



HELSINGIN YLIOPISTO
HELSINGFORS UNIVERSITET
UNIVERSITY OF HELSINKI



Stockholms
universitet

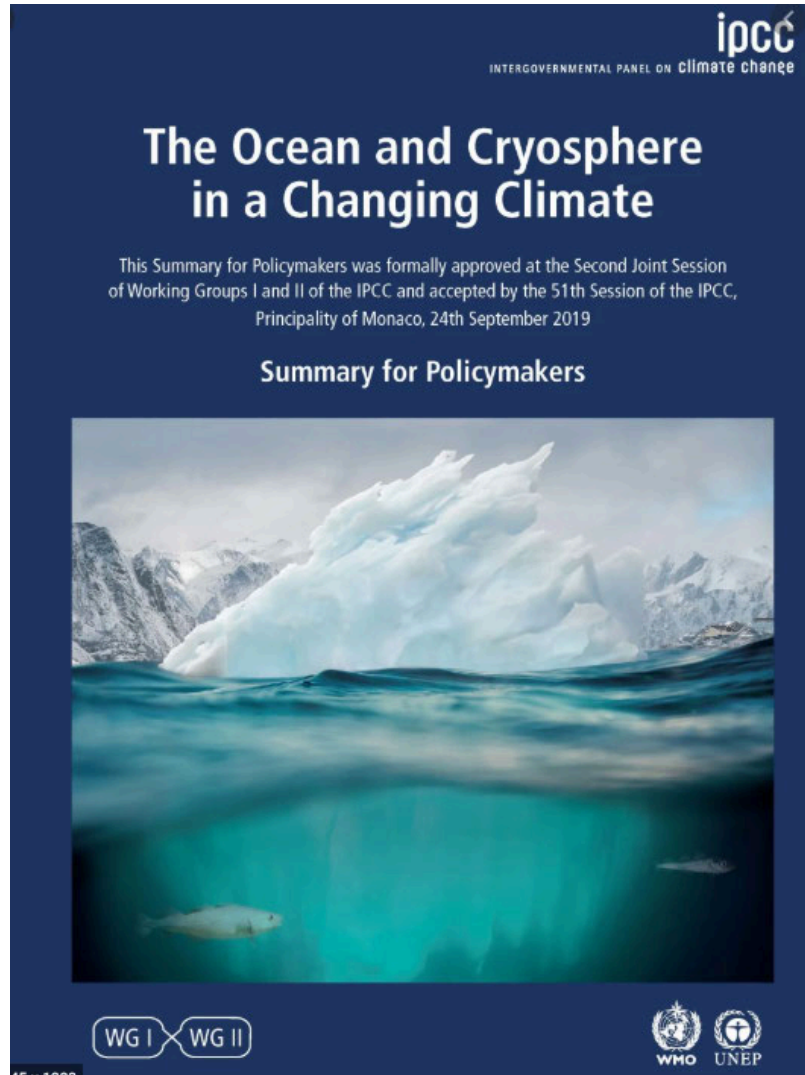
Climate effects in the Baltic Sea

Links between biodiversity and
carbon sequestration

From victim to solution

Christoph Humborg

