Back to Blue

An initiative of
Economist Impact and The Nippon Foundation

CLOSING THE MARINE POLLUTION DATA GAP: A ROADMAP IN THE MAKING

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Key takeaways

- Back to Blue's previous reports highlighted the underappreciated problem of marine chemical pollution and the lack of data on this topic. This issues paper identifies the key questions that must be addressed to develop a practical and workable roadmap to close the marine pollution data gap.
- Back to Blue's purpose in developing such a roadmap is to understand and reduce the impact of pollution on ocean health and provide an evidence base to galvanise action. To be effective, the process must be firmly grounded in science.
- The roadmap must consider how existing data and knowledge about land, air and freshwater pollution can be leveraged to understand marine pollution better. It must also interoperate with, and not duplicate, existing efforts to build a global, federated, digital architecture of ocean data.
- Digital solutions such as artificial intelligence (AI) and physical technologies such as autonomous underwater vehicles will be powerful tools for filling knowledge gaps. A critical question for the roadmap will be how best to ensure that pollution data are integrated into existing ocean databases and that ocean pollution data systems can interface with technology solutions.
- Back to Blue's Theory of Change is that high-quality, standardised data can provide decision-makers in government, business and civil society with compelling evidence of the need to address marine pollution. This, in turn, should lead to better policymaking and support business transformation.
- Back to Blue is convening a series of stakeholder workshops to explore these questions throughout 2023 and aims to publish a draft roadmap on closing the marine pollution data gap in early 2024. We invite ocean stakeholders to participate in this process.

About the report

This paper is partly based on research conducted for *The Invisible Wave: Getting to zero chemical pollution*[1] and *The zero-pollution ocean: A call to close the evidence gap.*[2] Readers should refer to these publications for an introduction to the topic.

It is also primarily based on stakeholder interviews, meetings and submissions in response to The Zero-Pollution Ocean. These were conducted and collected between January and April 2023. Back to Blue is extremely grateful to the individuals and organisations who generously contributed submissions and responses via our website. We would also like to thank the many individuals who have shared their time and insights with our team over the past two years, both on and off the record. These discussions have been vital in helping inform and shape this report, as well as the Back to Blue initiative more broadly.

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- Elsie Sunderland, professor of environmental science and engineering, **Harvard University**

Any errors or omissions remain our own.

Critical questions to close the marine pollution data gap

Knowledge about how pollution impacts the ocean's health is fragmented and scattered. Yet the evidence that does exist suggests action to tackle marine pollution is urgently needed. Better data are a critical step to catalyse action.

In 2022 Back to Blue published a detailed research report, *The Invisible Wave: Getting to zero chemical pollution*,[3] which focused on bringing attention to an urgent and underappreciated crisis that, if left unaddressed, will lead to considerable—and possibly irreversible—damage to the marine environment. A follow-up discussion paper, *The zero-pollution ocean: A call to close the evidence gap*,[4] called for greater collaboration, transparency and interoperability.

Back to Blue is not the only initiative focused on this question. There are many projects led by United Nations (UN) bodies, universities, national governments, non-government organisations (NGOs) and the private sector that aim to better understand the impact of pollution on ocean health. But these are fragmented. A comprehensive picture of ocean pollution remains elusive.

Back to Blue has issued four ambitious calls to action:

- that marine pollution—beyond plastic—be central to the agenda at the **2025 UN Ocean Conference** and other major meetings, such as the UN Environment Assembly in 2024, to raise awareness and spur action among policymakers;
- that the **UN Decade of Ocean Science for Sustainable Development framework** be used to foster effective collaboration among the various agencies that collect and hold data relevant to understanding marine pollution, including (but not limited to) UN agencies, national government agencies, universities, scientific organisations and the private sector;
- that a **strategic roadmap is developed by 2025**, setting out the pathway to a comprehensive global understanding of marine pollution. The process of developing this roadmap must incorporate the widest possible range of actors from the UN system, national governments, scientific agencies, universities, NGOs and the private sector, including the technology industry; and
- that a diverse group of projects and initiatives—including Back to Blue—**work collaboratively with scientists to raise awareness** and use existing marine pollution data to inform policymakers, business leaders and the broader public.

