



SEAs of
Uncertainty

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**What is
Uncertainty?**

What is Uncertainty?

- Complex world
- Probabilities for different key parameters or possible futures are unknown
- Key parameters or possible futures are unknown
- Different levels of uncertainty from statistical uncertainty to recognized ignorance
- Different locations of uncertainty such as Data, Models or Expert judgement

Short timeline of Offshore Wind Development in Norway

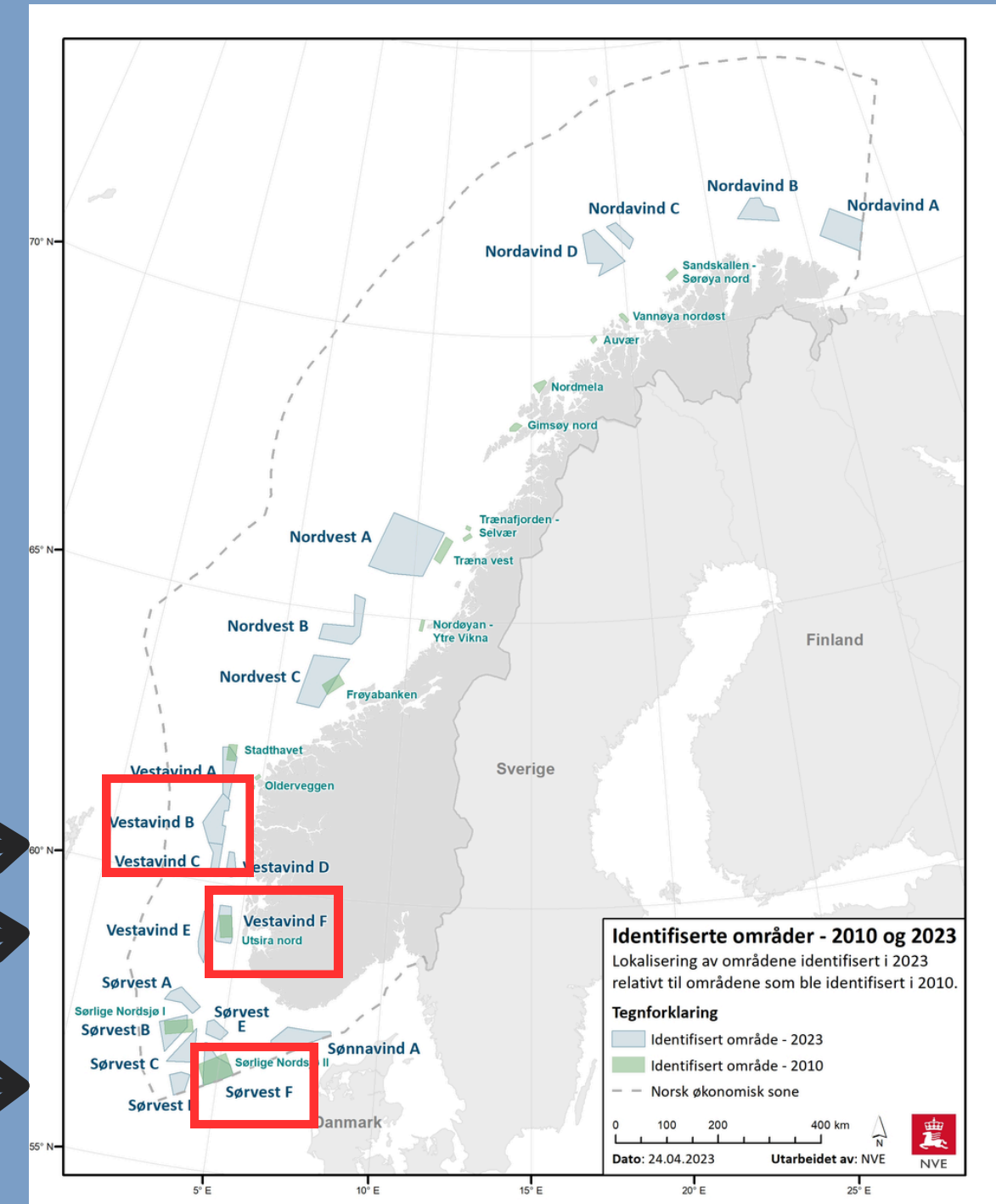
2023

NVE releases 20 potential areas for offshore wind

2024

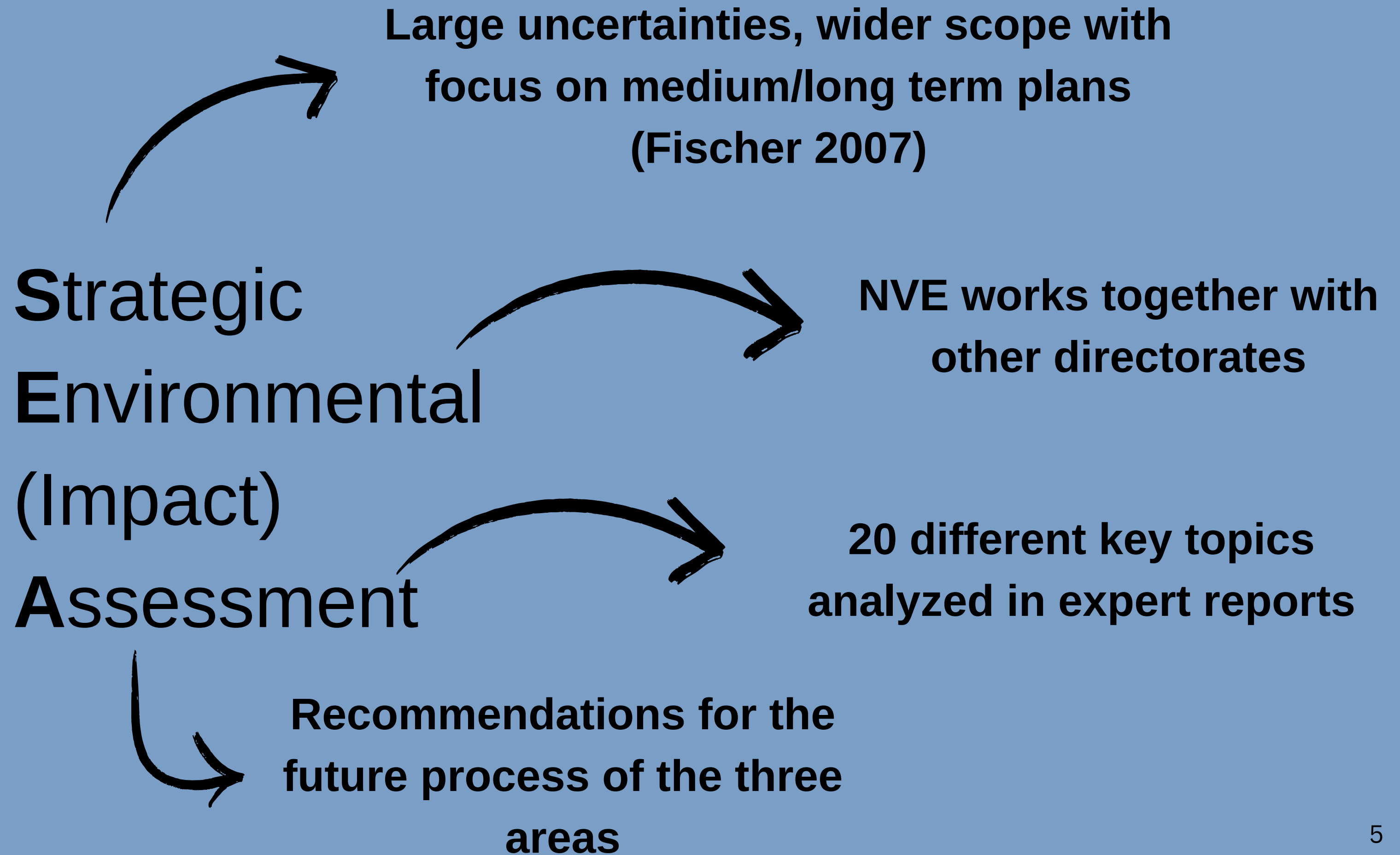
NVE releases SEAs for three areas:

- Vestavind B
- Vestavind F
- Sørvest F



NVE: Norwegian Water Resources and Energy Directorate

Map of potential Offshore Wind areas presented by NVE in 2023



Method: Uncertainty Assessment

Problem
Framing

Stakeholders

Main Indicators

Level of
Knowledge

Key
Uncertainties

Communication
of Uncertainties

Level of Knowledge



High level of knowledge of abundance for certain marine animals and habitats

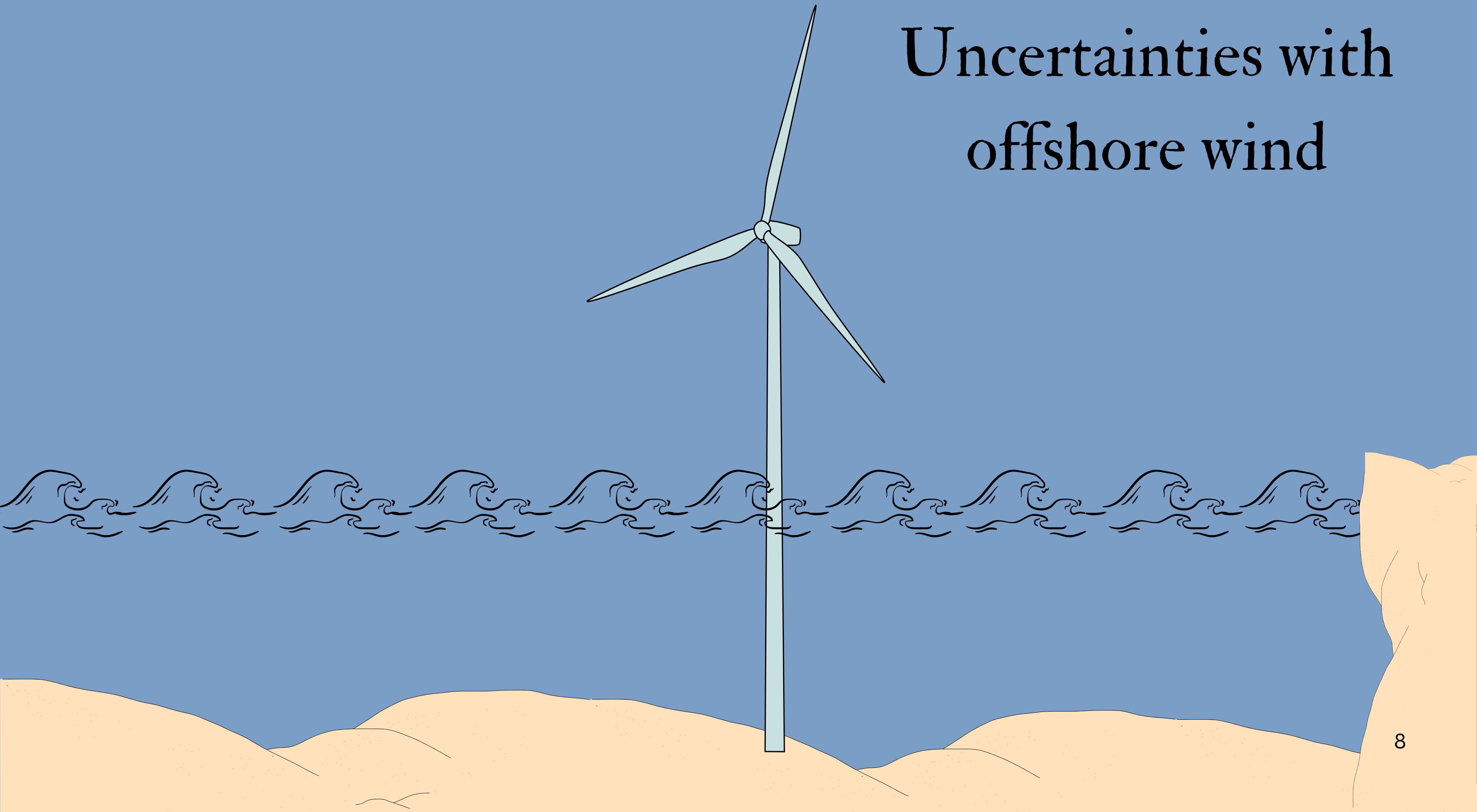


Medium level of knowledge for abundance for certain marine animals and certain possible impacts of offshore wind



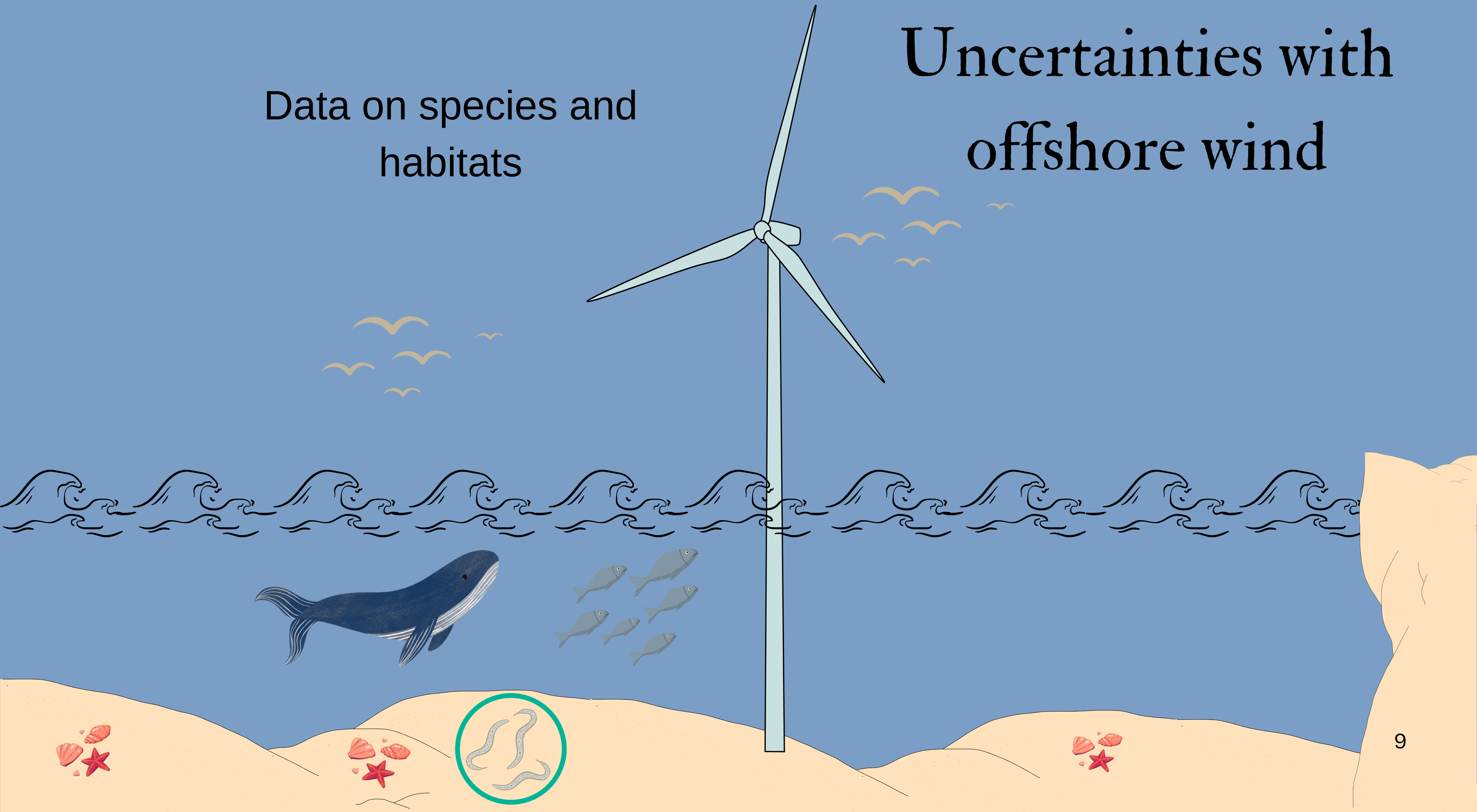
Low level of knowledge for floating turbines, most impacts of offshore wind and abundance of smaller marine animals

