# An ecosystem functioning approach for thinking about cumulative impacts

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FaCE-It 2016 - 2020

WinMon.BE

PERSUADE
EXPERIMENTAL APPROACHES TOWARDS FUTURE SUSTAINABLE USE OF NORTH SEA ARTIFICIAL HARD SUBSTRATES

belspo

# Getting ourselves geolocated...




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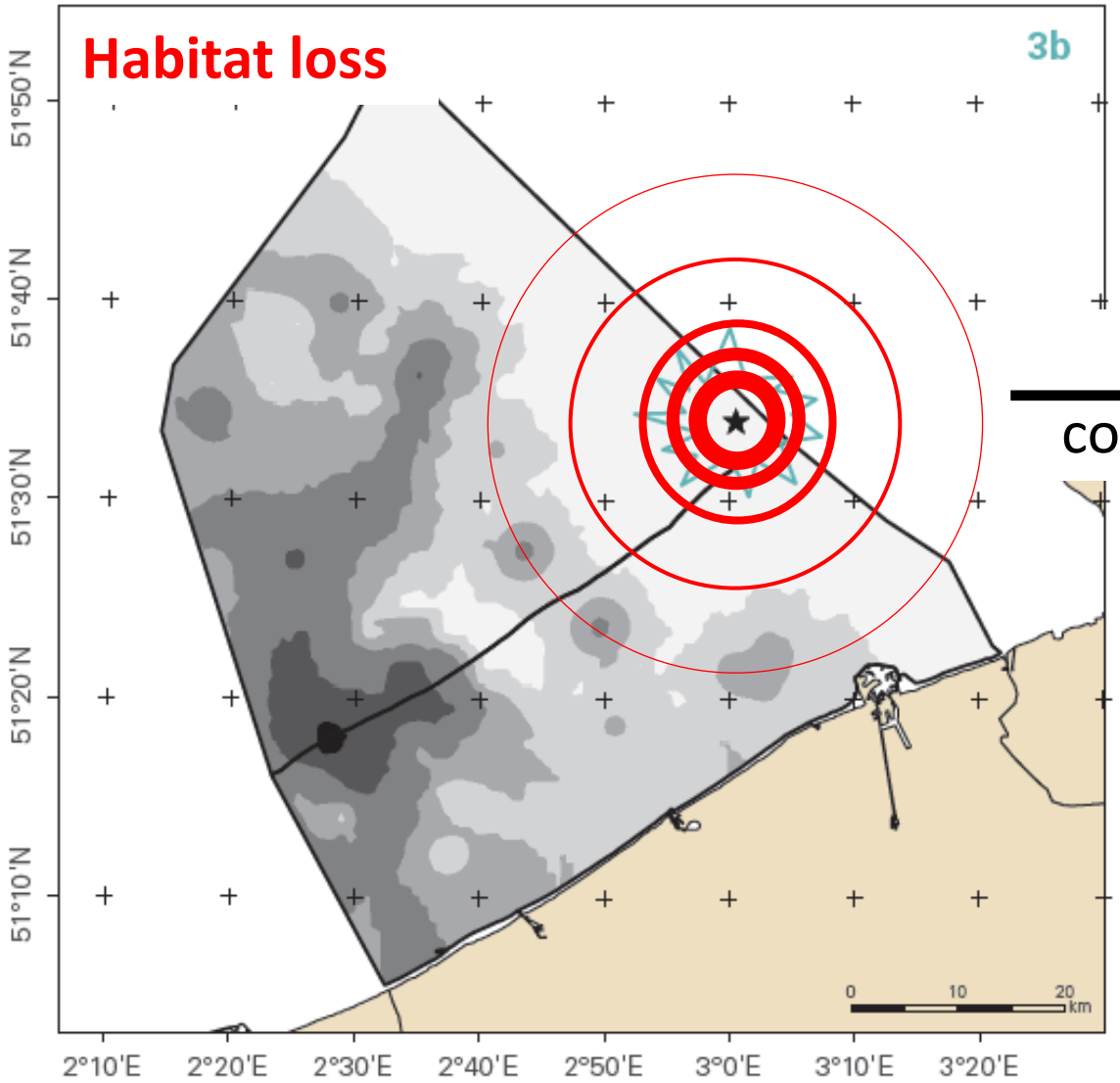
# Three key messages

