathways to ocean pressures.

In doing so, the project explored different levels of risk assessment (see Table 2). The first level was to assess the most at-risk exposures in a diversified portfolio in terms of activities. Using linkage data, the MOC tested such an approach with the listed equity portfolios of six Nordic financial institutions to identify hotspots and the most at-risk exposures to be prioritized in terms of sectors, pressures and geographies.[15] The second level was to explore how to get more granular risk assessments to measure the specific ('idiosyncratic') risks related to a specific company, project or asset, by integrating more specific activity and asset-level data, including data on companies pressure contribution levels and their operating standards. In a third stage, these assessments could be augmented with the geolocated risk analysis presented earlier in this report.

FLEXIBLE ASSET MAP

Visual representation of vessel movements
Overlayed with Marine Protected Areas

Table 2: *Components of ocean risk metric assessment*

RISK COMPONENTS	CHARACTERISTICS
Level 1 (β): Exposure to ocean material activities	Which activities and related business processes in the investment porfolio are ocean material, for what pressures and ecosystem services in the applicable ecoregions?
Level 2 (α): Investment's environmental characteristics ("idiosyncratic" risk)	How much is the investment effectively and relatively contributing to actual pressures? (or vulnerable to ecosystem loss)
Level 3 (γ): Geolocated risk exposure	Which ecosystem components are vulnerable and at risk in the areas impacted by the activities?

LOOKING FORWARD: KEY OPPORTUNITIES FOR MARKET PARTICIPANTS AND STAKEHOLDERS

'Fit for purpose' blue metrics will be increasingly required to better assess human activities' impacts on oceans and manage the associated risks and opportunities. Looking forward, there are several opportunities that can be addressed by financial market participants, data providers, start-ups and through the development of appropriate regulatory frameworks.

First, there is a need for more corporate-specific data and asset-level data related to oceans to be made available, to improve the quality and relevance of blue metrics that can be used by financial institutions for risk and opportunity assessments. There is an opportunity for nature-related and corporate disclosure data platforms to include geolocated asset-level data pertaining to ocean-exposed activities. In addition to the location and ownership data, the asset-level data could be enriched with information on the characteristics of the assets and observational data.

To support this development, there is a need for enhanced corporate disclosure on oceans in material sectors, including pressure metrics, asset level and site-specific data, as well as supply chain data. Disclosure frameworks such as the EU Corporate Sustainability Reporting Directive (CSRD) and industry-led initiatives such as the Taskforce for Nature-Related Financial Disclosures (TNFD) or Global Reporting Initiative (GRI) will be critical to improve the availability and quality of data. In parallel, there is an opportunity for financial institutions to directly address the data disclosure gaps on the issuer side as part of their engagement process with companies, requesting more specific data from them.

Furthermore, in order to better integrate marine biodiversity into financial decision-making and support impact and dependency assessment, there is a need to develop a wider set of science-based ocean-related assessments, data and models. For instance, marine sensitivity datasets for specific ocean-exposed industries could be made more widely available, in order to complement MPA and key biodiversity area data. Tools like ENCORE[16] or specific marine linkage frameworks such as "Options for Delivering Ecosystem-Based Marine Management" (ODEMM)[17] could also be further developed to enable more systematic assessment of marine exposures embedded in financial investments. Environmental and cumulative impact assessment models could be extended to cover a wider set of marine pressures and impacts to translate data on activities' pressures into actual impacts on marine biodiversity.[18]

While the ocean-related data and models are made more accessible, nature metric providers and data vendors to the financial sector have a key role to play to address financial institutions' need for more granularity, actionability and transparency in terms of blue metrics and data. The MOC has investigated the needs of financial institutions and assessed some key opportunities for blue metrics, which can be a starting point for market participants to develop and onboard more relevant blue metrics. There is an opportunity for innovation to take place in this respect, using digital technologies to address existing data limitations and scale up opportunities.

All these initiatives should pave the way for the integration of fit-for-purpose blue metrics into the practices of financial institutions, to better account for ocean risks and opportunities.

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6. For instance, the EU Marine Strategy Framework Directive (Annex III updated in 2017). See https://ec.europa.eu/ environment/marine/eu-coast-and-marine-policy/marine-strategy-framework-directive/index_en.htm
7. WWF Denmark Briefing Note *SETTING SAIL: Mapping a journey to managing financial institutions' ocean impacts and dependencies*. February 2023.
8. In January 2021, a Responsible Investor survey ('Unearthing Investor Action on Biodiversity', conducted in collaboration with Credit Suisse, The Nature Conservancy, the Zoological Society of London and the International Union for the Conservation of Nature) found that data is the biggest barrier to making investments that support biodiversity, with 70% of 222 surveyed investors putting it above being unable to value natural capital and lacking internal expertise.
9. Such as the European Marine Observation and Data Network (EMODnet – www.emodnet.com),the Marine Biodiversity Observation Network (MBON – www.marinebon.org) and UNEP-WCMC's global Ocean Data Viewer (https://data.unep-wcmc.org/) and Ocean+ habitats and Ocean + library (https://oceanplus.org/)
10. Such as the HELCOM data platform for the Baltic (https:// helcom.fi/baltic-sea-trends/data-maps/) and OSPAR Data & Information Management System for the North Sea (https:// odims.ospar.org/)
11. Finance for Biodiversity Foundation, *Guide on biodiversity measurement approaches, Updated edition* (October 2022) https://www.financeforbiodiversity.org/publications/guide-on-biodiversity-measurement-approaches/
12. Multi Regional Input Output datasets (such as Exiobase) and Life Cycle Assessment (LCA) datasets, with environmental inputs/outputs, are useful to analyse supply chains and use of products, as well as end-of-life product treatments.
13. UNEP FI, 'Turning the Tide' and 'Diving Deep' reports. Specific criteria have been defined for seafood, ports, marine transportation, marine renewable energy, coastal and marine tourism, as well as waste management and coastal infrastructure. For further information, see https://www.unepfi.org/blue-finance/resources/
14. A series of three workshops was conducted with data providers including MSCI, Matter and ENCORE.
15. WWF Denmark Briefing Note *SETTING SAIL: Mapping a journey to managing financial institutions' ocean impacts and dependencies*. February 2023.
16. Exploring Natural Capital Opportunities, Risks and Exposure (ENCORE) is a tool to help users understand how businesses across all sectors of the economy potentially depend on and impact on nature, and how these potential dependencies and impacts might represent a business risk. ENCORE was developed by the Natural Capital Finance Alliance in partnership with UNEP-WCMC.
17. Linkage framework developed under the European Commission's 7th framework project 'Options for Delivering Ecosystem-Based Marine Management' (ODEMM), provides linkages between specific sectors' activities and 24 marine pressures.
18. Similar to what models such as Globio (www.globio.info/) can provide for land-based assessments.


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