Developing an indicator of the state of offshore habitats: a UK case study using a spatially-explicit vulnerability model

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Joint Nature Conservation Committee, UK

ICES Symposium:
"Effects of fishing on benthic fauna, habitat and ecosystem function"

Tromsø, 17 June 2014

Who is JNCC?

Joint Nature Conservation Committee

- Public body that advises UK governments on UK-wide and international nature conservation.
- Provides evidence, information and advice towards the protection of natural resources.
- Key role in UK's offshore marine nature conservation, including identifying, monitoring and advising on protected areas and on the impacts of offshore industries.

Background to the method

Joint Nature Conservation Committee

Marine biodiversity status assessments are required to:

- deliver national & international reporting obligations, e.g. MSFD
- inform management at different scales

Assess the condition of Annex I Reef and Sandbanks in UK offshore waters as part of the 2007-2012 reporting under the Habitats Directive

Developing an indicator of the state of offshore habitats

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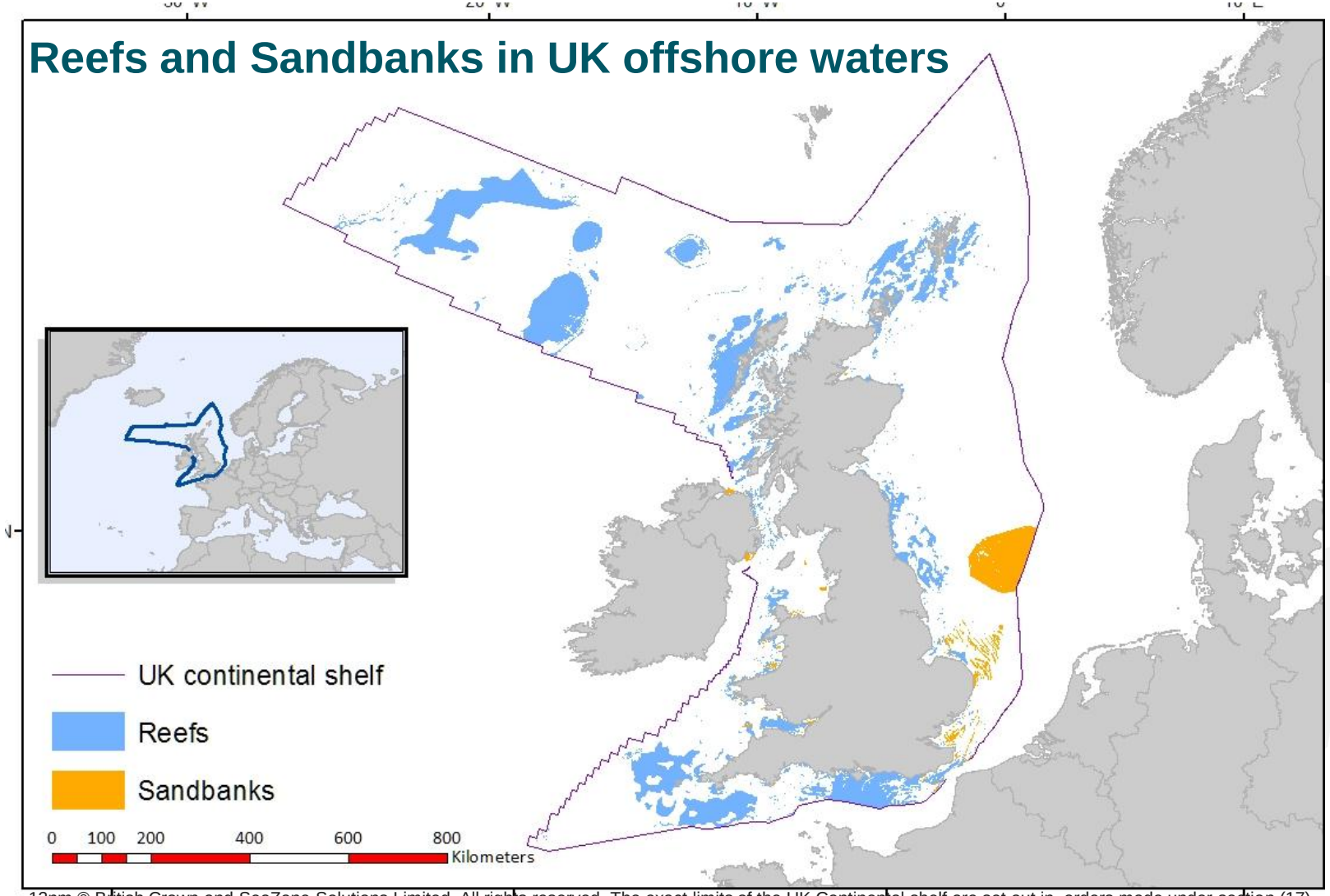

