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UK Marine Economic Growth & Environmental Enhancement?

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Our Vision for the Next Decade

The purpose of the National Oceanography Centre is to gain a deeper knowledge of the ocean to address major challenges facing society and the natural world. We are uniquely placed, working with partners from around the world, to turn research and technological innovation into trusted knowledge for real action and solutions.

We focus on four ocean-related missions:

CLIMATE

Society can plan for, adapt to and mitigate against environmental change.

BIODIVERSITY

Marine biodiversity is protected and thriving.

HAZARDS AND POLLUTION

People, infrastructure and ecosystems are protected from hazards and pollution.

SUSTAINABLE MARINE ECONOMY

Ensure development of marine-based economic activity is sustainable, whilst protecting the ocean's future health.

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Sustainable Marine Economy

Mission: Gain the deeper knowledge of issues related to a marine sustainable economy to balance the growing use of ocean resources with the need to protect marine ecosystems

Vision:
Marine-based economic activity is sustainably developed whilst protecting the ocean's future health

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Punching Above Our Weight

The UK's location at the boundary of the Atlantic Ocean and European shelf seas, combined with strong tides, energetic wind and wave regimes, and a highly varied seabed, supports a diverse range of marine ecosystems. These same environmental conditions underpin a wide range of marine industries, including productive fisheries and aquaculture, offshore wind and other marine renewables, oil and gas, shipping and ports, subsea connectivity, and coastal tourism.

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Cumulative Pressure and Interactions

The marine economy is growing rapidly, driven by the energy transition, global trade, digital connectivity, and food security. Unlike in the past, this growth is happening at greater scale, faster pace, and with increasing overlap between sectors.

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The Challenge

Marine systems are highly connected — water, sediments, species, and pressures move across large distances, beyond individual project boundaries.

Impacts accumulate and interact over time, making cause and effect difficult to isolate.

Ecosystem responses are often non-linear, with thresholds beyond which change can be rapid.

Recovery can take decades, and some impacts may be long-lasting or difficult to reverse.

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A Moving Target

Climate change is shifting temperatures, species distributions, and seasonal timing, while land-based pressures continue to influence coastal waters.
As a result, environmental baselines are moving, increasing uncertainty and making impacts harder to predict.

Environmental Enhancement Supports Economic Growth

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Degradation increases operational risk, maintenance costs, and uncertainty across marine industries, constraining long-term growth.
The economic consequences of marine degradation extend beyond individual industries to the loss of ecosystem services that support public wellbeing, resilience, and long-term prosperity.

Marine Science is essential to economic growth that delivers genuine environmental enhancement rather than cumulative decline.
It provides the evidence base for understanding ecological limits, cumulative pressures, and long-term system responses, informing where development can occur, how it should be designed, and where impacts cannot be mitigated or compensated.

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Environmental Enhancement

Enhancement isn't less damage but should mean:

- Measurable biodiversity gain
- Improved ecosystem function
- Increased resilience to climate change

Build on long-term ocean observation to ensure:

- Ecologically relevant (right habitat, right place)
- Long-term (decades, not project cycles)
- Monitored and adaptive

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Infrastructure Design for Ecological Function

Habitat-forming structures on offshore installations
Avoidance of sensitive periods/species
Seabed designs that support recovery

Based on site-specific ecology:
(understanding of indigenous species composition, life cycles and migration patterns) and how this might change due to climate change and externalities
Combined with evidence based siting decisions