IPCC SROCC. A clarion wake up call



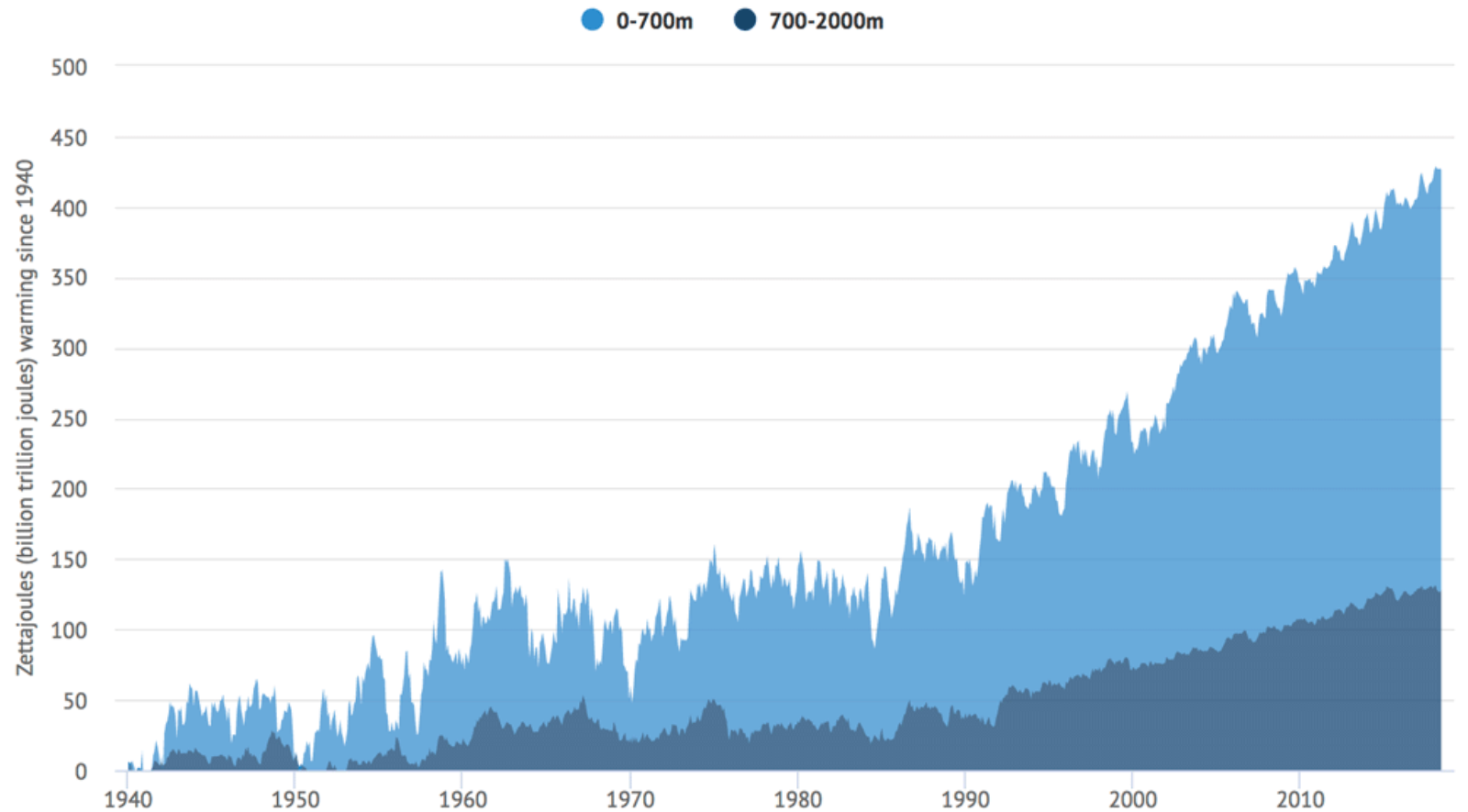
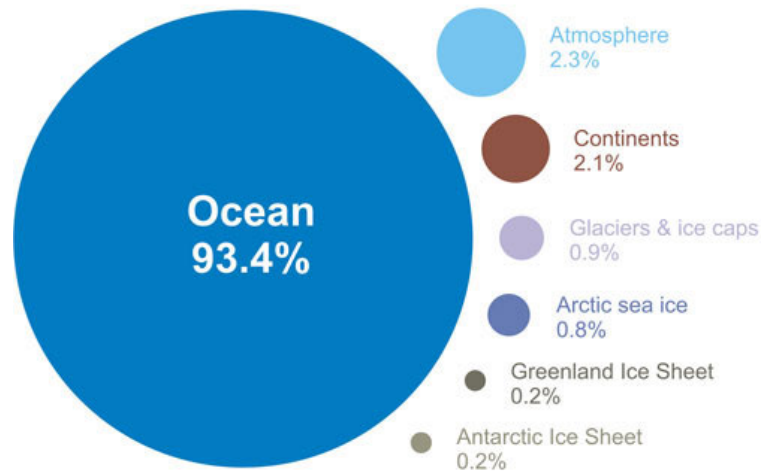
Climate change makes the ocean:

- higher
- warmer
- more acidic
- see heat waves
- hold less oxygen
- less productive
- less predictable

