NATURE-RELATED RISK REPORTING FOR INVESTORS

A CASE STUDY OF THE AQUACULTURE SECTOR

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WWF

storebrand

NINA

Grieg Seafood

Contents

The participants

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WWF World Wide Fund for Nature is one of the largest environmental organizations in the world, founded in 1961 and active in nearly 100 countries with more than 5 million supporters. WWF's mission is to stop the degradation of the earth's natural environment and to build a future in which humans live in harmony with nature.

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The Norwegian Institute for Nature Research (NINA) is Norway's leading institution for applied ecological research, with broad-based expertise on the genetic, population, species, ecosystem and landscape level, in terrestrial, freshwater and coastal marine environments.

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Introduction

Major financial institutions and multinational corporations have endorsed the launch of a new market-led Taskforce on Nature-related Financial Disclosures (TNFD), which will support businesses in assessing emerging nature-related risks and opportunities. The initiative aims to develop and deliver a risk management and disclosure framework that helps corporates, investors, lenders and insurance underwriters understand and manage nature-related risks.

In its first year, the TNFD aims to build upon the success of the Task Force on Climate-related Financial Disclosures (TCFD), which has become instrumental in mainstreaming the issue of climate-related financial risks. The TNFD's framework for nature-related risks will complement the TCFD's climate-related framework, to give companies and financial institutions a complete picture of their environmental risks. Through its framework, the TNFD will support organisations to report and act on both their impacts and dependencies on nature. The framework will be tested and refined in 2022 before its launch and dissemination in 2023.

Inspired by background work on nature risk launched by WWF Norway in 2019, and in order to support the adoption and implementation of TNFD recommendations, Storebrand Asset Management and Grieg Seafood came together with WWF Norway and the Norwegian Institute for Nature Research (NINA) in a pilot project to test a framework for reporting on nature related risks in the aquaculture sector. Grieg Seafood is one of the 34 members of the TNFD Taskforce, while Storebrand Asset Management is member of the TNFD Forum, a consultative network of over 250 institutional supporters. The aim of this project is to demonstrate how a company can report on nature-related risks in a way that allows its investors to identify potential risk exposure and engage with its portfolio company in an active, structured and informed way. The project is also contributing to the UNEP FI Sustainable Blue Finance Initiative and acting as a case study on how to use the recent guidance for financial institutions on how to finance a sustainable blue economy across five sectors, including seafood.

The value of understanding nature-related risks

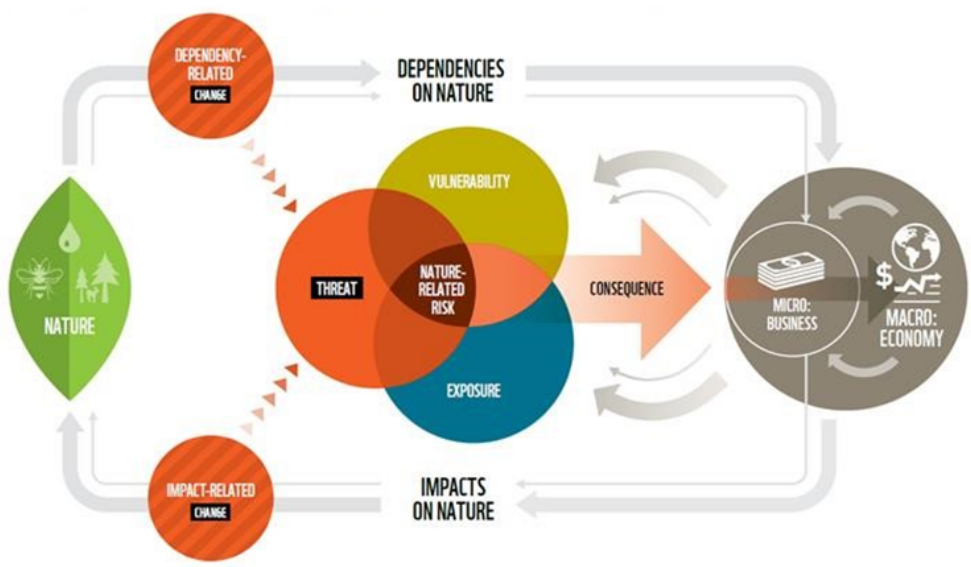
By World Wildlife Fund for Nature (WWF)

Loss of nature and biodiversity is happening at an unprecedented pace, and it is both exacerbating, and being driven by, the climate crisis. Global institutions such as the *Network for Greening the Financial System*[1] and the *World Economic Forum*[2] recognize that environmental degradation is a source of risks to businesses and financial institutions, and that nature loss is one of the top five most likely and impactful risks in the next 10 years. It is therefore crucial that companies increase their understanding of nature-related risks and start to reduce their negative impacts on nature and ecosystems, as well as grasp the opportunities associated with a nature-positive future.

Businesses connect to nature in two primary ways: through their **dependencies** on nature, ecosystem services and resources, and through their negative or positive **impacts** on nature ***(Figure 1***). Often these two things are connected when a company negatively impacts on those parts of nature that it is dependent on.

A **change** in these dependencies and impacts can become a **nature-related risk** when that change creates a **threat** to the business activity, and when the company is both exposed and vulnerable to that threat. Changes can be **dependency-related** (e.g. degradation of ecosystems, reduced availability of resources, climate change impacts on operations, or changes in policies, consumers or markets) or **impact-related** (e.g. when the company activities negatively impact nature, such as pollution or overexploitation). In some cases, businesses both impact on and are dependent on nature and biodiversity and as such, this framework is consistent with the principle of "double materiality". A company's impacts and dependencies on nature are equally relevant as they can both lead to the emergence of nature-related risks.

