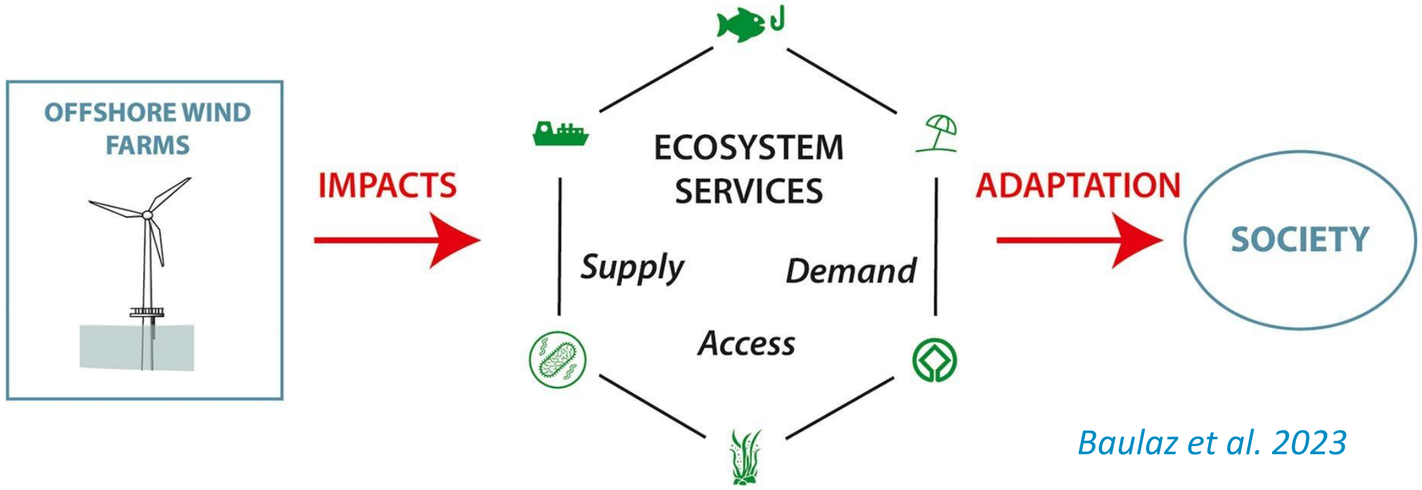
# How can ecosystem services mapping support marine spatial planning?

With the financial support of:

# CONTEXT




*Baulaz et al. 2023*

1. OWF reshape **benefits** – *not just « impacts »* - by reconfiguring who gain/loses, and where/when

2. ES responses are **phase-dependant** and **spatio-temporally heterogeneous**

*Püts et al. 2023*
*Hernandez et al.2021*
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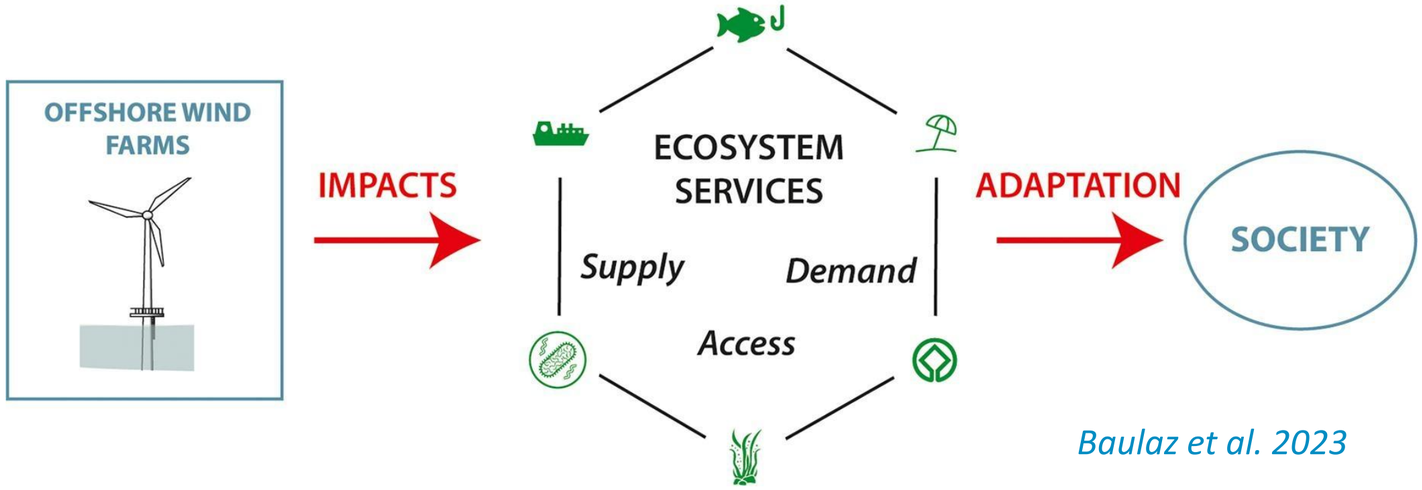


