

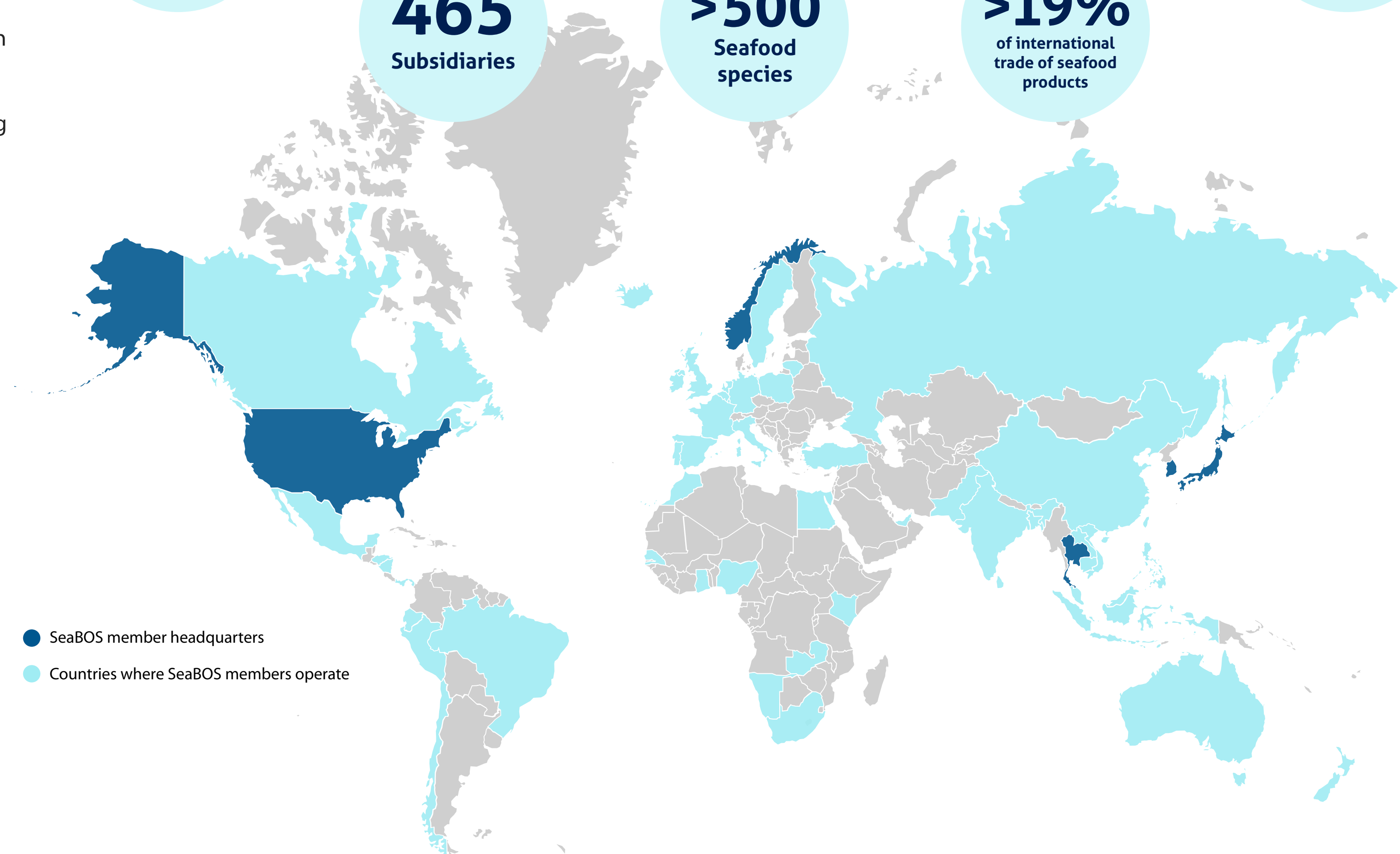
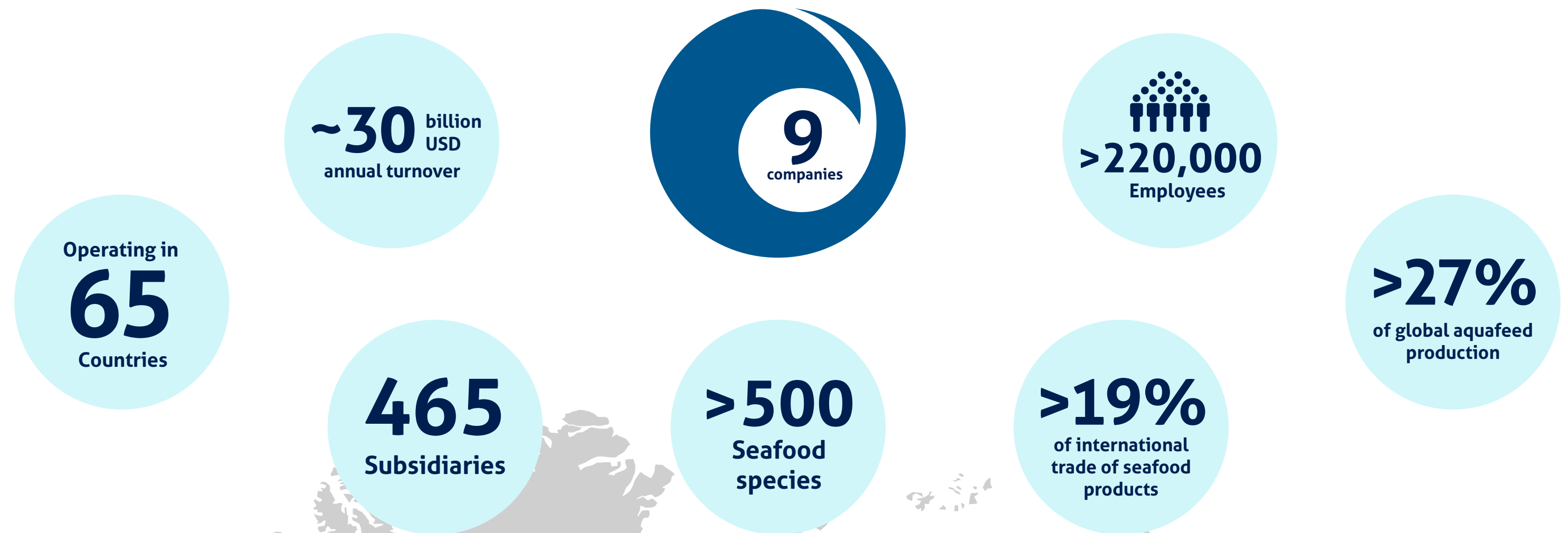


Charting a sustainable course: The SeaBOS initiative

Our Impact 2022-2023

SeaBOS at a glance

Seafood Business for Ocean Stewardship (SeaBOS) is a collaboration between nine of the world's largest seafood companies. SeaBOS is the result of a series of keystone dialogues initiated by scientists, aiming to evaluate whether or not the largest seafood corporations in the world could drive systemic change. Scientists from leading institutions, coordinated by Stockholm Resilience Centre, are collaborating with SeaBOS members, with independent funding – to help companies lead a global transformation towards sustainable seafood production and a healthy ocean. The member companies represent over 19% of the world's seafood production and operate over 465 subsidiaries. SeaBOS is coordinated by a secretariat with funding from member fees from the companies.



SEABOS MEMBERS










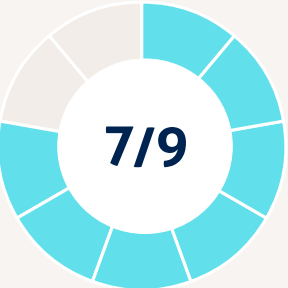


SCIENTIFIC COLLABORATORS



The big picture: SeaBOS goals and actions 2022-23

The mission of SeaBOS is to lead a global transformation towards sustainable seafood production and a healthy ocean. During the 2020 and 2021 keystone dialogues, five time-bound goals* were agreed upon by the CEOs of the SeaBOS member companies. Below is an overview of these goals and the progress we have made in achieving them in 2022-2023.

	 IUU FISHING & MODERN SLAVERY	 BIODIVERSITY & ECOSYSTEMS	 ANTI-MICROBIAL RESISTANCE	 CLIMATE RESILIENCE	 REDUCING OCEAN PLASTICS
GOAL	Reducing IUU Fishing and Eliminating Modern Slavery	Advancing Protection of Endangered Species	Reducing Antibiotics Use	Addressing Climate Change	Reducing Plastic Pollution
MEASURES	IUU Fishing and Forced Labour Risks Assessed	Affected IUCN Red List Species Identified	High-Resolution Antibiotic Data Shared with Scientists	Scope 1 & 2 GHG Emissions Measured	Plastic use and management
JOINT ACTIONS	 Undertook Social Assessment of Suppliers	 Conducted Assessment of Biodiversity Risks and Impacts on Natural Areas	 Established a Road Map for Reducing Antibiotic Use	 Set Climate Targets to Reduce their Emissions and 7/9 Reported Scope 3 Emissions	 Adopted Plastics Reduction Strategy and 7/9 Disclosed Plastic Consumption
OUTCOMES	Assessment of forced labour and IUU fishing risks in own operations, and in supply chains in majority of member companies.	Initial efforts to assess and manage biodiversity risks and impacts across operations and supply chains.	Increasing transparency in the measurement and disclosure of antibiotic use.	Measurement and target-setting of scope 1, 2 & 3 GHG emissions, emission reductions achieved in certain scopes by some companies.	Global ocean cleanup resulting in 25 tonnes plastic recovered, reduction initiatives in place, and packaging footprints measured.

*A detailed overview of the SeaBOS time-bound goals is available [here](#)

Contents

SeaBOS at a glance	2
The big picture: SeaBOS goals and actions 2022-23	3
Our journey so far	5
Our ambition	6
About SeaBOS	7
Our purpose	7
What makes us unique	7
How SeaBOS works	8
SeaBOS Monitoring and Reporting framework	9
A deeper dive into our commitments	10
Reducing IUU fishing and eliminating modern slavery	11
Advancing protection of endangered species	15
Reducing antibiotics use	19
Addressing climate change	23
Reducing plastic pollution	27
Appendix – Member company disclosures	31

ABOUT THIS REPORT

This report provides an overview of the progress and impact made by the Seafood Business for Ocean Stewardship (SeaBOS) initiative in 2022 and 2023. It articulates our commitments, the nature of SeaBOS, and the science-driven action we have taken to achieve a sustainable transformation within the seafood industry.

The report presents the progress we have made on our time-bound goals, highlighting specific case studies from our task forces and illustrating how our work contributes to sustainable seafood production and a healthy ocean. It seeks to foster understanding, awareness, and continued engagement among our stakeholders and the broader public. For more information about SeaBOS or for questions about this report, please visit our [website](#) to learn more.

Specific data and qualitative disclosure relating to SeaBOS goals for individual member companies can be found in the [Appendix](#) of this report including links to the comprehensive sustainability reports of member companies, where further detailed disclosure is contained. A description of the SeaBOS Monitoring and Reporting framework is also presented on page 9.

Our journey so far



Thiraphong Chansiri

*President and CEO
Thai Union and Chair
of SeaBOS*

The seafood industry is facing challenges that one company cannot tackle alone. That is why SeaBOS is so important – it brings together likeminded businesses to achieve positive change on a global scale. Collectively, and grounded in science, we have the strength and reach to make a difference. Thai Union’s own goals and ambitions align with those of SeaBOS, and together we want to protect our oceans, ensure fisheries around the world are sustainable, and protect workers across the entire industry. After it’s launch in 2016, SeaBOS has a clear vision, but much work remains. It is crucial that the work of the individual member companies remains aligned with that of SeaBOS, with equal ambitions. As this Impact report shows, we have achieved good progress on some of our goals, and less on others. Seven years in, we need to continue delivering on our ambitions on ocean stewardship, work together and do our part to make further progress in our operations and supply chains to positively influence the industry as a whole.



Henrik Österblom

*Professor, Stockholm
Resilience Centre*

In 2016, eight keystone actors answered our call from science to discuss their possible engagement in global ocean stewardship. In 2017, two additional companies joined, and scientists were asked to identify key geographical areas of IUU fishing and labor abuse. By 2018 companies agreed to focus on these challenges, antibiotics use and plastics, and to substantially advance transparency. In 2019 they added climate change and resilience as focus areas. By 2020, companies set time bound goals and started to share sensitive data with us, on their possible exposure to IUU fishing and labor abuse, use of antibiotics, plastics, and climate emissions. By 2022 they published their first progress report. Today, they share publicly, in ways they have never done before, their achievements, challenges and ambitions. They have come a long way and have far to go. I am proud to be part of this movement towards ocean stewardship and encourage the seafood industry to follow their lead.



Martin Exel

*Managing Director,
SeaBOS*

SeaBOS is firmly established as a unique collaboration, with exciting and challenging opportunities ahead, to deal with some of the biggest problems in the seafood sector. We have developed trust between and amongst science and industry members from wild-catch, aquaculture, fish feed producers, and processors. We have aligned ourselves with a common vision, commitments, and time bound goals. Having developed the fundamentals of trust across our group, we have been able to hold ‘constructive dialogue’ about potential solutions and challenges, develop collaborations across our group and broader, and this Impact Report is a mechanism to hold both ourselves accountable to our stated goals and collaborations, as well as demonstrate publicly what we are doing. There is still much to achieve, but this report demonstrates there has been valuable progress, and we will continue efforts to speed up and deliver on our vision.



Our ambition

SeaBOS is a collaboration between leading scientists and CEOs of global seafood businesses. Together we are leading a science-based global transformation towards sustainable seafood production and a healthy ocean.

In 2016, we established [ten commitments](#), which we have been implementing in the SeaBOS task forces. Going forward our ambition is to accelerate our progress and impact on these, including to:

Provide healthy food from a healthy ocean

The potential of the ocean to help provide healthy food for hundreds of millions of people is tremendous. But bold and firm action is needed to make this happen. As the Keystone Actors in the international seafood industry, depending as we do on a healthy and resilient ocean, we know we can and must make a major contribution.

Take action and be transparent

We have established operational Task Forces, ambitious strategies, and bold time bound goals to help direct our actions and publicly report on progress. We are taking actions to drive impact through both short- and longer-term programs.

Create transformational change through collaboration

We, the undersigned, reaffirm our common purpose and desire to create transformational change across the seafood sector through our corporate stewardship and collaborative actions for a healthy ocean.



Thiraphong Chansiri

President and CEO
Thai Union



Helene Ziv-Douki

President and CEO
Cargill Aqua Nutrition



Therese Log Bergjord

CEO Skretting/COO Nutreco



Steven Rafferty

CEO
Cermaq Group



Prasit Boondoungprasert

President and CEO
Charoen Pokphand Foods



Myoung Woo Lee

Vice-Chairman
Dongwon



Masaru Ikemi

President and CEO
Maruha Nichiro



Makoto Inoue

President and CEO
Kyokuyo



Shingo Hamada

President and CEO
Nissui

About SeaBOS

Seafood Business for Ocean Stewardship (SeaBOS) is a unique initiative that sets out to lead a global transformation towards sustainable seafood production and a healthy ocean. What makes SeaBOS special is its innovative approach to bridging the gap between science and industry.

It represents a collaboration between scientists and nine of the world's largest seafood companies, connected across wild capture fisheries, feed producers, seafood processors, and aquaculture businesses in Asia, Europe, and North America. This cross-sectorial synergy is an industry-first and sets the stage for integrated, system-wide improvements in sustainability.

Read the [Joint Statement](#) from 2016.

OUR PURPOSE

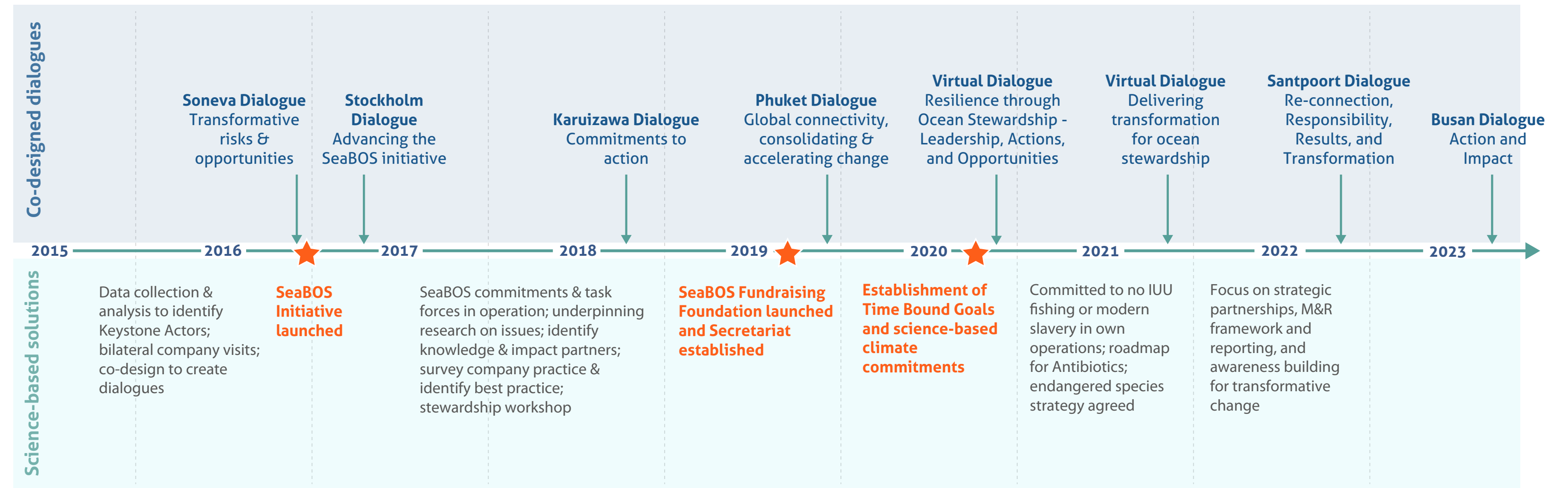
The journey of SeaBOS began in 2012 with an intriguing question: could there be “keystone actors” within the seafood industry that could drive transformative change in ocean stewardship? [Research at the Stockholm Resilience Centre \(SRC\)](#) at Stockholm University, the Beijer Institute of Ecological Economics, and the Global Economic Dynamics and the Biosphere program (GEDB) revealed that only a small number of companies exerted significant influence over the seafood industry. Thirteen companies were found to control between 19-40% of some of the largest and most valuable stocks, as well as 11-16% of the global marine catch. [These keystone actors](#), defined by their dominance in global production revenues and volumes, their control over globally relevant production segments, and their influence over global governance processes and institutions, presented a significant opportunity for initiating transformative change.