Figure 1 High level framework illustrating nature related risk to business and the economy. Illustration from WWF (2019). The Nature of Risk. A Framework for Understanding Nature-related Risk to Business.



Framework of nature-related risk. This framework for nature-related risk combines two ideas. The first is how businesses and the economy both impact and depend on nature (outer gray arrows). The second is that nature-related risk arises from not just the change to impacts and dependencies on nature (striped circles), leading to a threat (orange circles), but also from a business's exposure and vulnerability (blue and yellow circles). When a nature-related risk is realized, there may be a consequence to the business and to the broader economy. These consequences may trigger feedbacks on the company's vulnerability and exposure or may create further threats related to its impacts and dependencies on nature. *Adopted and integrated from NCFA & UNEP-WCMC 2018, Field et al. 2014.*

[1] NGFS (2019). A call for action: climate change as a source of financial risk.

[2] WEF (2022). Global Risks Report 2022. https://www.weforum.org/reports/global-risks-report-2022

A review[3] of more than 30 frameworks that help to define nature-related risk identified the following risk categories:

- **Physical** risk, i.e. material destruction or degradation
- **Regulatory and legal** risk, linked to changes in policies, regulations and court actions
- **Market** risk, linked to changes in consumer and market preferences
- **Reputational** risk, linked to changes in public and media perception, manifesting as public campaigns, boycotts or purchasing decisions
- **Transition** risk, often used to group the types of risks articulated above as the world transitions to a climate and nature positive future
- **Financial** risk, which arises as a consequence of the previous risks and can affect the company (financing risk) and/or the financier (financier risk)

There is currently no common standard to report on nature-related risks. *The Taskforce on Nature-related Financial Disclosures* (TNFD) aims to deliver such a framework as articulated above. However, in the meantime, a variety of tools and methodologies for businesses and financial institutions have been developed and therefore companies can already start to increase their understanding, identification and mitigation of their nature-related risks, and, crucially, begin to start reporting on the most important risks for their business[4].

The purpose of this pilot is, therefore, to test how a reporting framework for nature-related risks within a specific sector might be implemented; how the framework can create value for both companies and investors, as well as other stakeholders; and how it might be improved over time. At the present time, and to our knowledge, no such thorough reporting exists that specifically relates to risk. Many progressive companies already disclose data and information in their publicly available reporting (annual and sustainability reports). However, it is often the case that this information is not adequate for financial institutions to assess the level of risk that a company might represent, nor is it reported in a standardised way that enables corporate comparisons.

The aquaculture sector, which is the focus of this project, is a useful sector to test this reporting framework on as it is – in most cases - highly embedded within a nature-based context. Fish farms are often located in natural environments and rely on the ecosystem services that they provide. In addition, they also rely on feed sources that either contain marine-based ingredients or terrestrial commodities, such as soy, both of which come with high potential impacts and dependencies on ecosystems and biodiversity. The ENCORE tool[5], which was established to highlight the level of dependency a sector has on ecosystem services and nature, shows the aquaculture sector to be dependent on 18 of the documented 21 ecosystem services, confirming a high degree of dependency on nature.

To undertake this pilot, a number of frameworks and tools were considered including the ENCORE tool and a version of an adapted TCFD-framework. However, given its specific focus on nature-related risks and impacts and its inclusion of aquaculture as a sector, the recently published 'Turning the Tide' guidance for financiers was chosen as the basis for this pilot.

[3] WWF (2019). *The Nature of Risk. A Framework for Understanding Nature-related Risk to Business.* wwf.panda.org/?352751

[4] A recent review of tools is WWF (2021) Assessing Portfolio Impacts

[5] The ENCORE tool helps to identify nature-related risks that can arise from **dependencies** and **impacts** of business activities on the natural world. For each industry sector, ENCORE lists the ecosystem services the sector is dependent on. The degree of dependency on an ecosystem service is assessed and rated as "*Very High, High, Medium, Low or Very Low*" based on how important that service is to the production process, and the related materiality of the impact if that service is disrupted. This rating allows financial institutions to determine which ecosystem services are more critical to production processes. Once the most material and relevant dependencies and impacts have been identified, it is possible to develop a framework to guide/facilitate company reporting in order to allow shareholders and stakeholders to analyse to what extent the company is aware of, and acting on, its potential nature-related risks.

Company reporting framework

UNEP-FI Sectoral Guidance for Implementation of the Sustainable Blue Economy Finance Principles

Under the UNEP FI Sustainable Blue Finance Initiative, the Sustainable Blue Economy Finance Principles (SBEFP) set out to define what financing a healthy and resilient ocean looks like.[6] These Principles are the world's first global guiding framework for banks, insurers and investors to finance a sustainable blue economy. They promote the implementation of Sustainable Development Goal (SDG) 14 (Life Below Water), as well as a multitude of other SDGs, and set out ocean-specific guiding principles that support the financial industry to mainstream sustainability of ocean-based sectors. The Principles were developed by the European Commission, WWF, the World Resources Institute and the European Investment Bank.