Back to Blue is now embarking on a targeted consultation and co-design process, calling on scientists, policymakers, business leaders and investors to **co-design a roadmap by 2025 to close the marine pollution data gap**. A lack of data on ocean health can no longer be an excuse for inaction.

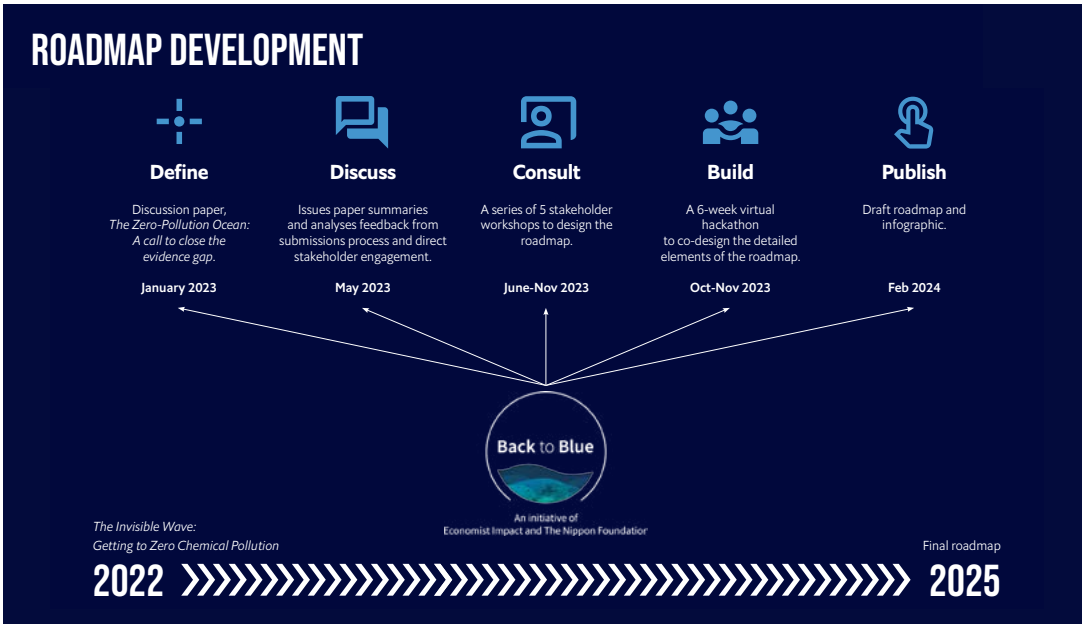
Developing a roadmap: what comes next

This issues paper sets out the key questions that must be addressed to develop an effective and workable roadmap to close the marine pollution data gap. To begin answering these questions, Back to Blue will convene five stakeholder workshops in 2023, each focusing on a thematic area critical to the roadmap:

1. Building a science-based and purpose -driven process
2. Leverage existing pollution data sources and knowledge
3. Building a federated architecture of interoperable databases
4. Technology to increase the visibility of marine chemical pollution
5. Unlocking the resources to turn data insights into action

In late 2023 we plan to host a virtual hackathon: a process designed to bring together experts from each thematic area to refine a common vision for closing the marine pollution data gap. We expect to publish a draft roadmap in early 2024. The question of how to refine and advocate for the roadmap will be a central priority for Back to Blue in 2024 and 2025.

Figure 1: Back to Blue calls ocean stakeholders to co-design a roadmap to close the marine pollution data gap



Source: Back to Blue

Our call to action: who should respond?

We can't do this alone. Back to Blue's mandate is to catalyse action; however, a wide group of stakeholders must collaborate to develop and implement the roadmap. Where should ultimate responsibility for closing the marine pollution data gap lie? The UN is an obvious candidate, but as Box 2 explains, various UN bodies have responsibility for different aspects of ocean health. Overcoming this fragmentation will take some effort.

Many organisations outside the UN are interested in preserving the ocean's health and should be deeply engaged in a collective effort to close the marine pollution data gap. Scientists and universities, the private sector and NGOs, policymakers and local authorities, and other multilateral agencies with knowledge of ocean and chemical pollution, data management, policy, and governance must be involved to ensure the roadmap is adequately and fairly designed, developed and implemented.

Figure 2: A broad range of stakeholders will be required to close the marine pollution data gap.

Source: Back to Blue. Please note that this stakeholder map is illustrative only and does not imply that these organisations are partnering with Back to Blue.