WHAT MAKES US UNIQUE

Following years of bilateral contacts and dialogues initiated by the Stockholm Resilience Centre, eight of the world's largest seafood companies agreed to an initial meeting in November 2016, resulting in a shared commitment to ocean stewardship. This marked the genesis of SeaBOS, a global science- business initiative dedicated to driving sustainable practices within the seafood industry.

Today, SeaBOS involves nine major companies and fosters an [annual CEO-level dialogue](#) with scientists, reaffirming our commitment to bridging the gap between scientific research and industry application. Our approach hinges on mutual learning, co-designing sustainable practices, and fostering change through collaboration and dialogue.

SeaBOS timeline





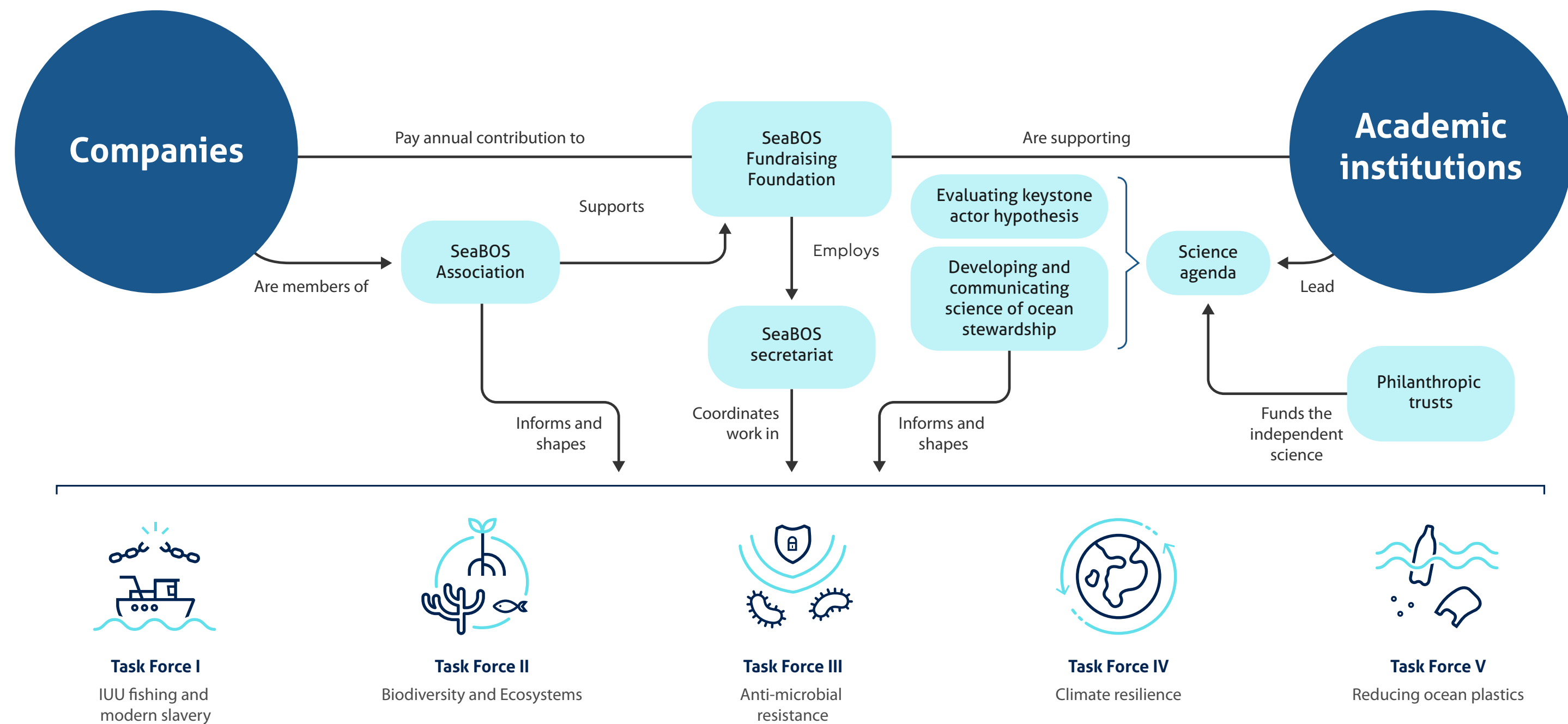
HOW SEABOS WORKS

SeaBOS organizes its activities into Task Forces, each led by SeaBOS members and supported by scientists from the Stockholm Resilience Centre and other partners. This structure allows SeaBOS to tap into the collective wisdom and expertise of its members and supporting scientists, ensuring that the work it undertakes is both practical and science-based.

Each Task Force focuses on specific areas of challenge and opportunity, such as reducing illegal, unreported, and unregulated (IUU) fishing, eliminating seafood fraud, improving working conditions, and minimizing

the environmental impact of seafood production. The work of these Task Forces forms the backbone of SeaBOS's operations, enabling the initiative to enact meaningful, industry-wide change and pave the way for a sustainable future for the ocean and the seafood industry.

Through its structure and approach, SeaBOS is working towards a progressive and science-based transformation of the seafood industry, fostering mutual learning among its members and setting new standards for ocean stewardship.



SeaBOS Monitoring and Reporting framework

Ensuring transparency, progress and building trust

The M&R framework is based on the standards of the [World Benchmarking Alliance Seafood Stewardship Index](#) (WBA) and [Global Reporting Initiative](#) (GRI), including GRI 13.



PURPOSE

The SeaBOS Monitoring and Reporting framework (“the M&R framework”) was established at the Santpoort Keystone dialogue in 2022. The purpose of the M&R Framework is to measure progress and demonstrate that the member companies are accountable and transparent, but also to enable sharing of best practice within SeaBOS, with company subsidiaries and the broader industry.

INDICATORS FROM LEADING GLOBAL STANDARDS

The M&R framework consists of indicators from leading global reporting frameworks considered most relevant for measuring progress on the SeaBOS time-bound goals. In addition, SeaBOS specific indicators – co-developed by the companies and the science team - have been established where no indicators exist to sufficiently cover SeaBOS reporting needs.

The indicators used are based on the two frameworks Global Reporting Initiative (GRI) and the World Benchmarking Alliance’s Seafood Stewardship Index (WBA). The new GRI 13 sector standard on Agriculture, Aquaculture and Fisheries is incorporated. The indicators SeaBOS members are reporting on are both qualitative and quantitative in nature to enable a better understanding of the processes and management approaches taken.

DATA TO INFORM SCIENCE AND TASK FORCE ACTIVITIES

The reported data is used internally to inform the scientific work of SeaBOS, to advance learning and support progress in the work of the SeaBOS Task Forces. Collected data shown in the Impact report is a selection of the indicators considered the most material for this baseline year of reporting, and important factors for inclusion have been comparability and data quality across companies.

The 2023 Impact Report is considered the first step towards establishing biennial public reporting on progress on SeaBOS goals. The M&R framework will be further developed to incorporate learnings and feedback from this baseline year. Ultimately, the objective of the SeaBOS Impact reporting is to help advance ocean stewardship in the seafood sector.

The SeaBOS members individual reports are presented in the Appendix.

The M&R framework is available [here](#).



**A deeper dive into
our commitments**



GOAL 1

Reducing IUU fishing and eliminating modern slavery

Illegal, unreported, and unregulated (IUU) fishing and modern slavery are undermining human rights, food security, and the sustainability of seafood production. As industry leaders, we aim to eradicate these detrimental practices and foster ethical operations, for our sake and that of future generations.

TASK FORCE LEAD



Jose Villalon
Corporate Sustainability
Director, Nutreco
(Until May 2023)

MANAGEMENT APPROACH:

We're implementing a comprehensive, systematic approach grounded in scientific guidance and complemented by innovative tools to combat IUU fishing and modern slavery. This involves conducting risk assessments of our supply chains, identifying high-risk areas, and engaging in proactive initiatives to mitigate these risks. We've co-developed a [Tool Kit](#), which includes policy documents, audit protocols, and advanced traceability mechanisms. We also engage in external reporting for accountability and transparency, and actively engage with governments, civil society, and other stakeholders to influence policy changes and inspire broader industry change.

SEABOS GOALS

1. Have no IUU fishing products or modern slavery in our own seafood operations by Oct 2021.
2. Put science-based measures in place that substantially reduce the risk of IUU fishery products or modern slavery being in our supply chains.
3. To act swiftly and transparently on any evidence that IUU fishing/modern slavery exists within our operations and/or supply chains.



OUR IMPACT

Our actions, while fostering new industry norms, have also highlighted the need for more effective public policies and legislation. By sharing high-resolution operational data with the Science Team, our member companies are aiding in the development of innovative solutions and risk mitigation strategies. Through our advocacy and collaborative efforts, we are proud to be making progress towards a more ethical and sustainable seafood industry.

OUR PROGRESS IN MITIGATING IUU FISHING AND MODERN SLAVERY RISKS

SeaBOS members are collectively battling IUU fishing and modern slavery with actions to improve transparency of supply chains and activities, policies and risk analyses of own operations and supply chains. We are working with other industry initiatives to call for combined government and industry actions to strengthen regulations, including [calling on governments to implement the Port State Measures Agreement](#) and associated transparency measures. Separately, we have written to the World Trade Organisation to recommend removal of [harmful subsidies from seafood production](#).

Thai Union has launched rigorous audit programs and a Vessel Improvement Program and Code of Conduct (VCoC) with regular compliance monitoring. They aim to ensure 100% on-the-water monitoring by 2025, partnering with The Nature Conservancy.

Cargill, with initial focus on supply chains to Norway and Scotland, carries out risk assessments on suppliers using the US State Department TIP report and ASC Country Risk Score Cards. Intensive Human Rights Impact

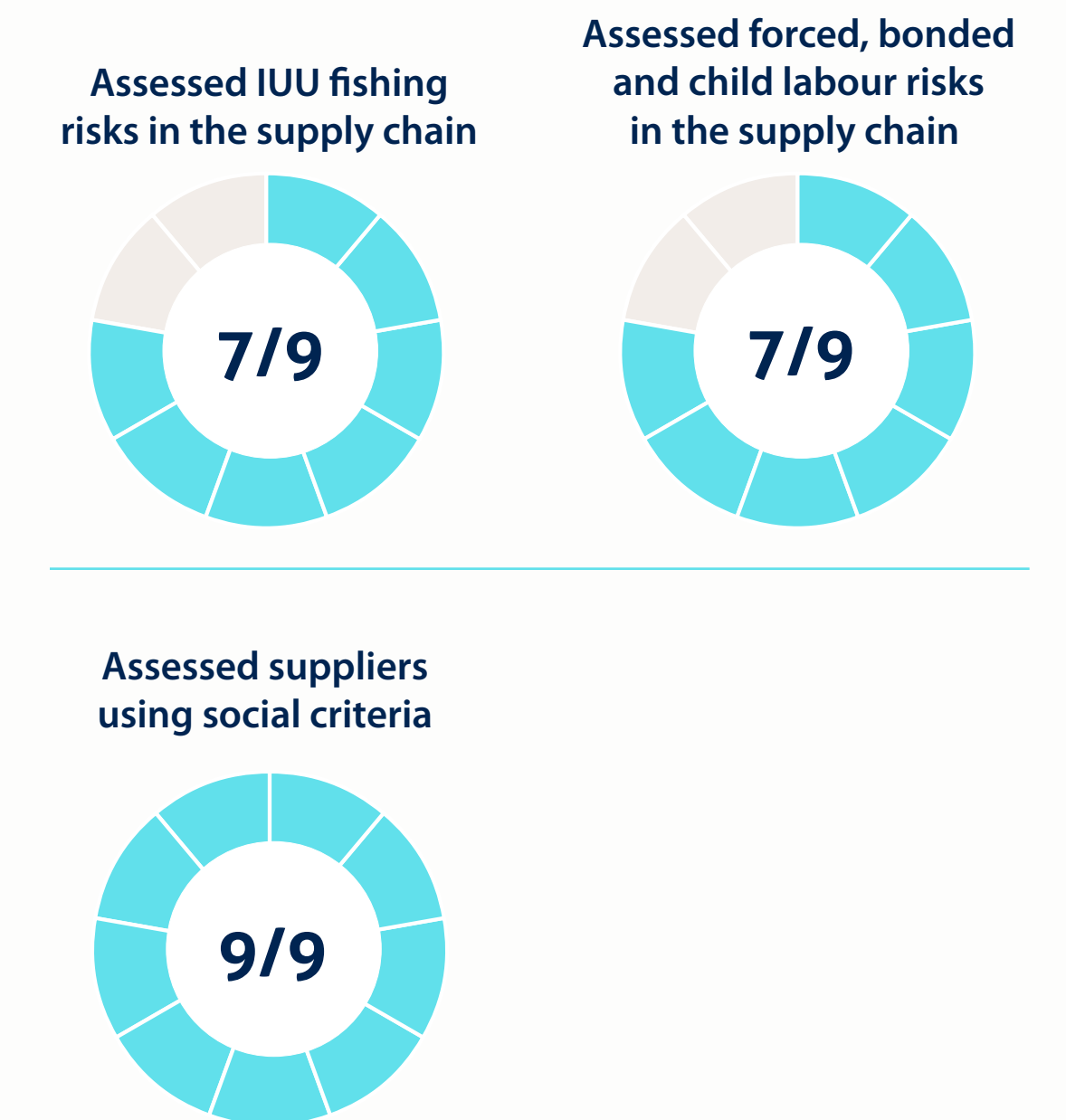
Assessments are being carried out on supply chains identified as higher risk, so appropriate mitigations can be implemented if needed. One example is with Partner Africa in Mauritania and Senegal, through work with the Global Roundtable on Marine Ingredients.

Companies like **Skretting**, **Nissui**, **Maruha Nichiro**, and **Kyokuyo** are leveraging tools such as EcoVadis, SeaBOS [toolkit](#), and supplier surveys to monitor risks. **Dongwon** adheres to guidelines from NGOs and international organizations and participates in the Fishery Improvement Project (FIP).

Cermaq enforces its code of conduct, disallowing forced, bonded, or child labor and monitors fishmeal and fish oil origins to ensure IUU compliance. **CP Foods**, has an extensive Human Rights Due Diligence Process, working closely with the Labour Protection Network Foundation (LPN) to ensure labor rights and recruitment transparency. Cumulatively, SeaBOS members are proud to be supporting a more transparent and humane seafood industry.

OUR ACTIONS

Our concerted actions are integral to our efforts to eliminate IUU fishing and modern slavery. The graphics below outline the initiatives each member company has undertaken.