In order to support adoption and implementation the Principles, UNEP FI has developed sector specific guidance **that builds directly on the SBEFP and seeks to apply the principles at a more granular level**. The purpose of the guidance is to provide sector-specific, decision-useful information to **banks, investors and insurers** on how to avoid and mitigate environmental and social risks and impacts, as well as make the most of opportunities, when providing capital to companies or projects within the blue economy. Seafood, including wild capture fishing and aquaculture are one of the five sectors included in this first iteration of the guidance. Published in March 2021, the guidance provides a framework to identify key impacts and risks to and from nature, specific to aquaculture. However, the guidance was not designed to be a reporting framework, so part of the purpose of this pilot is to make certain modifications to adapt it for this purpose, without changing the basic content and information presented. We believe that this will be helpful for other investors wanting to encourage comprehensive company disclosure in order to evaluate investments against the guidance. The pilot is intended to be relevant for all aquaculture species globally, including the most common species like shrimp, tilapia and salmon. The case is conducted with a salmon aquaculture company.

How does it work?

The guidance lays out the key impacts and risks arising from a specific sector, and then suggests a number of indicators that evaluate whether a potential risk or impact is present. For example:

Evidence that owned and operated farms or farms in supply chain are located in areas of ecological sensitivity such as mangroves and wetlands

Each indicator has a number of potential "verification sources" (including company disclosure, which can be obtained either from websites and reports or from requesting information). On the basis of the presence or absence of a certain indicator, certain actions are recommended for financial institutions:

- **Avoid**, where it is recommended financial institutions do not provide financing due to the severity of a given indicator;
- **Challenge**, where financial institutions are recommended to address a specific issue highlighted by an indicator, for example via engagement with a company or project developer; and
- **Seek out**, where an indicator denotes current best practice on a particular issue and where financing is encouraged.

Each action is also coupled with a recommendation for what the financier should or could expect from the company in question. This could be, for example:

[6] The Principles – United Nations Environment – Finance Initiative (unepfi.org)

- Require evidence that farms are located in legal and permitted zones for aquaculture development;
- Require evidence of best practice in planning and development of new sites such as environmental and social impact assessments; require accountability framework initiative and verification of deforestation and conversion free aquaculture production and supply chains.

The framework is based on the following 5 categories of nature-related risks. These were adapted from the TCFD framework and the nature risk framework identified above.[7]

Risk	Description	Example
Physical	The risk to physical assets, often related to the impacts of climate change.	Increased physical damage to coastal assets (e.g. hotel property) subsequent to tropical cyclones.
Operational	The risk of interruption of ongoing activities, including supply chain operations, logistics and other disruption of business operations.	Disruption to tourism business operations due to coral reef bleaching events.
Market	The risk of changes to the market served by a sector or development, including shifts in demand or supply.	Increased consumer demand for sustainable seafood options.
Regulatory	The risk of changes in the regulatory environment affecting the sector, including changes in how it may be taxed or subsidised.	Policy change on sulphur dioxide emissions within shipping.
Reputational	The risk of change in public perception, manifesting as public campaigns, boycotts or purchasing decisions.	Negative press coverage associated with wind turbine noise pollution on marine mammals.

The table below highlights the links between pressures, impacts and risks specifically within aquaculture, as identified in the UNEPFI's report "Turning the Tide"[8]. For the full suite of impacts and risks, please see the full report.

Key Pressures	Key Impacts	Key Risks
Location and Siting of Farms	Habitat destruction, Biodiversity, Ecosystem Services	Regulatory, Market, Physical
Pollution and Water Contamination	Biodiversity, Geochemical and Biological Cycles	Reputational, Regulatory, Market
Invasive Species and Escapes	Biodiversity, Economic Impact	Reputational, Operational
Spread of Disease and Parasites	Biodiversity, Economic Impact	Reputational, Operational
Use of unsustainable marine and terrestrial ingredients in feed	Ecosystem Services, GHG Emissions	Reputational, Operational, Market
Interaction with Wildlife and Predators	Animal Welfare	Reputational, Regulatory

The aquaculture guidance was adapted to a reporting framework by clustering indicators together under each criteria and providing suggested metrics for the company to report against. This then, in theory, enables the investor to have the information required to decide how to respond, whether to ask for more information or require or encourage the company to do more to meet the recommendations outlined in the guidance. The following sections outline the experience of the stakeholders involved and any challenges or opportunities that were identified. The reporting exercise itself is provided in Annex A. Commentary on the framework's indicators specific to this exercise are provided in Annex B.

[7] WWF (2019). *The Nature of Risk. A Framework for Understanding Nature-related Risk to Business.* wwf.panda.org/?352751

[8] UNEPFI (2021). Turning the tide: how to finance a sustainable ocean recovery. https://www.unepfi.org/publications/turning-the-tide/

A company perspective on reporting on nature-related risks and impacts By Grieg Seafood

Food systems are responsible for about 70-92% of the water extracted from nature, more than 70% of tropical deforestation, 60% of all biodiversity loss, and generate up to a third of human greenhouse gas emissions[9]. Whilst "blue foods" and aquaculture have been noted to be in some instances more resource efficient than land-based animal proteins and therefore, may play a role in reducing nature-related dependencies and impacts from the global food system, there is still work to be done in order to identify, manage and mitigate key climate and nature-related risks from this sector.