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**MSP CHALLENGE**
turning uncertain, cumulative pressures into explicit spatio-temporal trade-offs

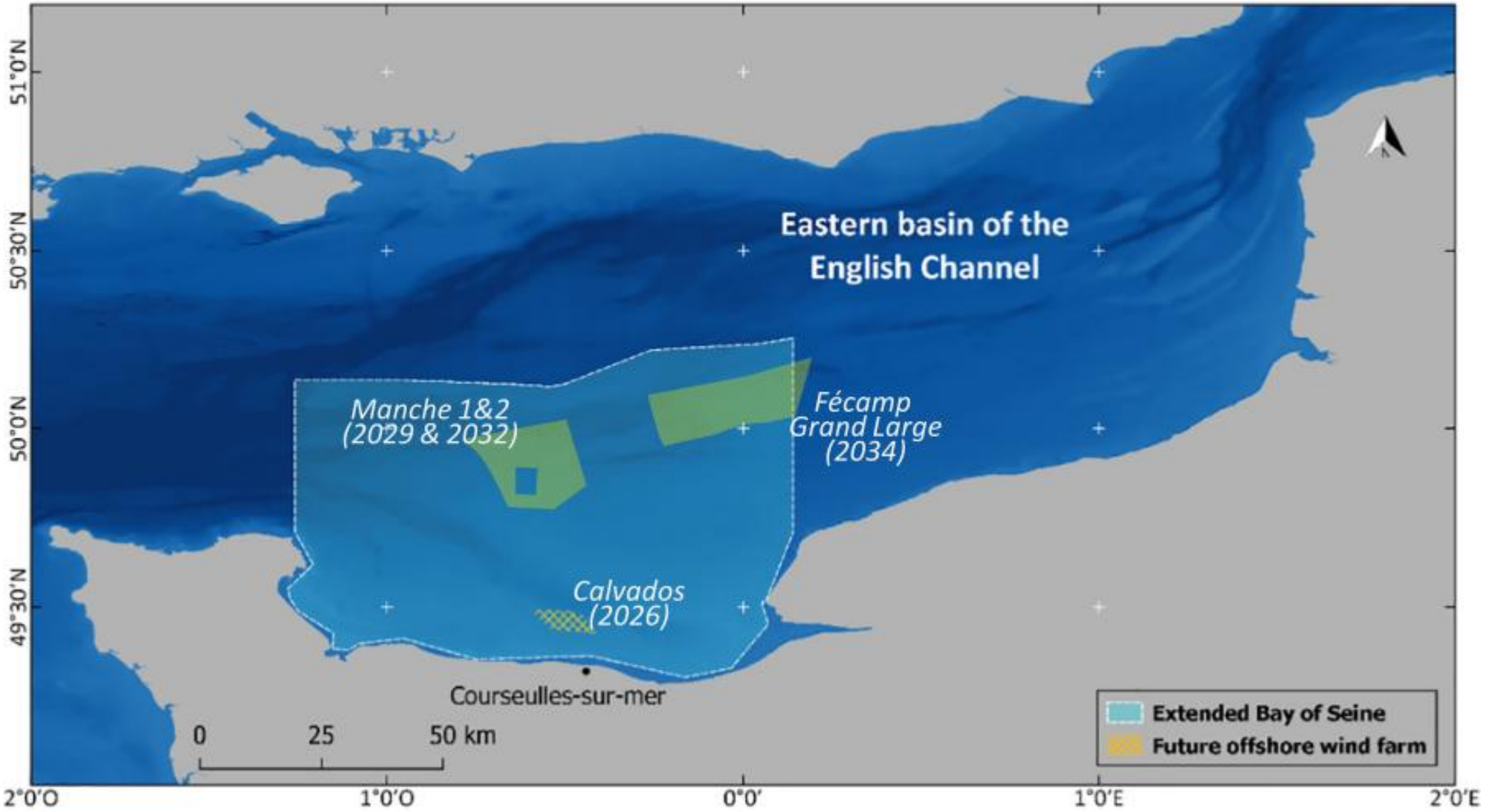
# Problematic and challenge

**Can ES mapping provide an