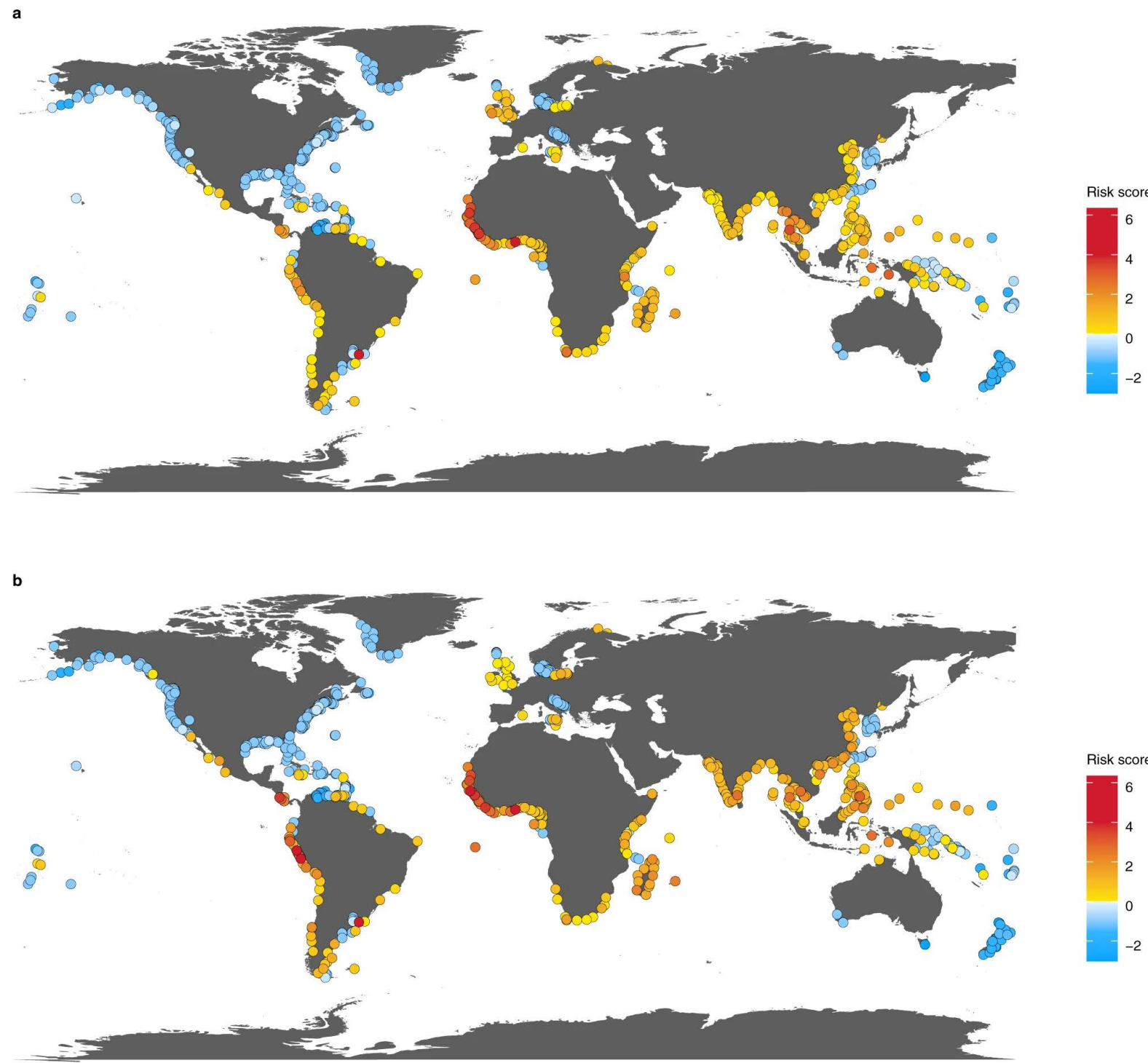
SCIENCE OUTLOOK

Scope, scale and urgency of action

In 2023, despite major efforts during the last two decades in national, regional, and global institutions, among corporations and across governments, modern slavery and IUU fishing remain endemic in the seafood industry. The International Labour Organization along with the Walk Free Foundation and International Organization for Migration estimated that [at least 128,000 fishers remain under forced labor conditions](#) aboard fishing vessels. Research has highlighted considerable [overlap in patterns of risk for modern slavery and IUU fishing](#) in the seafood industry (see Figure), although the actions needed to address them will differ. The livelihoods, well-being and economic impacts of IUU fishing are devastating for coastal communities and nations, with economic losses in hotspots of IUU fishing such as West Africa estimated at up to [USD 9.4 billion annually](#).

Pathways forward

Modern slavery and IUU fishing represent unacceptable practices for any seafood company. SeaBOS members have worked to assess IUU fishing and modern slavery risks across their operations and to improve traceability in their supply chains, with support from the science team. They have also advocated for government action on the Port State Measures Agreement, which includes efforts to eliminate IUU fishing. These steps are important, but not sufficient. Companies have a responsibility to ensure they have adequate policies, traceability schemes, auditing processes and mitigation approaches for addressing IUU fishing. They also need to engage directly with fisheries workers to develop monitoring and report mechanisms and design solutions to address modern slavery. They can also advocate for closing loopholes in national regulatory frameworks that fail to protect migrant fisheries workers. For both modern slavery and IUU fishing, they can share risk assessment frameworks and approaches and communicate openly how they will address known risks, and directly engage with key governments and actors to collaborate on addressing them.



Risk maps for (a) labor abuse and (b) IUU fishing at port. Selig et al. 2022, licensed under CC BY-4.0

KEY PUBLICATIONS

- Background briefs on [Defining Modern Slavery](#) and [Human and Labour Rights Reporting](#)
- Selig et al. 2022 [“Revealing global risks of labor abuse and illegal, unreported, and unregulated fishing”](#)

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There is no question. As leaders of industry, we have a responsibility to make a positive impact. We cannot do it alone, and we don't. As industry, we must seek inputs based on science, and then – and this is the critical step – we must act.

Therese Log Bergjord
CEO of Skretting

CASE STUDIES

Transparency and traceability are important elements to fight IUU fishing and ensure that modern slavery is not present in seafood supply chains. Below are some examples of our joint action in SeaBOS on this topic.



Transparent reporting for accountability

Public reporting in accordance with the GRI standards has a requirement in SeaBOS since 2020 based on conducted materiality assessments. Some SeaBOS companies are also reporting through the [Ocean Disclosure Project \(ODP\)](#) and making their marine products portfolio publicly available. Four companies have been engaging with GDST to implement traceability solutions.



Electronic monitoring on vessels

SeaBOS has developed a Proof of Concept (PoC) to transform the level of transparency aboard commercial fishing vessels, using facial recognition software and deck cameras to identify e.g. species and catch volume, with automatic upload to a blockchain platform. The PoC illustrated that it is possible to execute this level of traceability on fishing vessels.



Joint statements

SeaBOS has publicly supported the removal of [harmful fishing subsidies](#), a key barrier for reducing IUU fishing. In addition, we have published a [joint statement on traceability and Port State Measures](#) to support healthy marine ecosystems and fisheries.



I've learned a lot from the other companies' activities and efforts, they serve as a motivation for us to work harder.

Dr. Myoung-Woo Lee
CEO of Dongwon Industries



GOAL 2

Advancing protection of endangered species

The health of our oceans and the future of sustainable seafood rely on robust biodiversity. However, endangered species are under increasing threat due to human activities, with seafood production playing a significant role.

TASK FORCE LEAD



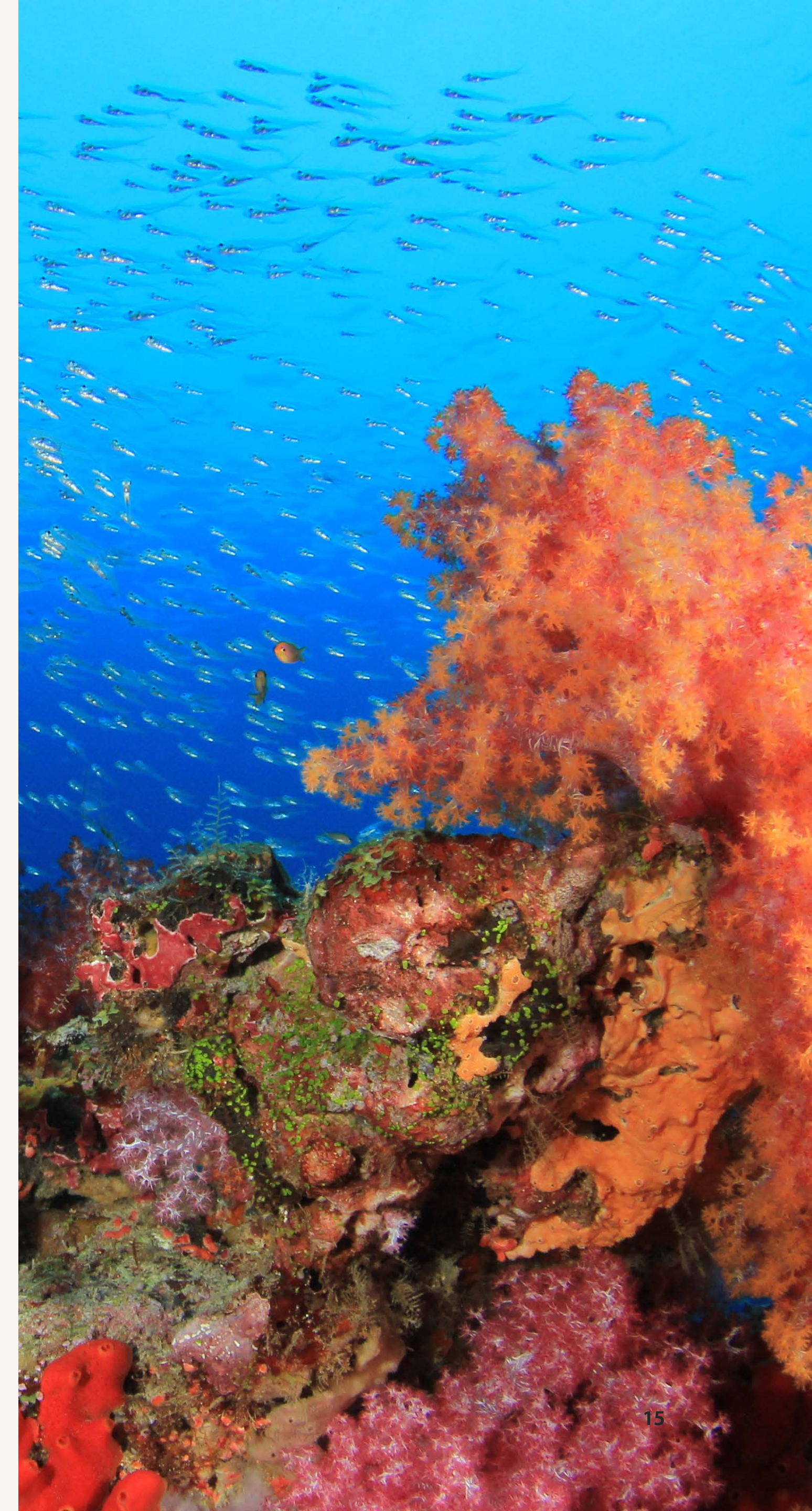
Jorge Diaz Salinas
Global Sustainability
Manager, Skretting

MANAGEMENT APPROACH:

In accordance with our [Endangered Species Strategy](#), SeaBOS members have agreed to conduct rigorous internal due diligence to identify and understand their exposure to risks related to endangered species. We prioritize engaging with science-based best practices and continuously innovate to mitigate these risks. Our collaborative approach extends beyond our operations to include our supply chains and other industry actors. Through these strategic efforts, we are working towards science-based operational measures that substantially reduce the risk of harm to endangered elasmobranch and seabird species.

SEABOS GOALS

1. Implement measures to significantly lower risks to endangered sharks, rays, and seabirds from our operations and supply chains by Oct 2022.
2. Publish a “best practice” list for limiting harm to these species by Jan 2022.
3. Develop a framework for monitoring and reporting species interactions by May 2022, for adoption in Oct 2022.
4. Report progress towards Goal 1 and mitigation actions in Oct 2023 and Oct 2025.
5. Using lessons from initial phase, expand SeaBOS endangered species work scope from Oct 2023, aiming to gradually eliminate all negative impacts on endangered species.



OUR IMPACT

As the newest task force in SeaBOS, established in 2022, we are starting to develop collective efforts to deliver on our Endangered Species strategy, focusing on seabirds and elasmobranchs as a first step. With a new global momentum following from the Kunming-Montreal biodiversity agreement, SeaBOS aims to take leadership in biodiversity protection in the seafood industry through individual company initiatives and collective action, including development of nature based solutions such as mangrove and eelgrass restoration projects.

HOW WE ARE SAFEGUARDING BIODIVERSITY

SeaBOS companies are collaborating on significant projects and fostering innovative efforts to safeguard biodiversity. Ongoing projects include mangrove restoration projects led by **Thai Union** and **CP Foods** in Thailand, eelgrass restoration in Japan by **Maruha Nichiro** and **Cermaq's** mussel and kelp restoration projects in Chile and Norway.

Specifically, **Thai Union** has committed to no deforestation in their operations and has partnered with the Sustainable Fisheries Partnership (SFP) to enhance transparency in their supply chains. Through this partnership, they conduct bycatch audits and ensure the protection of endangered species in their fisheries.

Skretting mitigates risks in its supply chain by working with certification bodies and interacting with other stakeholders like the Sustainable Fisheries Partnership and Global Roundtable on Marine Ingredients.

Maruha Nichiro is engaged in eelgrass bed restoration in Tokyo Bay and collaborates with SeaBOS and BirdLife to monitor the biodiversity of marine products.

CP Foods conducts biodiversity risk screening using the Integrated Biodiversity Assessment Tool (IBAT) to manage their operations near key biodiversity areas, while **Cermaq** uses the IUCN Red List to catalogue endangered species in their operation areas, actively rejecting suppliers that violate their Code of Conduct.

Cargill pushes for ecosystem-based fisheries management. They increasingly source certified marine ingredients, and support credible FIPs to improve fisheries not yet managed to maximize biodiversity protection.

All these efforts are valuable, although we recognise there is still much more to be done, so that we can collectively be protecting endangered species and safeguarding our planet's biodiversity.

OUR ACTIONS

SeaBOS members are committed to protecting endangered species. Below is an overview of our member companies' initial actions for this task force.

Conducted a biodiversity risk assessment including IUCN red list species



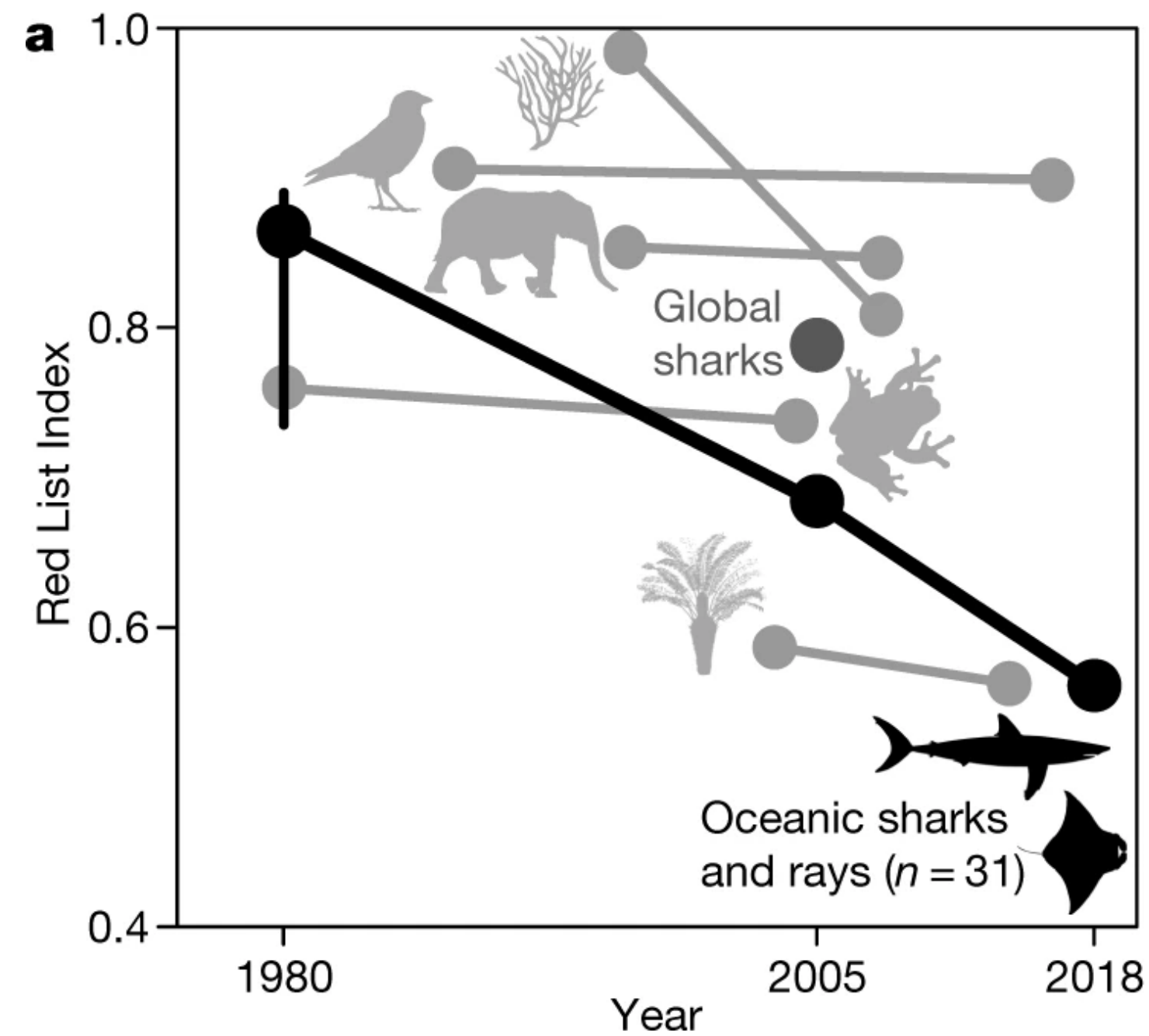
SCIENCE OUTLOOK

Scope, scale and urgency of action

Seafood production is directly dependent on, and can fundamentally affect, the functioning of ecosystems. Species such as sharks, seabirds and rays are [critically important](#) for aquatic foodchains, but their populations have declined sharply. Currently, [31% of all seabird species are globally threatened according to the IUCN Red List](#), and almost half of all species have declining populations. Similarly, shark and ray populations in tropical, subtropical and oceanic ecosystems have [declined by over 75% and 71%](#), respectively. For oceanic sharks, these declines have been attributed to an 18-fold increase in fishing pressure, while entanglement in fishing gear remains the single greatest threat to sea turtles. Long-term studies of albatross species in the south Atlantic Ocean indicate that fisheries are the primary driver of 40-60% population declines, and the extinction risk for sharks and rays exceeds that of any other category calculated by the IUCN Red List.