Grieg Seafood believe that the aquaculture industry must:

- Reduce impacts related to production and ensure that our operations can co-exist with other species, such as wild salmon, coastal white fish, crustaceans, marine mammals and others
- Improve fish health and welfare
- Reduce impact from feed ingredients
- Cut carbon emissions, especially from feed and freight
- Reduce overall use of scarce resources and increase recycling rates
- Ensure that human rights are protected

Nature-related risks are integral to several of these challenges, and with that basis, Grieg Seafood has found it relevant to explore this topic to learn more and improve our understanding..

Dependencies

As ocean farmers we depend upon ecosystem services to operate; such as access to clean water without harmful plankton or ocean-borne diseases/pathogens; good oxygen levels; appropriate currents throughout the pens; and not least the right temperature. Future changes in these nature-based services, whether natural changes or those caused by humans, may pose a risk to the aquaculture industry. As a sector, we might also contribute to changes in ecosystem services, creating a double materiality. For example, carbon emissions from operations contribute to climate change, one of the strongest drivers of changes in ecosystem services. Another example is that if responsible farming practices are not used, fish farming activities may themselves temporarily cause changes to ecosystem services in local farming areas, before the ecosystem restores during fallowing after harvesting.

Today, as a company, we are working on developing mitigating measures to the different ocean environments that we experience. We farm in different geographies and each area has distinct ecosystem services and biological challenges. In some areas, cold temperatures pose risks to the fish, while in other geographies harmful algae, low oxygen levels or ocean pathogens are key risks. Due to climate change, these challenges may increase in some areas, and decrease in others. As fish farmers, it is our job to develop technologies and farming methods that allow us to ensure optimal conditions for the fish in all areas. Our aim is to put in place measures that prevent adverse conditions from affecting the fish and their welfare. Preventative actions reduce the need for treatments and post-event mitigation measures; reduces the impact on the environment; protects fish welfare; and avoids unforeseen costs. Nature-based solutions may have the ability to play a role in the toolbox of preventative measures, although, as these solutions emerge, non-nature-based remain crucial.

Some examples of the ways that we are working to manage and mitigate nature-based risks include: shortening the time our fish spend at sea and are exposed to risks; using real-time ocean data, data analytics, machine

[9] WWF (2021). Bringing it down to Earth. Nature risk and agriculture. https://wwf.panda.org/?2660466/nature-finance-risk-and-agriculture

learning and artificial intelligence to better predict outcomes and implement mitigating actions early; and experimenting with new farming technologies that create barriers between the fish and the natural environment such as semi-closed sea-based systems, land-based farming and offshore farming.

While we expect global warming to change ecosystem services during the next decades, increasing nature risk, more knowledge must still be developed to understand how it will impact our farming geographies specifically. Our response is to develop a variety of farming technologies that allow us to ensure control in the farm environment under different biological conditions, and reduce our vulnerability to changing ecosystem services.

Impacts

Today, we are regulated to avoid impact on biodiversity and the marine environment beyond what is considered acceptable by the authorities in the countries in which we operate. Certifications, like the Aquaculture Stewardship Council (ASC), which we aim to have implemented on all farms by 2023, help us raise the bar above regulatory limits. Still, we acknowledge that we have challenges to solve, as listed above. With increased focus on impacts on nature and biodiversity by politicians, investors, consumers and society at large, finding solutions will be key to maintaining favorable regulatory frameworks, access to capital and consumer confidence. As such, future growth prospects and the long-term success of the sector overall depends on these solutions.

Preventative farming is key to reducing our impacts. The same mitigating measures that we are engaged in to reduce our vulnerabilities to changes in ecosystem services within a geography, are also at the heart of reducing impacts and improving fish welfare. Shortening the time our salmon spend at sea, utilizing digital solutions, creating barriers between the farm and the environment, developing new technologies like semi-closed, closed, land-based or offshore farming systems will help us achieve these objectives.

Applying the Nature Risk Framework

While we have not used the term before, nature risk is at the core of many of the issues we are working to mitigate. As such, it is a highly useful term to structure some of our work and reporting around. While we have been reporting on our impacts for years, lack of a standardized framework may have made it difficult for investors to understand the data and integrate it into their decision making. Moreover, the notion of ecosystem services is highly useful, and coincides to a large degree with what we would normally call "biological farming conditions". Our farmers have always been attentive to changes in biological farming conditions, but we have not previously had an overarching concept that is universally understood by investors to tie these changes to. As there is currently no external framework that allows us to assess our dependencies on ecosystem services in a standardized way, the focus of this pilot has been mostly on impacts. However, getting familiar with the notion of ecosystem services has been useful, and we will continue to develop our thinking on that concept.

Reporting on our impacts along this framework was a resource-effective experience, as the framework was closely linked up to the ASC standard. As such, we have already made most of the information required publicly available. However, as the information was not previously structured along the lines of the nature risk concept, this reporting framework hopefully makes the information more useful for investors who regard nature-risk as a material topic. Such a framework should also make it easier to benchmark us according to our peers, as it provides some quantitative metrics to compare, and highlights in which areas companies should be expected to have policies and work structurally to improve. However, key to this positive experience was the broad alignment to recognized standards which meant avoiding additional workload on companies. In addition, as the ASC certification process is subject to external and independent audits, it should give more confidence to the accuracy of the reporting.

In particular, this project has increased our awareness of the likely regulatory risks associated with proximity to sensitive habitats and ecosystems, given the risks we have outlined. As such, avoiding operations in proximity to such nature is the business option with the least risk going forward. We will look at better incorporating this aspect into our operations.