empirical, spatially explicit entry point to support MSP decisions in offshore wind contexts?**

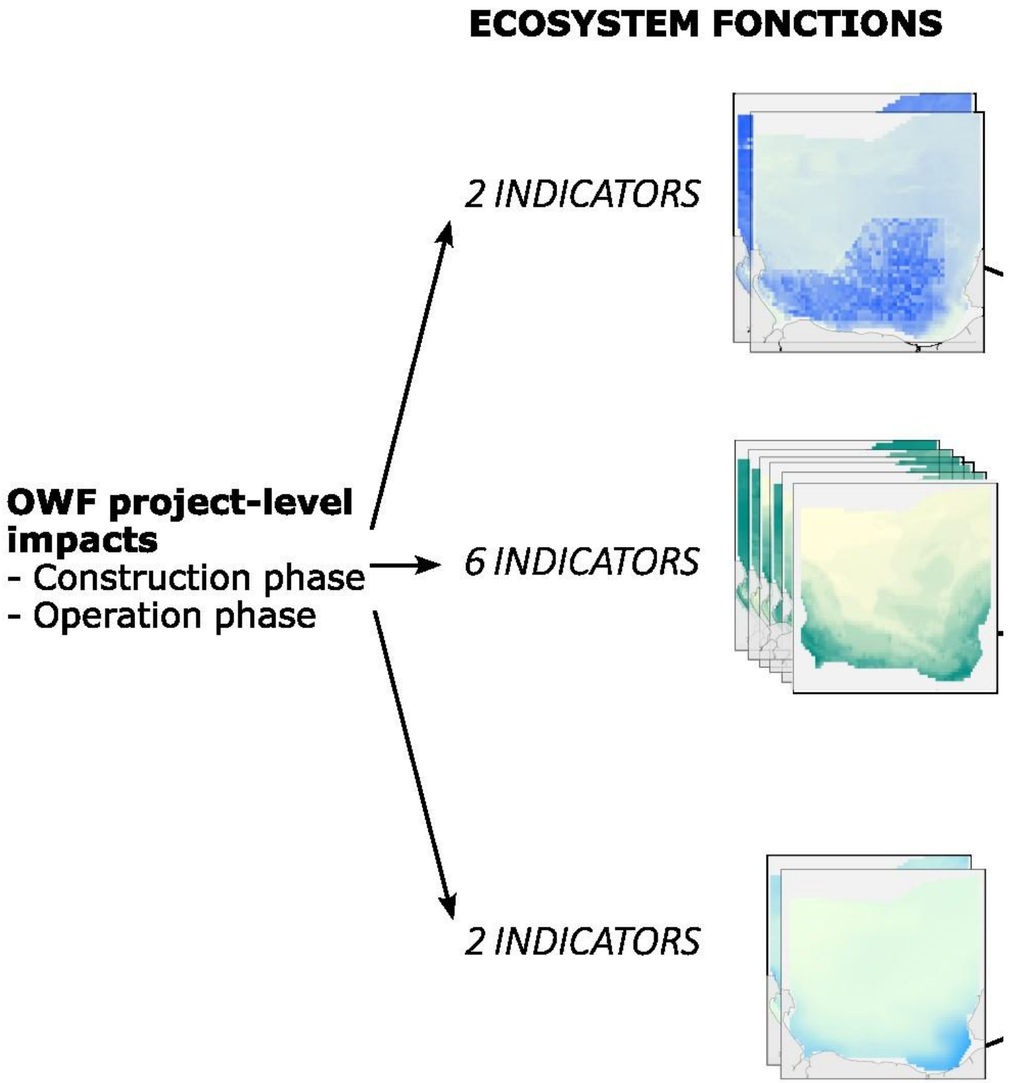
- Spatially explicit modelling
- Multi-ES assessment
- Cumulative OWF effects assessment
- Lifecycle-based trajectory tracking

