

Conservation must overcome shifted environmental baselines to address 21st century problems

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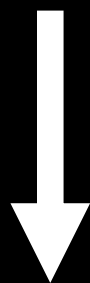


European seas have experienced
extraordinary change over the centuries

1889



UK Trawl Landings



<5x



2010

1889



Landings per
unit of fishing
power



<17x

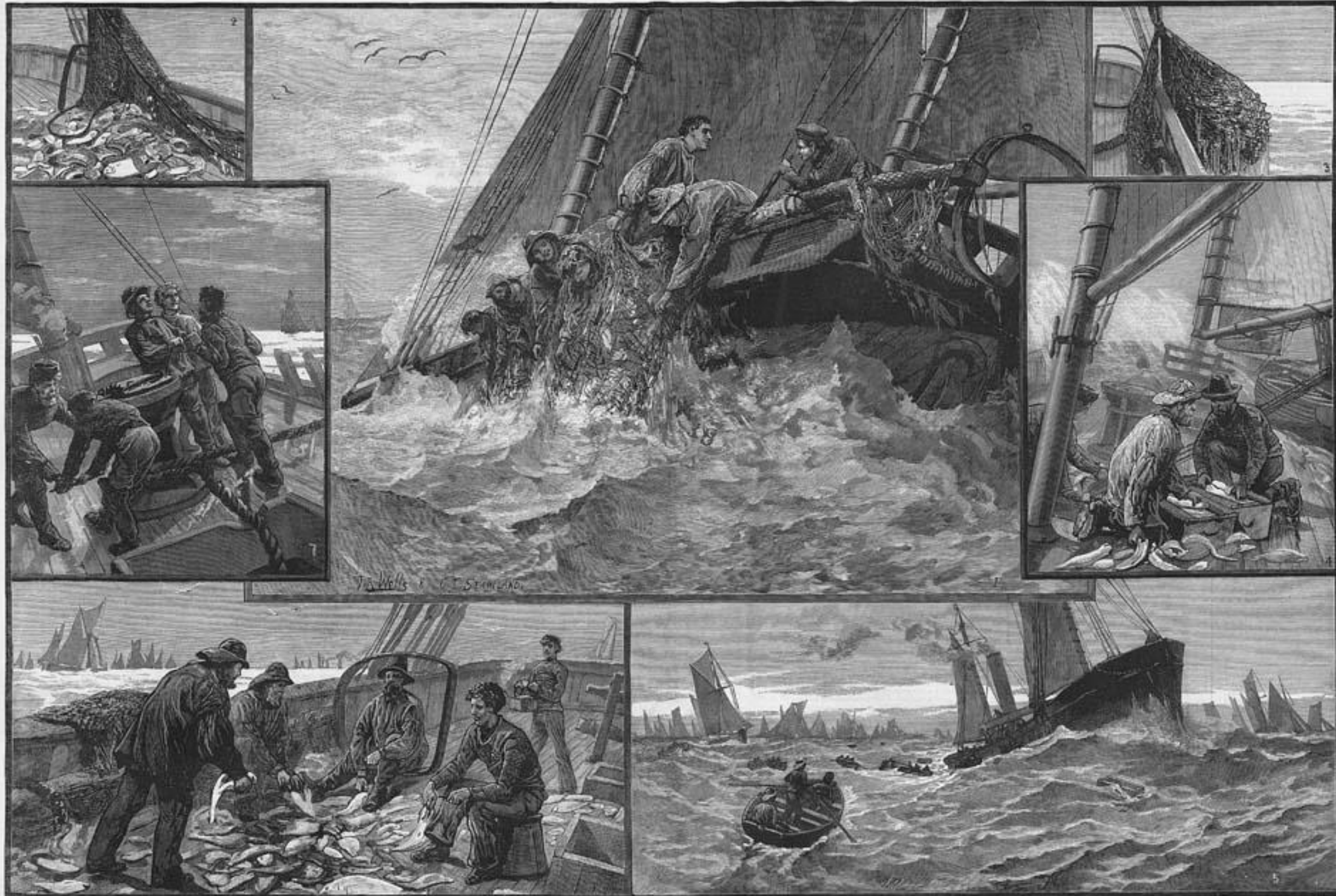


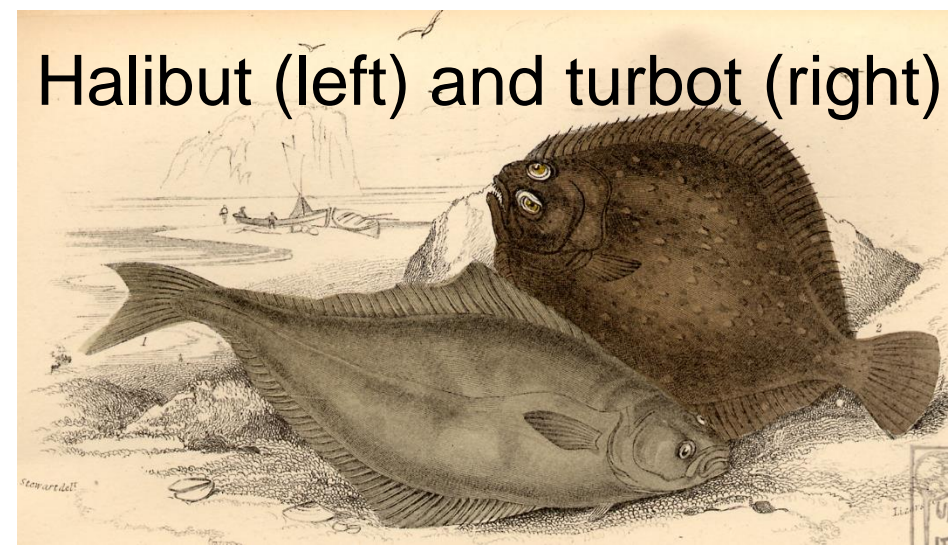
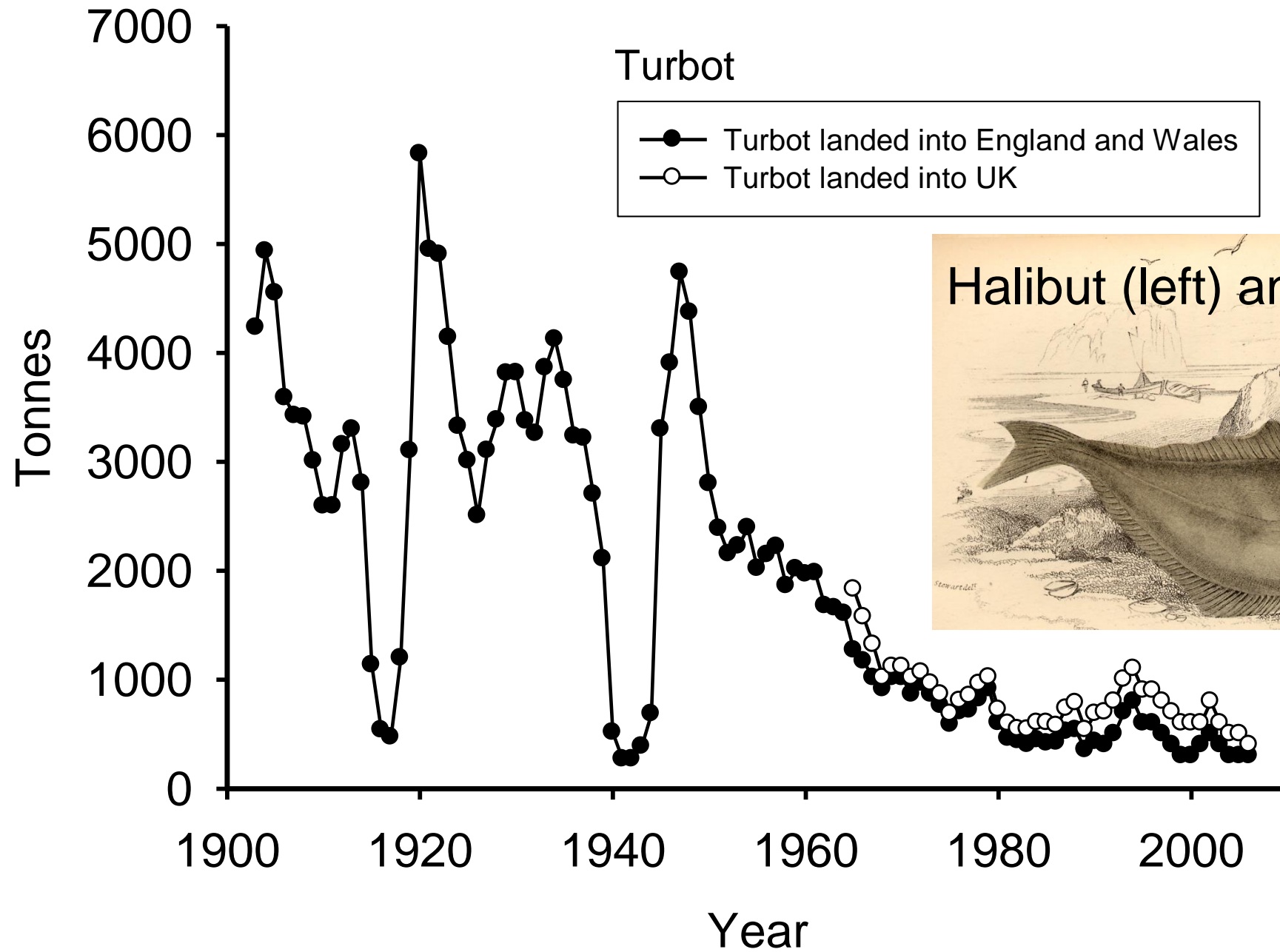
2010