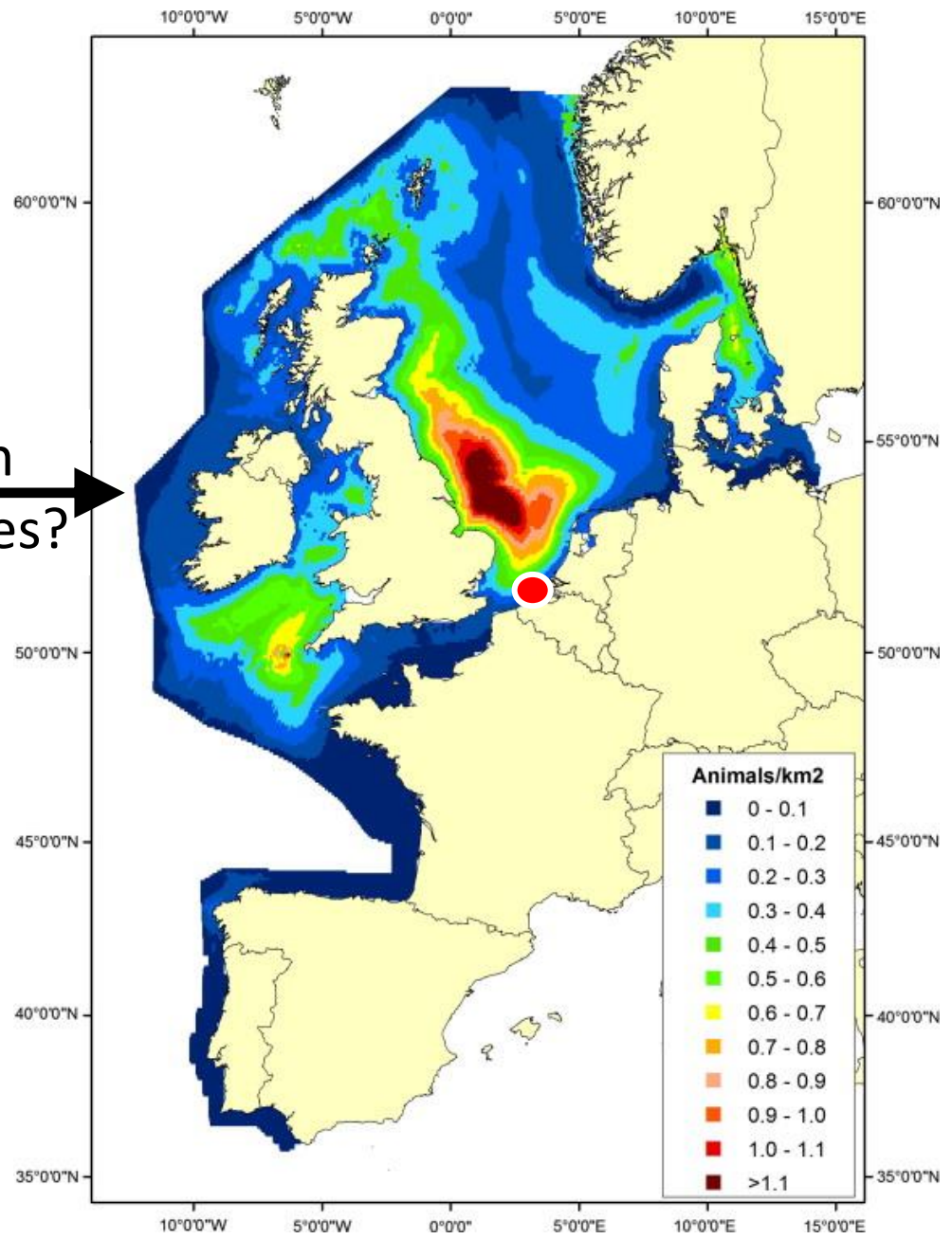
- Impacts can be negative but also positive.
- Meaningfulness of impacts can be assessed only in a cumulative context.
- An understanding of cause-effect relationships behind impacts offers options for mitigating the bad and promoting the good.

# Offshore wind farms and protected species...




Haelters et al., 2015, Hydrobiologia

Population consequences?