Nature Inclusive Design

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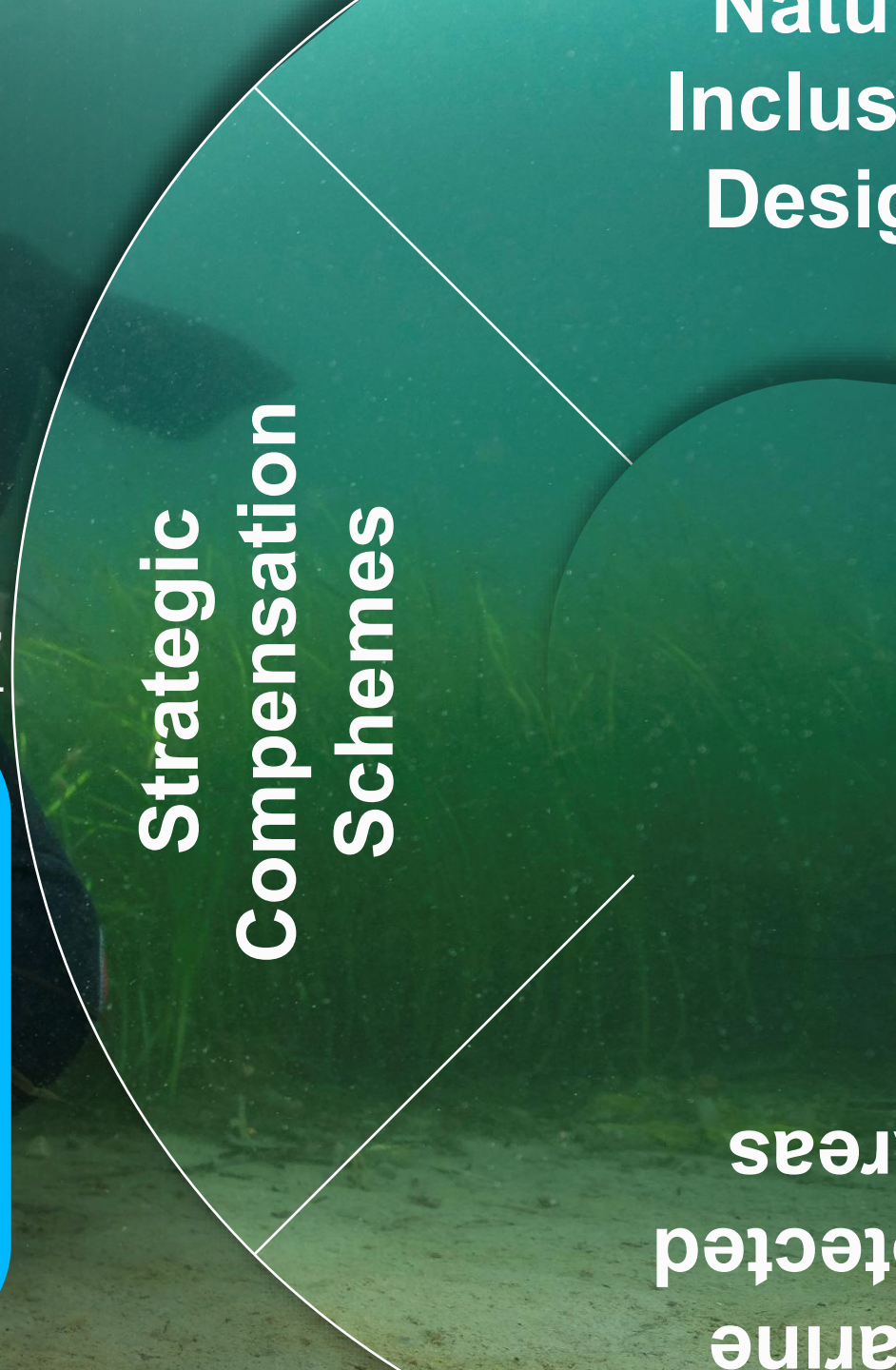
Offsetting & Compensation

If designed rigorously, they can fund seascape-scale restoration that wouldn't otherwise happen (e.g., seagrass restoration, saltmarsh, oyster reef projects, catchment measures that reduce nutrient loading of coastal waters). They can shift from "project-by-project patches" to strategic, connected interventions (the right places, at the right scale).

To avoid 'licence to degrade' generate understanding around habitats/services are which are not substitutable: equivalence, restoration success, time lags, and which features are effectively irreversible on human timescales
Should only be for residual impacts after avoidance and minimisation and with a clear criteria to ensure

- **Additionality** (wouldn't happen anyway)
- **Like-for-like (or better)** in ecological function
- **Time-lag accounting** (often requiring overcompensation or advance restoration)
- **Permanence** and legally binding maintenance



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Protection & Conservation

When properly designed and enforced, MPAs can deliver real recovery (benthic habitat integrity, biomass, size structure, ecosystem resilience).
They can reduce cumulative pressure by providing spatial separation between intensive uses and sensitive features and create reference sites for monitoring.
(crucial for proving whether “enhancement” is real).

MPAs require robust evidence and long-term monitoring to ensure they protect high-value habitats (e.g. seagrass, reefs), connectivity corridors, and spawning/nursery areas — not just low-conflict sites. They must reduce damaging activities and be embedded within marine spatial planning, as MPAs alone cannot address diffuse pressures such as warming, acidification, and some pollution sources.

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Environmental Enhancement & Economic Growth

Avoidance first -Ecologically inappropriate locations are ruled out early
Hard limits on cumulative pressure - Regional caps on disturbance, noise, mortality
High-integrity enhancement - Functional outcomes, not cosmetic features
Strategic, not project-level compensation - Large-scale, additional, long-term restoration
Effective MPAs - Enforced, connected, and integrated with spatial planning
Long-term monitoring and adaptive management - Decades, not consent periods

Science helps us avoid mistaking incremental mitigation for genuine recovery — ensuring that cumulative small gains are not used to mask overall decline. It guards against treating compensation as a substitute for avoidance, exposing where offsets are unlikely to deliver equivalent or timely ecological outcomes.
Robust evidence also prevents symbolic protection without enforcement, overconfidence in unproven future technologies, and planning based on historical baselines rather than a rapidly changing ocean.

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Thank You

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