Back to Blue

An initiative of
Economist Impact and The Nippon Foundation

WORKSHOP 4: TECHNOLOGY TO INCREASE THE VISIBILITY OF MARINE CHEMICAL POLLUTION

—summary notes

This virtual workshop was held on September 12th, 2023

ECONOMIST IMPACT

THE NIPPON FOUNDATION

Workshop 4:

Back to Blue calls on a broad group of stakeholders to co-design a roadmap to close the marine pollution data gap. Please *visit our website* to learn more.

This workshop, the fourth of five, sought:

- 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
- Provide concrete solutions and recommendations to feed into a roadmap

This summary report does not attempt to represent all the views shared during the workshop; rather, it is a brief synthesis. The purpose of this report is to inform the first draft of the roadmap. We welcome further comments on this summary and the roadmap.

Attendees:

- Ellie Mackay, CEO & Founder, Ellipsis Earth
- Environment Programme (UNEP)
- Guy Woodward, Professor of Ecology and Deputy head of Life Sciences, Imperial College London
- Jacek Siadkowski, Co-founder & Managing director at Tech To The Rescue
- José Avila, Research scientist, IODE INVEMAR
- Karen Ibarra, Research scientist, IODE INVEMAR
- Kazuhiro Yagasaki, Senior project coordinator, Global Ocean Environment Division, Ocean Affairs Department, The Nippon Foundation
- Lucy Scott, Project manager, Ocean InfoHub Project
- Marius Suteu, Chief technology officer, EyeSea
- Matthew Palmer, Head of science - Digital Innovation & Marine Autonomy, Plymouth Marine Laboratory
- Sandra Topic, Environmental Equity BD, AWS - Amazon
- Vicky Honda, Manager, Oceans Affairs Division, The Nippon Foundation (Observer)

Moderators:

- Charles Goddard, Executive director, Back to Blue
- Oliver Steeds, CEO, Nekton Foundation

Technology to fill knowledge gaps

Deploying technologies at scale

- The costs of remote sensing are still high. It's essential to focus on key pollutants in areas that can be monitored.
- Deciding what needs to be measured - and where - will help guide technology deployment. For example, coastal ecosystems require different impact assessments than open oceans.
- Leverage existing technologies and adapt them to aquatic environments.
- While we are still a long way from affordable, long-range, long-term, autonomous robotic sensors, satellite spectrometry and aquatic drones can be used with AI systems to measure and predict the impacts of pollutants over time.
- The Internet of Things (IoT) can be useful in marine environments.
- While the range of sensors currently limits IoT, there is potential for satellite-monitored devices. Existing cloud infrastructure and hardware could be adapted for marine environments.
- Robotic technologies are improving the capacity to monitor coastal areas and open oceans, but there are still significant barriers to monitoring over long periods.
- Current monitoring of pollution impacts is concentrated in G7 nations. Future deployment of technology must extend beyond these to get a global perspective on changing marine envrionments.

Recommendation 1:

Don't lose sight of the **why** by focusing too much on the **how**. Measuring chemicals and pollutants of interest is the starting point for technological development and deployment.

Data collection at a distance

- Tap into citizen scientist and public networks to broaden data collection efforts.
- Get creative about who can provide valuable data. There are already good examples of crowdsourced data collection efforts by PADI divers, surfers, private vessels and marine hobbyists.
- However, collection efforts should be aligned with a specific focus area. Data collection technology is part of a closed-loop system. To be valid, data has to be aggregated and maintained.
- Prioritising chemicals and/or nutrients of concern should inform how public data collection networks are designed and deployed.

Recommendation 2:

Explore innovative methods of technological deployment by leveraging citizen scientists and the public in addition to organised scientific projects.

Metadata and predictions

Integrating AI

- AI models can be used to generate sample data for the purposes of hypothesis testing in advance of technology deployment. This can inform when, where and how to devote resources to future sensor development most efficiently.
- AI is data-hungry. For remote sensing, this presents a problem where the cost of deployment is prohibitively high.
- However, in other areas where large amounts of data are available, AI can be scaled very quickly.
- Satellite imagery and photos allow AI systems to create large databases, analyse the contents of different kinds of images and generate predictions to monitor and track pollution impacts over time.
- AI analysis of satellite data can be combined with weather data to generate even more sophisticated predictions.

Recommendation 3:

Start training AI on readily available data to improve predictive capacity and inform future collection efforts.

End-to-end data management

- Data has to be shared to reveal its full potential. Small data collected by individuals or single organisations may not be helpful but are part of a larger picture.
- Open source data is critical to advancing knowledge of marine pollution worldwide.
- Different users will have different data needs. A flexible management system will allow more users to generate a wider variety of insights.
- A transparent data management system is integral. Oversight is needed from collection to aggregation, management, maintenance and publication.
- Holes in existing datasets should inform new data collection efforts.
- Encourage organisations to share more data but use what's already available. For example, some entities may be willing to share metadata before complete datasets.

Recommendation 4:

Data must be available when and where it is needed. The ocean is a shared resource; its data should be, too.

Private sector collaborations

Making private data public

- Awareness is the first step to private data sharing.
- Recognise and address potential legal concerns for organisations in a position to share pollution data. For example, polluter-pays systems may be inhibiting sharing.
- Intrinsic motivation for data sharing might not be enough. Start by educating organisations on the benefits of data sharing.
- Put pressure on clients to require companies to share information.
- Public policy can also be an effective way to improve data sharing from the private sector.

Partnerships for deploying technology

- Seek out private and not-for-profit collaborations to advance the agenda. Organisations may have data but need guidance on how it might benefit others.
- Consider how the private sector can be useful beyond data sharing.
- Widespread infrastructure development is a possible way to improve the scope of technology deployment. Offshore wind turbines and underground cables are good examples of areas where remote sensors could be installed on a large scale.
- Corporate pledges or social initiatives can pressure organisations to share information publicly.

Recommendation 5:

Don't rely on voluntary data sharing from the private sector. Think creatively about policy initiatives, not-for-profit collaborations and corporate pledges to leverage private sector assets.

Next steps:

- Please share your comments with the Back to Blue team, either in this document or by email to jessicabrown@economist.com
- Please feel free to share this document with other colleagues who may be interested; we welcome their comments and feedback
- We will keep you updated with information about our upcoming publications workshops and other opportunities to contribute to the roadmap's development.

Additional resources

- Please visit our ***stakeholder resource centre*** for further information about Back to Blue's initiative to develop a roadmap to close the marine pollution data gap and about our series of virtual stakeholder workshops.
- ***The Invisible Wave: Getting to zero chemical pollution in the ocean***, Back to Blue (2022)
- ***The Zero-pollution ocean: A call to close the evidence gap***, Back to Blue (2023)

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