A roadmap in the making

1. Grounded in science

Back to Blue's purpose in developing a roadmap to close the marine pollution data gap is to **understand and reduce the impact of pollution on ocean health and provide an evidence base to galvanise action** (see Figure 3). To be effective, the process must be firmly grounded in science.

Understanding the scope and impact of marine pollution is a necessary first step. Yet it is also a difficult hurdle to overcome, as *The zero-pollution ocean: A call to close the evidence gap* details.[5] A fleet of naturally occurring and manufactured invisible pollutants interact with the environment and each other. Adding to this issue, these pollutants are difficult to track and measure in large and deep marine habitats.

Fig 3: Four steps to ocean health

Source: Back to Blue

The complexity and scale of the data collection challenge mean that the roadmap must make clear recommendations on where to prioritise efforts. To this end, reaching a preliminary consensus on what to prioritise, what is scientifically possible and meaningful, and how the scientific community can effectively support the roadmap's implementation will be critical. "For many years, and especially within the coral reef community, pollution was not on anybody's radar, but this changed a few years ago," says Amelia Wenger, a conservation scientist with the Wildlife Conservation Society and a senior research fellow at the University of Queensland. "There is such a dearth of information about what to do. The challenge is, what do you measure, based on different questions you may have?"

An important question is whether the roadmap should focus on pollution or the impact that pollutants have on ocean health. "A key consideration is not only having data on pollution but also being able to link pollution levels to ecosystem change," says Ms Wenger. "Right now, knowing that areas are exposed to pollution does not tell us what kind of changes are happening in the water, and that is a huge gap, even in data-rich places."

Another related question is whether the roadmap should recommend an expansive and holistic approach to tracking marine pollution or if it should attempt to prioritise key pollutants of concern. "Although there are over 100,000 chemicals in use, only some of these will end up in coastal waters, triggering environmental concerns," explains Kenneth Leung, professor of environmental toxicology and chemistry at the City University of Hong Kong and director of China's State Key Laboratory of Marine Pollution. "Given limited resources, we should target those of concern based on their environmental concentration, persistence, toxicity and bioaccumulative potential," he believes.

There are many layers involved in considering how best to determine priorities. Is it better to first focus on coastal waters, where more data are available? Or is it equally critical to begin building an evidence base for pollution in the open ocean, where much less is currently known? Most pollution data are collected by sampling rather than active monitoring. Is there a way to improve the ongoing monitoring of marine pollution? What is the best way to collect long-term time-series data for marine pollution? Can sampling for marine pollution be standardised to enable better data interoperability?

Roadmap theme 1: Building a science-based and purpose-driven process

Objectives	Discussion questions
• Design a framework for a science-based approach to marine pollution that complements existing processes and bodies	• What are the purpose and intended outcomes of the roadmap?
• Define the purpose, audience, and intended outcomes and actions of the roadmap	• Should this process aim to take an expansive and holistic approach to track marine pollution or identify priority pollutants of concern?
	• What mechanisms can be implemented to ensure emerging scientific knowledge feeds into the process?
	• Is there a 'safe operating space' for ocean pollution, and how can this be determined and defined?

2. Taking a systems approach

Poor and fragmented data mean that it is not currently possible to build a holistic picture of marine pollution, as *The zero-pollution ocean: A call to close the evidence gap* details.[6] However, it is critical that an approach to understanding ocean pollution be better integrated into interconnected global systems such as climate change and biodiversity loss.[7]

The roadmap must consider how existing data and knowledge on land, air and freshwater pollution can be leveraged to build a clearer understanding of marine pollution. Scientists increasingly recognise that fresh and saltwater systems are deeply connected and form a single hydrological system, and therefore much ocean pollution comes from freshwater sources.[8] Understanding the risks posed by chemical use, dispersal and disposal in non-marine ecosystems can further our understanding of what happens in the ocean.

Yet traditional policies and regulations on water management typically focus on one segment of the hydrological cycle.[9] Finding ways to connect different knowledge bases and rally the scientific community around the impacts of pollution across the entire hydrological system will be critical to establish co-ordination and collaboration across source-to-sea segments.