A full assessment of nature-related risks within our feed supply chains was beyond the scope of this project. However, Grieg Seafood and WWF US are collaborating on creating a holistic assessment tool for feed ingredients according to various environmental, social and governance metrics. The outcome of this collaboration will complement the assessment of this project.

While this pilot is a good start, nature-related risk reporting should be further developed to provide a more comprehensive assessment for aquaculture. Several concepts are still unclear and require more sector-relevant definitions. In particular, knowledge and tools to understand and assess ecosystem dependencies could be developed. Current tools that we are aware of (such as ENCORE) are high-level and do not provide sufficient granularity to have real operational value.

An investor perspective on nature-related risk reporting

By Storebrand Asset Management

At Storebrand, we believe that companies that are able to proactively manage sustainability risks, as well as adjust their strategies and business models to embrace sustainable solutions, will create increased shareholder value over time. The concept of climate risk is well understood in the financial sector, and risk assessment has been greatly helped by reporting frameworks like the Task Force on Climate Related Financial Disclosures. Unfortunately, the concept of nature risk is not yet as developed, and data is not reported in a systematic fashion. This does not mean that it is any less important.

Nature underpins all economic activities. Businesses depend on it for direct inputs, such as water and materials. They also have an indirect dependence on it for production processes, such as through erosion control and flood protection. Protection and sustainable management of oceans, forests, wetlands and other sensitive ecosystems is essential to long-term social and economic stability. Environmental degradation puts at risk the capacity of nature to continue to generate the ecosystem services which businesses and society depend on. Failure to recognize business dependencies and impacts on nature exposes companies, and the financial institutions that invest in them, to 'hidden' risks.

Companies depending on or impacting biodiversity and ecosystems should integrate relevant nature-related risks and opportunities into their corporate strategy, risk management and reporting. Reporting standards and principles in this area are still evolving, and once the Task Force on Nature-related Financial Disclosures (TNFD) delivers a standardized reporting framework for biodiversity, we expect our investee companies to report in line with these recommendations.

As investors we need data on impacts and dependencies on nature to be able to assess risks and opportunities and make well-informed investment decisions. Granular data on environmental, social and governance issues is also needed to comply with regulations for reporting on the sustainability of investments, such as the EU Taxonomy and the Sustainable Financial Disclosures Regulation (SFDR). Our clients increasingly demand proof that their money is invested in a fashion which not only creates profit, but also contributes to sustainable development within the boundaries of nature.

Instead of waiting for a standardized reporting framework to be created, we continuously explore opportunities to get better data on nature risk. We were therefore happy to participate in this project with Grieg Seafood, WWF and NINA to explore how a company in the aquaculture sector could report on impacts and dependencies on nature. Storebrand has significant holdings in aquaculture, especially in Norwegian salmon producers, which supply more than 50% of Atlantic salmon on the global market[10]. Storebrand is a signatory of the Sustainable Blue Economy Finance Principles, and we actively use guidance created by the United Nations Environment Programme Finance Initiative (UNEP FI) for our engagement with companies in the aquaculture sector. This guidance provides a set of indicators which we find very useful to structure dialogue with companies around key sustainability issues, and we were interested in seeing how it could be adapted to a blueprint for company reporting. If successful, we would encourage other salmon producers to report in the same fashion, so that we could get comparable data for all our investee companies in the sector.

The process has been very instructive and rewarding. The breadth of perspectives represented in the project group allowed for detailed discussions on the pros and cons of suggested indicators. One benefit of this was to get a better understanding of the relevance of the different indicators, which were originally designed to apply to all types of aquaculture operations globally, to the specific context of a salmon farming company with operations in Norway and Canada. This process contributed to improving the usability and relevance of the guidance as a reporting framework both to companies and investors.

[10] FAO: https://www.fao.org/in-action/globefish/market-reports/resource-detail/en/c/1416627/

While salmon producers already report on many of the issues related to impacts on nature, they do not always use the same metrics or indicators, and the information is often spread out in different chapters of sustainability reports. For us as investors, this makes comparing peers difficult, and we found it useful that this report from Grieg Seafood provided all the information in one place. For easy reference, we recommend displaying key data points in one table, with references to where additional information can be found. We hope more companies in the sector will consider reporting on the same data points. We would also recommend aquaculture companies to ask their suppliers of feed and other resources to report in the same fashion, as this would provide a more complete picture of total impacts and dependencies on nature throughout supply chains. However, to avoid increasing the total reporting burden on companies, it would be advisable to add such data to their existing reporting frameworks rather than report separately.

A significant improvement on regular sustainability reporting was the focus in this report on dependencies on ecosystem services, which we don't often find in current reports. Ideally, we would like to see companies attempt to quantify dependencies on nature in economic terms, to allow us to better understand the value at risk if these ecosystem services deteriorate. Getting data on the company level would improve our risk assessment and allow optimization of investment in companies that manage nature risk well. To increase uptake of nature data among investors, ESG data vendors can play a key role in integrating data on companies' impacts and dependencies in their sustainability datasets.

For investors to get a good understanding of a company's performance and risk management, it is preferable if companies use measurable indicators, either quantitative or qualitative, of status and progress which allow for comparability in time and between competitors. Quite frequently, however, companies report on activities rather than results, which makes it difficult to assess the effectiveness of the actions taken, especially relative to actions taken by their peers. While activity reporting is certainly useful to understand how a company addresses its challenges, we would encourage companies to attempt to report as clearly as possibly on results and progress. While this was not the objective of this reporting exercise, we include this point as a general recommendation for reporting.