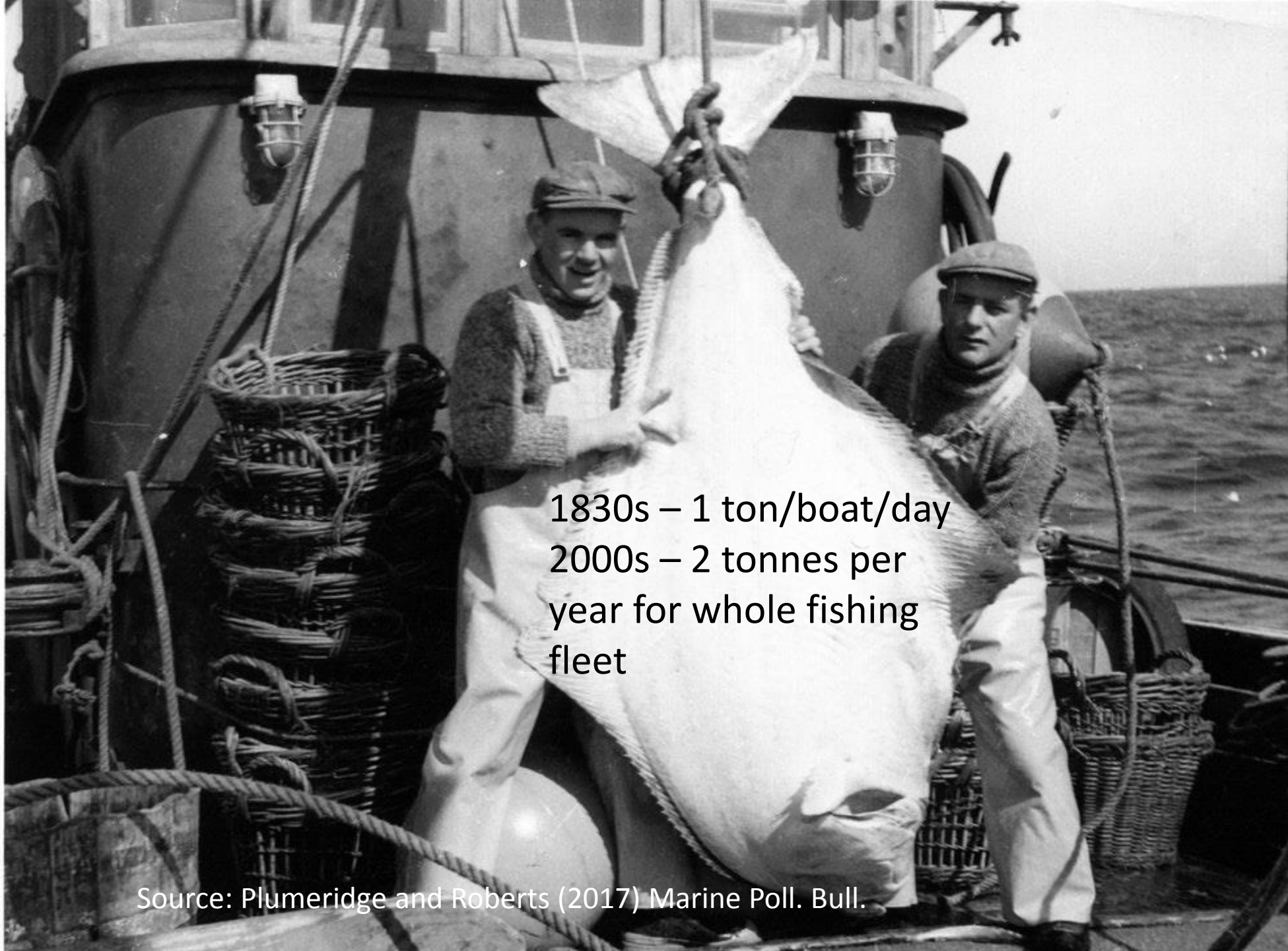
Source: Thurstan et al. (2012) Nature Communications