Other disciplines can also provide insight into understanding marine pollution's state and scope. Nuclear and isotopic techniques used in nuclear science, for example, can be used to detect toxins and monitor harmful contaminants in seafood and marine environments.[10] Leveraging different disciplines and research techniques can fill important knowledge gaps and help overcome current hurdles found in ocean research.

Scientists are increasingly beginning to understand that as global ocean temperatures rise, induced by climate change, the impact of pollution on marine ecosystems will likely change or intensify.[11] The roadmap must consider the need to foster collaboration among the ocean science community, climate scientists and other disciplines focused on land, air and freshwater pollution.

Box 1: Using proxies to draw 'good enough' conclusions

Data about the health of coral reefs,[12] the presence of plastics in the ocean[13] or poly- and perfluoroalkyl substances (PFAS) in freshwater or soil systems can help infer the state of ocean pollution. Here are some examples of what is possible:

- Plastic releases chemicals into the marine environment throughout its life cycle, meaning that where plastic is found in the ocean, there is a high chance that it will leave a chemical trail.[14]
- Coral reefs are vulnerable to land-based sources of pollution, so monitoring coral growth, reproduction and the level of damage can help identify pollution hotspots.[15]
- Also known as "forever chemicals", PFAS do not break down in the environment and accumulate in water and soil. They end up in rivers, seawater and drinking water, have been shown to impact the immune and neurological function of marine wildlife,[16] and can "boomerang back to shore" in the air when waves crash, for example.[17] Growing public interest in PFAs can be leveraged to further our understanding of marine pollution more broadly.

Getting perfect data is difficult and expensive. Proxies such as these may enable scientists to draw conclusions that are "good enough" to underpin recommendations for action.

Roadmap theme 2: Leverage existing pollution data sources and knowledge

Objectives	Discussion questions
• Identify and leverage disciplines where existing knowledge and evidence about pollution on land, in freshwater and the atmosphere can provide insight into the state of pollution in the ocean	• How can existing knowledge about pollution (rivers, coastal areas, estuaries, land, atmospheric, etc) be applied (or not) to the ocean?
• Identify how the ocean can be better integrated into global systems for monitoring pollution	• Which proxies can be used to infer the state of pollution in the ocean?
	• How can studies about ocean pollution be better integrated into global systems such as climate change and biodiversity?
	• Which other disciplines need to be considered?

3. Building a federated architecture of ocean-related databases

There are significant gaps in scientific knowledge about marine pollution, but this does not mean there are no data at all. On the contrary, huge swathes of evidence already exist, but knitting them into a coherent whole will be a challenge. However, there are critical questions that need to be answered first. How do we assemble and integrate existing datasets? What governance structures will be needed? Who should be responsible for creating and operating a global marine pollution data framework?

As "the UN is already on the pathway to consolidating this data," it would make the most sense for such an initiative to sit within the UN system, believes Kakuko Nagatani-Yoshida, the global coordinator of the chemicals and pollution sub-programme at the UN Environment Programme (UNEP).

Situating this initiative within the UN doesn't necessarily mean creating a new body: it may be possible to task an existing agency or project with spearheading a collaborative global marine pollution data project. The UN Ocean Decade is a useful framework to support this.

One challenge is that UN bodies are primarily accountable to their member states, meaning programmes are prioritised and resources allocated according to member needs. This is one of the UN's strengths, but, conversely, it can also hinder effective collaboration. Another alternative may be to integrate pollution data into an existing non-UN project, such as the European Digital Twin of the Ocean[18] or the Ocean Data Platform.[19]

Regardless of who ultimately leads the global initiative to map marine pollution, a huge effort will be required to ensure that the many agencies and organisations collecting data can feed into it. The International Oceanographic Data and Information Exchange (IODE), which sits within the Intergovernmental Oceanographic Commission of UNESCO (IOC), convenes UN member states to share best practices on collecting, standardising, managing and sharing ocean-related data. It also seeks to bring together different organisations dedicated to ocean data management to adhere to FAIR guiding principles (findability, accessibility, interoperability and reusability of data) for scientific data management and stewardship, aiming to bring consistency and comparability to the data.[20]

Several initiatives that focus on improving interoperability, introducing common application programming interfaces and standardising data collection and implementation exist beyond the IOC IODE too. The Global Partnership for Sustainable Development Data, part of the UN Foundation, "enables partners in national statistical systems to get the tools, skills and infrastructure to achieve their Sustainable Development Goals," says Linet Kwamboka, the partnership's senior programme manager. "We also support teams to access timely data, which requires skills and tools to collect, clean, manage and store the data properly." But she believes data infrastructure needs to be bolstered, particularly in the global south. This will require more capacity building.