As mentioned, good data on impacts and dependencies on nature can help investors improve risk assessments of companies in their portfolio, which is useful in several ways. It provides the basis for active ownership dialogues with companies, helping investors ask the right questions, identify potential improvements and monitor progress. It is also essential to the investment process, enabling portfolio managers to differentiate between companies that manage nature risk well and those that don't. This can contribute to increased capital flows to the most sustainable companies, which in turn can induce companies to improve their management of nature risk.

An expert view on nature-related risk reporting and benchmarking: a research institution's perspective

By the Norwegian Institute for Nature Research

The role of the Norwegian Institute for Nature Research (NINA) in this project was to provide general comments on the framework, as well as more detailed comments on factors and indicators that relates to the fields of expertise that NINA represents. The nature-risk concept represents an interesting, but challenging, approach for evaluating the risks or threats on businesses from nature (dependencies) and the risks to nature from businesses (impacts). The proposed framework can be seen as a precursor to an index system based on a set of five risk categories with sub-sets of key indicators that should illustrate the risk status under each category, as well as being representative for the duality of the nature risk concept. Development of an index system for the assessment of nature-related risks is in general a challenging and complex task and it could potentially result in misconceptions with the result that impacts on nature are either under- or overestimated. The nature risk concept in this project is primarily meant to be a tool for investors, and it is thus crucial that the framework and the assessment is reliable, representative and valid, in order to avoid unsustainable and negative impacts on nature as well as un-profitable investments.

Clear and precise communication of the assessments in index-based risk evaluation systems is crucial. In this context, a prerequisite is a consistent and transparent system for synthesizing and collating information into standardized index values, that in turn should represent real and documented risks. Finally, the assessments for each risk factor could be merged into a single overall comprehensible risk indicator.

A common principle in risk evaluations involving impacts on nature is that the worst perceived impact will be indicative for the overall risk. For instance, this is the main principle in the EU Water Framework Directive. This first phase of this pilot project has not focused on how to apply the UNEP FI framework as a functional risk assessment system. However, this could be a goal for a potential second phase of this project, because the duality of the suggested framework may signify that common, ordinary practices in risk assessment would be inadequate.

When developing index-based risk evaluation systems for businesses in different countries, with different legislation systems and ecosystems, it is of uttermost importance to standardize how the key indicators are measured, quantified, verified or assessed. The key indicators should be universal, measurable and representative. In addition, the structure of the companies, as well as their size should be taken into account. In this project a range of challenges related to the standardization of metrics for the key indicators were identified. For instance, it will be insufficient to report that companies have plans or procedures for avoiding negative impacts on nature since such plans/procedures vary among countries and companies. In such cases the key indicators should relate to components of the plans and procedures in order to assess their utility value enabling a comparison of various plans and procedures. A specific example of this is if companies have "escape plans". To be able to assess whether such plans would be efficient, one would need to evaluate the details in the plans. Another example is whether the companies comply with national regulatory requirements. Regulations vary among countries with respect to the focus and concern for the conservation of biodiversity. Another example is that indicators referring to the number of observations or actual reports, e.g., related to disease outbreaks or seabirds killed, should be related to the extent and size of the operations (e.g., number of farms or standing stock).

There exist several index-based systems for assessing the sustainability of salmonid farming, for instance the Aquaculture Stewardship Council (ASC), which the proposed framework is, to a large extent, based on. However, the suggested nature-risk framework is novel as it also aims to take into account "voluntary" actions to prevent or avoid negative impacts on nature. In this context, the focus on nature-based solutions in the companies will be assessed. However, a strict and too narrow focus on nature-based solutions could be misleading since efforts that do not correspond to what typically is thought of as nature-based solutions also are important to prevent or

mitigate negative impacts on nature. One example is surveillance of potential impacts (e.g., escape of farmed fish or pollution). Surveillance is not a "solution", but it is imperative for deciding whether and when there is a need for solutions or mitigative actions.

It will be challenging or even impossible to establish quantifiable key indicators for all ecological impacts or dependencies. One example of this is efforts for preventing or mitigating negative impacts on nature. Not all efforts are equally efficient or required. In cases where it is not possible to develop quantifiable key indicators, third party assessments would be necessary to provide representative metrics for the index system. In this context it is imperative that third party evaluations are conducted by an independent, competent team with multidisciplinary expertise.

An index-based framework for assessment of nature risk on company level would undoubtedly be a useful tool for a range of stakeholders, including managers, investors and concerned consumers. If the suggested framework should be useful, however, it should also be acknowledged and approved by other relevant stakeholders and thoroughly validated to enable representative and reliable assessments.

The first phase of the current project has shown that there is a significant need for further development of the framework to avoid the many pitfalls and concerns that such systems may involve. Moreover, the suggested framework does not have a clear focus on how it will deal with the duality of the nature risk concept with respect to how impacts and dependencies interact. The key indicators are predominantly developed to indicate to what extent companies impact nature in a negative way. The focus on dependencies and how these could be measured or assessed is still unclear. Hence this project illustrates that there is a need for follow-up projects in order to develop a functionable, reliable, representative and comprehensive framework for assessing nature-risk in its completeness. It is important to realize and acknowledge that this would demand considerably more resources and a realistic time frame, as well as the involvement of expertise representing a range of scientific disciplines, a representative selection of companies, as well as other relevant stakeholders.