*St-Brieuc OWF – personal credit(s)*

# Case study: extended Bay of Seine, with 4 OWFs planned for 2050



# Spatially explicit workflow for ES supply mapping




*Ecopath suite*

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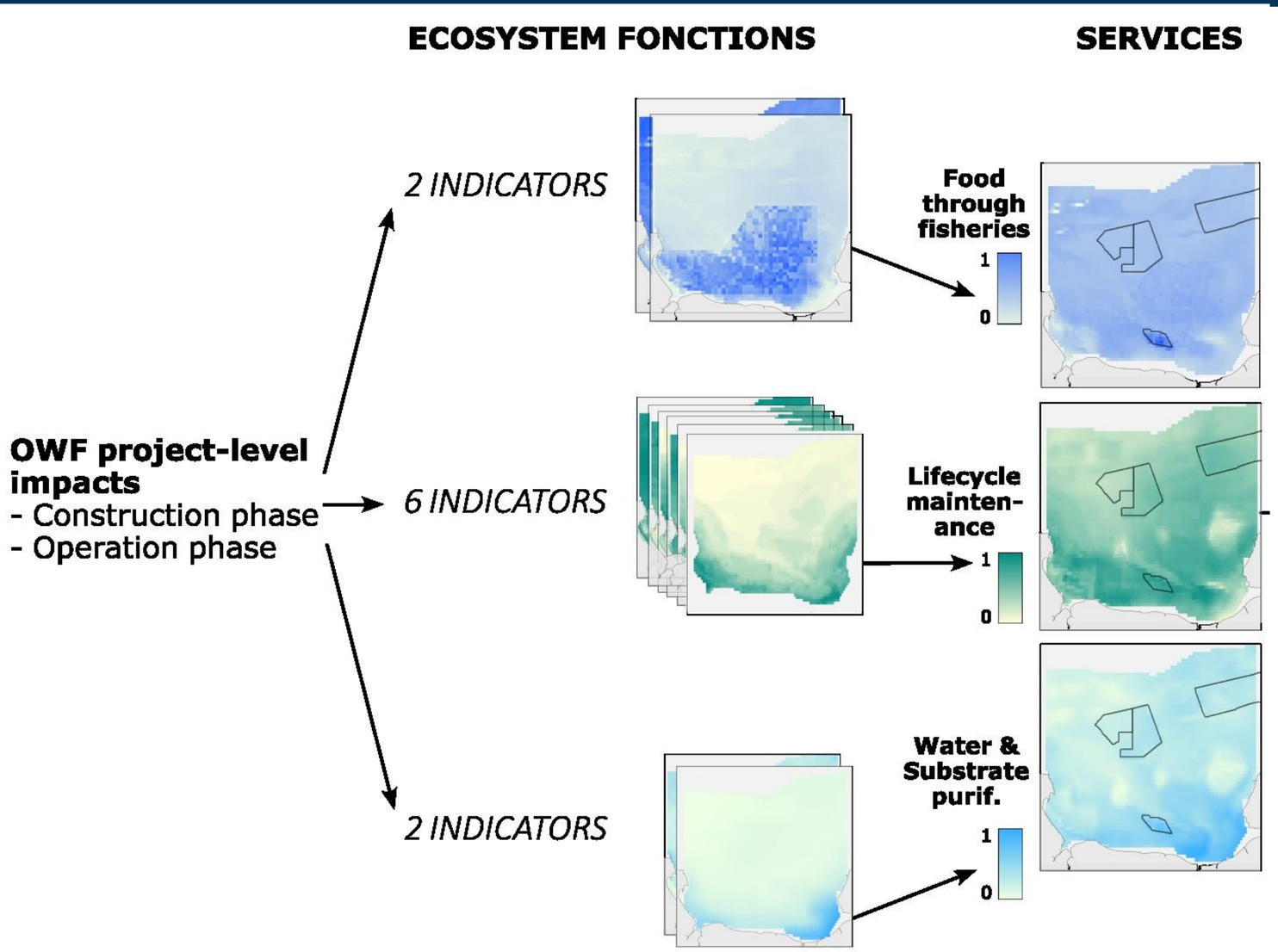