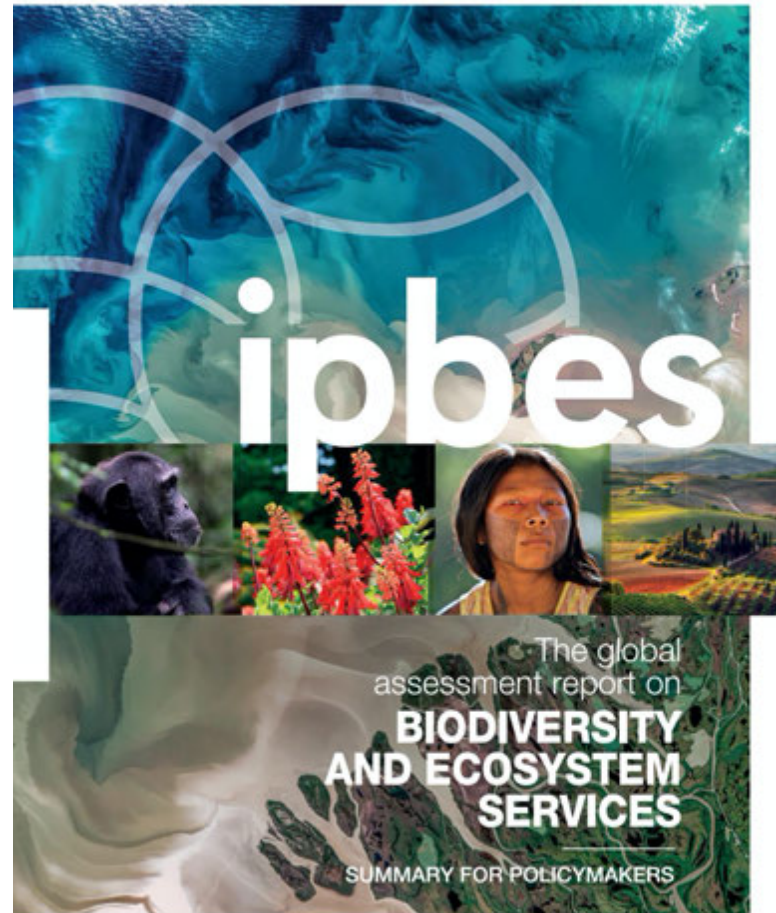
Jane Lubchenco, AUG 2020

OUR OCEANS ARE TAKING THE HEAT – BUFFERING >90% OF GLOBAL WARMING

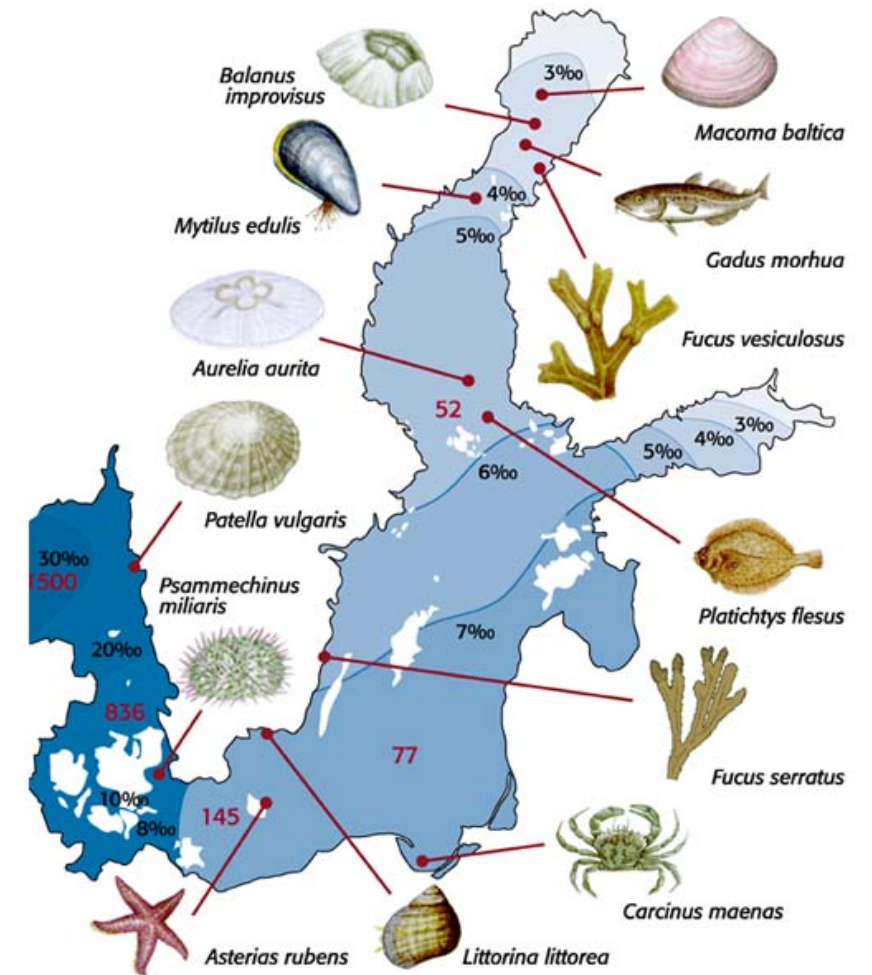
Where is global warming going?