Conclusions

It is clear that, increasingly, financial institutions expect companies to understand and assess their dependencies and impacts on nature, as these are recognised as potential sources of financial risks. In August 2021, Norges Bank Investment Management, the world's largest sovereign wealth fund, with $1.4 trillion in assets, published its expectations for companies on how they should take biodiversity and sustainable use of ecosystems into account in their business activities. One of the expectations is that "*Companies should assess their direct and indirect dependencies and impacts on biodiversity and ecosystems*". It is very likely that companies of all types and sectors will increasingly be pressured, by financial and other institutions, to do this kind of assessment in detail, and to publicly report on results. Companies that are starting to develop internal capacity and knowledge to do so will likely have a competitive advantage. This message is confirmed by Storebrand who have made clear that the availability of this type of information available enables them to better understand risks and make responsible investment decisions.

As new frameworks and regulatory imperatives emerge, this project demonstrates that it is already possible for a company to report thoroughly on a variety of nature-related risks. This exercise aims to contribute to the ongoing development of international standards, such as the TNFD, and constitutes a concrete example of how a reporting framework could be designed. In addition, the reporting framework is consistent with the guidance for financial institutions produced by the UNEP FI Sustainable Blue Finance Initiative which means that investors, such as Storebrand, can easily respond with follow up engagement questions and expectations based on the information provided. It is therefore an efficient and streamlined way for investors to engage seafood companies. To get consistency and comparability, this type of reporting template could be used for all comparable companies across a broad swathe of investors. One key challenge of this type of framework is that most of the reporting information is of qualitative nature. While this is extremely valuable for financial institutions in their in-depth dialogue with companies, it is challenging to use this type of information to assess and compare dozens, if not hundreds, of companies which are part of a typical financial portfolio. One possible solution is to identify, on the basis of this and other frameworks, a set of quantitative and standardised indicators which can be more easily aggregated at company level and which can provide a measurable assessment of a company. This could in turn be easily integrated as a sustainability (ESG) factor in the investment strategies. We believe that the TNFD and other actors should carefully consider this aspect when developing its framework. As NINA suggested, an index-based system could be a natural follow up to this pilot project, despite the amount of additional resources and expertise that this would require.

Another challenge is that several indicators would require a third-party quality assessment, as at the moment they are solely based on a company's own reporting. Moreover, some definitions should be standardised and quality-assured, for example what activities can be credibly defined as Nature-Based solutions. In addition, the framework needs to be able to assess better the 'dependency' side of the nature-risk equation. Whilst dependencies and impacts are interrelated through the double materiality concept, this framework mostly highlights the degree of impact a company is having.

Nature, as well as companies' impacts and dependencies, is complex, but at the same time there is nothing preventing companies from acting now. The first step to assessing and managing impacts and dependencies requires transparency and disclosure to gather the necessary information base, with both qualitative and quantitative indicators. This project has demonstrated that willing companies are able to provide a good starting point to build such a base, and that open collaboration involving different perspectives from the industry, finance sector, research institutions and civil society is an effective way to progress on the road to a more holistic understanding of how the economy is dependent on Nature for its continued functionality.

Annex A: Commentary on indicators

ID	Indicator	Overall comments
1	**General overarching**	
1.1	Information on certifications	Share of farms certified, important that the company reports on which standards applies, and in which regions.
1.2	Risk assessment of how changes in ecosystem services might impact company	This is a qualitative assessment of which ecosystem services the company depends on. Tools such as ENCORE can be used here.
1	**Location and siting of farms**	
1.3	Owned and operated farms, or farms in supply chain are located in legally designated aquaculture zone and have the required permit or licence, including within legally protected areas that allow multiple uses, such as High Conservation Value Areas or RAMSAR or UNESCO World Heritage Site	This is about legality of operations and compliance with regulations. A key challenge related to self-reporting is that companies will likely not report if some operations are in breach of regulations. Companies should be required to e.g. disclose all licenses. Spatial Intelligence tools can help to overcome this barrier, as they can allow monitoring if operations are located in sensitive areas.
1.4	Owned and operated farms or farms in supply chain that are located in areas of ecological sensitivity, including in High Conservation Value Areas or RAMSAR or UNESCO World Heritage Sites.	A key challenge is that there is no standard definition of what an "area of ecological sensitivity" is. This challenge applies to other indicators and is a well-known obstacle for standardization. Nonetheless, it is possible to use standardized definitions such as IUCN Protected Areas, Red List, etc. The SFDR PAI indicators include definitions of "biodiversity-sensitive areas" in scope. Companies should disclose which definitions they base their reporting on.
1.5	Transparency and traceability of siting of owned and operated farms and in supply chain.	Specific location of farms is an important information to enable third parties to use spatial intelligence, satellite data etc to e.g. verify potential impacts on sensitive ecosystems.
1.6	Nature-based solutions including reforestation or remediation.	There is no agreed definition of what constitutes a Nature-Based Solution, so solutions presented as NBS by a company might not be considered as such by another organization. NBS is a term, and in the UNEPFI guidance a definition is provided.
2	**Pollution and water quality**	
2.1	Carrying Capacity Assessment (CCA) in farming areas undertaken by company or relevant competent authority and compliance with Carrying Capacity Assessment by company	CCA systems can vary across countries, so when reporting, companies should report by region and specify which standard they follow.
2.2	Use of harmful chemical, anti-microbials or pesticides by company or within company supply chain and compliance with international and national regulations and agreements.	
2.3	Lack of disclosure of usage levels of harmful chemicals, antimicrobials or pesticides	Only relevant for investors.
2.4	Development of products or services that are supporting the company or aquaculture sector to reduce the need for harmful chemicals, anti-microbials or pesticides in pursuit of more responsible production and reducing anti-microbial resistance.	Qualitative reporting, difficult to standardize, ideally it would require a third-party opinion.
3	**Invasive species and escapes**	
3.1	Sourcing or farming of an invasive non-native (INNS) species against local regulations.	Similar to 1.3, but this indicator forces companies to take responsibility for declaring that they are in compliance with regulations.
3.2	Escape events within owned and operated farms or within supply chains.	Important metric is the number of fish escaped, e.g. % of standing stock escaped per year. Escape reporting should be differentiated from mortality reporting, as they have different impacts.
3.3	Management plan in place to manage and mitigate escapes within owned and operated farms or within supply chains.	Requirements might differ across countries and there is no universal standard. The framework suggests the ideal components that such a plan should have, against which companies can report on.
3.4	Use or development of products or services that support the company/aquaculture sector to minimise or prevent escapes and meet global standards.	As 2.4 and others, this is a qualitative indicator, difficult to standardize, ideally it would require a third-party opinion.