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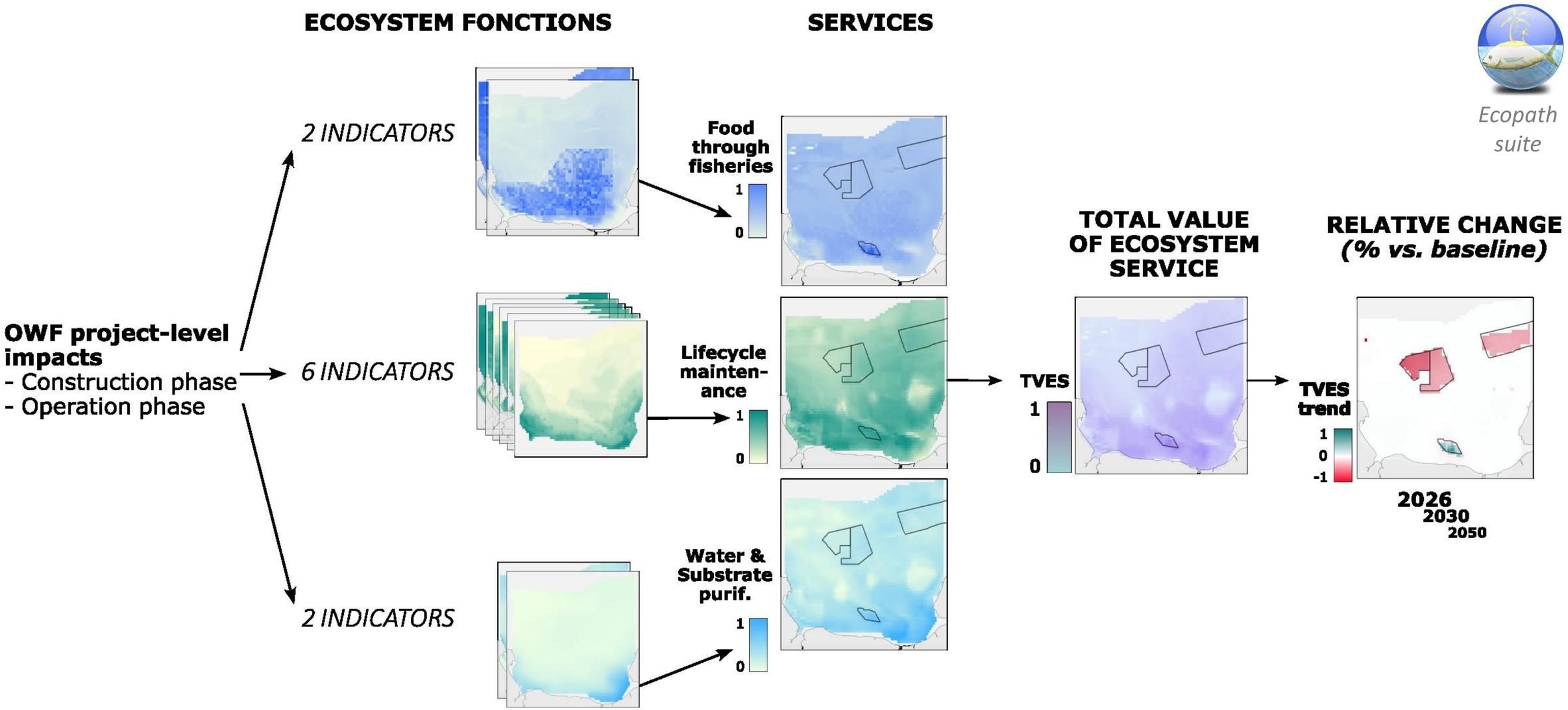
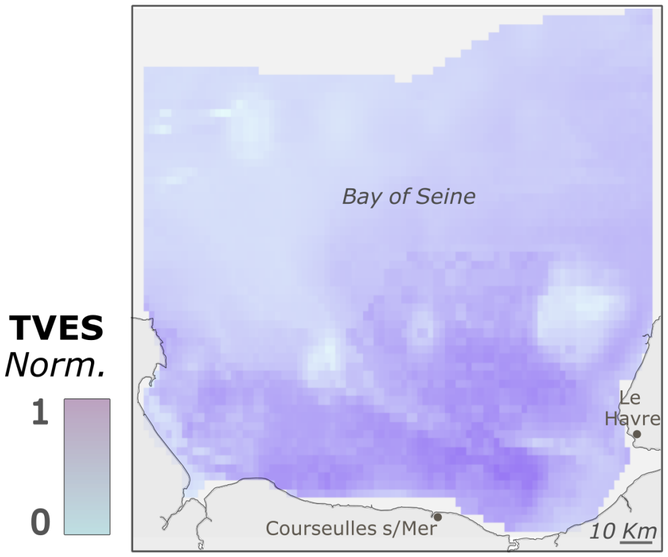