It will also be important to find mechanisms and incentives for national governments and the private sector to provide access to their data. Many private companies collect ocean-related data, explains Anna Silyakova, science lead at HUB Ocean, instigator of the Ocean Data Platform. Some, but not all, is commercially sensitive. Businesses may be more inclined to share data if there are more compelling incentives to do so, she believes.

Similarly, several national statistical offices are mandated to sell some data to commercial organisations to generate revenue that will support their activities. Kenya's National Bureau of Statistics is one example, says Ms Kwamboka. While some of the data are freely available, she believes these government institutions will be disinclined to openly share all data unless they can find alternative revenue sources to support their work.

Roadmap theme 3: Building a federated architecture of interoperable databases

Objectives	Discussion questions
• Assess the current state of collaboration on ocean pollution data and determine opportunities to build (or build upon an existing) federated data architecture	• How can existing ocean observation and pollution data platforms be integrated at a global scale? What is needed?
• Identify key success factors to ensure that the system is fair, inclusive and well governed	• How can marine pollution data be integrated into existing large-scale scientific datasets?
	• Who should drive this process? What type of governance framework is best suited?
	• Which technical, human capital and governance issues need to be overcome?
	• How can public and private sector players be incentivised to share ocean-related data?

Box 2: The UN ecosystem: mapping out where ocean data sits

Mapping out existing data sources and ocean monitoring platforms is no small feat; they are numerous, scattered and cover a wide spectrum of observation data, from macro-level meteorological ocean observation to localised and specific pollution monitoring. This is true even within the UN system. There is no centralised UN ocean pollution dataset, but rather many discrete platforms that gather different environment- and ocean-related data from member states.

The **United Nations Environment Programme (UNEP)** hosts the World Environment Situation Room (WESR) and the Global Partnership on Plastic Pollution and Marine Litter (GMPL), for example. GMPL is a multi-stakeholder partnership and knowledge hub for plastic pollution work, including third-party databases external to the UN. The GMPL is developing an application programming interface to enable different databases to connect and interoperate. WESR, meanwhile, is a large data initiative and the latest "reincarnation of the UN's effort to have more data on the environment," explains Kakuko Nagatani-Yoshida, global co-ordinator for chemicals and pollution at UNEP. "But," she laments, "there is still a long way to go."

UNEP is not the only body working to improve ocean data systems. The **IOC** is developing an "e-environment" to find ocean data, data products and services, and information on IOC projects, called the Ocean Data and Information System. At the same time, the Global Ocean Observing System (GOOS), which is under the auspices of the IOC, works closely with the **World Meteorological Organization (WMO)** to co-ordinate and monitor global ocean observation efforts and integrate ocean data into a global system (OceanOPS). The WMO also has its own Integrated Global Observing System for managing all its observing systems, from satellites and weather stations to observer ships and buoys.

The International Maritime Organization has a Global Integrated Shipping Information System that includes data on "pollution prevention equipment and anti-fouling systems", while the Food and Agricultural Organization hosts a Global Information System on Water and Agriculture (more commonly known as AQUASTAT).

This list is not exhaustive, and other databases are likely in use across the UN system. These could all potentially help inform the state of global ocean pollution. However, this information is fragmented, and whether and how these datasets will be integrated remains unclear.

Who decides?

One of UNEP's key objectives is supporting UN member countries in meeting the Sustainable Development Goals (SDGs), meaning its data platforms have typically been designed to support specific SDG-related programmes. They are often disconnected and time-bound rather than being a broad-based and long-term global environmental data repository. "UNEP and others are developing excellent data services, but wider coordination is essential to build the comprehensive data network we need," says Anya Waite, a co-chair of GOOS.

There are other obstacles to opening data collection and sharing in the UN system, and getting unanimous support for long-term global ocean monitoring remains a challenge for many UN agencies. "One of the biggest knowledge gaps is the need for more continuous monitoring to understand change", says David Vousden, the chair of GESAMP. "Long-term data collection programmes often lose funding as they become less innovative and more routine-like," Mr Vousden says, "but these data records become increasingly important as we try to understand the relationship between climate change and habitat degradation, for example."