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In the absence of operational biological indicators we need interim assessment framework that uses:

- best available scientific information
- expert judgement

JNCC → exploring use of **spatially-explicit assessment of vulnerability** to assess the likely condition of benthic habitats

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Vulnerability to Pressure p_0 = ***f*** (Sensitivity & Exposure)

- If the habitat is *vulnerable* → ***not likely*** to be in good condition
- Method is applicable at **multiple scales** and can incorporate **multiple pressures** acting at the same spatial location

Vulnerability assessment:
Example of offshore Annex I Reefs

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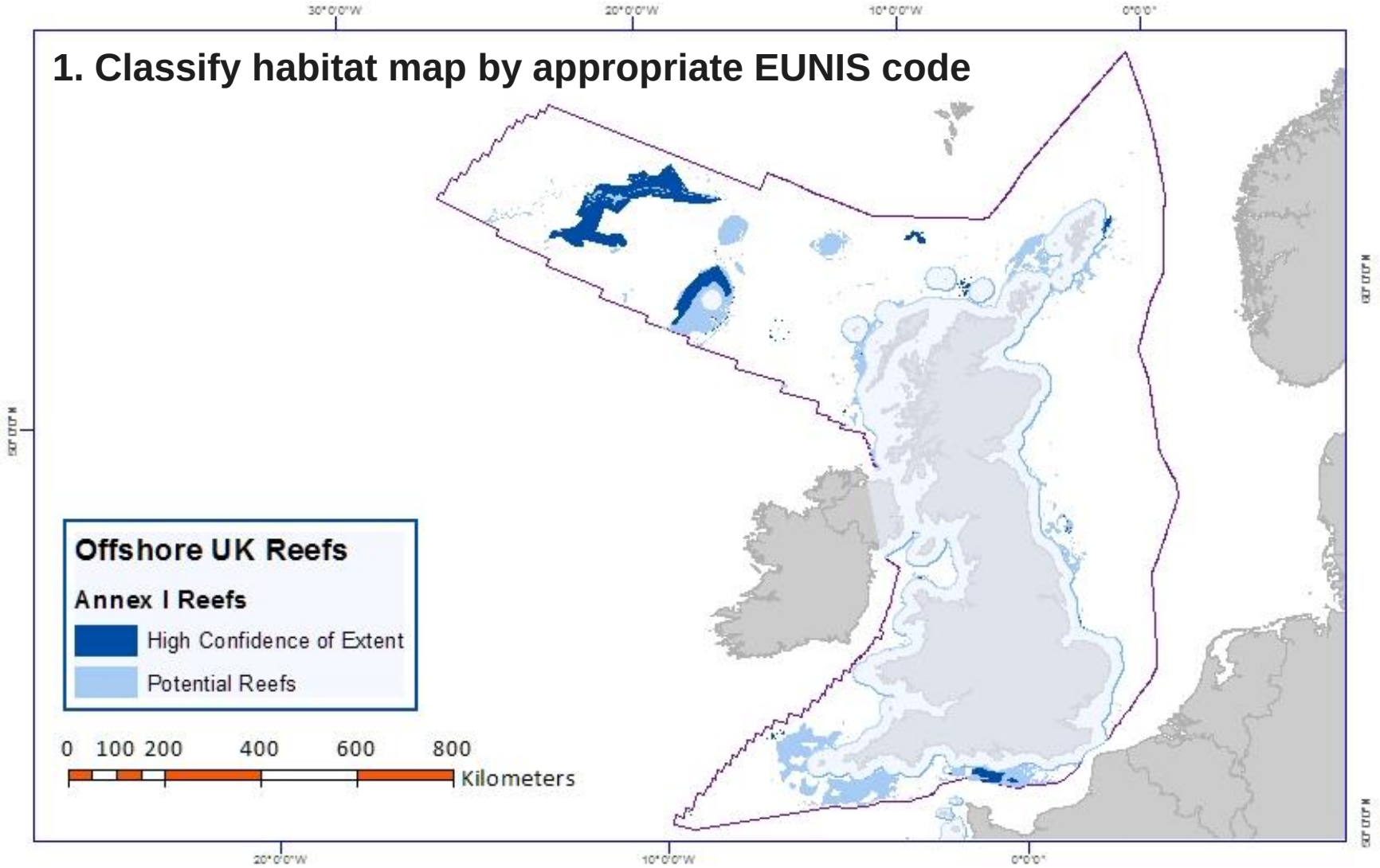
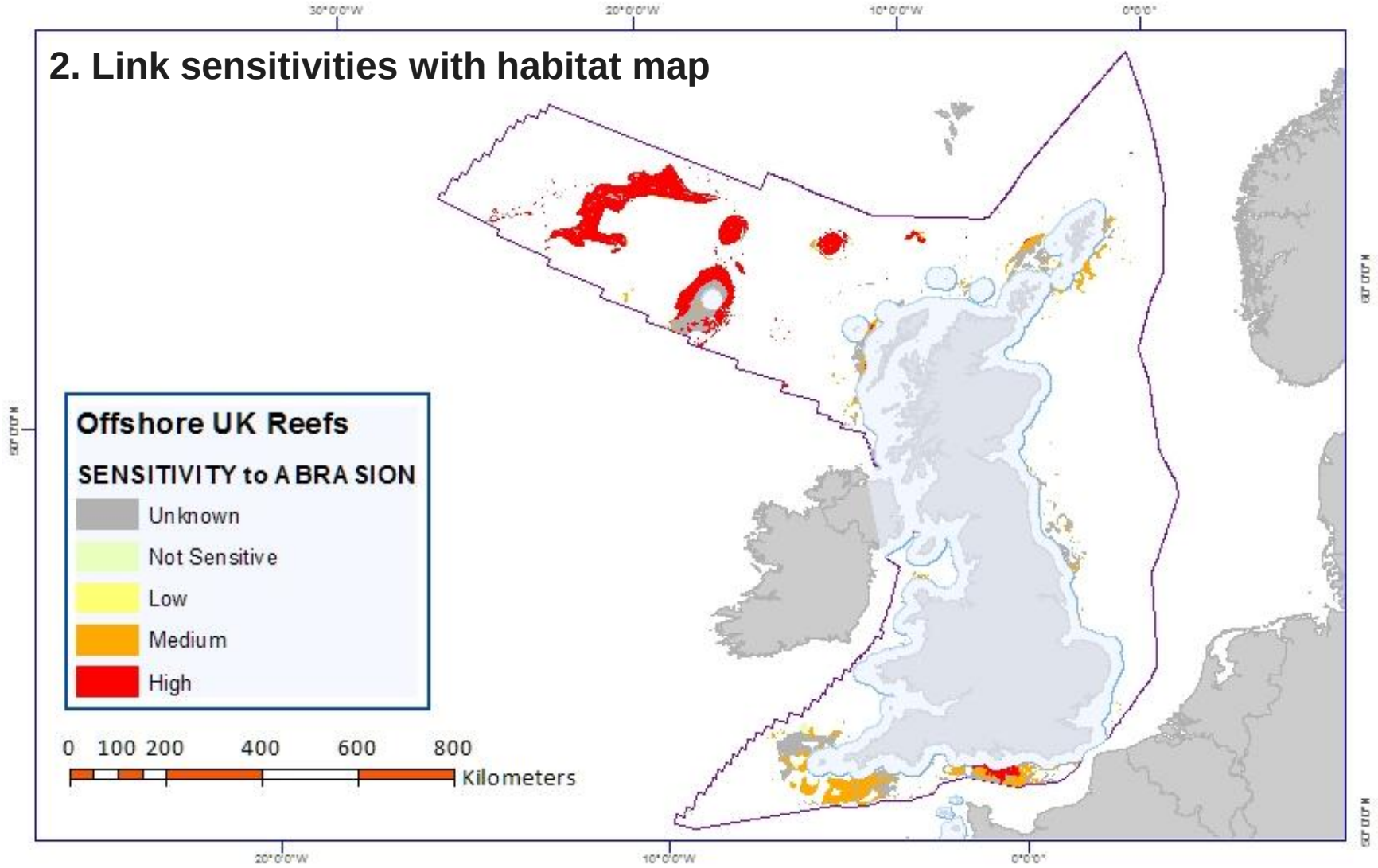