Source: Plumeridge and Roberts (2017) Conservation targets in marine protected area management suffer from shifting baseline syndrome: A case study on the Dogger Bank. *Marine Pollution Bulletin* 116: 395-404.





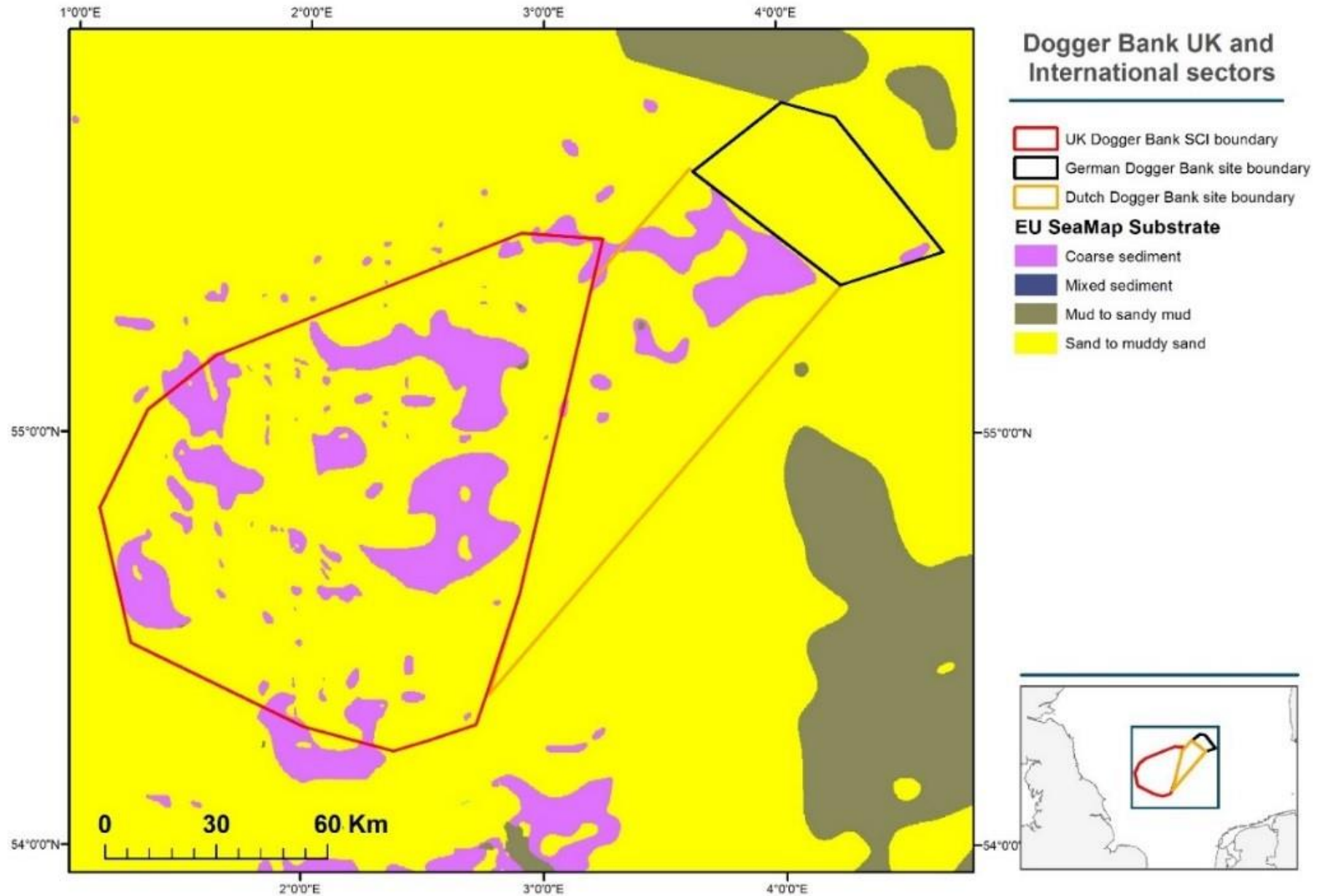


1830s – 1 ton/boat/day
2000s – 2 tonnes per
year for whole fishing
fleet

Source: Plumeridge and Roberts (2017) Marine Poll. Bull.