Uncertainties with offshore wind



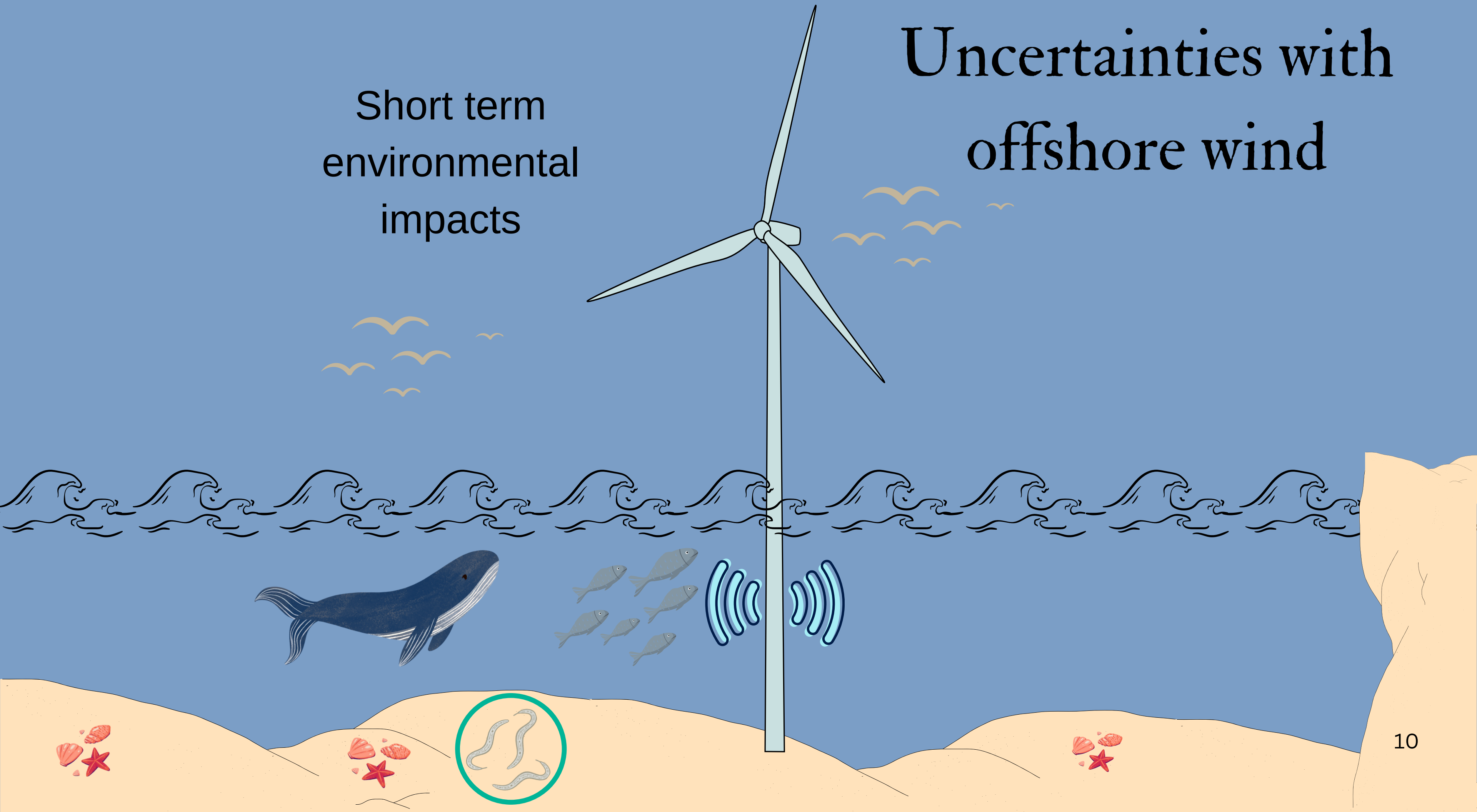
Data on species and habitats

Uncertainties with offshore wind



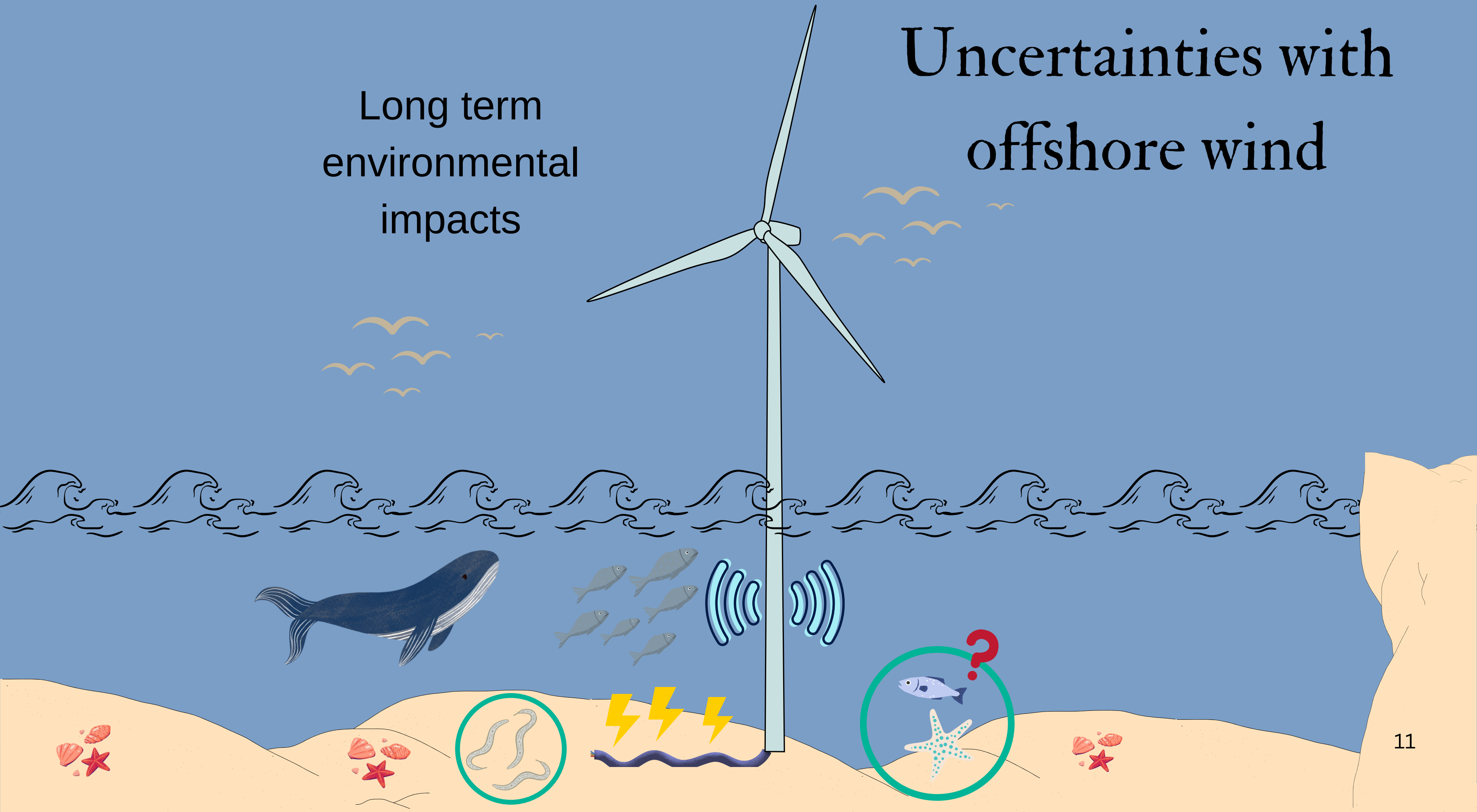
Uncertainties with offshore wind

Short term environmental impacts



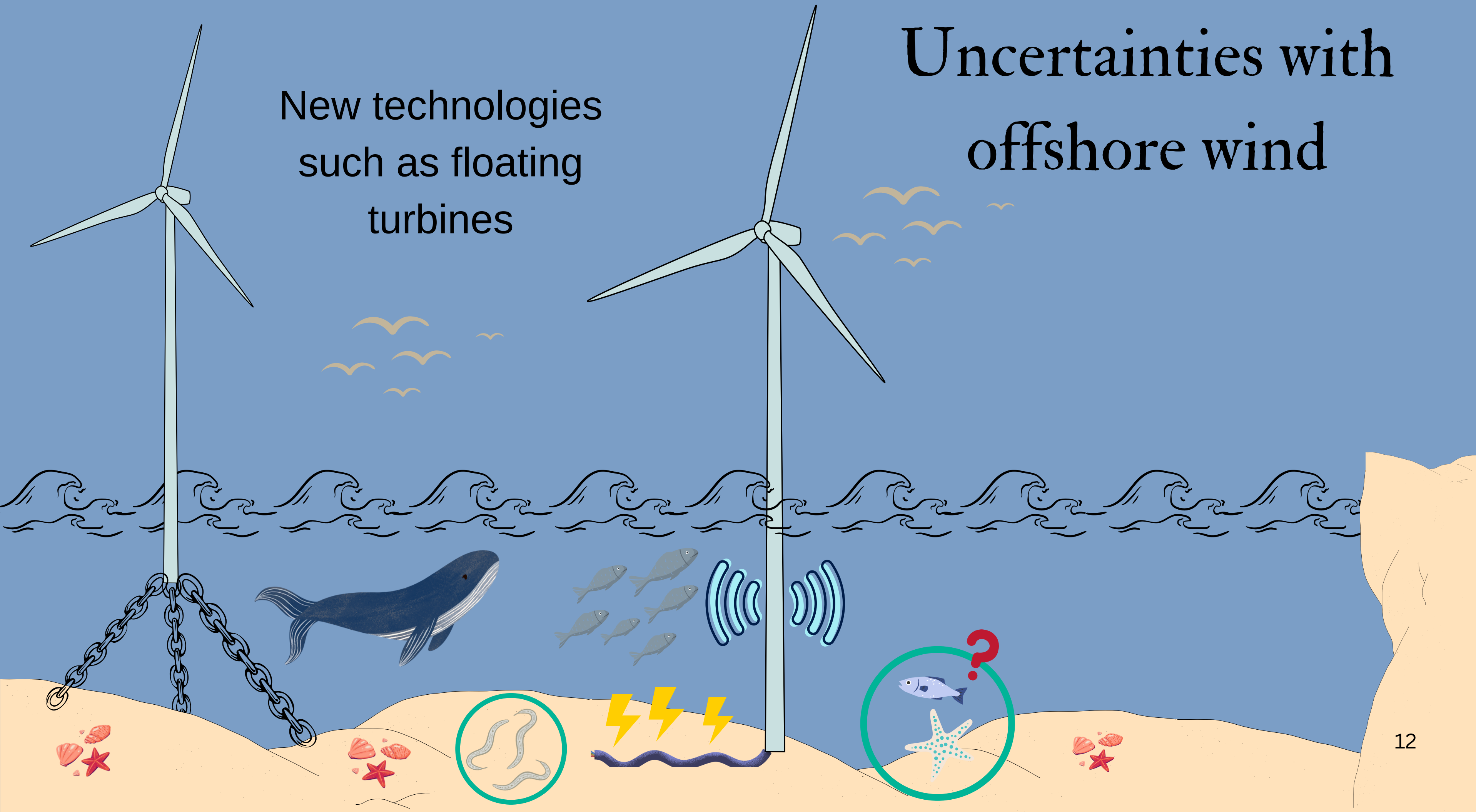
Uncertainties with offshore wind

Long term environmental impacts



Uncertainties with offshore wind