Pathways forward

The seafood industry has the power to do something about this challenge, and previous work to reduce negative impacts on seabirds illustrates that concerted efforts can generate significant results. Implementation of bycatch regulations in the Namibian hake fishery, for instance, [reduced albatross mortality by 94%](#). Understanding risks, engaging with high-risk areas, and spreading knowledge about what works, can ensure that best practices are used, normalized, and legislated. Participating in regional initiatives to identify Important Shark and Ray Areas (ISRAs) and supporting the implementation of corresponding management measures will encourage and rapidly normalize uptake of best practice. Moving beyond elasmobranchs and seabirds to other threatened species will be critical for ensuring the resilience of marine ecosystems and seafood operations.



Increase in extinction risk of oceanic sharks. Global RLI for the 31 oceanic shark species (black line) estimated in 1980, 2005 and 2018, and for mammals, birds, amphibians, reef-forming corals and cycads (in grey) (Pacoureaux et al. 2021). Copyright © 2021, Pacoureaux et al., under exclusive licence to Springer Nature Limited

KEY PUBLICATIONS

- Background brief on [Endangered Species and Loss of Marine Biodiversity](#)
- Briefs on [Seabirds](#) and [Elasmobranchs](#)
- [Best practices for reducing negative impacts on elasmobranchs and seabirds](#)



We recognise that we need to conduct business responsibly to safeguard and preserve biodiversity, operate and manage existing resources efficiently, and work towards creating balanced, sustainable production and consumption around the world.

Dr. Sujint Thammasart
COO of Charoen Pokphand Foods (CP Foods)

CASE STUDIES

The seafood industry is dependent on a healthy ocean and healthy marine ecosystems and has a great responsibility in protecting biodiversity and support the restoration of nature. Going forward, SeaBOS is stepping up its joint activities in this Task Force. Current initiatives include contribution to the development of industry specific frameworks for biodiversity and standards for nature based solutions, in addition to developing joint strategies for action. Below are some examples of our ongoing work.



A strategy for endangered species

In 2021, SeaBOS members established a strategy for addressing negative impacts on endangered species. The first step was to establish a scientific assessment of best practices, published in 2022. SeaBOS companies started to report on risks and impacts on endangered species in 2023 and is developing its risk management approaches. Joint efforts will continue going forward.



Preventing bycatch of seabirds

Fishing companies in the Nissui Group have introduced a variety of measures to prevent the bycatch of seabirds. These include Tori lines (as shown above) - a device that prevents birds from approaching the bait by towing a rope to which streamers and tapes are attached. Other measures include using bafflers (a metal scarecrow) to scare birds away, weights to lower towing lines from bird flight paths; trawling at night when fewer birds are around; managing offal onboard to avoid attracting birds; and, having a bycatch reduction management plan for every vessel.

”

SeaBOS can be the lever that transforms the fisheries industry. That is my hope for the future.

Shingo Hamada
President and CEO of Nippon Suisan Kaisha



GOAL 3

Reducing antibiotics use

The inappropriate use of antibiotics in aquaculture threatens both human health and marine ecosystems through its contribution to potential antimicrobial resistance (AMR). SeaBOS is leveraging science and cooperative stewardship to enable transformative change in antibiotics use across global aquaculture operations.

TASK FORCE LEAD



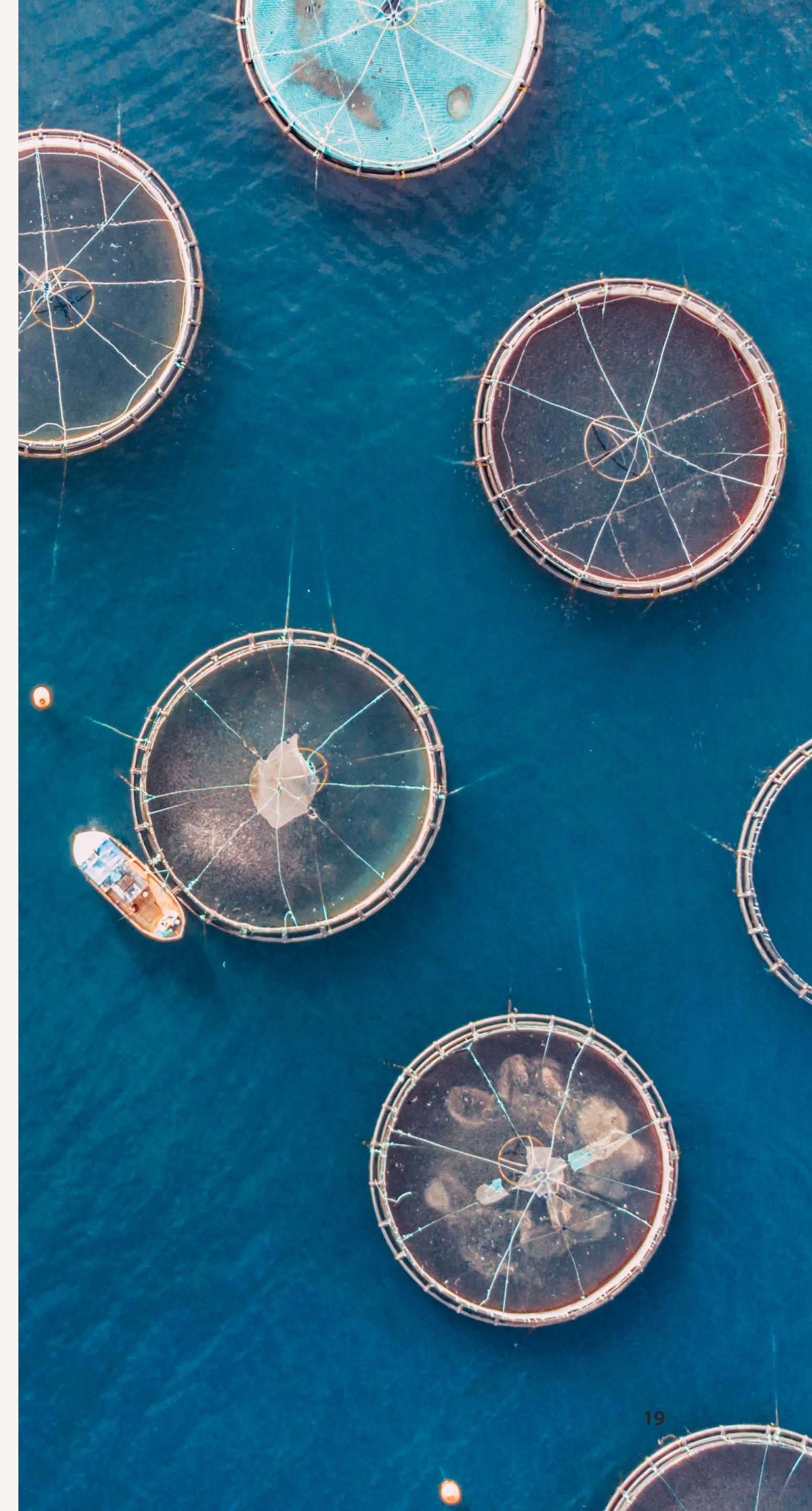
Dave Robb
Program Lead, SeaFurther™
Sustainability, Cargill Aqua
Nutrition

MANAGEMENT APPROACH:

SeaBOS aims to minimise antibiotics use by improving overall health management in aquaculture, adopting preventative practices, and implementing a Code of Conduct for responsible antibiotics use. Through data collection, enhanced farm management practices, disease diagnostics, and the development of preventative strategies and resources like vaccines, we strive to promote transparency and accountability. We work collaboratively with diverse stakeholders, including pharmaceutical companies, veterinarians, intergovernmental agencies, and government departments, to develop and improve stewardship and alternatives to antibiotics.

SEABOS GOALS

1. By October 2021, outline a roadmap to phase out high-risk antibiotics from aquaculture and develop an antibiotic use Code of Conduct. Enhance antibiotic survey data and collaborate with expert organizations on alternatives.
2. Agree to a roadmap for establishing a "SeaBOS Antibiotics Code of Conduct" by October 2022.
3. Extend the Code's scope to member operations and aquaculture supply chains.
4. Cease the use of HPCIA and CIA in aquaculture unless permitted by national legislation.
5. Commit to annual antibiotic stewardship surveys to monitor progress.



OUR IMPACT

The collective actions of SeaBOS have resulted in increased transparency in antibiotics use. We aim to further reduce antibiotics use in aquaculture by the sharing of best practice and implementation of SeaBOS tools such as the Antibiotics Stewardship Roadmap and Code of Conduct, which includes the phasing out of High Priority Critically Important Antimicrobials (HPCIA) and Critically Important Antimicrobials (CIA) in alignment with World Health Organization standards. Our approach will help reduce the risk of AMR and enhance the health management of aquaculture species, paving the way for a sustainable and responsible seafood industry.

OUR EFFORTS IN REDUCING ANTIBIOTICS USE

In the concerted effort to reduce antibiotic use in aquaculture, SeaBOS member companies have leveraged collective initiatives and individual actions. A standout example in Japan involves **Nissui, Maruha Nichiro,** and **Kyokuyo**. This collaboration has the companies joining forces with pharmaceutical company Kyoritsu Seiyaku, government agencies, and the Japan Fisheries Research and Education Agency. Their collective aim is to reduce antibiotic use and develop vaccines that enable transfer away from HPCIA's.

Simultaneously, **Thai Union** has undertaken a project to advocate responsible antibiotic use among Thai shrimp farms, underpinned by a stringent quality assurance system and a policy prohibiting the use of WHO-listed critical antibiotics. They've also implemented the SeaBOS tools, such as the Code of Conduct, in their risk management procedures.

Skretting has undertaken an awareness project in Vietnam, focusing on the responsible use of antibiotics and addressing antimicrobial resistance (AMR). This project includes training and a medicine calculator app to provide appropriate dosing recommendations.

Cargill focuses on continuous development of feeds that enhance animal health and welfare, thereby reducing the need for medicated treatments. Antibiotics are only applied in feeds under direction of a veterinary prescription. **Cermaq** invests in vaccine research for salmonid diseases and screens broodfish against pathogens, only resorting to antibiotics when prescribed by a veterinarian.

Through collaborative and individual initiatives, SeaBOS member companies are proud to demonstrate their strong commitment to reducing antibiotics use, in line with SeaBOS's goal.

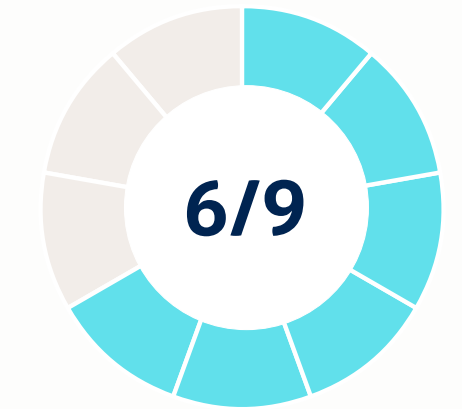
OUR ACTIONS

To reduce antibiotics use, SeaBOS has been developing a Code of Conduct and a roadmap for implementation by our members. In addition, annual reporting of antibiotics usage has been a priority to better inform science and practice on antibiotics in seafood production.

Road Map for Reducing Antibiotic Use



Shared High-Resolution Data with Scientists



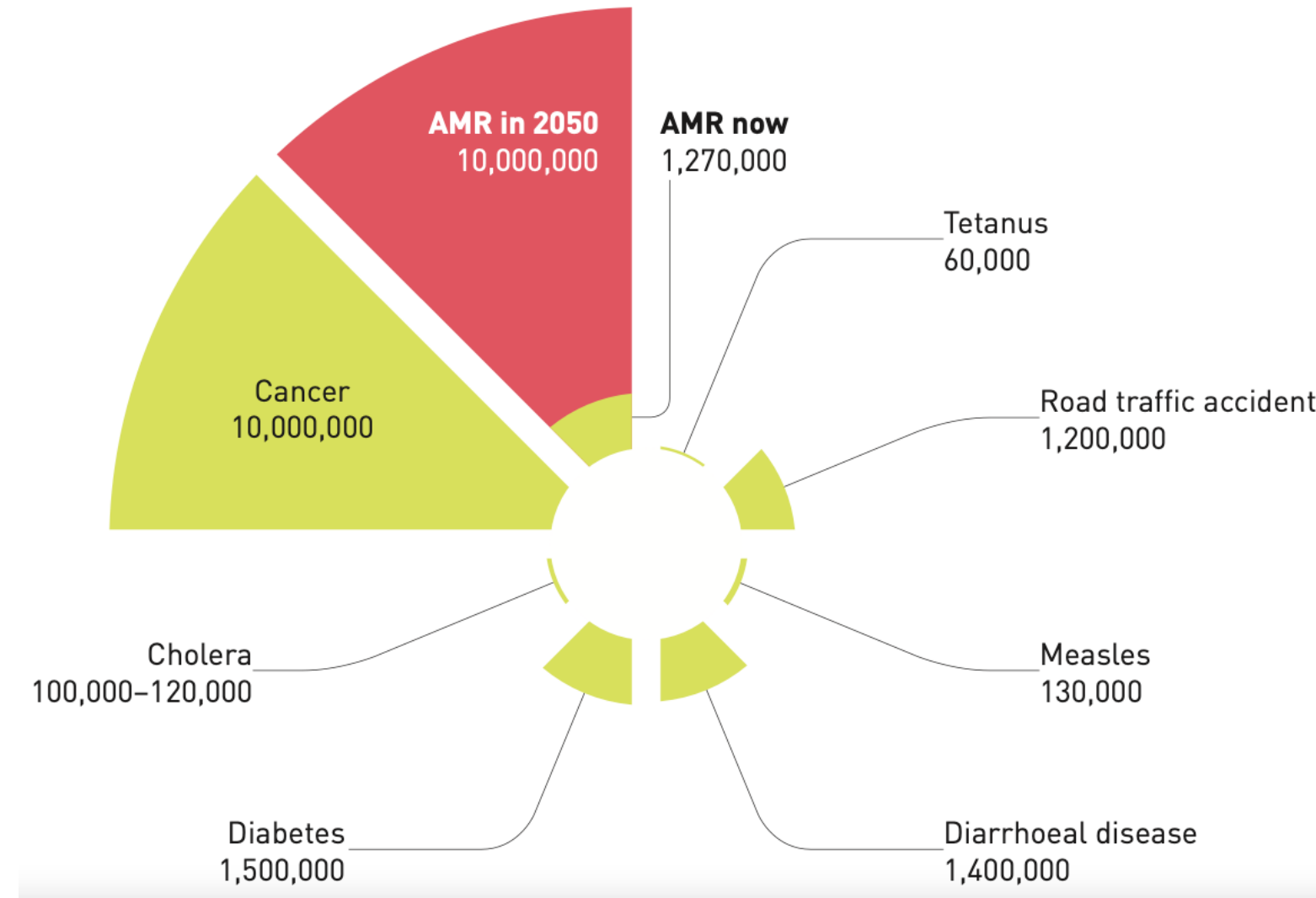
SCIENCE OUTLOOK

Scope, scale and urgency of action

Antibiotic use has contributed to the spread of antimicrobial resistance, an emerging public health crisis estimated by the United Nations to result in [up to 10 million deaths annually by 2050](#). While antibiotics enable greater food production and have importance for animal welfare, considerable scope exists to limit usage by reducing misuse and over-application around the world. Over longer timeframes, the development of vaccines can reduce dependency on antibiotics; in Norway, for instance, vaccines have resulted in the virtual elimination of antibiotics in salmon aquaculture production. [Over 600 species are in aquaculture production](#) around the world, but vast gaps exist in knowledge about the quantity and type of antibiotics used in these diverse production systems, hampering action and progress.

Pathways forward

The improper use of antibiotics in aquaculture results in the loss of efficacy of antimicrobials crucial for human healthcare. Focusing on reducing and eventually eliminating the need for [Critically Important Antimicrobials for Human Medicine](#), as identified by the World Health Organization is a crucial priority. A focus on responsible antibiotic use and overall health management is indispensable to ensure the sustainable future of the aquaculture industry. Companies can contribute by providing transparent accessibility of data, engaging in vaccine development, and contributing to eliminating vast knowledge gaps about the frequency and prevalence of antimicrobial resistant genes in production systems around the world.



Predicted mortality from AMR compared to common causes of death today (United Nations Environment Programme 2023, adapted from O'Neill 2016; Murray et al. 2022).

KEY PUBLICATIONS

- Background brief on [Antibiotics in Aquaculture](#)
- Gephart et al. 2021 [“Environmental performance of blue foods”](#)

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There is the saying that alone you can go fast, but together you can go further. SeaBOS provides a platform for organizations to work together to build sustainability solutions at scale.

Helene Ziv-Douki
President of Cargill Aqua Nutrition

CASE STUDIES

Joint action to reduce the antibiotics use in aquaculture operations is a key priority in SeaBOS. In addition to developing and implementing industry tools and resources, our member companies are engaging in regional partnerships, including with government agencies and the pharmaceutical industry, to effectively develop solutions. SeaBOS became a member of the AMR Multi-Stakeholder Partnership Platform in 2023, working together with organizations such as the Food and Agriculture Organization of the UN, UN Environment Program, World Health Organization and World Organization for Animal Health, to ensure the responsible use of antimicrobials.