ERODING BIODIVERSITY– THREAT TO SUSTAINABILITY



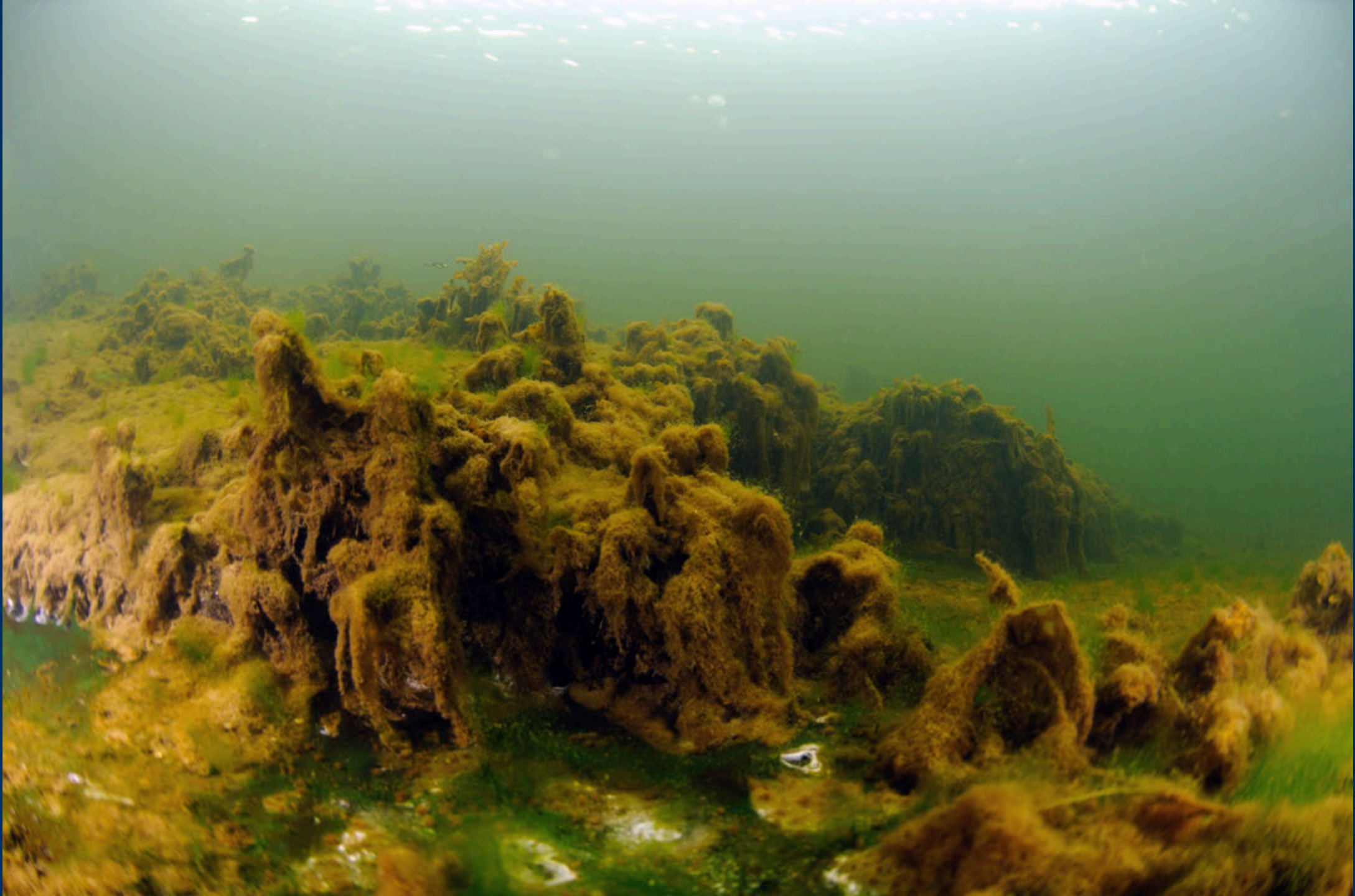
THE BALTIC – A SENSITIVE COASTAL SEA



An aerial photograph of a small, rocky island in the middle of a body of water. On the island, there is a tall, cylindrical lighthouse with a green lantern room, a red-roofed building, and other smaller structures. The water around the island is a deep blue, but in the foreground and to the right, there are large, swirling patches of greenish-brown sediment or algae, indicating eutrophication. The text "EUTROPHICATION – THE LARGEST THREAT TO THE MARINE ECOSYSTEM" is overlaid in white, bold, sans-serif font across the lower half of the image.