New technologies such as floating turbines



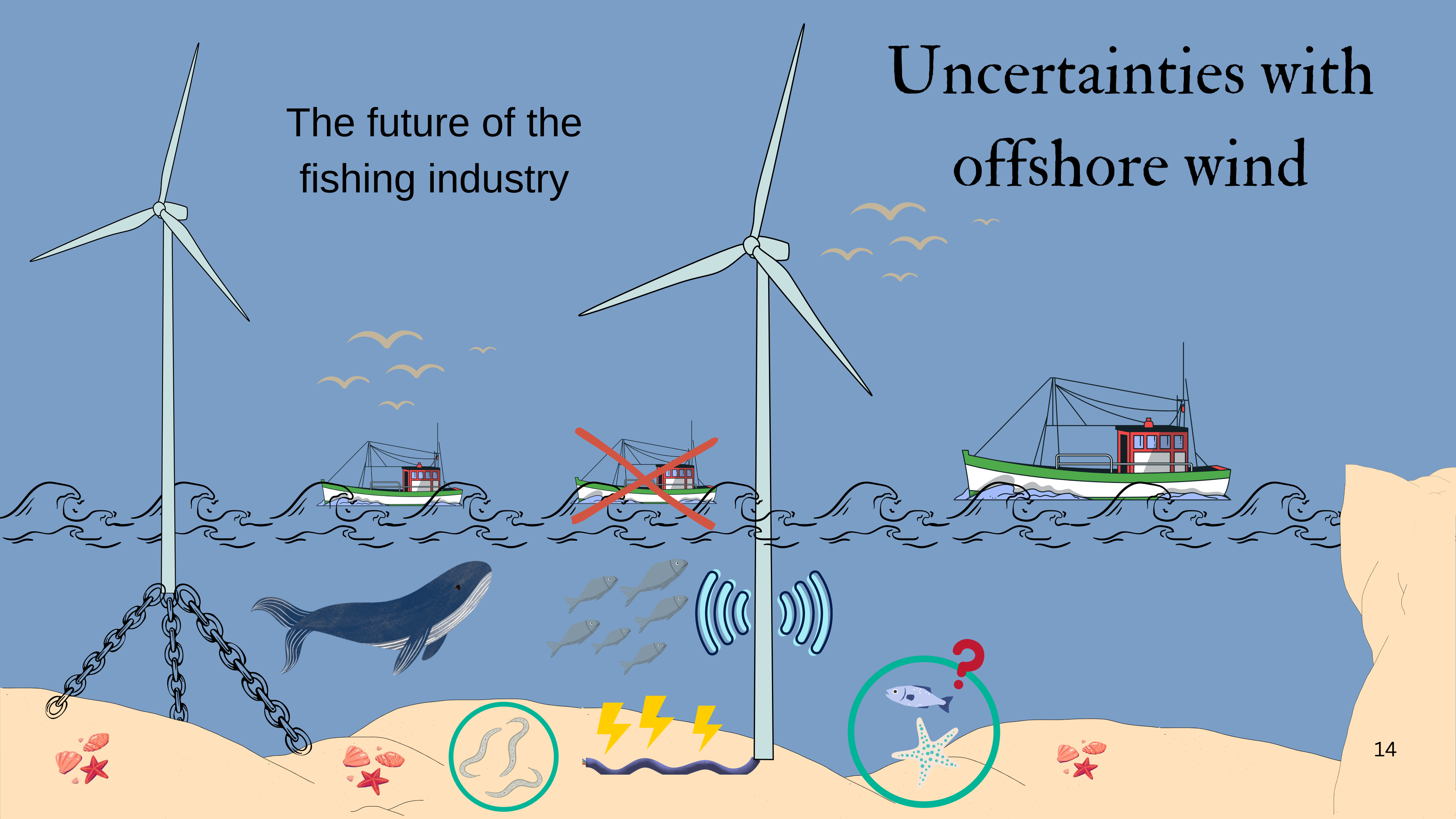
Data and impacts on
fishing industry

Uncertainties with offshore wind



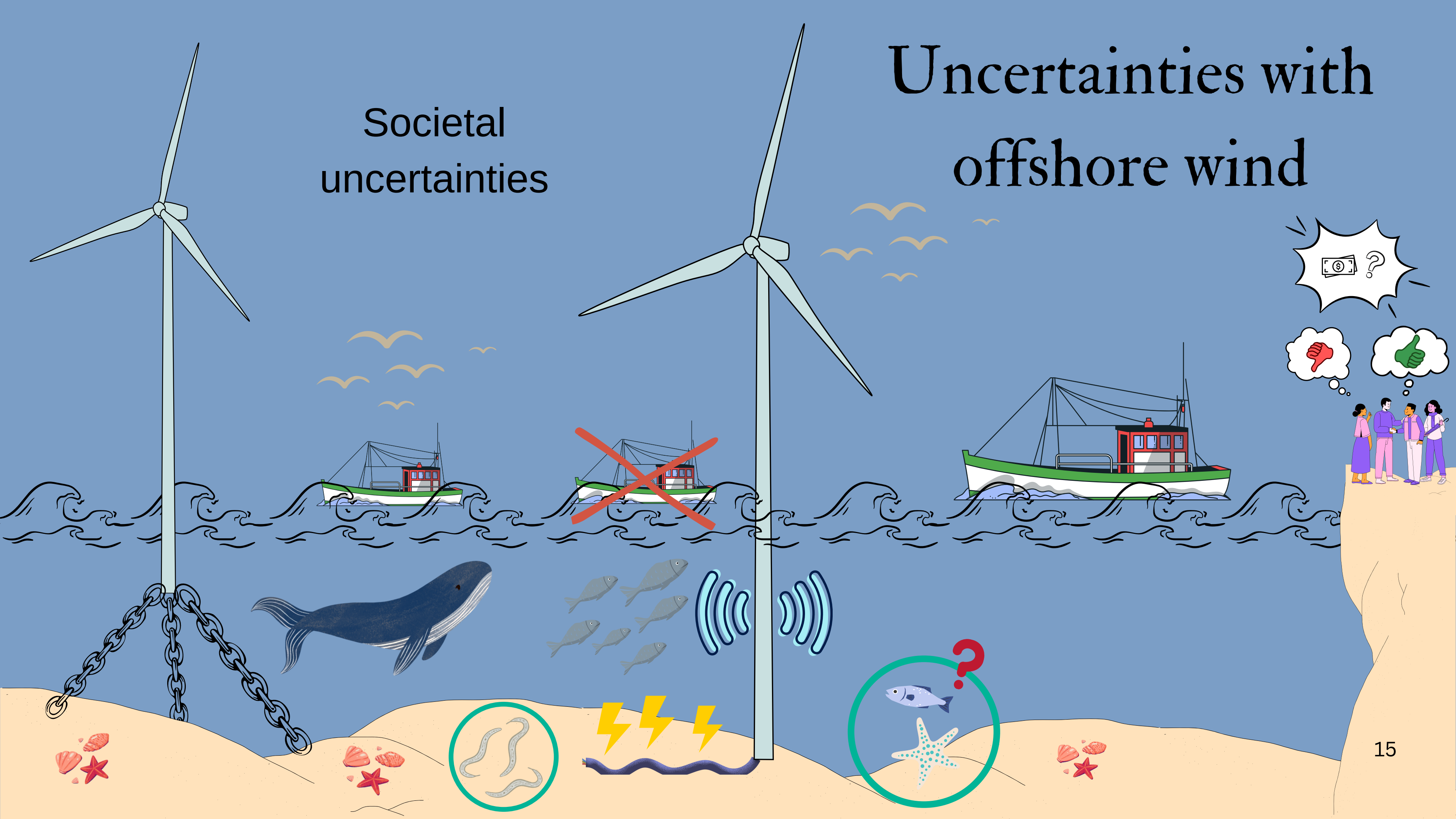
The future of the fishing industry

Uncertainties with offshore wind



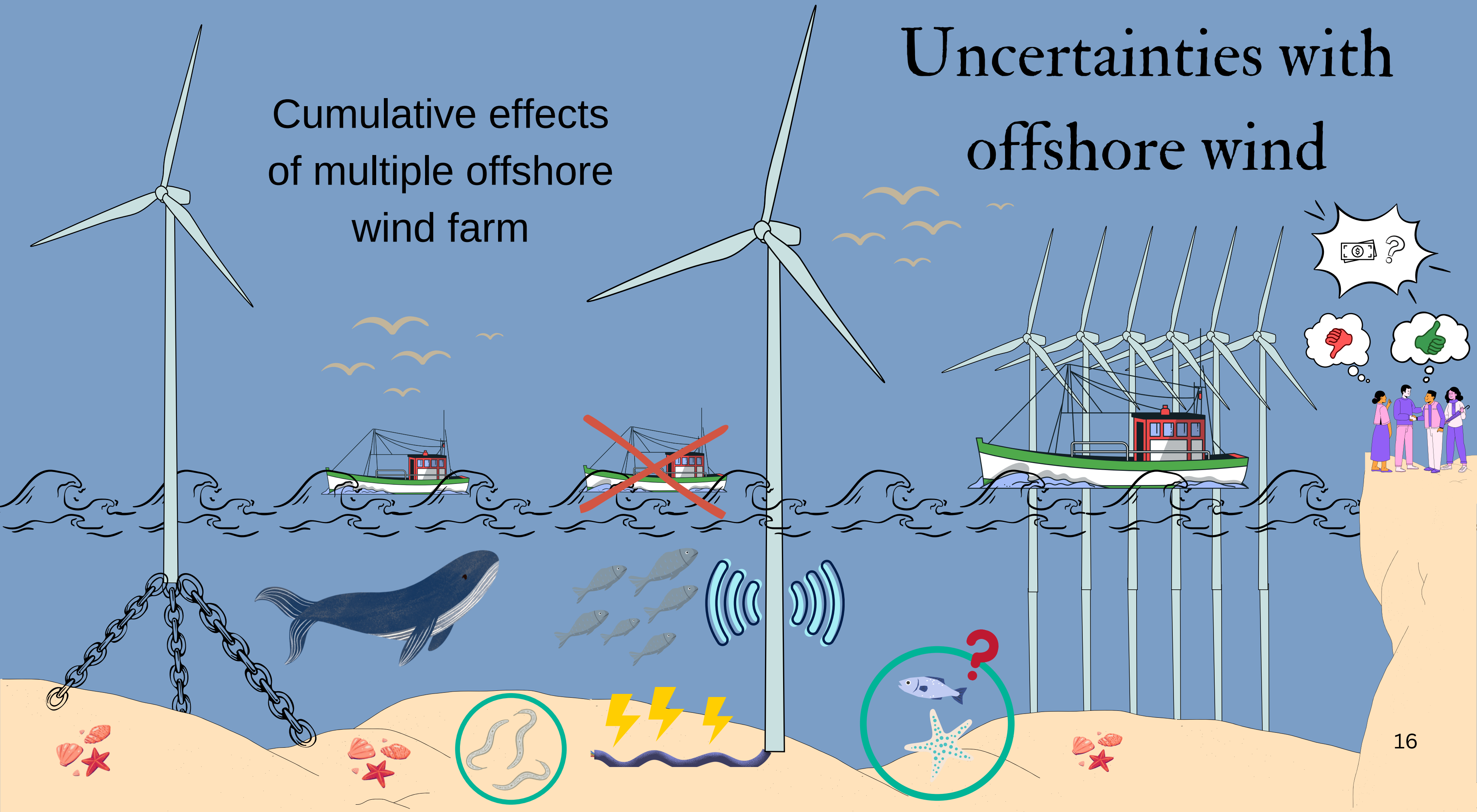
Uncertainties with offshore wind

Societal uncertainties



Uncertainties with offshore wind

Cumulative effects of multiple offshore wind farm



Communication of Uncertainties

- Uncertainty can be found in most expert reports
- Reports focused on biodiversity explain methods used to evaluate uncertainty
- High uncertainty due to large knowledge gaps leads to different evaluations
- In the summaries levels of uncertainty are often not mentioned

What does NVE do with the results from the expert reports?

- Vestavind B: Wait with the opening
- Vestavind F: Potential for opening of new development areas or increase in capacity*
- Sørvest F: Open one development area for offshore wind in 2025*

*The Norwegian Environment Agency recommends not to open new areas based on the pre-cautionary principle

Why is Norway continuing on their path for offshore development?

- Ambitious target of 30GW until 2040
- Idea of a frontrunner in floating offshore wind
- Pressure from politics and economy
- Idea of less resistance



Conclusion



- Many areas with low levels of knowledge
- High uncertainties at various locations and various levels
- Uncertainty is acknowledged to a certain degree but not handled
- Do we know enough to make these decisions?

Thank you for
your attention!

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