Hammond et al., 2013, Biological Conservation

# Offshore wind farms also seem to be attractive...

...for example, for seals

Russell et al., 2014, Current Biology

# Offshore wind farms also seem to be attractive...

**...for commercial species**

e.g. Reubens et al., 2015, Hydrobiologia

# Offshore wind farms also seem to be attractive...

...for fouling invertebrates

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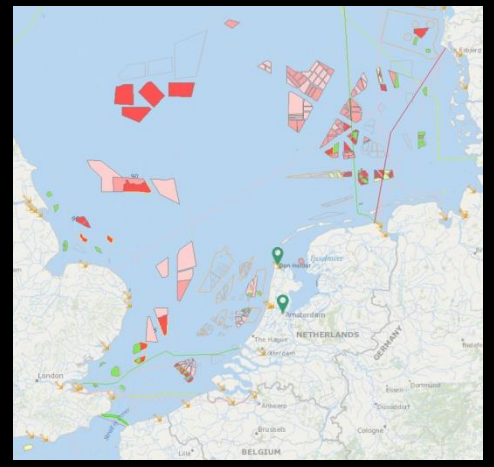
# Tackling "so what"?

Single wind turbine

Single wind farm

Multiple wind farms

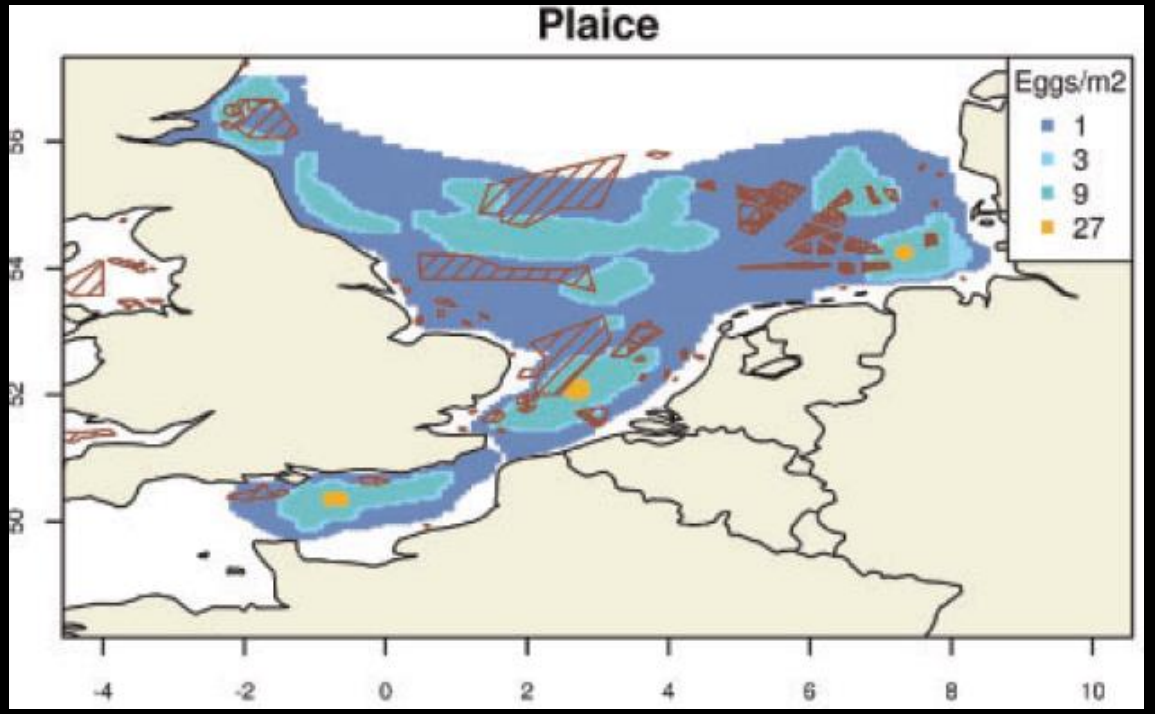



**Current monitoring and research programs**

**Here's where we want to be**

# Taking the blinders off means

- Tackling the issues at the appropriate spatial scale
- Understanding the cause-effect relationships
- Spatial contextualisation of locally observed impacts