EUTROPHICATION – THE LARGEST THREAT TO THE MARINE ECOSYSTEM

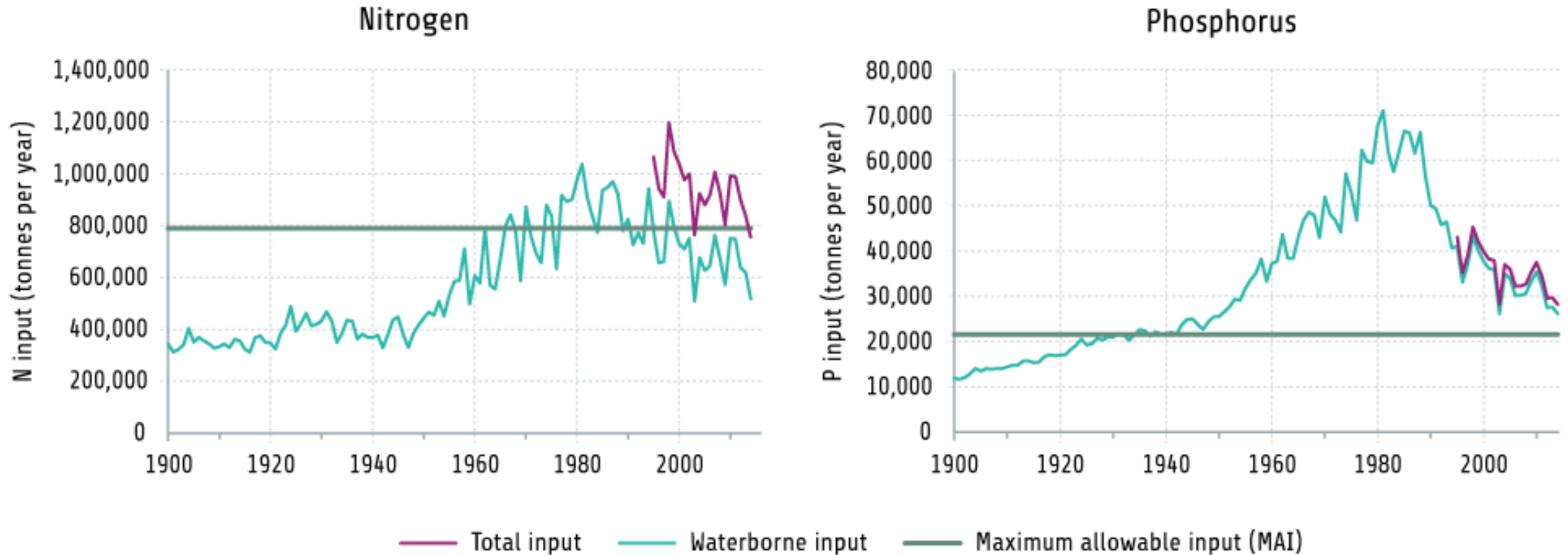
Photo: Alf Norkko



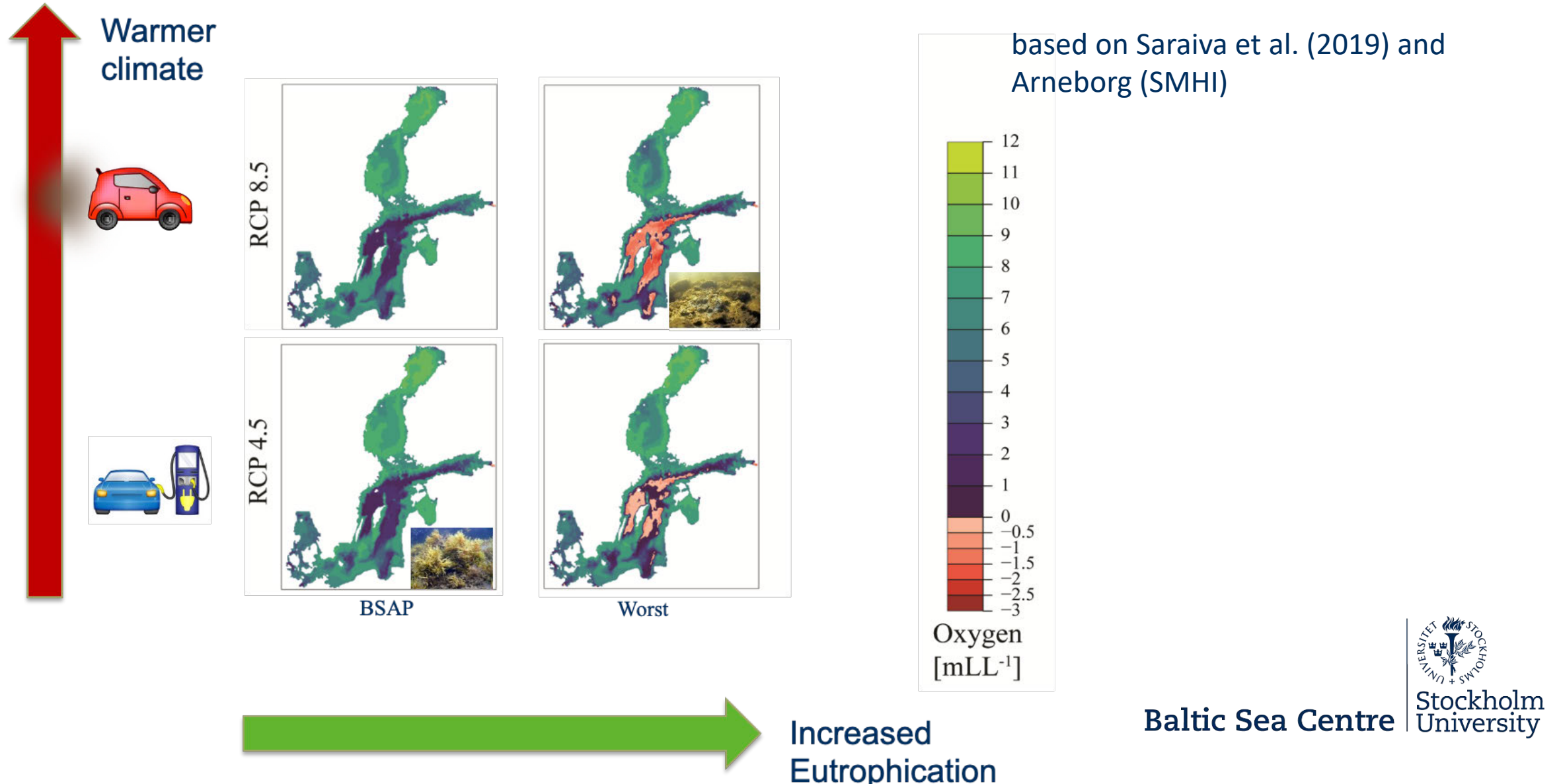
BALTIC SEA ACTION PLAN- A SUCCESS STORY



Waterborne and total nutrient inputs



Measures will improve the Baltic Sea environment - even in a changing climate