Collaboration for vaccine development

Nissui, Maruha Nichiro and Kyokuyo are working together with Japanese government offices and the pharmaceutical industry in Japan to reduce antibiotics use and develop vaccines that enable a transfer away from the use of highest priority critically important antibiotics (HPCIA).



Establishment of Roadmap and Code of Conduct

The SeaBOS Antibiotics Code of Conduct provides strategies for maintaining fish health and welfare and reducing use of antibiotics through preventative practices and interventions. Furthermore, the [SeaBOS Antibiotic Stewardship Roadmap](#) guides members in the phasing out of HPCIA and CIA in line with World Health Organization (WHO) standards.



Aquaculture is a part of the solution but there are also challenges we need to overcome, and this makes aquaculture attractive for dedicated people who want to make a difference.

Steven Rafferty
CEO of Cermaq Group



GOAL 4

Addressing climate change

As the world grapples with the realities of climate change, the seafood industry must adapt and contribute to the solution. This involves reducing our greenhouse gas emissions, understanding the changing conditions, and building climate resilience to protect ocean ecosystems and our industry.

TASK FORCE LEAD



Adam Brennan
Group Director,
Sustainability, Thai Union

MANAGEMENT APPROACH:

Our management approach is two-pronged, focusing on mitigation and adaptation. Firstly, we are committed to reducing greenhouse gas emissions in line with scientific targets. This involves setting and implementing ambitious goals, innovating our operations and supply chains, and reporting publicly on our emissions. Secondly, we're developing resilience to manage climate-related risks in our operations. This includes collecting and assessing operational data, advancing our understanding of blue carbon ecosystem conservation and restoration, and leveraging financial instruments to support transformation.

SEABOS GOALS

1. Set science-based goals and reporting for GHG emissions reduction by October 2021.
2. Announce GHG reduction targets in line with the Paris Agreement by May 2022.
3. Implement and publicize scope 3 emissions and climate resilience actions by October 2022; conduct GHG workshop and surveys in late 2021.
4. Raise awareness of the benefits of dietary shifts as part of the solution to climate change.



OUR IMPACT

Addressing climate change is a key priority for SeaBOS. All our member companies have set science-based climate goals, with five committed to the Science Based Targets Initiative. Our combined actions aim to significantly reduce GHG emissions, and to achieve this, working with customers and suppliers is essential. SeaBOS is also collaborating with organizations such as the UN Global Compact, WWF and the Climate Champions to develop standards and policy recommendations on climate change in the seafood industry. In 2022, we co-developed a guide to help other companies in the industry set science based targets in accordance with the Science Based Target Initiative (SBTi).

COLLABORATIVELY TACKLING CLIMATE CHANGE

All SeaBOS member companies have set science-based targets to reduce their emissions. So far, five have had their targets approved by the Science Based Targets initiative (SBTi). All our member companies are reporting on Scope 1 and 2 emissions, and some have gone further by reporting on Scope 3 emissions.

Thai Union is harnessing innovation with projects focused on sustainability and climate action in aquaculture. For instance, they have integrated solar power and HydroNeo's smart farm system into their operations. **Skretting** is committed to SBTi targets across all scopes as well as utilising new ingredients in feed. **Nissui** is promoting energy-saving measures and renewable energy use while exploring alternative protein products. **Maruha Nichiro** is installing solar panels at their Utsunomiya Plant and converting to non-CFC refrigeration equipment.

Meanwhile, **Dongwon** aims to reduce Scope 3 emissions with the establishment of land-based salmon farming. **Cermaq** has initiated electrification at seawater sites and boats in Norway and is exploring similar opportunities in Canada and Chile. **Cargill** is dedicated to reducing both its Scope 1 & 2 emissions and relative Scope 3 emissions. Through the SeaFurther™ Sustainability program, they are focusing on decarbonization along their value chains, developing regenerative agriculture with suppliers, and using digital tools to improve feed efficiency.

These concerted efforts by SeaBOS member companies demonstrate our clear and shared commitment to combating climate change. By working collectively and sharing best practices, we are proud to set a precedent for others in the seafood industry and beyond.

OUR ACTIONS

Joint action is critical to address climate change. Below is an overview of actions taken by our member companies, including setting climate targets, and reducing and disclosing GHG emissions.

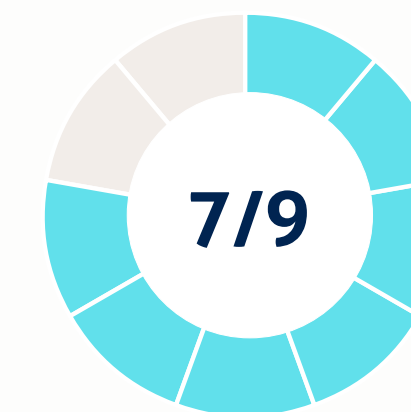
Set Science-Based Targets to Reduce their Emissions



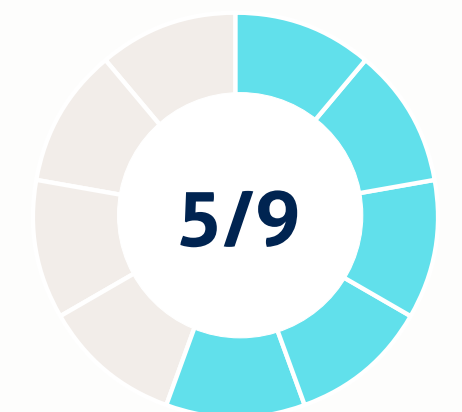
Reported Scope 1 & 2 Emissions



Reported Scope 3 Emissions



Had Their Emissions Reduction Targets Validated by SBTi



SCIENCE OUTLOOK

Scope, scale and urgency of action

Climate change represents an existential challenge to humanity, with once-distant projections increasingly becoming a reality. In mid-2023, for instance, nearly [half the ocean's surface area was experiencing marine heatwave conditions](#), and sea surface temperature spiked to unprecedented levels around the world (see Figure), [exacerbating climate change impacts](#) on fisheries and aquaculture production. The IPCC has estimated that more than [99% of the world's coral reefs would not recover from 1.5 degrees](#) of warming above pre-industrial levels, an alarming prospect given 25% of ocean biodiversity depends on coral reefs during some stage of their life cycle and [current emissions reduction policies are expected to result in 3.2 degrees of warming](#) by 2100. Immediate and dramatic reductions are thus urgently needed (see Figure).

Pathways forward

Although the greenhouse gas emissions of SeaBOS members do not represent much at the global level, combined action and substantial emission reductions represent a strong signal to the sector and beyond. All corporations in 2023 should have a public climate target, preferably a science-based target, and consistently report on their Scope 1, 2 and 3 GHG emissions. Leading efforts to standardize reporting methodologies in the seafood sector will contribute to broader action, while investment in the development of green technologies remains crucial. Collaboration with scientists to understand how climate risk translates into financial risk can help mainstream climate risk reduction into fisheries and aquaculture management.

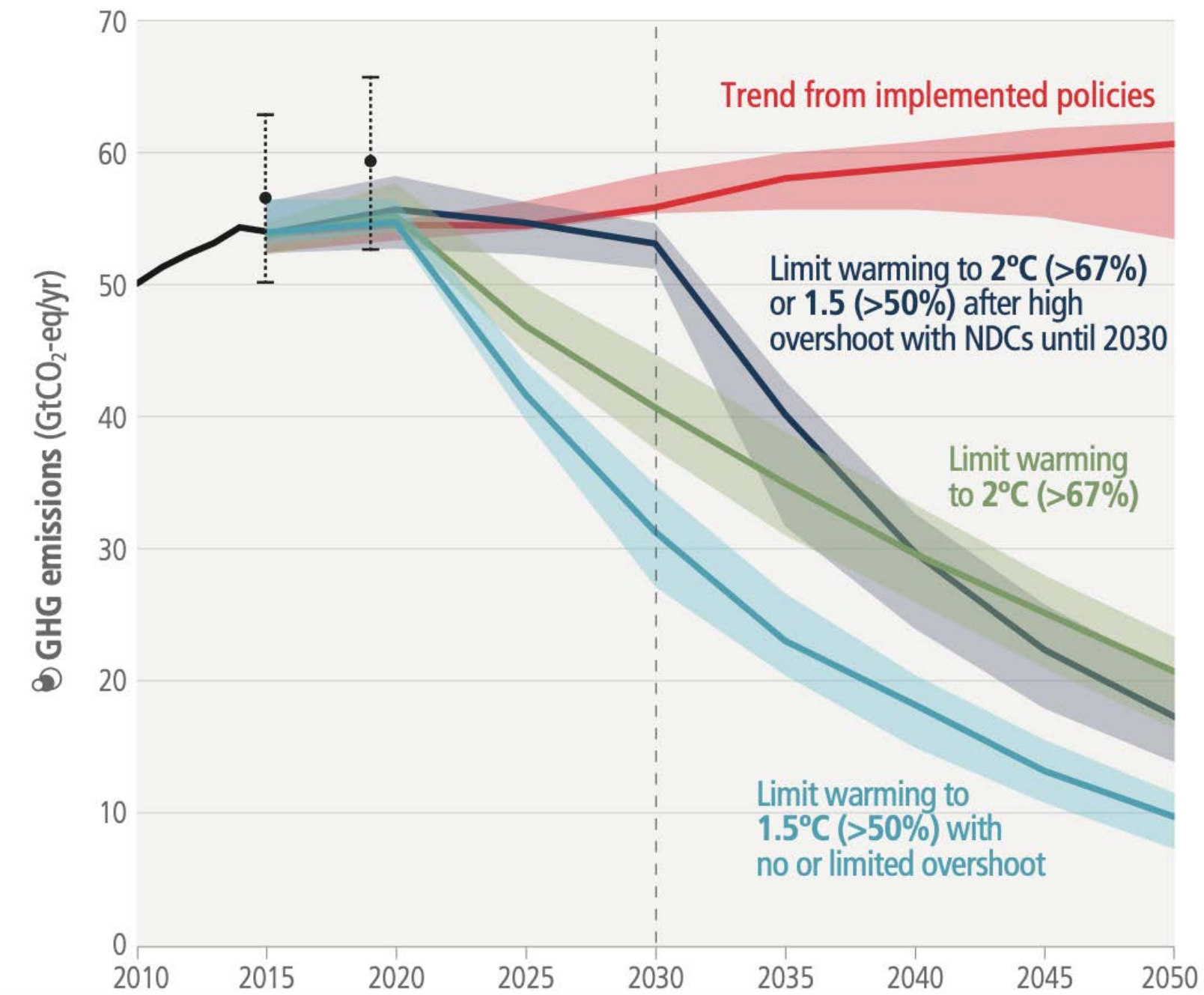


Figure. Limiting warming to and 2°C involves rapid, deep and in most cases immediate greenhouse gas emission reductions (IPCC 2023)

KEY PUBLICATIONS

- Background Brief on [Climate Change Impacts on Fisheries and Aquaculture](#)
- [Survey of Corporate Climate Change Strategies](#)
- IPCC 2023 [“Climate Change 2023: Synthesis Report – Summary for Policymakers”](#)

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To succeed, alignment is crucial.

Thiraphong Chansiri
President and CEO of Thai Union, and Chair
of the SeaBOS Association

CASE STUDIES

SeaBOS works actively to strengthen climate resilience in seafood operations and its members are working to reduce their GHG emissions in line with set targets. Below are some examples of the work we do, and we continue to seek out effective collaborations to deliver on our shared commitment for climate action and reduced emissions.



Collective commitment to setting climate targets

All SeaBOS companies have established a climate target, of which five are in accordance with the Science Based Target Initiative (SBTi). Acknowledging the challenge in reducing especially scope 3 emissions, SeaBOS is focusing on aligning efforts across the industry and developing GHG accounting standards that enables adequate measurement of emissions and joint efforts through the supply chain to invest in reduction measures.



Sharing best practices for climate targets

Together with the UN Global Compact and World Wildlife Fund (WWF), SeaBOS has developed a guide for how to set science-based climate targets in the seafood sector, to guide other seafood companies and encourage climate action. The guide is available [here](#).

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**A healthy seafood industry
relies entirely on healthy
oceans. Without that we have
nothing.**

Makoto Inoue
President of Kyokuyo



GOAL 5

Reducing plastic pollution

Plastic pollution poses a grave threat to our oceans, affecting marine life, seafood production, and overall ocean health. With an alarming estimate of 322 million metric tons of plastic produced in 2015, approximately 79% of which is deposited in landfills or entered the natural environment, the urgency to address this global issue has never been more profound.

TASK FORCE LEAD



Hiroyuki Sato
Manager Sustainability Group,
Maruha Nichiro



Toshiya Yabuki
Deputy General Manager
Sustainability Department,
Nissui



Kunio Akiyama
CSR Manager, Kyokuyo

MANAGEMENT APPROACH:

In response to this crisis, SeaBOS developed the “City to Sea” Framework, a comprehensive strategy targeting areas where the seafood industry can significantly reduce plastic pollution. Our management approach leverages scientific insights and harnesses innovative solutions to cut down plastics use. Initiatives such as biennial reporting on our plastics footprints, adoption of alternative materials, reduction, reuse, and recycling of plastics, alongside awareness campaigns, comprise our multi-pronged approach.

SEABOS GOALS

1. Provide at least biennial reporting on plastics packaging footprints, along with shared learning webinars during 2021 on innovative solutions to make plastics lighter; re-use, reduce, recycle, or make plastics compostable.
2. To continue City to Sea plastics strategy including reporting on our plastics footprints and reduction actions by October 2022.



OUR IMPACT

Members' commitment to understanding and lowering their plastic footprints, combined with practical actions such as coastal cleanup programs and company efforts to reduce our own plastics use have resulted in significant advancements. We're not only making strides towards reducing our own plastic use, but we're also raising awareness and advocating for broader industry and governmental commitment to tackle this pressing issue. Together, we are creating a ripple effect towards a plastic-free ocean.

A COLLECTIVE PUSH AGAINST PLASTIC POLLUTION

SeaBOS companies, in their commitment to ocean health, have collectively partnered with the Ocean Conservancy on an international Ocean Cleanup program, demonstrating the significance of industry-wide action against plastic pollution. Through initiatives like a joint cleanup day led by the CEOs of the three Japanese SeaBOS companies, SeaBOS is spotlighting the issue of plastic pollution and reinforcing the importance of ocean stewardship among their workforces.

Beyond collective efforts, individual SeaBOS companies are also embracing innovative approaches to reduce plastic use and manage waste effectively. **Thai Union**, for instance, has developed reusable models to decrease reliance on single-use plastic packaging. They've also partnered with the Global Ghost Gear Initiative to manage and recover discarded fishing gear.

Nissui is taking robust action by introducing non-Styrofoam packaging and enhancing fishing gear management rules using GGGI's "Best Practice Framework". **Skretting** has implemented compostable and post-consumer recycled packaging, underlining the possibilities of sustainable alternatives.

Maruha Nichiro is advancing plastic reduction with a new production management system and strengthened buoy strength for aquaculture. **Kyokuyo's** approach includes diligent repair and maintenance to prevent plastic components of fishing nets and buoys from entering the ocean.

CP Foods, have developed reusable Q-pass tanks for transporting shrimp post-larvae and redesigned packaging to reduce plastic usage, while also ensuring product safety and nutritional value. **CP Foods** is also focussing on reducing plastic use in their farm business and developing alternative packaging designs.

All these actions, alongside SeaBOS's City-to-Sea framework, demonstrate the initiative's drive for a holistic approach to tackling ocean plastic pollution, from reducing plastic use, improving waste management and recycling infrastructure, to promoting sustainable packaging alternatives. This collective commitment from SeaBOS companies contributes significantly to the broader vision of sustainable seafood production and a healthy ocean.

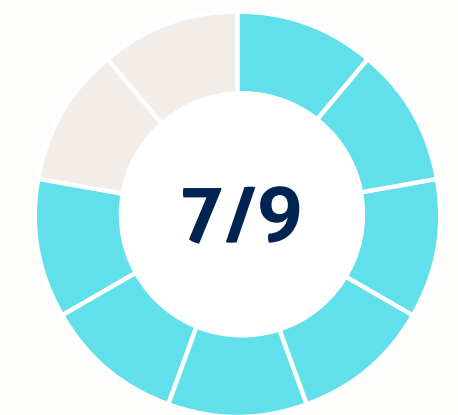
OUR ACTIONS

Our member companies are united in their commitment to reduce plastic pollution. Below is an overview of the actions taken by our member companies.

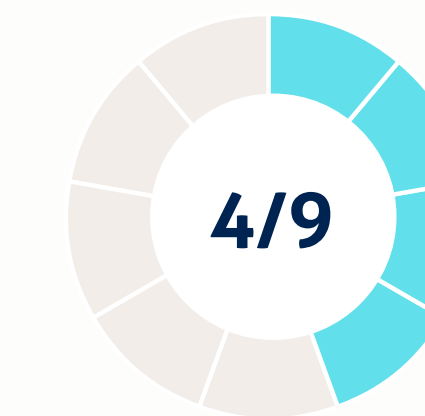
Adopted a Strategy for Reducing Plastics



Disclosed Plastic Consumption



Disclosed Plastic Reuse



5000 participants in Ocean Cleanup and 25 tonnes ocean plastic removed since 2021

SCIENCE OUTLOOK

Scope, scale and urgency of action

Plastics have become ubiquitous in the environment, including marine ecosystems. Over 300 million metric tons of plastic are produced annually, with [nearly 80% expected to enter landfills or the natural environment](#). An estimated [170 trillion plastic particles](#) are floating in the ocean today, while [thirty times as much](#) is thought to have accumulated in sediment on the seafloor. Macroplastics from fishing activities entangle and kill marine life and seabirds, and have also been found to be [the most prevalent human debris on coral reefs](#) (see Figure). Meanwhile, microplastics (less than 5 mm in length) have been [identified in the bodies of 1,288 marine species](#) including over 750 fish species. According to the 2017 FAO report on [Microplastics in Fisheries and Aquaculture](#), even the “worst-case scenario” of plastic ingestion due to contaminated seafood remained far below allowable daily intake levels for well-studied

contaminants such as PCBs, PAHs, DDT, Bisphenol A and PBDEs. Yet, consumers remain deeply concerned about microplastics in their food (e.g. [63% of respondents in a 2020 study by the German government](#)).