4. Bringing visibility through technology

Collecting ocean pollution data can be expensive and time-consuming, yet emerging technologies can provide increasingly cost-effective, scalable and far-reaching solutions. AI and machine learning (ML) can significantly accelerate metadata processing, make more accurate predictions about marine pollution and support data visualisation. Despite the potential, big questions remain around how best to apply these solutions and, in particular, how to deploy technology in locations where they are most needed, such as the open ocean and in waters surrounding countries in the global south. Robust data infrastructures, data management processes and literacy programmes are prerequisites before advanced solutions like AI and ML can be deployed, warns Ms Kwamboka.

The good news is that efforts to use cutting-edge technology at the service of the ocean are well under way. The European Digital Twin of the Ocean (European DTO),[21] for example, aims to produce a digital representation of the ocean based on real-time and historical data. The European DTO currently includes the physical and biological features of the ocean, such as salinity and temperature, but it does not yet collect or generate pollution data and information. "This is our priority," says Pierre Bahurel, the chief executive officer of Mercator Ocean International, an NGO responsible for co-developing the project.

A critical question for the roadmap will be how best to utilise these technology solutions. How can the effort to build a comprehensive picture of marine pollution leverage existing technology infrastructure to support and advance research in marine pollution? Across the shipping, aquaculture and energy sectors, for example, many assets are already equipped with advanced robotics, sensors and monitoring solutions to collect real-time data in remote locations.[22] How can private-sector organisations play a role in monitoring ocean pollution via their assets and be champions of a healthy and pollution-free ocean?

Roadmap theme 4: Technology to increase the visibility of marine chemical pollution

Objectives	Discussion questions
• Identify how technology can support a federated digital architecture on marine pollution data	• How can technology, including AI and ML, be deployed to fill knowledge gaps in marine pollution?
• Identify how technology can help fill knowledge gaps	• How can collection and monitoring technology, such as remote sensors and autonomous underwater vehicles, be deployed to close the pollution data gap?
• Map out existing ocean-related tech initiatives and identify opportunities for collaboration	• How can AI support metadata management, information sharing and visualisation?
	• How can existing initiatives to digitalise the ocean be extended globally?
	• How can technological advances be rolled out where they're most needed and where resources are scarce?

5. Turning data insights into action

Data only have value if used. Several interviewees for this paper and *The zero-pollution ocean: A call to close the evidence gap* pointed out that collecting data is pointless if action isn't pursued.[23] This is especially true for ocean pollution data, which requires significant resources to collect. Defining how data will be used, for what purpose and by whom are fundamental questions that must inform the roadmap.

Back to Blue's Theory of Change (see Figure 2) is that high-quality, high-resolution, standardised data can provide decision-makers in government, business and civil society with compelling evidence of the need to address marine pollution. This, in turn, should lead to better policymaking and support business transformation.

But turning data into insights for the effective protection and sustainable use of marine resources requires the ocean community to identify priority areas and centralise resources. Comprehensive engagement with coastal communities, countries in the global south and small island developing states will be key to prioritising what kind of data need to be collected and by whom.

Data must be relevant, digestible and transferable to policymakers and other decision-makers. Collecting and collating evidence on the impact of pollution on the global ocean will not lead to change if it is not germane beyond the realm of science. "The goal is to connect with policymakers and explain that this data, these indicators, this knowledge must now enter their decision-making tools and don't just belong with scientists or businesses", says Mr Bahurel. How to turn complex scientific findings into visually compelling narratives and advocacy campaigns, implementable policies and easy-to-use dashboards accessible to a broader public and audience must be a key consideration of the roadmap.

It will be critical to develop a common language and a mutual understanding of the priorities, explains Ms Silyakova. One of the key challenges will be breaking down silos. "We've been talking about unlocking, aggregating and opening up data for ages, but not much has been done because it's being done in isolation," she says.

Another critical consideration will be how to fund the roadmap's implementation. This should include recommendations on the potential for self-funding models, for example by giving the private sector access to the data for a fee, or other business models.