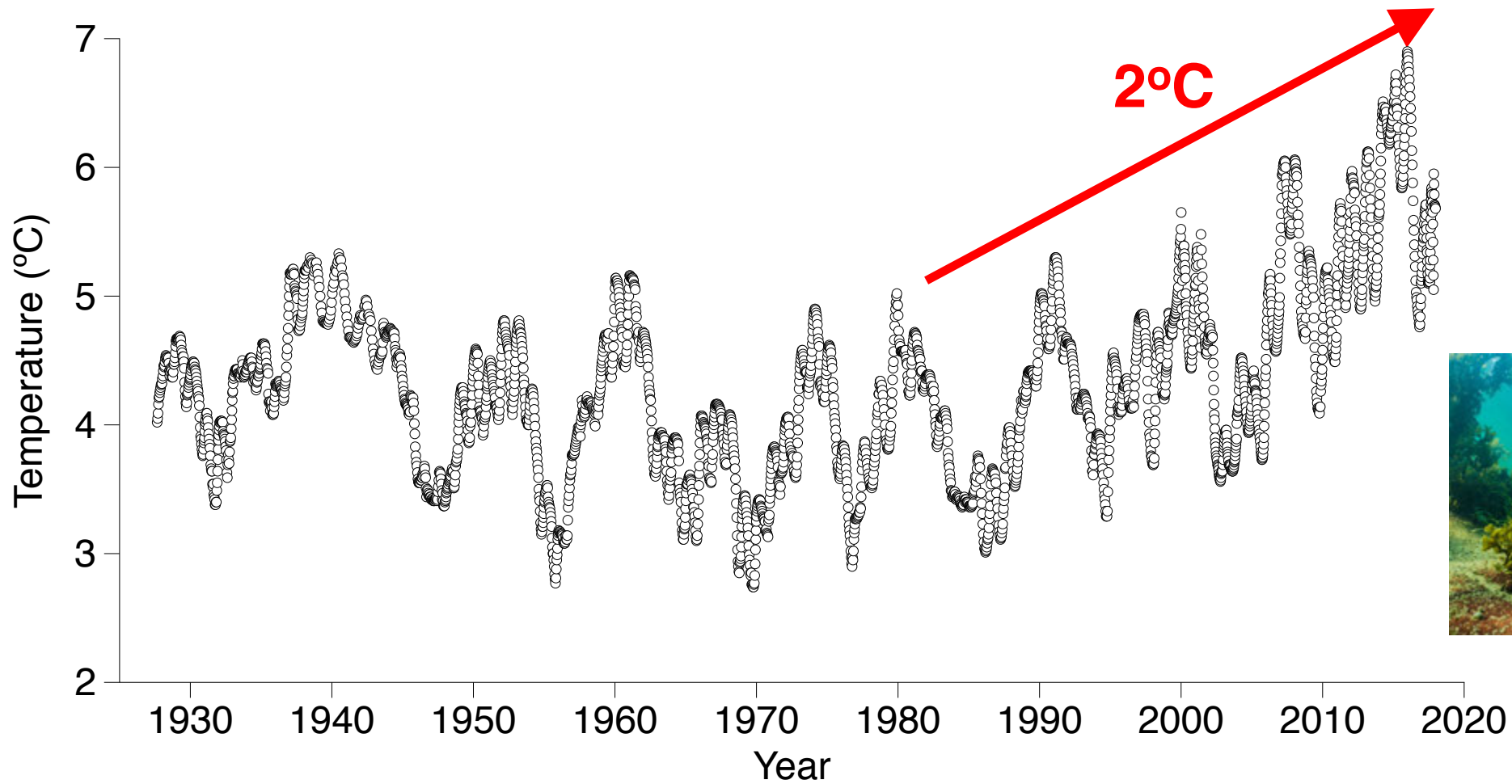
An underwater photograph showing a sandy seabed with patches of green seagrass. Sunlight rays penetrate the water from the top, creating a bright, hazy atmosphere. The seagrass is growing in clumps, and the sand is light-colored with some small rocks and debris.