Pathways forward

Companies can reduce the flow of plastic to the ocean by implementing comprehensive strategies that focus not just on recycling plastic waste, but systematically [reducing use across the entire value chain](#). Advocating an overall reduction of plastic production and fully utilizing ocean cleanup efforts as a means of communication on broader [issues of stewardship, responsibility and care](#) for the environment can amplify the impact of such efforts. Since [IUU fishing has also been correlated with incidences of abandoned, lost and discarded fishing gear](#), concerted efforts to address such activities represent an additional positive impact.

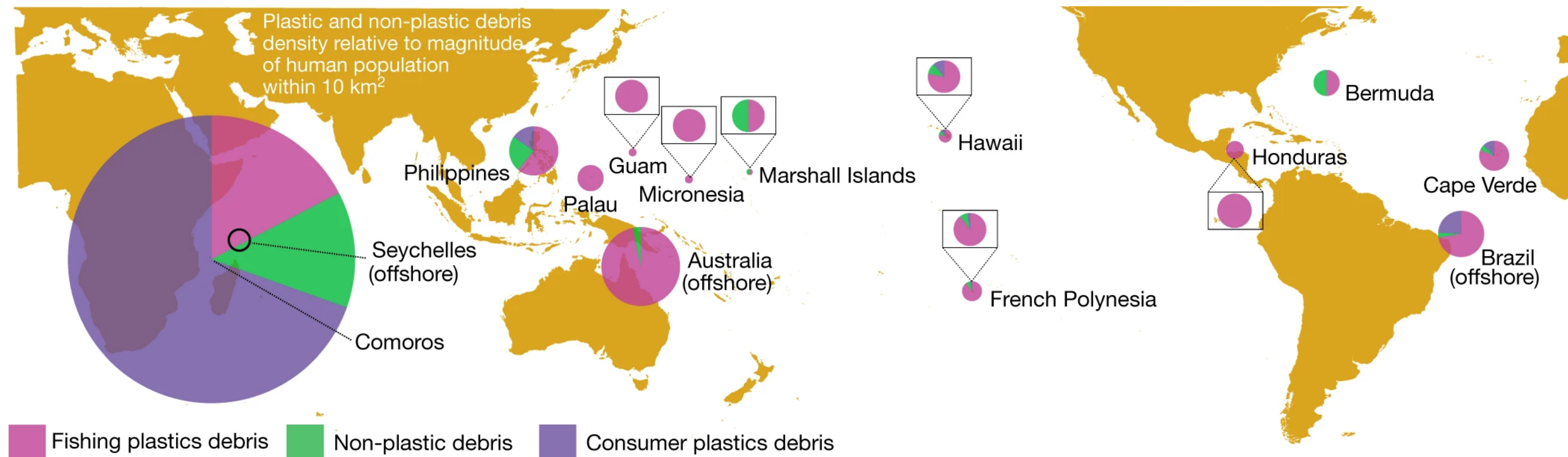


Figure. Distribution of anthropogenic debris on coral reefs of the world. Copyright © 2023, Pinheiro et al., under exclusive licence to Springer Nature Limited.

KEY PUBLICATIONS:

- Background brief on [Microplastics in seafood](#)
- Background brief on [Ocean Plastic Pollution](#)

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We believe that our mission is to keep the ocean clean and protect marine resources for the future. One can make a small difference, but together as a group, we can make a much bigger difference.

Masaru Ikemi
President and CEO, Maruha Nichiro

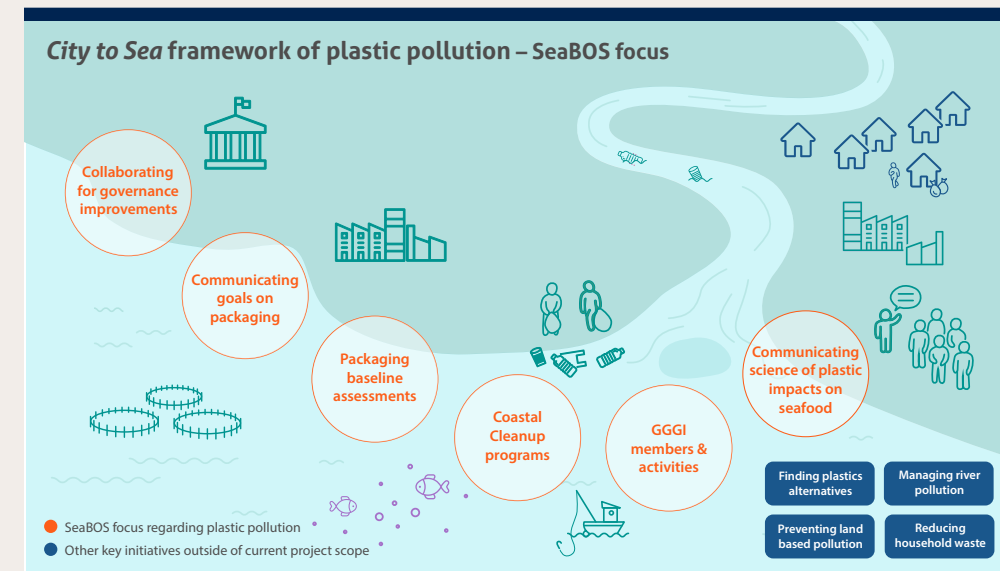
CASE STUDIES

Every year, millions of tons of plastic enter the ocean, affecting ecosystems and overall ocean health. SeaBOS is working with the Ocean Cleanup to help mitigate this challenge, while implementing our City to Sea strategy to reduce plastic pollution from seafood operations.



Ocean Conservancy | SeaBOS Cleanup

Since 2021, over 5000 employees of SeaBOS member Companies have actively participated in ocean plastic cleanup activities, removing over 25 tonnes of polluting material globally.



City to Sea Framework

SeaBOS developed the “City to Sea” Framework, a comprehensive strategy targeting areas where the seafood industry can significantly reduce plastic pollution.



Japanese Company Collaboration

The three Japanese SeaBOS member companies - Nissui, Maruha-Nichiro and Kyokuyo - collaborated on a beach cleanup event in Tokyo in the summer of 2023. Over 200 staff members took part, including the three company CEO's.

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It was exceptional for three companies that compete, to come together and clean up plastic from the ocean.

Masaru Ikemi
President and CEO, Maruha Nichiro



Appendix – Member company disclosures

Appendix contains individual member Company data disclosures relating to SeaBOS goals for the 2022 annual period. Commentary is provided to describe the data, including comparison with the previous annual period. Foot notes are provided to describe measurement methods and any data limitations. For complete disclosure of individual member Company sustainability data, please refer to its recent sustainability reports via the link provided.

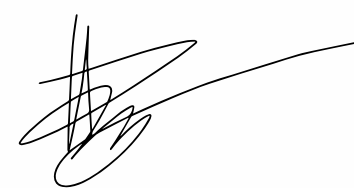


COMMITMENT IN ACTION: CARGILL

At Cargill Aqua Nutrition, we are at the center of aquaculture value chains, allowing us to positively impact the industry – from suppliers to customers and beyond. In 2022, our SeaFurther™ program demonstrated that with a regenerative agriculture pilot with UK suppliers that delivered a 1,000-tCO₂e reduction in emissions for a customer’s feed and fish. In 2023, we are delivering ten times more carbon savings for customers. In fishery supply chains we remain committed to certified sustainable sourcing and supporting FIPs across the globe, despite challenging market conditions. Through global partnerships we are accelerating our delivery of change in the value chains we work in.

Key initiatives

- A regenerative agriculture pilot with UK suppliers delivered a 1,000-tCO₂e reduction in emissions.
- Launch of the Fisheries Improvement Fund with Finance Earth and WWF in early 2023, aiming to catalyze \$100 million in investment in fisheries improvement by 2030
- Intensive human rights risk assessments launched in key supply chains.



Helene Ziv-Douki
President and CEO, Cargill Aqua Nutrition

➤ [Read the complete sustainability reporting disclosure here](#)

Disclosures

GHG Emissions²

Scope 1 (GRI 305-1)

Scope 2 (GRI 305-2)

Scope 3 (GRI 305-3)

GHG Intensity (GRI 305-4)

Climate management

Plastic Pollution

Plastic management

Antibiotic Use³

Product not treated with antibiotics

Active ingredient used

Antibiotic management

Endangered Species

Operating sites and natural areas (GRI 304-1)

IUCN red list species affected (GRI 304-4)

Biodiversity management

IUU and Modern Slavery

IUU management

Risk assessments in own operations and supply chain (GRI 409-1)

Supplier social assessments (GRI 414-1)

Labour management

Commentary

Scope 1 GHG emissions for our total business were 60,537 tonnes in 2022 (2021, 70,088).

Market based scope 2 emissions for our total business were 90,562 tonnes in 2022 (2021, 95,558).

Scope 3 GHG emissions were 1,873,266 tonnes in 2022 (2021, 2,535,792) for our salmon feed businesses. Scope 3 included land use change and was calculated cradle to feed mill gate, based on all the raw materials delivered to the mills.

In 2022, GHG emission intensity (based on scope 1 and 2 emissions) was 0.091 tCO₂e per metric tonne of feed produced (2021, 0.09)

Cargill has corporately set a Science Based Target for Scope 1 & 2 emissions and a separate target for Scope 3, approved by SBTi. This target is cascaded through to the Aqua Nutrition business, aiming to reduce the emissions of salmon farming customers’ harvested fish by at least 30% by 2030.

Cargill’s use of plastic is mainly for packaging of feeds, outbound to our customers. We are developing commercial options to reduce bag thickness and to change to bio-compostable materials in some countries of operation. We are working with suppliers to be able to collect and recycle more of our packaging – ideally back into bags for feed.

In 2022 99.05% of total feeds (by weight) were free from antibiotic treatment (2021, 99.15%).

In 2022, on average, total feeds with antibiotics contained 26,3g active ingredient per tonne of feed produced (2021, 23.7g/t).

Cargill manages antibiotics by only adding to feeds upon receipt of a veterinary prescription and strictly following local laws governing treatment, dosage, and distribution. In addition, treated feeds are manufactured in such a way as to prevent cross-contamination with non-treated feeds or other pathways of product leakage.

Cargill does not own, lease or manage operational sites in, or adjacent to, protected areas and areas of high biodiversity value outside protected areas.

Cargill is not aware of any IUCN Red List species and national conservation list species, or their habitats, affected by its own direct operations (factory locations).

Cargill takes an ecosystem approach to fishery management in our supply chains, through the MSC certification scheme. We are engaged in five fishery improvement projects (FIPs) to improve fishery management, four at a basic level and one comprehensive FIP (Peru) which includes changing management approaches and fishing practices to reduce impact on predators including birds and marine mammals.

In order to reduce the risk of IUU fishing in our supply chains, we work closely with our suppliers. We use the MarinTrust and MSC certification schemes and their respective improvement project approaches to reduce risk and build supply chain traceability back to legal catches. Where we do not have these certifications, we are working to improve current risk assessments and build in mitigations.

Cargill has carried out a corporate risk assessment of our aqua nutrition business and its supply chains. Our own Aqua Nutrition operations are considered low/no risk of modern slavery and we have no fishing operations. Supply chain fisheries, in Southeast Asia, China, India, Ecuador, and Mauritania, were identified as having high risks. We are carrying out further human rights due diligence with our suppliers in Vietnam, Thailand, Indonesia and India.

Cargill has assessed 100% of its new and existing suppliers to Norway and Scotland for social impacts, including the risk of forced or compulsory labour. We are expanding our supplier social assessments to our other countries of operation.

Cargill’s Supplier Code of Conduct ([Supplier Code of Conduct | Cargill](#)) requires our suppliers to never use or tolerate the use of human trafficking, forced labour or child labour as defined by the ILO. This is being strengthened in an updated [Supplier Policy](#) which is being applied in our aquaculture nutrition business.

2022¹ Data

70,088

95,558

2,535,792

0.09 tCO₂e/t

99.05%

26.3g/t

>5

100 %

1. GHG emissions were calculated using relevant conversion factors from the International Energy Agency (IEA). These account for annual changes in fuel use for generating electricity in each country, together with the global conversion factors for each direct fuel. Cargill continues reporting Scope 1 & 2 emissions using market-based account factors, including the European national residual mixes. Our focus in Scope 3 data gathering for coldwater feeds has been on the headline figure of Global Warming Potential Including Land Use Change, reported in tonnes of carbon dioxide equivalents, using the European Union’s Product Environmental Footprint Category Rules for Feed for Food Producing Animals (v4.2) as guidance. 2. Antibiotic data are taken from across the whole of Cargill’s aqua nutrition business, but in 2022 only operations in Canada, Chile and Scotland added antibiotics to feed – always on request from the customer and with a veterinary prescription.

COMMITMENT IN ACTION: CERMAQ

Producing healthy food, with low carbon footprint in a sustainable way is a robust response to the climate and biodiversity crisis. Still, Cermaq is impacted by the global uncertainty and the pressure this puts on our partners, customers, and other stakeholders. Our response is to raise the bar. We will work to reduce the footprint of our operations further and adapt to the changes we face through strong partnerships and long-term positioning in line with the SDGs.

Key initiatives

- To establish the plastic footprint of a salmon farming operation, Cermaq has registered all plastics used in a smolt facility, a sea site, and a processing plant over a one year period and is using this information to design plastic reduction strategies
- Cermaq is cooperating with the University Austral in Argentina on using effluents from a salmon farming operation to improve mussel growing in a nearby facility
- Cermaq is testing a new hybrid barge in Canada for GHG emission reductions, improved air quality and working conditions.



Steven Rafferty
CEO, Cermaq

[Read the complete sustainability reporting disclosure here](#)

Disclosures

GHG Emissions¹

Scope 1 (GRI 305-1)
Scope 2 (GRI 305-2)
Scope 3 (GRI 305-3)

GHG Intensity (GRI 305-4)

Climate management

Plastic Pollution

Plastic management

Antibiotic Use

Product not treated with antibiotics

Active ingredient used

Antibiotic management

Endangered Species

Operating sites and natural areas (GRI 304-1)

IUCN red list species affected (GRI 304-4)

Biodiversity management

IUU and Modern Slavery

IUU management

Risk assessments in own operations and supply chain (GRI 409-1)

Supplier social assessments (GRI 414-1)

Labour management

Commentary

Scope 1 GHG emissions were 57,399 tonnes in 2022 (2021, 57,334)

Location based scope 2 emissions were 19,218 tonnes in 2022 and market based scope 2 emissions were 16,071 tonnes (2021, 16,291 and 23,494)

Scope 3 GHG emissions were 985,038 tonnes in 2022 (2021, 1,037,168). All scope 3 categories were assessed, with the main emissions related to purchased goods and downstream transportation (categories 1 and 9).

In 2021, GHG emission intensity (based on scope 1 and 2 emissions) was 357 kg CO₂e per tonne fish produced LWE (live weight equivalent) (2021, 317)

Cermaq is working towards our Science Based Targets of 35% reduction across all three scopes. In the countries where we operate, we have assessed the possible reduction activities and implemented a number of electrification, hybridization and energy management projects. In our value chain we are focusing on working with our feed suppliers and transportation partners to identify options for emission reduction.

Cermaq has implemented a number of plastic reduction, recycling and reuse initiatives, alongside awareness raising throughout its business. A plastic footprint project for salmon farming is being piloted based on the [Responsible Plastic Management Standard](#) (RPM standard) and [EU plastic Strategy](#).

Antibiotic use in Norway is almost non-existent, whereas a more challenging fish health situation exists in Canada and Chile. Data is reported on a country basis in the Cermaq annual report.

In 2022, fish were treated with 128 grams of antibiotic active ingredient per metric tonne of fish produced (2021 161g API/tonne LWE)

Our fish health research team is engaged in reducing the need for antibiotics through vaccine development in partnership with pharmaceutical companies. Alongside reducing antibiotic use to minimum effective doses, fish health is actively managed to identify and investigate pathogens, and ensuring any health risks are addressed at our freshwater facilities.

Cermaq does not operate in protected areas as defined by the International Union for Conservation of Nature (IUCN). Cermaq operates some farming sites located in areas protected by national legislation.

A total of 65 (Norway 14 and Chile 51) IUCN Red List species or their habitats, are potentially affected by Cermaq's operations. In Canada, there are 150 marine species identified as "Species of interest" by regulatory agencies that can be found in the general geographic locations of Canadian operations

Cermaq installs preventive measures and monitoring to reduce the number of interactions with wildlife. Seabed samples must demonstrate that the fauna under the pen has been restored before new fish can enter. In Norway and Canada where salmon is a local wild species, Cermaq engages in wild salmon enhancement programs.