The Dogger Bank is now a Special Area of Conservation, but...





Dogger Bank conservation objective:
'Maintain' habitat as it is today.

We are protecting sand, not the
species that live in, on and around it.

Only 0.001% of the waters around the British Isles are protected from all fishing for nature conservation

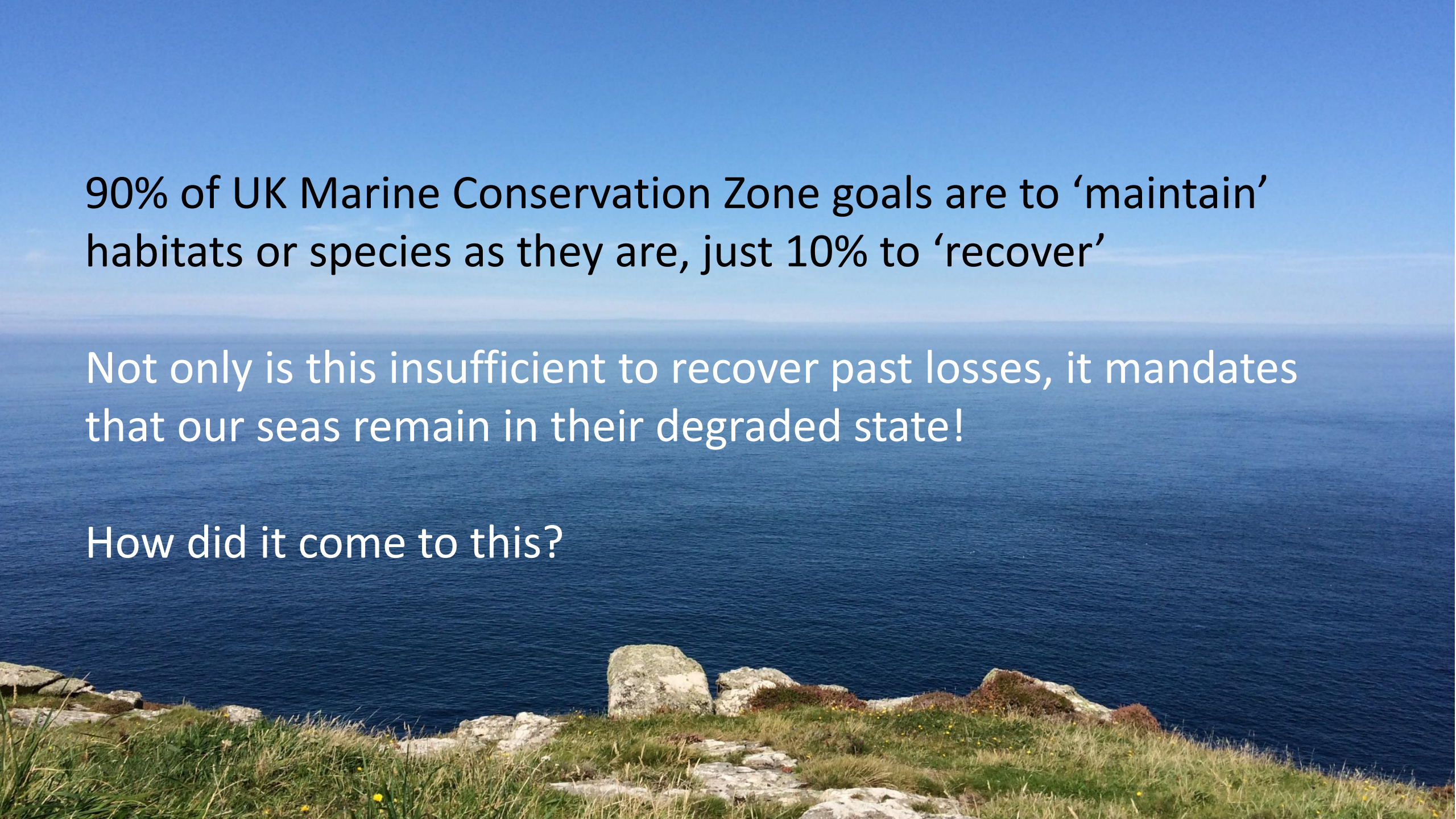


**Just 1% of UK seas are protected
from trawling and dredging**

**MPAs in the UK and Europe have more trawling
and fewer rays and sharks than fishing grounds**

Sources: Solandt (2018) A stocktake of England's MPA network...Biodiversity

Dureuil et al. (2018) Elevated trawling inside protected areas undermines conservation outcomes. Science