"BLUE CARBON"

– THE ROLE OF COASTAL BIODIVERSITY

Photo: Mats Westerborn

Water temperature at 31 m



Source: Humborg et al. 2019

Baltic Sea Centre



Photo: Mats Westerborn

Massive methane emissions detected

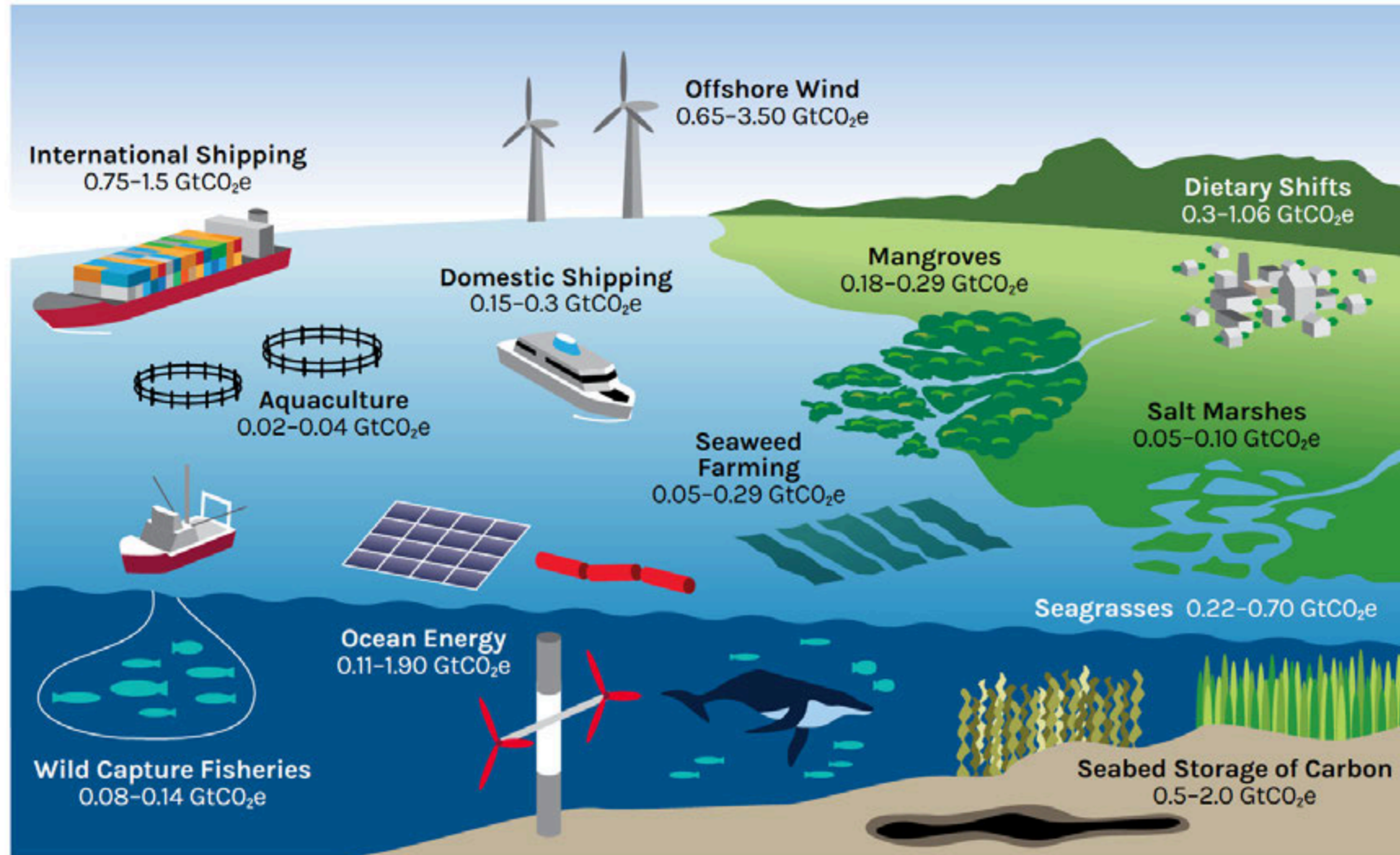


EUTROPHICATION EXACERBATED BY CLIMATE CHANGE - NEGATIVE EFFECTS ON BIODIVERSITY

- **COASTAL AREAS VULNERABLE**
- **PROTECT BIODIVERSITY FROM MULTIPLE PRESSURES – STRONG ACTION NEEDED (MPA)**
- **RESTORE CARBON-RICH ECOSYSTEMS TO BUILD RESILIENCE**