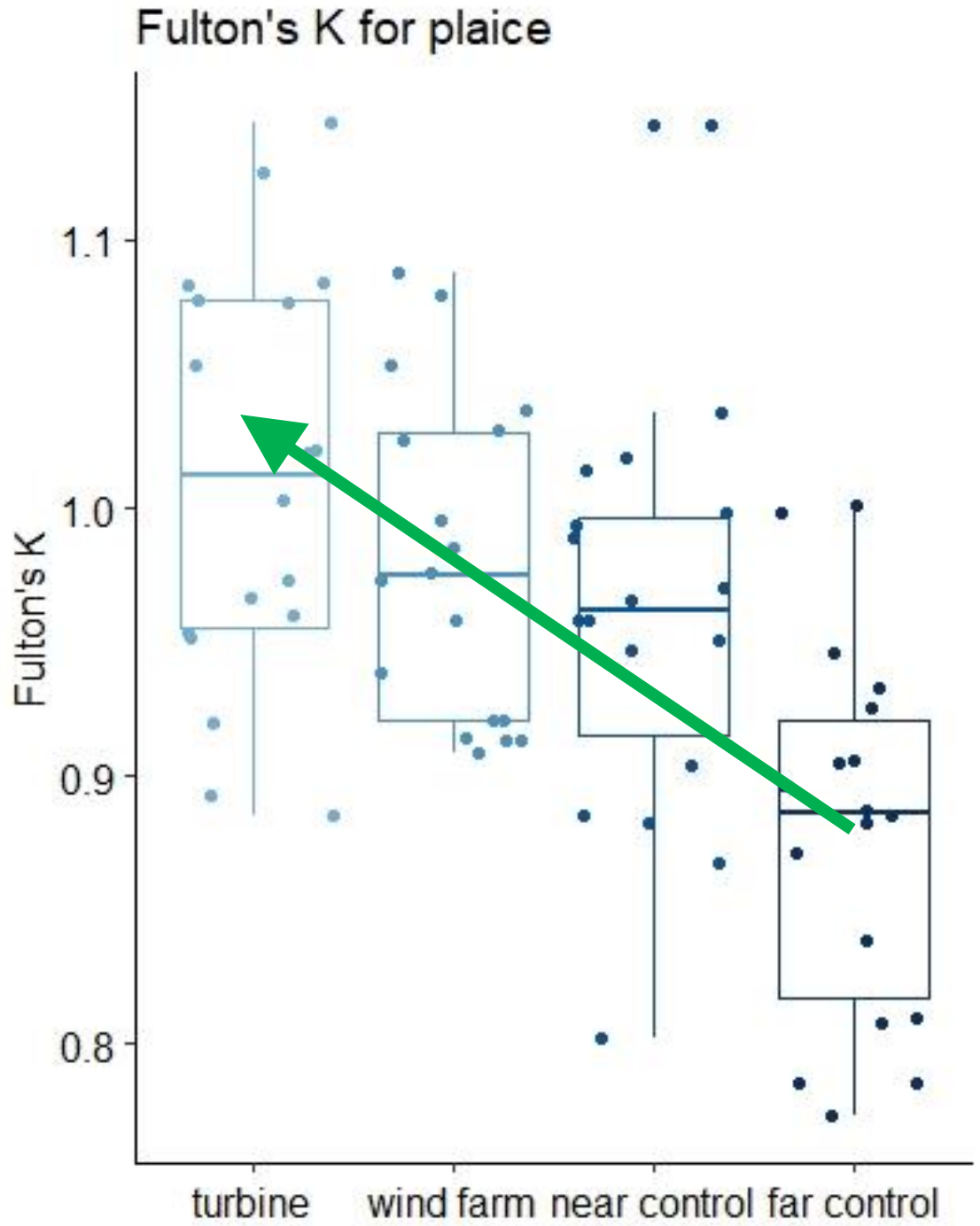

Expected change of settlement under different scenarios of altered egg production

| | −20% | +10% | +25% | + 50% |
|---|---|---|---|---|
| Plaice | −1.78 | −0.89 | 2.25 | 4.45 |
| Turbot | −0.4 | 0.2 | 0.5 | 1 |
| Dab | −3.22 | 1.61 | 4.03 | 8.05 |
| Sole | −0.36 | 0.18 | 0.45 | 0.9 |
| Brill | −1.38 | 0.69 | 1.73 | 3.45 |
| [illegible] | [illegible] | [illegible] | 0.58 | 1.15 |