4	**Disease**	
4.1	Farms are located in a country or region where an OIE-listed disease has been prevalent.	To provide further information relevant to assess company's risks, this metric should include information on how many of production sites are affected by which disease.
4.2	Biosecurity measures as recognised by globally leading and where possible benchmarked standard	A qualitative indicator. In addition, companies should provide the number of outbreaks registered, and this should be related to the size of the operation in order to allow comparability across companies.
4.3	Development of products or services that are supporting the aquaculture sector to increase biosecurity, such as RAS systems or other closed loop technologies (that otherwise do no harm).	A qualitative indicator, which would ideally require a third-party assessment.
5	**Feed**	
5.1	Sourcing, processing or selling marine or terrestrial ingredients from overfished fisheries or areas at risk from deforestation.	Companies should report on the share of feed which is certified, and specify which standards apply to which share, as some certifications are considered more robust than others.
5.2	Use of resources for feed, as measured by best practice fish-in-fish-out ratios and feed conversion rates.	A quantitative indicator which would allow for comparison across companies.
5.3	Producing, sourcing or selling alternatives to marine ingredients that allow companies to lower their overall footprint.	Companies should report on which alternatives, if any, are in use, and the share of the total feed. Ideally, companies should include information on the life-cycle impact of alternatives.
5.4	Products or services that reduce feed consumption, increase efficiency or decrease feed waste.	A qualitative indicator, which would ideally require a third-party assessment.
6	**Interaction with wildlife, including predators**	
6.1	Mortality of wildlife, including ETP species, marine mammals or bird species (including predators), at the farm level or within supply chains.	This indicator can be challenging, but as a baseline companies can report on the number of registered mortalities by species, per farm, per year, so to give an indication of the impact on surrounding wildlife.
6.2	Products and services that provide humane, low-impact predator control methods and technologies in accordance with best practice animal welfare standards.	A qualitative indicator. Since not all solutions are equally good, this would ideally require a third-party assessment.
12	**Carbon emissions**	
12.1	Producing, processing or selling seafood reliant on fossil fuel energy.	Companies can report on e.g. emissions from energy sources at a company level, as well as if a company has a renewable energy guarantee of origin purchase agreement. Ideally, scope 3 emissions would be included here, given their particular prominence in supply chains through transport or feed ingredients for example.
12.2	Products or services that support production (aquaculture and wild-caught fisheries), processing or selling of seafood to transition to renewable energy sources.	This qualitative indicator is mainly about company's plans to increase reliance on renewable sources of energy.
13	**Animal welfare**	
13.1	Lack of policy or management plan on animal welfare, including for stocking densities, transportation of live fish, and stunning and killing of fish for human consumption or disease control purposes.	A key indicator for a risk assessment, and if translated into quantitative measurements, a useful indicator to compare companies. Animal welfare should include both the fish farmed, e.g. salmon, and other animals used in production, e.g. cleaner fish. For both, companies should report on mortality rates relative to the size of the operation, to allow for comparison with peers. This indicator should be reformulated to focus on these aspects.
17	**Loss and waste of seafood products along the supply chain**	
17.1	Lack of policy addressing food loss and waste at all stages of the seafood supply chain.	This indicator should be expanded to also include other non-food related waste, such as plastic. Key metrics should include quantitative ones such as consumption of plastic, share of plastic recovered/ recycled, and a circularity score for the operation.
17.2	Products or services that help the seafood sector to minimise waste, for example through cold-chain storage, quality control or by-product development.	A qualitative indicator that allows companies to disclose eventual relevant activities.

18	Extreme weather events	
18.1	Owned and operated aquaculture or fishing operations, or operations in supply chains are located in areas of high exposure and vulnerability to extreme weather events.	This indicator is included in the TCFD reporting.
18.2	Products or services that support aquaculture or fishing operations to be more resilient to severe weather events.	This indicator is included in the TCFD reporting.

Annex B: The reporting template

The actual reporting exercise done by Grieg Seafood can be downloaded here.