Vulnerability assessment:
Example of offshore Annex I Reefs

Joint Nature Conservation Committee



Vulnerability assessment:
Example of offshore Annex I Reefs

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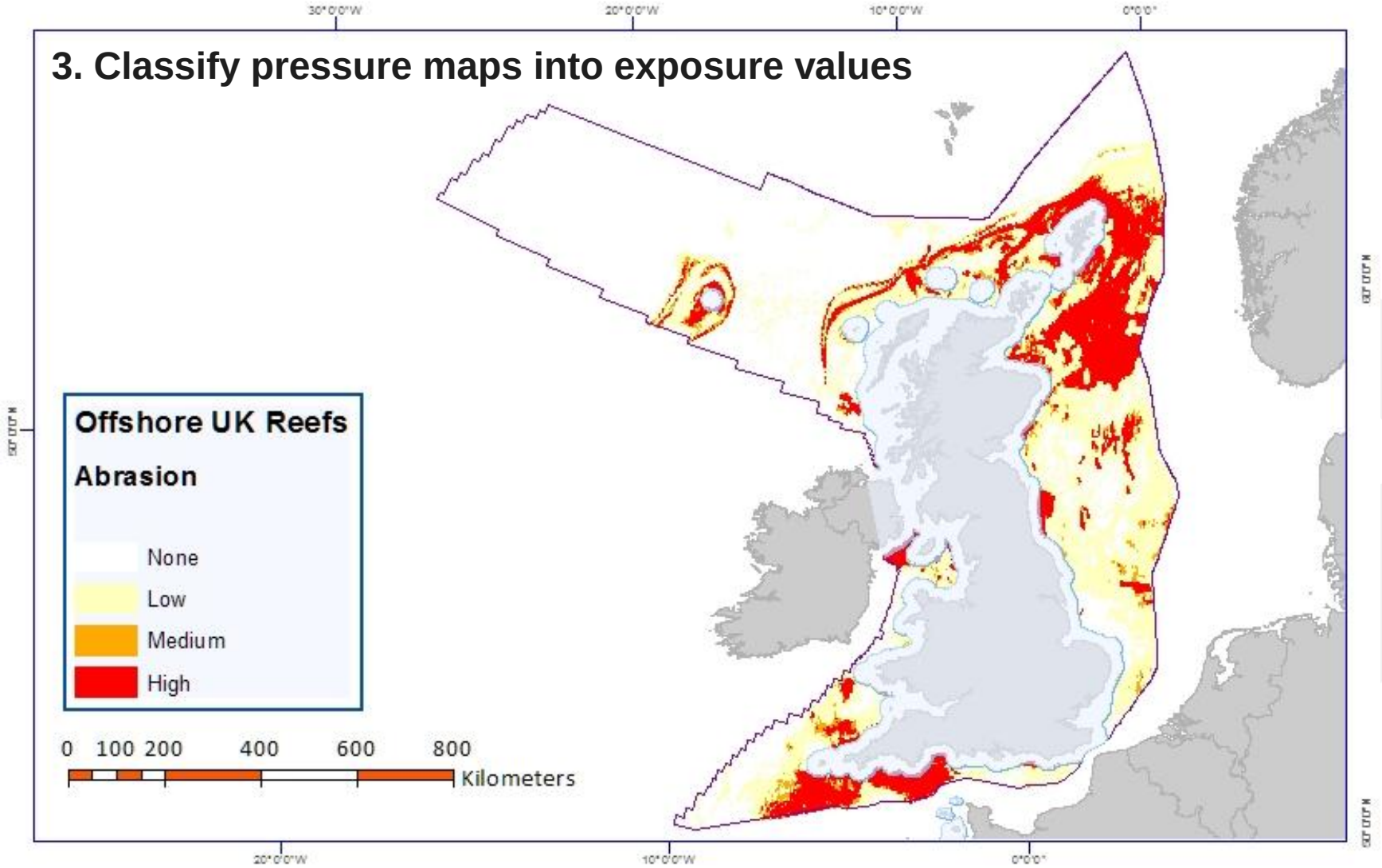