Cermaq is not directly involved in fishing activities. Our code of conduct for feed suppliers requires measures against IUU fishing and through partnerships we support actions and programs addressing IUU fishing.

Cermaq conducts regular risk assessments related to forced and compulsory risks for individuals in and around its operations. Some risks related to labour conditions in feed and equipment supply chains exist.

Cermaq conducts regular investigations, such as workplace audits, to assess working conditions in its own operations and its supply chain. No major new suppliers were engaged in 2022.

Cermaq has prioritized measures to reduce the risk of forced or compulsory labour, including conducting dialogues with suppliers regarding human rights violations and decent working conditions; updating contract terms that set requirements for labor rights and respect for human rights; and, requiring feed suppliers to meet the [Aquaculture Stewardship Council \(ASC\) Feed Standard](#), including for labour and human rights.

2022 Data

57,399

19,218

985,038

357 kg
CO₂e/t

128 gAPI/
tonne

65

1. Calculated using DEFRA emission factors used and an operational control consolidation approach



COMMITMENT IN ACTION: CP FOODS

Protecting our **C**limate – “Take action towards positive environmental impact throughout our value chain”

Improving Quality Living of **P**eople – “Create positive social impact in the lives of Employees and individuals throughout our value chain”

Creating Prosperity **F**ood – “Establish food security with products that promote health and well-being for consumer”

Key initiatives in 2022

- Developed probiotic feed to boost the animals’ immune system and keep them in good health from the inside out, yielding safe and high-quality products for consumers
- Improve 3,000,000 livelihoods in communities connected to our business activities via various programs e.g. contract farming and Five star
- Commit to Net-zero carbon by 2050 by successfully eliminating the use of coal in Thailand and Vietnam operations (100%) and substituting with biomass and renewable energy accounting for 30% of CPF’s total energy consumption in 2022

Prasit Boondoungprasert
President and CEO, Charoen Pokphand Foods

➔ [Read the complete sustainability reporting disclosure here](#)

Disclosures

GHG Emissions¹

Scope 1 (GRI 305-1)²

Scope 2 (GRI 305-2)²

Scope 3 (GRI 305-3)²

GHG Intensity (GRI 305-4)²

Climate management

Plastic Pollution

Plastic management

Antibiotic Use

Product not treated with antibiotics

Active ingredient used

Antibiotic management

Endangered Species

Operating sites and natural areas (GRI 304-1)

IUCN red list species affected (GRI 304-4)

Biodiversity management

IUU and Modern Slavery

IUU management

Risk assessments in own operations and supply chain (GRI 409-1)

Supplier social assessments (GRI 414-1)

Labour management

Commentary

Scope 1 GHG emissions were 1,483,296 tonnes in 2022 (2021, 221,960).

Location based scope 2 emissions were 1.197 million tonnes in 2022 and market based scope 2 emissions were 43,378 tonnes (2021, 596,390 and 44,696).

Scope 3 GHG emissions were 4.41 million tonnes in 2022.

In 2022, GHG emission intensity (based on scope 1 and scope 2 emissions) was 86 kg CO₂e per metric tonne of product (2021, 97).

CP Foods is proud to be the first processing company in the world with both near- and long-term forest, land and agriculture (FLAG) science-based targets validated by the Science Based Target initiative (SBTi).

CPF is committed to developing a value chain based on Circular Economy principles, efficiently using resources and minimizing packaging waste. We are aiming for 100% of the Company’s plastic food packaging to be reusable or recyclable or upcyclable or compostable by 2025 for Thailand operations and by 2030 for international operations.

In 2022, 100% of cultured shrimps in our own operations were raised without using antibiotics including the shrimp larvae hatchery and nursery business.

In 2022, no antibiotic active ingredients were used.

The Company’s approach to antibiotic use is in accordance with the [CPF Global Vision for Antimicrobial Use Stewardship in Food Animals](#). The company has implemented practices to remove potential disease risks through cleaning and hygiene procedures. Where possible, alternative ingredients and probiotics are used instead of antibiotics.

CPF has conducted a biodiversity risk screening of 351 sites in Thailand which include both terrestrial and marine sites. The findings from the Critical Biodiversity Risk Screening revealed that 3 sites require further assessment to confirm if they are conclusively located in close proximity to critical biodiversity.

No IUCN red list species affected found.

In 2022, CPF progressed its mangrove restoration program in three Thai provinces; Samut Sakhon, Rayong and Trad, spanning over 432 hectares. Since 2014, restoration of mangrove forests across a total of eight provinces, in line with the Company’s mangrove forest strategy. This restorative program provides nursery habitat for marine species, increasing biodiversity and improving the integrity of coastal ecosystems, including improved access to marine resources for local communities.

CPF does not own or operate fishing vessels and is not directly involved in vessel and sea operations. Currently, 100% of fishmeal used for the company’s feed production in Thailand has been sourced from the by-product of fish processing plants and is certified by the MarinTrust.

A total of 632 CPF operational sites (14% of global total) present human rights risks, with five identified human rights issues. All identified sites have mitigation measures and remediation process in place. The Human Rights due diligence process also covers joint ventures as well as [mergers & acquisitions](#).

100% of CPF’s Tier-1 suppliers (total of 8,014 suppliers) were assessed for human rights risks, including the risk of forced or compulsory labor. The 18.06% of CPF’s Tier-1 suppliers (1,447 out of 8,014 suppliers) assessed as having potential human rights risks have mitigation measures and remediation processes in place

CPF treats its employees equally and fairly without discrimination, while fostering diversity and inclusion within the organisation. CPF adheres to ethical recruitment principles, with a particular focus on the related costs for which it is responsible and systematic monitoring of labour agencies for exploitation of migrants.

2022 Data

1,483,296

1,197,647

4,412,000

86 kgCO₂e/t

100%

3

0

100%

1. Calculated using Thailand Greenhouse Gas Management Organization (Public Organization) emission factors and an operational consolidation approach. 2. The figures are consolidated GHG inventory and intensity of all CP Foods’ businesses – feed mill, farm and processing plant for livestock and aquaculture. Aquaculture business is a part of entire CP Foods’ businesses.

COMMITMENT IN ACTION: DONGWON

2022 was an important year for ESG management for us. To strengthen our work, we reorganized the ESG Management Committee and set three core agendas and five strategic tasks that apply across the entire group. As the parent company of the Dongwon Group, Dongwon Industries is leading the way in sustainability in the fisheries industry by diagnosing its current position and setting sustainable goals. We will make this year a year to enhance the value of Dongwon in all aspects of economic, social, and governance by enhancing our ESG management. We will continue to work together with SeaBOS on the journey toward a sustainable ocean.

Key initiatives in 2022

- Calculated and established GHG emissions targets which complies with SBTi with a 42% reduction by 2030 and net zero by 2050
- Proactively engaged in traceability management, especially focusing on extending scope in MSC from Pacific Ocean to Indian and Atlantic Ocean.
- Dongwon Industries complies with all evolving regulations of international organizations, including WCPFC, ICCAT, IATTC, CCAMLR, and CCSBT, and continues to support environmental policies for sustainable development.



Myoung Woo Lee
Vice-Chairman, Dongwon

Disclosures

GHG Emissions¹

Scope 1 (GRI 305-1)
Scope 2 (GRI 305-2)
Scope 3 (GRI 305-3)
GHG Intensity (GRI 305-4)

Climate management

Plastic Pollution

Plastic management

Antibiotic Use

Product not treated with antibiotics
Active ingredient used

Endangered Species

Operating sites and natural areas (GRI 304-1)
IUCN red list species affected (GRI 304-4)
Biodiversity management

IUU and Modern Slavery

IUU management
Risk assessments in own operations and supply chain (GRI 409-1)
Supplier social assessments (GRI 414-1)

Labour management

Commentary

Scope 1 GHG emissions were 240,270 tonnes CO2 equivalents in 2022 (2021, 257,179 tonnes).
Location based scope 2 emissions were 11,427 tonnes in 2022 (2021, 11,285 tonnes).
Scope 3 GHG emissions were 565,492 tonnes in 2022 (2021, 563,545 tonnes). Scope 3 categories included 1-7, 9 & 12.
GHG intensity in 2022 was 23.29 tonnes/KRW 100 million (2021, 36.81 tonnes/KRW 100 million).

In 2020 Dongwon Industries declared its goal of carbon neutrality by 2050 and its plans to achieve the goal, including reduction targets and implementation plans. In addition, we are actively taking the lead in developing technologies to produce low-carbon products such as solar power solutions and advanced materials.

Dongwon has established a dedicated plastics management role within the company (Total Plastic Officer), who is focused on the development and management of plastic reduction initiatives. Dongwon is replacing plastic fishing gear (FADs) with Bio-FADs. Nearly 70% of FADs have been replaced to date with a goal of 100% by 2025. Each BIO FAD equates to roughly 200 kg of avoided plastic. In 2022, Dongwon reduced plastic packaging by 83.8 tonnes compared to 2021. In November 2022, Dongwon signed an agreement with Hyundai Motor Company and Kia Motors to promote eco-friendly plastic recycling, and established a partnership to produce automobile parts through the reutilization of waste fishing nets.

Not applicable.

Not applicable.

Dongwon operates its fishing fleet in, or adjacent to, protected areas and areas of high biodiversity value outside protected areas. These include fishing areas in the Western Pacific Ocean, Indian Ocean and Atlantic Ocean.

Dongwon is aware of at least 3 IUCN red list species affected by its direct operation and giving its efforts to conserve marine ecosystem by setting and complying with its bycatch management.

Dongwon implements strict Bycatch Management Guidance for Longliners (in Pacific FAO 71, 77) for seabirds, sharks and sea turtles. Common requirements for those include installing Tori line on longliners operating in Indian, Atlantic Ocean and trawlers operating in Antarctic Ocean and setting longline only at night, prohibiting the fishery and commercial exploitation of all parts of sharks or reducing bycatch by fishing only with circle hooks of size 14/0 or larger.

Dongwon Industries opposes any form of IUU (Illegal, Unreported, Unregulated) fishing and participates in the fight to eradicate IUU fishing. We support the relevant regulations adopted by fisheries organizations to combat IUU fishing by implementing VMS, making observer on-board mandatory and regularly training crew on regulations and IUU fishing cases.

Dongwon has conducted regular risk assessments for forced or compulsory labour in 4 of its operating geographies – Western Pacific, Indian, Atlantic and Antarctic Ocean.

Dongwon is undertaking supplier social assessments, including the risk of forced or compulsory labour. Our Procurement Policy and Policy for child and forced or compulsory labour are available on our company web site.

Dongwon supports and strives to comply with the principles of UN Global Compact. Dongwon has its own policy in protecting human rights of workers and eliminating any kinds of forced labour (available on our website) and it also complies with the standards of the MSC and other global and local fisheries associations. The Korean Ministry of Oceans and Fisheries (MOF), the Korea Overseas Fishery Association (KOFA), and the Overseas Fishery Labor Union conduct joint inspections every 3-months to ensure compliance with relevant labour laws and regulations.

2022 Data

240,270
11,427
565,492

3

4

1. Calculated using IPCC national inventory guideline by Korea Environment Corporation emission factors and an operational control consolidation approach



COMMITMENT IN ACTION: KYOKUYO

In Kyokuyo, we work to achieve our mission “Aiming to grow together with society, contributing to a healthy and happy lifestyle and food culture based on management of human respect”. In SeaBOS, our efforts are especially focused on ocean plastic reduction and preventing plastics such as fishing nets and buoys from flowing into the ocean from our operating activities. Reduction of plastic usage for packaging by our factories is also a priority. We have set a number of targets to reduce plastic usage for packaging by our factories in Japan in 2022, expanding to overseas factories in 2023. We will continue to openly disclose our efforts and the progress of our group to our stakeholders.

Key initiatives in 2022

- Statement of agreement for TCFD proposal and disclosure of information
- Reduction of plastic usage for packaging by our group factories.

Makoto Inoue
President and CEO, Kyokuyo

[Read the complete sustainability reporting disclosure here](#)

Disclosures

GHG Emissions¹

Scope 1 (GRI 305-1)
Scope 2 (GRI 305-2)
Scope 3 (GRI 305-3)
GHG Intensity (GRI 305-4)
Climate management

Plastic Pollution

Plastic management

Antibiotic Use

Product not treated with antibiotics
Active ingredient used
Antibiotic management

Endangered Species

Operating sites and natural areas (GRI 304-1)
IUCN red list species affected (GRI 304-4)
Biodiversity management

IUU and Modern Slavery

IUU management
Risk assessments in own operations and supply chain (GRI 409-1)
Supplier social assessments (GRI 414-1)

Commentary

Scope 1 GHG emissions were 4,130 tonnes in 2022 (2021, 4,122).
Market based scope 2 emissions were 16,300 tonnes in 2022 (2021, 15,773).
Scope 3 Category 9 GHG emissions were 6,852 tonnes in 2022 (2021, 7,310).
In 2022, GHG emission intensity was 0.36 tonnes CO₂e per tonne of production volume by the group companies (2021, 0.34).
Please refer to our [disclosure for climate management along in accordance with TCFD](#) (in Japanese).

We have two key plastic reduction initiatives – reducing our plastic packaging usage by our group factories; and, preventing the loss into the ocean of plastic tools by our group aquaculture farming companies. Kyokuyo has a number of internal education and information sharing initiatives on plastic pollution prevention, including the repair and maintenance of any plastic equipment.

Information withheld from public disclosure due to confidentiality constraints. Reported to SeaBOS.

Information withheld from public disclosure due to confidentiality constraints. Reported to SeaBOS.

Antibiotics are used in our aquafarming operations in Japan in accordance with Government regulation. To reduce antibiotic use, Kyokuyo is collaborating with Japanese seafood companies Maruhanichiro and Nissui, in conjunction with the pharmaceutical sector, Government agencies and research institutions to develop suitable vaccines.

Kyokuyo has no operations in or nearby protected areas.

When bycatch includes endangered species other than tuna - including whales, sharks, rays, seabirds and other species, we act in accordance with regulations.

Kyokuyo Suisan Co. Ltd. is a member of Far Seas Purse Seine Fishing Association. The Company follows the guidance of the Japanese Fishery Agency, which belongs to the Western and Central Pacific Fisheries Commission (WCPFC) - working to manage fishery resources and ensure sustainable fishing. The incidence of bycatch, including of endangered species is recorded and reported, with procedures for release.

We have released the Kyokuyo Group Basic Procurement Policy and pursue business activities in consideration of the global environment and sustainability such as conservation of biodiversity and ecosystem.

We undertook a supplier survey in August 2023 to assess the risks of forced or compulsory labour. If we will detect some risks, we will make a dialogue to the applicable suppliers and take action to the situation. We plan to expand the survey to suppliers of group companies and overseas suppliers in the near future.

Not currently reported. Kyokuyo will identify risks and undertake self-assessments. We will consider future procedures for the formal assessment and monitoring of suppliers.

2022 Data

4,130
16,300
6,852
0.36 tCO₂e/t

¹. Calculated using IPCC emission factors and an operational control consolidation approach. Scope 3 emission factors are used in accordance with the Japanese Ministry of Economy, Trade and Industry's notice "Method of calculating the energy consumption, in freight transportation consigned to freight" Scope 3 calculation includes Category 9 Emissions.

COMMITMENT IN ACTION: MARUHA NICHIRO

As beneficiaries of the ocean’s bounty, we have corporate responsibilities that go beyond mere improvements in productivity and profitability. We must help ensure that marine resources are used sustainably, keeping the seas and the rest of our environment healthy and beautiful for future generations. This determination is what drives us to seek new ways we can solve social challenges through our business activities. We embrace bold innovation as a foundation for sustainable growth and development to ensure that Maruha Nichiro Group will still exist a century from now – and beyond.

Key initiatives in 2022

- Second marine resources assessment of suppliers conducted, with the aim to achieve 100% confirmation of the resource status of seafood products handled by the entire Group by FY2030.
- Created a CO₂ emission reduction roadmap to work actively and systematically to further reduce CO₂ emissions.
- Issued Japan’s first-ever Blue Bond.



Masaru Ikemi
President and CEO, Maruha Nichiro

Disclosures

GHG Emissions

Scope 1 (GRI 305-1)
Scope 2 (GRI 305-2)
Scope 3 (GRI 305-3)
GHG Intensity (GRI 305-4)
Climate management

Commentary

Scope 1 GHG emissions were 87,062 tonnes in 2022 (2021, 99,027)
Market based scope 2 emissions were 144,991 tonnes in 2022 (2021, 149,659)
Scope 3 GHG emissions were 20,430 tonnes in 2022 (Baseline)
Not reported.
Please refer to our TCFD reporting in our [Annual Integrated Report](#) (pp39-41)

Plastic Pollution

Plastic management

Reduction of plastic usage through switching to bioplastics, increasing volume of recycled materials and reduction in demand for plastics. Maruha Nichiro Corporation has set a plastic reduction target of 30% or more by 2030.

Antibiotic Use

Product not treated with antibiotics
Active ingredient used
Antibiotic management

Information withheld from public disclosure due to confidentiality constraints. Reported to SeaBOS.
Information withheld from public disclosure due to confidentiality constraints. Reported to SeaBOS.
Maruha Nichiro continuously uses the least amount of antibiotics necessary to ensure animal health. Antibiotics are prescribed by veterinarians and usage is determined by national regulation.