90% of UK Marine Conservation Zone goals are to 'maintain' habitats or species as they are, just 10% to 'recover'

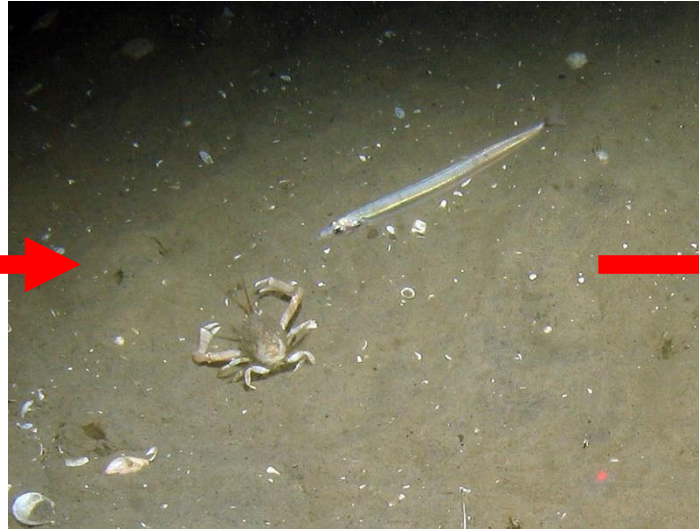
Not only is this insufficient to recover past losses, it mandates that our seas remain in their degraded state!

How did it come to this?

Before industrial fishing



After 150 years of industrial fishing



Marine habitat description

European Environment Agency



‘Successful’
management keeps
habitat like this

Conservation
objectives set for
altered habitat

Almost all marine habitats currently defined in Europe with high abundance of sessile epifauna are in places that are very difficult to fish with mobile gears: the bottom is rocky or experiences high currents



Photo: Alex Mustard

Before industrial fishing



After 150 years of industrial fishing



Marine habitat description

European Environment Agency



Conservation objectives set to recover: extractive and damaging uses removed

Marine life becomes more prolific, diverse and three-dimensionally complex. Ecosystem functions alter as recovery takes place

Real protection
brings real recovery
to South Arran



These two areas
would be
classified as
different
habitats under
the EU scheme:
protection
shows how
habitats are
defined by
activities, not by
environment
alone.