Vulnerability assessment:
Example of offshore Annex I Reefs

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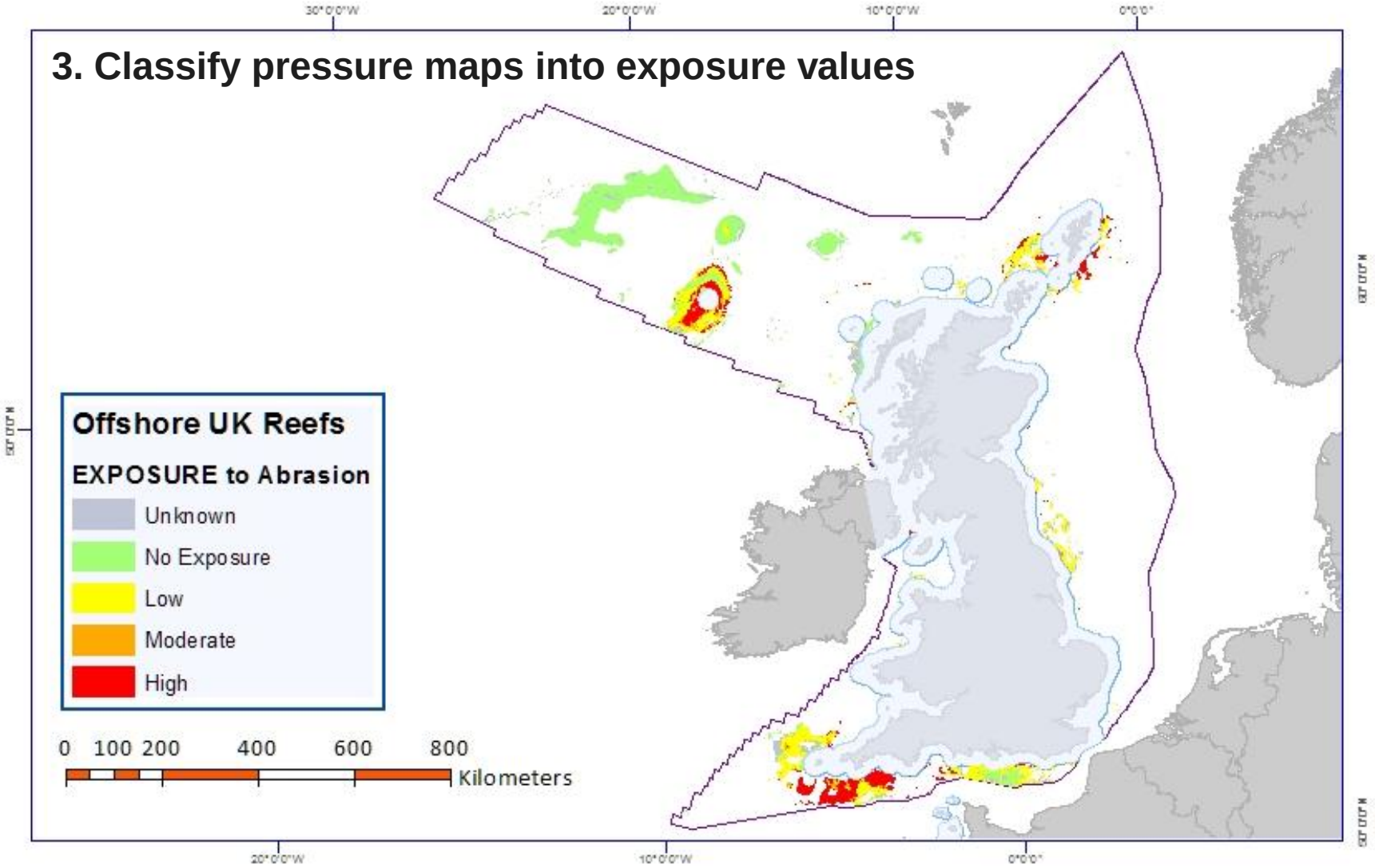