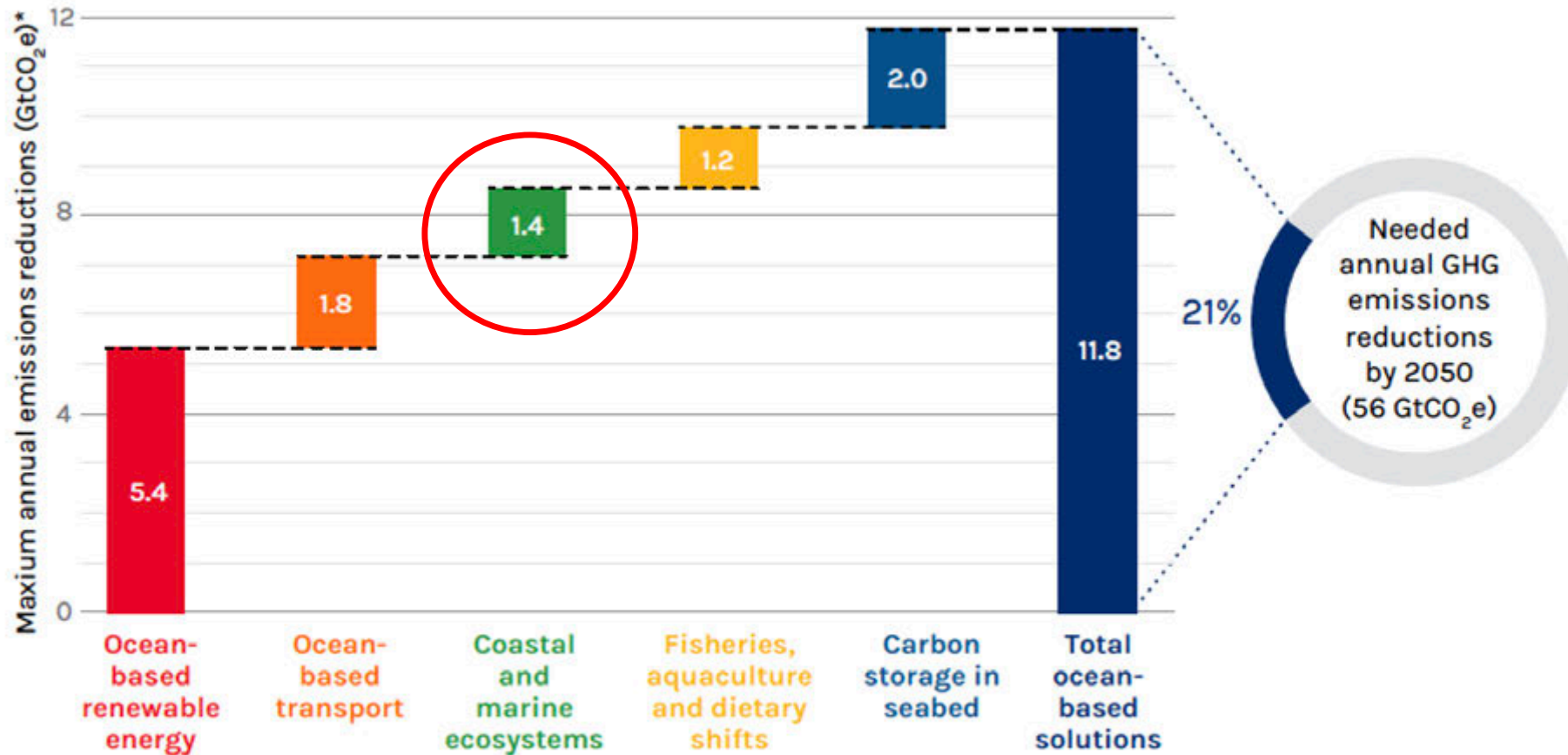
Ocean based mitigation options: From victim to solution

Figure ES-1. Ocean-based Mitigation Options Explored in This Report and Associated Annual Mitigation Potential in 2050



Ocean based mitigation options: From victim to solution

Figure ES-4. Contribution of Five Ocean-based Climate Action Areas to Mitigating Climate Change in 2050 (Maximum GtCO₂e)



Notes: * To stay under a 1.5°C change relative to pre-industrial levels

Source: Authors

Take home messages

- Following the BSAP will improve the open Baltic Sea environment
 - even in a changing climate
- A healthy coastal sea with high biodiversity is critical to achieving global targets to limit climate change