Barbut et al., 2020, ICES Journal of Marine Science

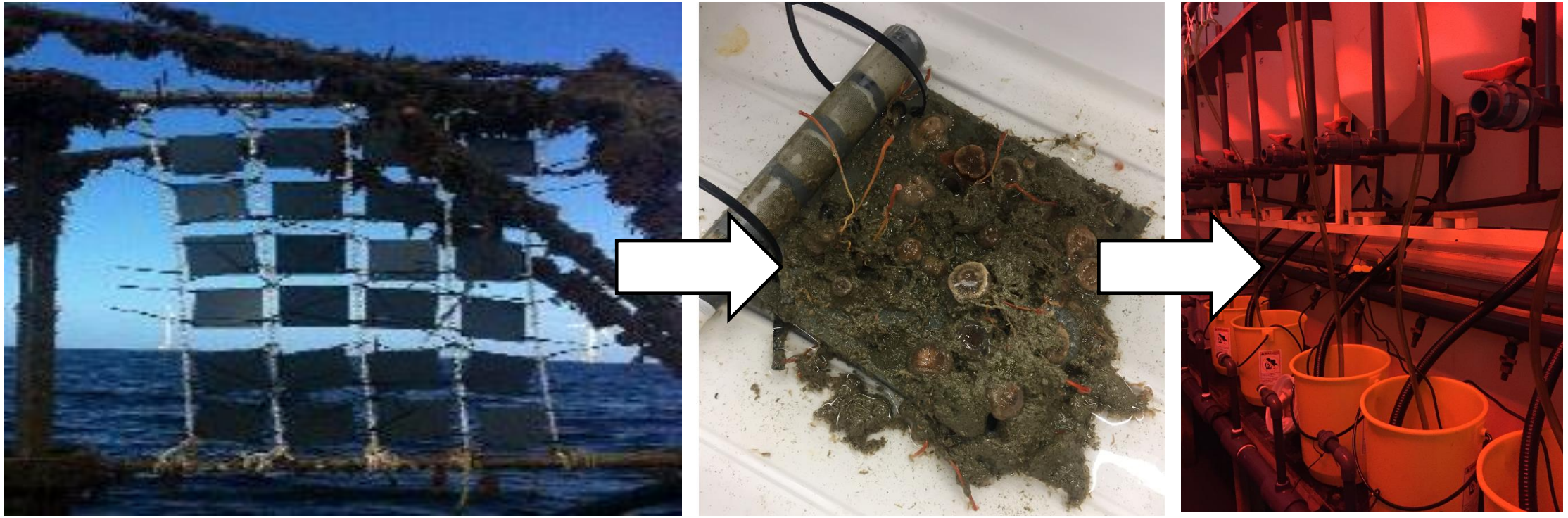
**Need for assessing at appropriate spatial scales**