Vulnerability assessment:
Example of offshore Annex I Reefs

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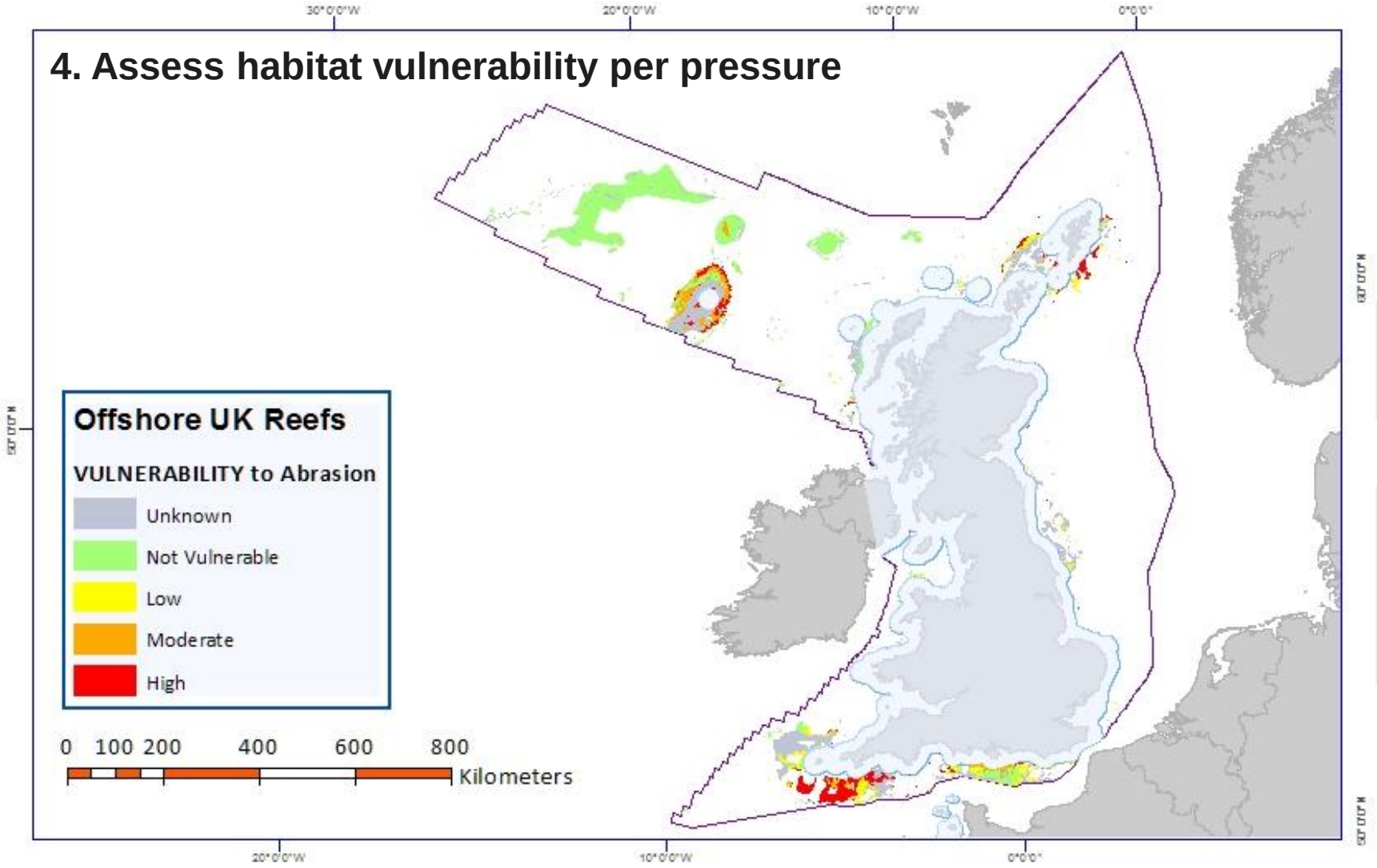