Roadmap theme 5: Unlocking the resources to turn data insights into action	
Objectives	**Discussion questions**
• Identify key success factors to operationalise and implement the roadmap, including policy examples and financing models	• What is needed to turn data into practical insights that are easily understandable and usable?
• Identify potential commercial opportunities associated with a zero-pollution ocean	• What are the lessons from existing science-to -policy initiatives?
• Identify and assess communication and advocacy best practices to reach target audiences	• What type of policies would help close the marine pollution evidence gap?
	• How can marine pollution data collaboration be funded in the long term?
	• What are the commercial opportunities associated with a zero-pollution ocean?

Next steps

The Invisible Wave: Getting to zero chemical pollution[24] and *The zero-pollution ocean: A call to close the evidence gap*[25] explored the urgent need to close the marine pollution gap. This paper, which leverages insights from a diverse range of ocean stakeholders, asks the critical questions that must be answered if that gap is to be closed. For this, we seek your help.

The next step is to develop a workable blueprint that sets out the steps needed to close the marine pollution data gap. The roadmap will be viable if co-designed by a broad group of stakeholders and if the process is anchored in science. To learn more and get involved, please contact the Back to Blue team at: backtoblue@economist.com.

End notes

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Appendix: Thematic Framework

Roadmap theme 1: Building a science-based and purpose-driven process

Objectives

- Design a framework for a science-based approach to marine pollution that complements existing processes and bodies
- Define the purpose, audience, and intended outcomes and actions of the roadmap

Discussion questions

- What are the purpose and intended outcomes of the roadmap?
- Should this process aim to take an expansive and holistic approach to track marine pollution or identify priority pollutants of concern?
- What mechanisms can be implemented to ensure emerging scientific knowledge feeds into the process?
- Is there a 'safe operating space' for ocean pollution, and how can this be determined and defined?

Roadmap theme 2: Leverage existing pollution data sources and knowledge

Objectives

- Identify and leverage disciplines where existing knowledge and evidence about pollution on land, in freshwater and the atmosphere can provide insight into the state of pollution in the ocean
- Identify how the ocean can be better integrated into global systems for monitoring pollution

Discussion questions

- How can existing knowledge about pollution (rivers, coastal areas, estuaries, land, atmospheric, etc) be applied (or not) to the ocean?
- Which proxies can be used to infer the state of pollution in the ocean?
- How can studies about ocean pollution be better integrated into global systems such as climate change and biodiversity?
- Which other disciplines need to be considered?

Roadmap theme 3: Building a federated architecture of interoperable databases

Objectives

- Assess the current state of collaboration on ocean pollution data and determine opportunities to build (or build upon an existing) federated data architecture
- Identify key success factors to ensure that the system is fair, inclusive and well governed

Discussion questions

- How can existing ocean observation and pollution data platforms be integrated at a global scale? What is needed?
- How can marine pollution data be integrated into existing large-scale scientific datasets?
- Who should drive this process? What type of governance framework is best suited?
- Which technical, human capital and governance issues need to be overcome?
- How can public and private sector players be incentivised to share ocean-related data?

Roadmap theme 4: Technology to increase the visibility of marine chemical pollution

Objectives

- Identify how technology can support a federated digital architecture on marine pollution data
- Identify how technology can help fill knowledge gaps
- Map out existing ocean-related tech initiatives and identify opportunities for collaboration

Discussion questions

- How can technology, including AI and ML, be deployed to fill knowledge gaps in marine pollution?
- How can collection and monitoring technology, such as remote sensors and autonomous underwater vehicles, be deployed to close the pollution data gap?
- How can AI support metadata management, information sharing and visualisation?
- How can existing initiatives to digitalise the ocean be extended globally?
- How can technological advances be rolled out where they're most needed and where resources are scarce?

Roadmap theme 5: Unlocking the resources to turn data insights into action

Objectives

- Identify key success factors to operationalise and implement the roadmap, including policy examples and financing models
- Identify potential commercial opportunities associated with a zero-pollution ocean
- Identify and assess communication and advocacy best practices to reach target audiences

Discussion questions

- What is needed to turn data into practical insights that are easily understandable and usable?
- What are the lessons from existing science-to-policy initiatives?
- What type of policies would help close the marine pollution evidence gap?
- How can marine pollution data collaboration be funded in the long term?
- What are the commercial opportunities associated with a zero-pollution ocean?

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