# Understanding cause-effect relationships…




Buyse, unpublished data ILVO

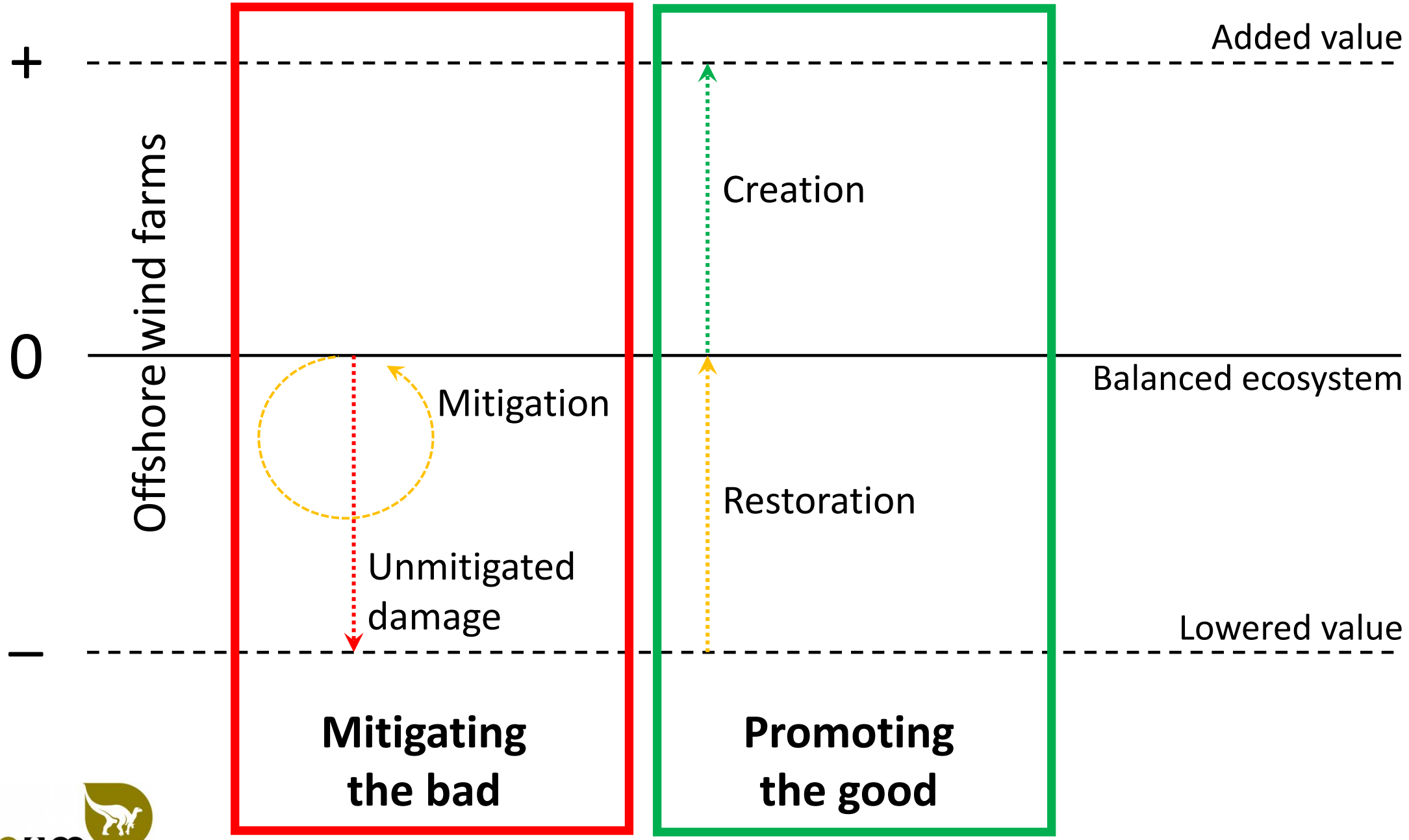
Spatial contextualisation of locally observed impacts…



- Fauna on 1 GBF consumes (annually)
  - 0.25% of primary production within C-POWER
  - 0.0004% of primary production within BPNS

- All currently existing turbines consume (annually)
  - 1.3% of primary production within BPNS

Mavraki et al., 2020, ICES Journal of Marine Science


+
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–
Offshore wind farms
Added value
Creation
Balanced ecosystem
Mitigation
Restoration
Unmitigated damage
Lowered value
Mitigating the bad
Promoting the good

