

Planetary boundaries and ocean solutions: A third-sector view on corporate opportunities

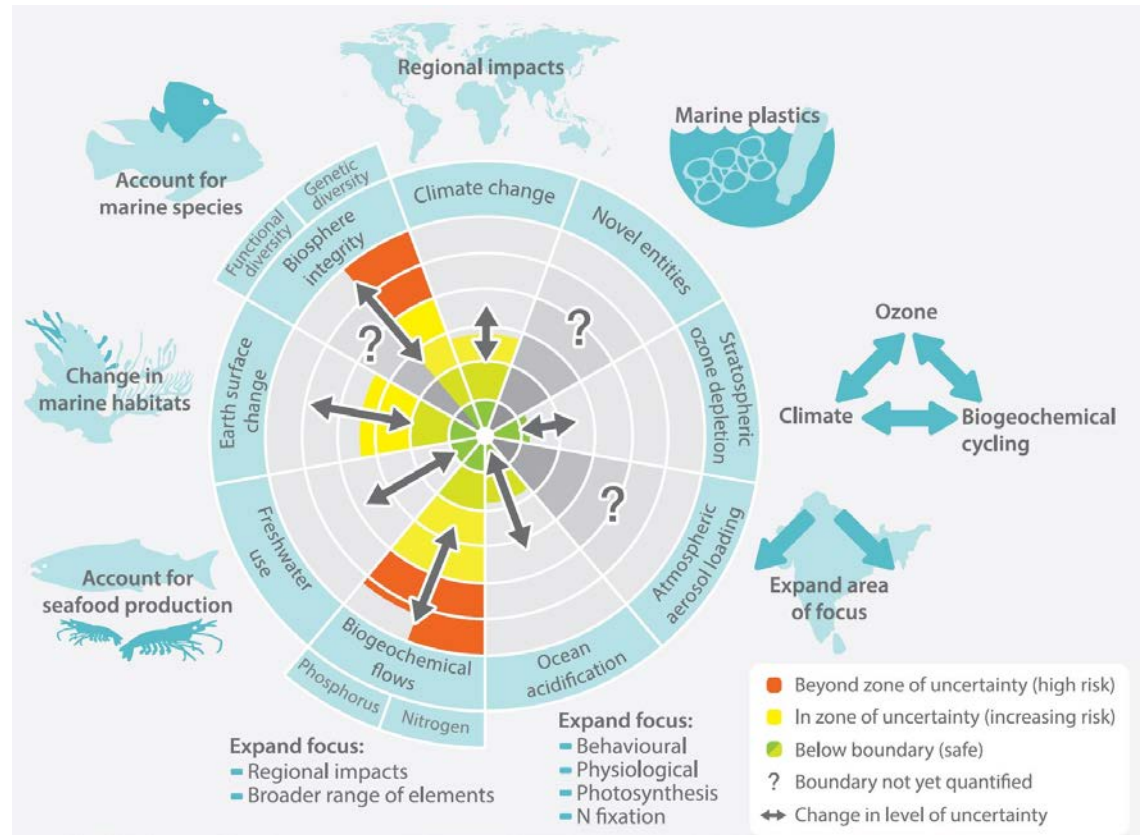
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Planetary boundaries for a blue planet

Kirsty L. Nash, Christopher Cvitanovic, Elizabeth A. Fulton, Benjamin S. Halpern, E. J. Milner-Gulland, Reg A. Watson & Julia L. Blanchard
 Nature Ecology & Evolution 1, 1625–1634, 2017

- Ecosystem services approach
- Blue Natural Capital assets
- SDGs, Paris, CBD etc
- Investment opportunities
- Public-Private Partnerships
- Voluntary Commitments



Ocean Opportunities

- Deliver one integrated infrastructure and ocean data architecture for multiple uses:
 - Efficient ports and routes using satellites, sensors, autonomous devices etc
 - Support monitoring, enforcement and traceability (PSMA, BWD etc)
 - Blue growth opportunities and jobs based on hubs, start-ups and accelerators
- Address coastal resilience in the light of development and climate change:
 - Optimised marine spatial planning and
 - Forward-looking nature-based coastal design
 - Blue natural capital project opportunities
- Harness progress in materials science, data, wave, aquaculture and other marine tech to deliver clean shipping, marine bio-economy, clean energy and water
- Use marine spatial planning and ecosystem-based management as resilience tools





How can we monitor progress towards the achievement of SDG 14?

The challenges

Greenhouse gases



Greenhouse gas emissions are driving climate change. The oceans absorb CO₂ but not without some impact. N₂O can be released from the oceans.

Ocean acidification



As the oceans absorb more CO₂, the water becomes more acidic, lowering the pH and changing ocean chemistry. Marine life which has evolved over millions of years may not be able to adapt at the speed of the change.

Ocean deoxygenation



Lack of O₂ in the oceans could impact ocean productivity, nutrient cycling and marine life. Marine plants, fish and organisms struggle to survive in 'oxygen minimum zones', areas which are increasing in size and number.

Eutrophication



An excess of nutrients due to e.g. industrial and farm run-off can lead to excessive growth of plants and algae. Decomposition of the algae consumes oxygen in the water. Oxygen is vital for fish and shellfish to survive.

Marine biodiversity

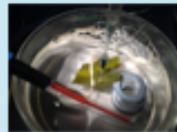


Marine systems are complex, all species are an integral part of the ecosystem performing specific functions. Biodiversity is crucial for human well-being and economic development.

SenseOCEAN tools

N₂O & pCO₂ sensors

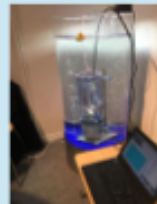
Optode sensors for CO₂ and electrochemical sensors for CO₂ and N₂O.



Electrochemical CO₂ sensor

pH sensor

Lab on chip and optode sensors



pH lab on chip sensor in demonstration tank

Oxygen sensor



Optode sensors

Nutrients sensors, FRRf

Electrochemical and lab on chip sensors for phosphate, nitrate and silicate. Fast Repetition Rate fluorimetry measures primary productivity.

Fluorescence sensor



Measures a range of parameters key in assessing ecosystem health.

These sensors will be integrated into a multiparameter sensor system that can be deployed on many platforms (e.g. observatories, AUVs). Common communications systems, electronics, data systems are being used to enable cost effective mass production.



THE GLOBAL GOALS
For Sustainable Development

Shaping corporate evolution

- Supportive advocacy: Ocean-Climate Platform, integrating ocean solutions into the Paris Agreement, supporting funding solutions for mitigation and adaptation
- Scaling ocean science: Nekton Foundation and the decade of ocean science
- Developing capacity: IUCN Blue Natural Capital Finance Facility
- Strengthening ocean governance: High Seas Alliance and the UN Marine Biodiversity Agreement
- Specific investment platforms and opportunities: Hatch.blue and #BlueInvest2018
- Voluntary Commitments as engagement tool: Tuna Sustainability Commitment and the Ocean Data Alliance
- Innovative ocean finance: The Ocean Sustainability Bank concept
- Promoting public discussions on ocean issues and ocean literacy: marine plastics and nutrients- runoff from land-based sources

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