South Arran Marine Protected Area
Same seabed substrate, gravel, pebble & cobble

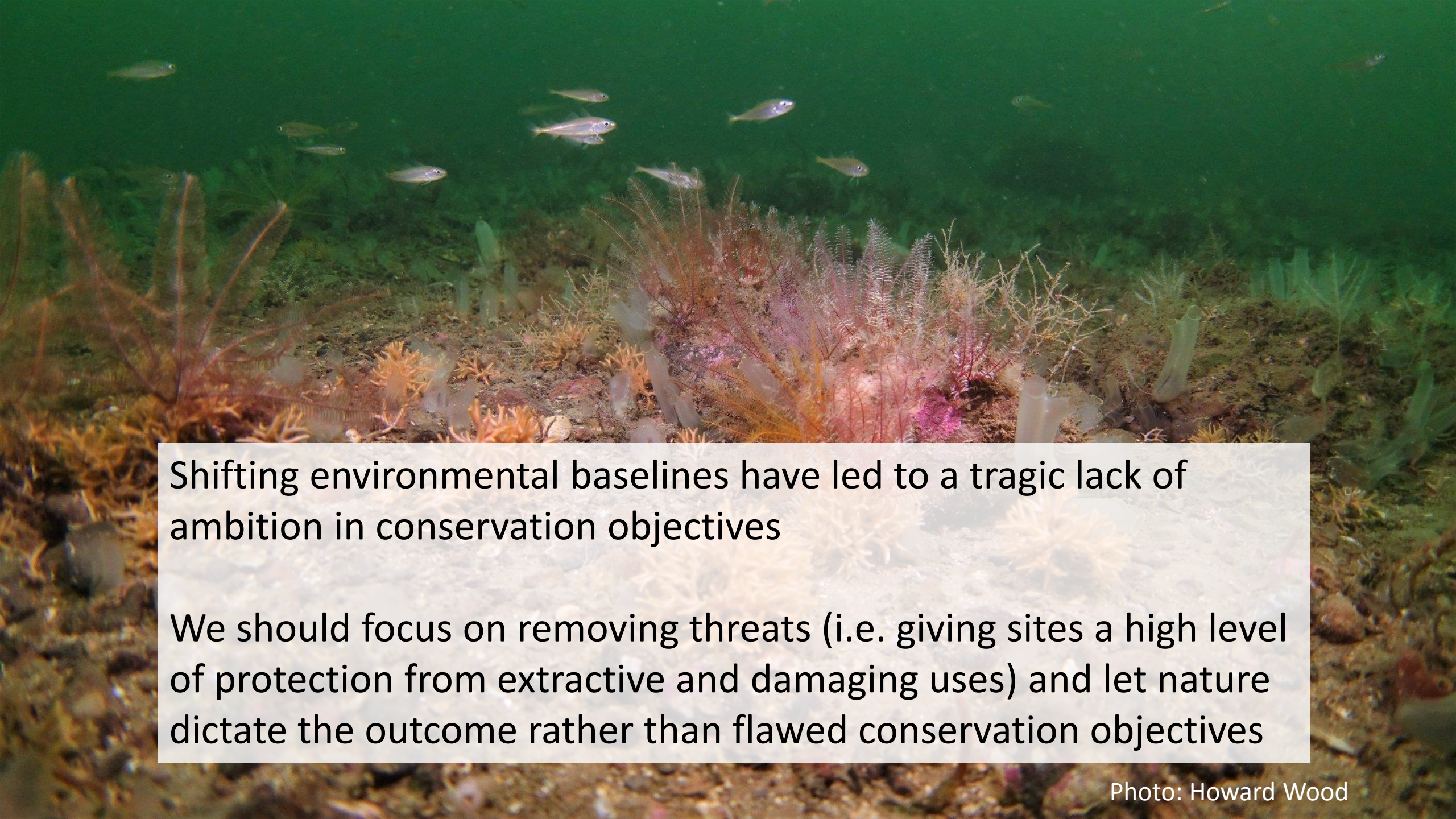
2014 baseline survey photograph

October 2018 photograph

Photos: Howard Wood

Shifting environmental baselines are embedded in the descriptions of marine habitats around Europe, in assessments of good environmental status, in conservation and management objectives, and in decisions on compatible activities



An underwater photograph showing a school of small, silvery fish swimming above a diverse coral reef. The water is clear and greenish. The coral includes various species like branching corals, sea fans, and sponges.

Shifting environmental baselines have led to a tragic lack of ambition in conservation objectives

We should focus on removing threats (i.e. giving sites a high level of protection from extractive and damaging uses) and let nature dictate the outcome rather than flawed conservation objectives

Marine reserves protected from fishing foster the recovery of species, habitats and ecological processes that can slow and offset the impacts of climate change

Published June 2017



 PERSPECTIVE

Marine reserves can mitigate and promote adaptation to climate change

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Edited by B. L. Turner, Arizona State University, Tempe, AZ, and approved May 8, 2017 (received for review January 30, 2017)

Strong decreases in greenhouse gas emissions are required to meet the reduction trajectory resolved within the 2015 Paris Agreement. However, even these decreases will not avert serious stress and damage to life on Earth, and additional steps are needed to boost the resilience of ecosystems, safeguard their wildlife, and protect their capacity to supply vital goods and services. We discuss how well-managed marine reserves may help marine ecosystems and people adapt to five prominent impacts of climate change: acidification, sea-level rise, intensification of storms, shifts in species distribution, and decreased productivity and oxygen availability, as well as their cumulative effects. We explore the role of managed ecosystems in mitigating climate change by promoting carbon sequestration and storage and by buffering against uncertainty in management, environmental fluctuations, directional change, and extreme events.