Cumulative effect

- Habitat vulnerability assessed independently for each pressure
- Overall habitat vulnerability calculated by selecting worst case assessment in any given location

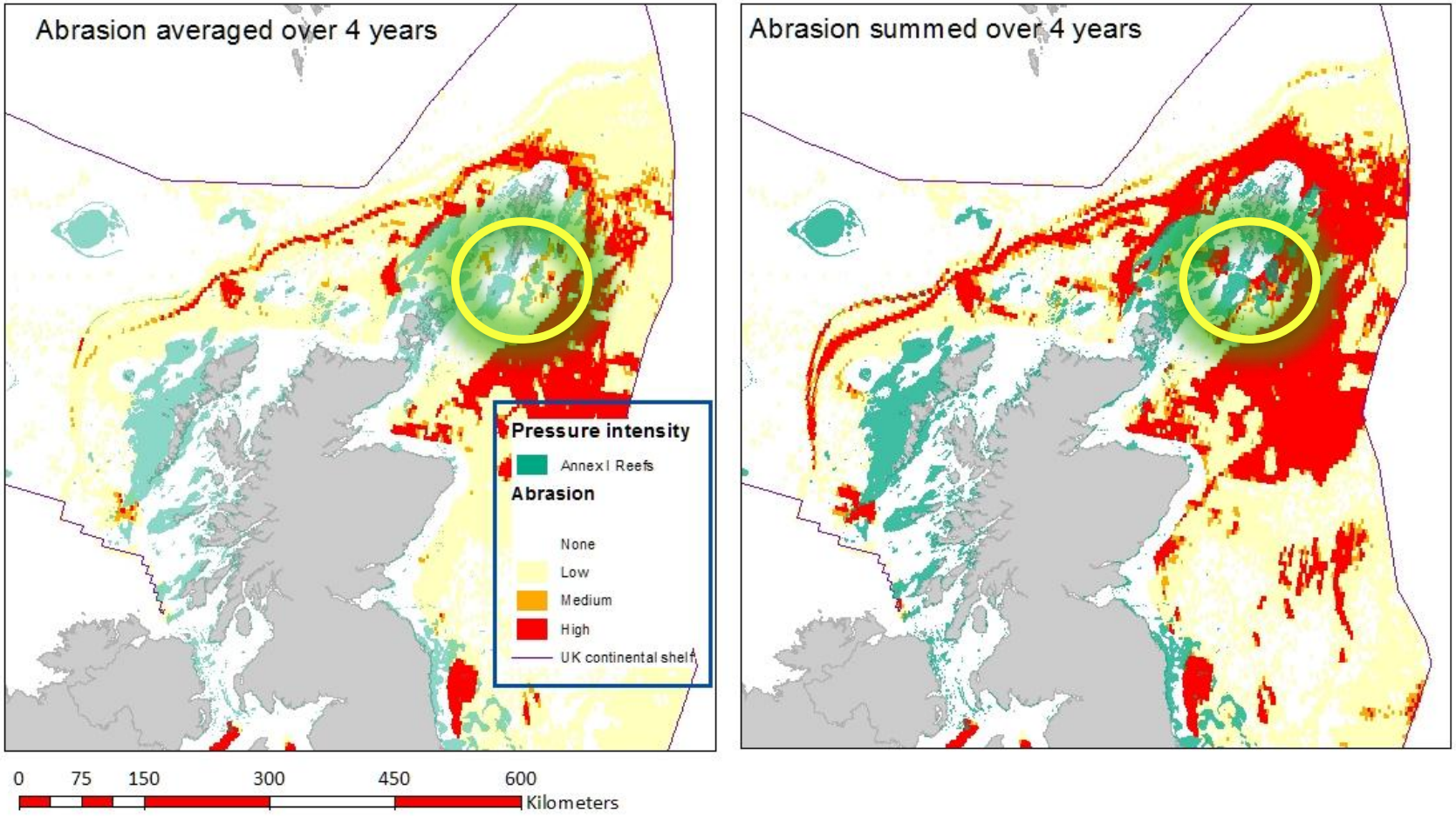
Scenario testing

The method allows for testing how the outcome of the vulnerability assessment varies depending on different sets of assumptions, e.g:

- Which spatial scale is the assessment undertaken at (i.e. wider environment vs MPAs)?
- Which features have been selected, in terms of confidence, from the underlying feature map?
- What habitat categorisation has been applied to the features?
- Which sensitivity score has been applied to a feature for each pressure?
- What pressures have been selected?
- What thresholds have been used to generate exposure classes?

Scenario testing

- For example, investigating changes in cumulative abrasion as a result of different aggregation methods



Scenario testing

By varying the input variables we can test which parameters have a greater influence in the overall results → in this case varied depending on habitat

Annex I Reef

- Assessment result primarily driven by exposure to abrasion pressure → many of the habitat sensitivities are 'high'

Annex I Sandbanks

- Assessment result primarily driven by sensitivity score → most scores are expressed in ranges

Benefits of model

- Useful to trial different assumptions to assess the effect on the overall assessment
- Multiple scales
- Applicable to different requirements (e.g. likely condition, management advice, risk based approach to monitoring)
- Decision-support tool

Evolving the method

To improve the robustness of the vulnerability assessments we need to improve:

- Resolution of habitat maps and inclusion of point data
- Knowledge of pressure-state relationships
- Spatial resolution of activities data & linkages with pressures
- Analysis of cumulative effects and the prioritisation of pressures

Ongoing and future work

Offshore MPA assessment pilot

JNCC and Cefas are working together to look at the applicability of this method at the site scale for UK offshore MPAs → focusing on issues of data scale and resolution, exploring assumptions within the model, and ways of making use of additional data sources

OSPAR priority candidate indicator:

JNCC is working with German colleagues to develop an OSPAR priority candidate indicator titled 'Physical damage of predominant and special habitats (BH-3)' → draw on experience and lessons-learnt from the method described here

Thank you!

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