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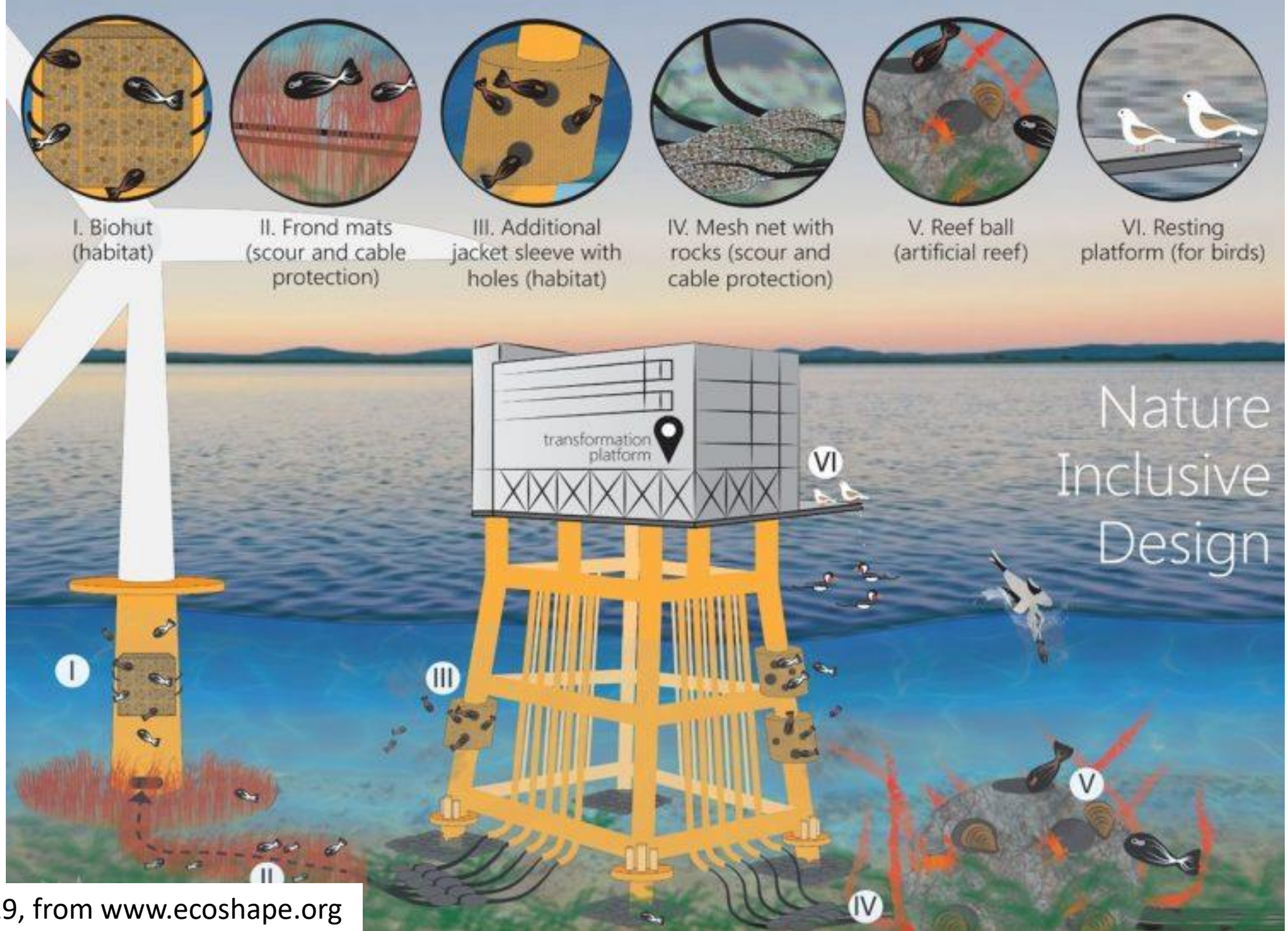
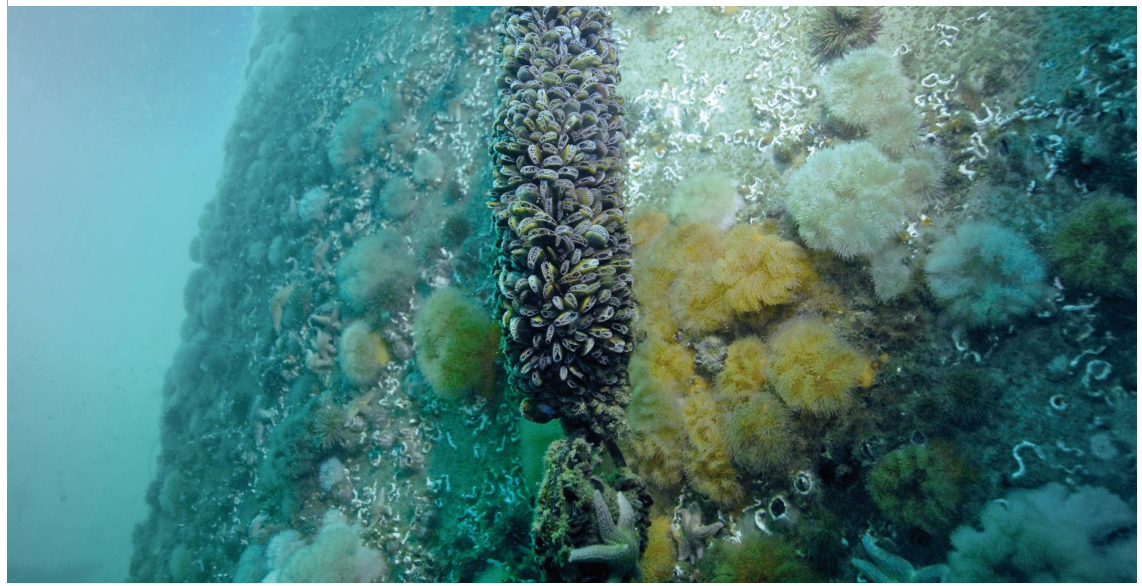



Witteveen + Bos, 2019, from www.ecoshape.org

# When thinking about cumulative effects, don’t forget about...



- Positive impacts.
- Taking the blinders off
- Considering options for restoration and creation of natural value

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Thank you for your attention