www.pnas.org/cgi/doi/10.1073/pnas.1701262114

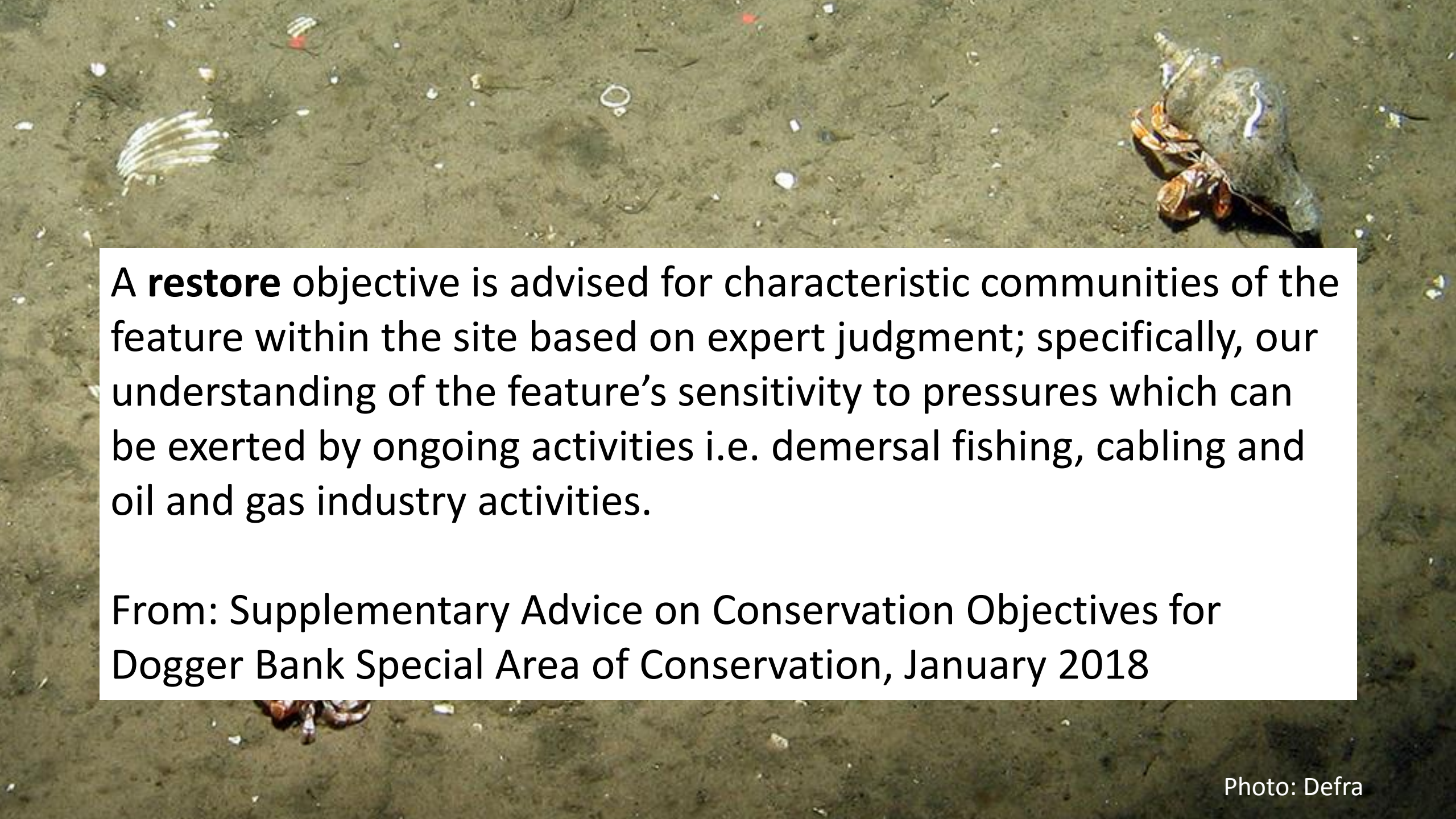
Managing for change:

Bigger populations with extended age structures produce more offspring, are more resilient, and better ecologically connected

Greater genetic variability promotes adaptability

More complex, intact habitats, support more species and a greater variety and intensity of ecological processes



A photograph of a sandy seabed. In the upper right, a crab is visible next to a large, dark, textured shell. In the upper left, there is a scallop shell. The sand is light brown and contains some small debris.

A **restore** objective is advised for characteristic communities of the feature within the site based on expert judgment; specifically, our understanding of the feature's sensitivity to pressures which can be exerted by ongoing activities i.e. demersal fishing, cabling and oil and gas industry activities.

From: Supplementary Advice on Conservation Objectives for Dogger Bank Special Area of Conservation, January 2018