Endangered Species

Operating sites and natural areas (GRI 304-1)
IUCN red list species affected (GRI 304-4)
Biodiversity management

Not reported.
Three IUCN red list species are affected – Southern Blue Fin Tuna, Short Fin Mako shark and Beaked Redfish. Click [here](#) for further information.
Maruha Nichiro is a member of the Japan Business Initiative for Biodiversity, as well as participating in 30 by 30 Alliance for Biodiversity. In addition the Company is a partner member for the Tokyo Bay Restoration Eelgrass Project. Maruha Nichiro is working with the Sustainable Fisheries Partnership to mitigate impacts on affected species and improve the biological status of those species.

IUU and Modern Slavery

IUU management
Risk assessments in own operations and supply chain (GRI 409-1)
Supplier social assessments (GRI 414-1)
Labour management

Maruha Nichiro Group Supplier Guidelines require suppliers to eliminate IUU fishing and modern slavery in their operations.
Human rights and labor practices have been surveyed at 292 factories in Maruha Nichiro’s supply chain.
Maruha Nichiro Corporation has assessed 50.1% of its suppliers for social impacts, including the risk of forced or compulsory labour.
We recognize that ensuring the health and safety of employees leads to improved productivity and employee awareness, and is essential for the sustainable growth of the company. In 2022, we worked to formulate the “Maruha Nichiro Group Guidelines for the Employment of Foreign Technical Interns and Specified Skilled Foreigners”.

2022 Data

87,062
144,911
6,199,068

3

50,1%



COMMITMENT IN ACTION: NISSUI

In 2022, the Nissui Group established a new mission, and set a long-term vision (Good Foods 2030) aiming to be a “leading company that delivers friendly foods both for people and the earth” by 2030. Our new mission expresses our continuing commitment toward the future, and we want to leverage the business foundations which have been built by our Fisheries Business to deliver innovative food solutions. Sharing this aspiration as our new mission, we hope to develop innovative food solutions globally which can enrich our lives and help solve social issues.

Key initiatives in 2022

- We have conducted the survey of our procured marine products as whole Nissui Group in order to understand the status of resource and identify the issues to be addressed.
- We have set the policy of procurement in terms of marine products related to endangered species following advice of relevant NGO and specialists.
- We have set the revised Suppliers Guideline and are working on introducing the Grievance Mechanism in order to secure the sustainable supply chains.

Shingo Hamada

Shingo Hamada
President and CEO, Nissui

[Read the complete sustainability reporting disclosure here](#)

Disclosures

GHG Emissions¹

Scope 1 (GRI 305-1)
Scope 2 (GRI 305-2)
Scope 3 (GRI 305-3)
GHG Intensity (GRI 305-4)

Climate management

Plastic Pollution

Plastic management

Antibiotic Use

Product not treated with antibiotics
Active ingredient used³

Antibiotic management

Endangered Species

Operating sites and natural areas (GRI 304-1)

IUCN red list species affected (GRI 304-4)

Biodiversity management

IUU and Modern Slavery

IUU management

Risk assessments in own operations and supply chain (GRI 409-1)
Supplier social assessments (GRI 414-1)

Labour management

Commentary

Scope 1 GHG emissions were 197,713 t CO₂e in 2022 (2021, 207,252).
Location based scope 2 emissions were 121,221 t CO₂e in 2022 (2021, 134,603).
Scope 3 GHG emissions were 2.55 million t CO₂e in 2021 (2020, 2.28). Scope 3 categories included are 1,2,3,4,5,6,7 & 12.
GHG emission intensity(based on Scope 1 and 2 emissions) was 0.42 tonnes CO₂e per ton of production volume in 2022.
Identifying risks and opportunities related to climate change, evaluating business and financial impact through scenario analysis, then implementing necessary measures.

Improving the control and management of plastic fishing gear used in our fisheries and farming operations. Promoting 3R+R (Reduce, Reuse, Recycle + Renewable) plastic materials used in processing plants or plastic. Packaging of final products as well as considering usage of alternative materials. We also conduct coastal cleanup activities in order to raise awareness and education against plastic pollution.

Information withheld from public disclosure due to confidentiality constraints. Reported to SeaBOS.

In 2022, fish were treated with 307 grams of antibiotic active ingredient per metric tonne of biomass produced (2021, 229g/t).
We have conducted collaborative program with three Japan companies, relevant authorities and a pharmaceutical company to develop new vaccines. We have implemented the Nissui Aquaculture Health Management System (NAHMS), managed by the Fish Disease Team in Nissui Oita Marine Biological Research Center. This team specializes in reducing usage of antimicrobials in collaboration with Nissui group companies that have aquaculture operations. We also have a policy to only use antimicrobial whatever is needed for fish health and well-being, when prescribed by vets.

Nissui salmon farming sites in Chile are located in highly valuable areas in biodiversity and environmental impact assessments focusing on biodiversity are conducted for each farming site based on the ASC standard.

After total of seven IUCN red list species were identified as potentially affected through our research, we formulated the Nissui Group Endangered Species (Marine Products) Procurement Policy including measures to address IUCN red species. Third parties, including NGOs, universities and other research institutes involved in fishery resource conservation were engaged to confirm the appropriateness of Nissui’s management approach.

Nissui conducts a survey of procured marine products in terms of their resource status and impacts every three years. Results from the survey are used to understand and respond to issues associated with elasmobranch related products as well as IUCN listed endangered species.

Supplier Guidelines revised in 2022 to prevent handling products related to IUU fisheries and Modern Slavery. Compliance with the Suppliers Guidelines checked and recorded via SAQ.

Planning to identify raw materials with high potential labour risks through an assessment based on relevant external data.

Nissui conducts supplier assessment by SAQ with our 500 tier-1 suppliers and is considering undertaking risk evaluations of suppliers by Sedex.

Nissui has introduced a grievance mechanism (available in eight different languages) for our foreign workers in Japan. Mechanism is accessible on all fishing boats of Nissui group companies for their foreign crew members. A whistle blower system has been established for external stakeholders.

2022 Data

197,713
121,221
2,545,561²
0.42

307g/t

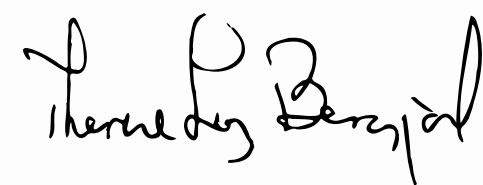
1. Calculated using IEA emission factors used and a financial control consolidation approach, 2. 2021 data, 3. Reported data includes salmon and trout farming. Data of other farmed species are not reported.

COMMITMENT IN ACTION: SKRETTING

A year of action. That’s how I’d describe 2022 when it comes to our sustainability activity. Over the past few years, I’ve talked a lot about how we are not doing enough, and we need to do better. While it may take some time for me to stop saying that, I’m happy to report that although we are still finding ways to meet our ambitious objectives, we have made significant progress in 2022. We’re also increasing our transparency. There are parameters that we’re reporting for the first time ever, either because we now have the ability to do so, or because we simply believe that it is the right thing to do to share our journey – even the markers that we are not so proud of. We do this to build trust and to ensure we can collaborate effectively with partners like SeaBOS to drive and accelerate the transformational changes that our industry needs.

Key initiatives in 2022

- Report on the Ocean Disclosure Project for our global operations
- Full disclosure on Scope 1, 2 & 3 emissions
- Implemented Ecovadis to better understand and mitigate risks in the supply chain



Therese Log Bergjord
CEO Skretting/COO Nutreco

[Read the complete sustainability reporting disclosure here](#)

Disclosures

GHG Emissions¹

Scope 1 (GRI 305-1)
Scope 2 (GRI 305-2)
Scope 3 (GRI 305-3)
GHG Intensity (GRI 305-4)

Climate management

Plastic Pollution

Plastic management

Antibiotic Use

Product not treated with antibiotics

Active ingredient used

Antibiotic management

Endangered Species

Operating sites and natural areas (GRI 304-1)

IUCN red list species affected (GRI 304-4)

Biodiversity management

IUU and Modern Slavery

IUU management

Risk assessments in own operations and supply chain (GRI 409-1)

Supplier social assessments (GRI 414-1)

Commentary

Scope 1 GHG emissions were 160,218 tonnes carbon dioxide equivalents (t CO₂e) in 2022 (2021, 148,000).

Location based scope 2 emissions were 49,108 t CO₂e in 2022 (2021, 38,000). Market based scope 2 emissions will be reported from 2023 onward. Scope 1 & 2 emissions have increased 23% from 2018 – 2022.

Scope 3 GHG emissions were 4.81 million t CO₂e in 2022. Scope 3 emissions have increased 16% from 2018 – 2022.

In 2022, GHG emission intensity was 1.92 ton CO₂e/ per ton of feed produced (2021, 2.08)

Skretting has adopted Science-Based Targets. It is committed to reducing its Scope 1 and 2 emissions by 30% and its Scope 3 emissions by 39%, by 2030, compared to 2018 as a baseline.

By 2025, Skretting has the ambition to make 100% of its packaging either recyclable, reusable or compostable.

In 2022, 98.7% of total feed produced was free from antibiotic treatment (2021,98.4).

In 2022 Skretting used less than 2,000 kg of CIA active ingredient (2021, 2,137). All of the feeds sold were prescription based.

All of Skretting’s medicated feed sales are based on a veterinary prescription with a valid clinical diagnostic, and are produced under controlled, high-quality conditions in separate production lines to avoid the risk of contaminating standard feed. By 2025 Skretting has the ambition of not using antibiotics that are listed in the World Health Organisation’s overview of Critically important antimicrobials for human medicine (CIA) (6th revision).

Skretting is not aware of any operational sites it has in, or adjacent to, protected areas and areas of high biodiversity value outside protected areas.

Skretting is not aware of IUCN Red List species and national conservation list species with habitats in areas affected by direct Skretting operations (factory locations).

Skretting is aligned with the SeaBOS Endangered Species Strategy which puts science-based and operational measures in place that, when combined, substantially reduce the risk of harm to endangered elasmobranch (sharks & rays) and seabird species from our own operations; and substantially reduce the risk of harm to these species in operations which are part of our supply chains.

Skretting has a Marine Ingredients Sourcing Policy in place with the ambition of sourcing products that are 100% certified or coming from a Fishery Improvement Project by 2025. The document has a specific section addressing the how to handle the risk of marine ingredients originating from IUU fishing activities.

According to its Marine Ingredients Sourcing Policy, Skretting assessed significant risks for forced or compulsory labour in its supply chain in the following countries: Philippines, Thailand, India, China, Iran, Russia, Mauritania, Mexico, Vietnam, Indonesia and Pakistan. The list will be continuously revised and updated.

Through EcoVadis, suppliers cumulatively contributing to 66% of Skretting’s spend have been assessed, highlighting 33 high-risk suppliers. The risks analysed are environmental, labour and human, ethics and sustainable procurement.

2022 Data

160,218

49,108

4,810,000

1.92 tCO₂e/t

98.7%

< 2,000

11

66%

¹. Calculated using IPCC 2013; DEFRA; IEA - CO₂ EMISSIONS FROM FUEL COMBUSTION (2022 Edition) emission factors and an operational control consolidation approach.



COMMITMENT IN ACTION: THAI UNION

Since its introduction in 2016, Thai Union's SeaChange® global sustainability strategy has delivered real and lasting changes in the way we operate, from improving seafood traceability and reducing GHG emissions, to advancing ethical labor standards and supporting communities affected by natural disasters and the pandemic. In support of our corporate goal "Healthy Living, Healthy Oceans" and the SDGs, SeaChange® will continue to drive a positive transformation across the global seafood industry through our commitments and programs in Safe & Legal Labor, Responsible Sourcing, Responsible Operations, and People and Communities.

Key initiatives

- Thai Union's new SeaChange® 2030 Sustainability Strategy launched, including targets and work programs for critical environmental and social issues
- Established GHG emissions targets verified and approved by SBTi with a 42% reduction by 2030 and net zero by 2050
- Entered a partnership with Sustainable Fisheries Partnership and now 81% of tuna sourced by Thai Union is certified by MSC or from a supplier engaged in a FIP towards MSC certification

Thiraphong Chansiri
President and CEO, Thai Union

[Read the complete sustainability reporting disclosure here](#)

Disclosures

GHG Emissions¹

Scope 1 (GRI 305-1)

Scope 2 (GRI 305-2)

Scope 3 (GRI 305-3)

GHG Intensity (GRI 305-4)

Climate management

Plastic Pollution

Plastic management

Antibiotic Use

Product not treated with antibiotics

Active ingredient used

Antibiotic management

Endangered Species²

Operating sites and natural areas (GRI 304-1)

IUCN red list species affected (GRI 304-4)

Biodiversity management

IUU and Modern Slavery

IUU management

Risk assessments in own operations and supply chain (GRI 409-1)

Supplier social assessments (GRI 414-1)

Labour management

Commentary

Scope 1 GHG emissions were 294,721 tonnes in 2022 (2021, 323,493). Direct GHG emissions (Scope 1) decreased by 8.9% between 2021 and 2022.

Location based scope 2 emissions were 180,703 tonnes in 2022 (2021, 188,119). Indirect GHG emissions (Scope 2) decreased by 3.9% between 2021 and 2022.

Scope 3 GHG emissions were 3,555,070 tonnes in 2022 (2021, 4,071,680). Measured Scope 3 categories included 1-7, 9, 10, 12 & 15. Scope 3 GHG emissions decreased by 12.7% between 2021 and 2022.

In 2022, GHG emission intensity (based on scope 1 and 2 emissions) was 0.61 tonne CO₂e per tonne fish, (2021, 0.64). GHG Intensity (Scope 1 & 2) decreased by 4.7% between 2021 and 2022.

Through its [PATH TO NET ZERO EMISSIONS](#), Thai Union has a commitment to reduce Scope 1, 2 and 3 greenhouse gas emissions by 42% by 2030 and net zero by 2050. We have set 1.5°C aligned short-term and long-term goals verified and approved by the Science Based Targets initiative (SBTi). Financial challenges and opportunities related to climate change are disclosed in our TCFD statement.

Thai Union's commitment on [OCEAN PLASTICS REDUCTION](#) aims to avoid and mitigate ocean plastic through a supply chain partnership with the Global Ghost Gear Initiative (GGGI), as well as taking an active role in the removal of 1,500 tons of ocean-bound plastic from waterways and oceans.

Zero antibiotic usage in Thai Union own operations

Zero antibiotic usage in Thai Union own operations

The Company has a policy on reducing the (prophylactic) use of antibiotics and/or growth promoting substances in sourcing activities, including requiring suppliers to meet strict standards. We are currently mapping the existence of antibiotic resistance in shrimp farming and undertaking a pilot initiative to foster the responsible use of antibiotics in Thai shrimp farms.

Thai Union has undertaken a comprehensive biodiversity risk assessment and identified five operational sites in, or adjacent to, protected areas and areas of high biodiversity value outside protected areas.

Thai Union is aware of at least one IUCN Red List species and national conservation list species with habitats in areas affected by direct its fishing operations.

In 2022, Thai Union entered a partnership with Sustainable Fisheries Partnership and now 81% of tuna sourced by Thai Union is certified by MSC or from a supplier engaged in a FIP towards MSC certification. Starting in 2021, no new sites will be located on or in close proximity (within 1 km distance) to protected forest areas or sites of globally important biodiversity. In 2021, the Company released its Responsible Sourcing of Palm Oil Policy. See more information about our corporate impact assessment on nature, including biodiversity, within our operations in our [Biodiversity: Annual Progress Update](#).

Thai Union has completed several IUU and social risk assessments since 2016, as well as conducting third party audits of the vessels that we source from to ensure that our codes of conduct are being met. For transparency, we publish our policies and our list of fisheries and farms that we source from which can be found [here](#). See more information about Our Tuna Commitment 2025 on pdf page 21 – 22 of the 2022 [Thai Union Sustainability Report](#).

In 2022, Thai Union conducted an assessment of its own production facilities and tier 1 suppliers that were assessed in 2021 as having significant risks for forced or compulsory labour (Own operations - India, Seychelles, Thailand & Vietnam; Tier 1 suppliers – Bangladesh, Ecuador, China, Honduras, India, Indonesia, Thailand, Sri Lanka & Vietnam). See more information in [Human Rights Risk Assessment Report 2022](#).

Thai Union has assessed 100% of its new suppliers for social impacts, including the risk of forced or compulsory labour.

Thai Union's new SeaChange® 2030 sustainability strategy on safe, decent and equitable work, commits that by 2030 50% of management positions will be held by women; 100% of sourcing vessels will work to prevent illegal, unreported and unregulated (IUU) fishing and modern slavery; and, 100% of farms Thai Union sources from will use best labor practices.

2022 Data

294,721

180,703

3,555,070

0.61 CO₂e/t

0

0

5

1

12

100 %

1. Calculated using an operational control consolidation approach and emission factors from the Thailand GHG Management Organization (TGO), GHG Protocol, 2006 IPCC Guidelines for National GHG Inventories, and 2013 IPCC Fifth Assessment Report (AR5). GHG scope 2 (electricity) by country aligning with GHG Protocol: Green Energy Residual Mix Emissions Rates (2018), UNFCCC Harmonized Grid Emission factor data set version 3.0 (December 2021), Institute for Global Environmental Strategies (2021). List of Grid Emission Factors version 10.11, and TGO. For further details refer to: [2022 Thai Union Sustainability Report](#) on pdf pages 58-59, 2. A description of these sites and IUCN Red List species affected can be found on page 11 of the PDF: [2023 Biodiversity Annual Update](#)