*Ecopath suite*

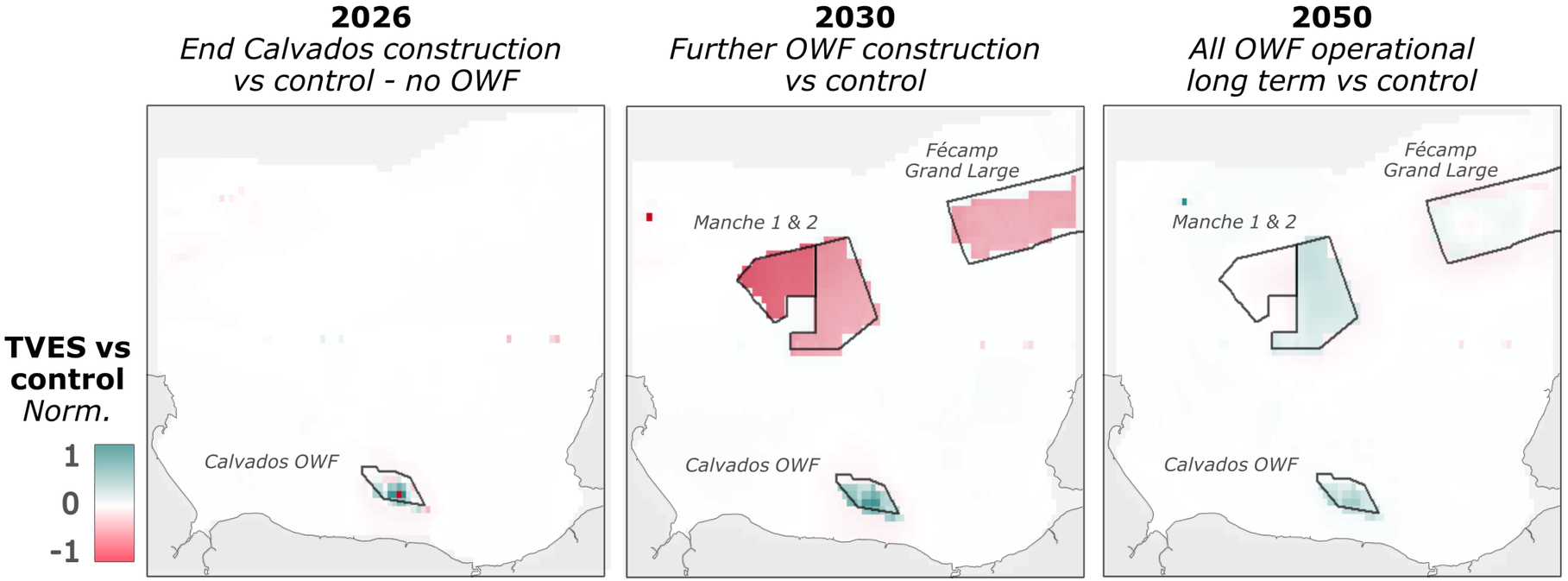
# Results: spatial patterns of TVES supply

## *TVES potential supply*

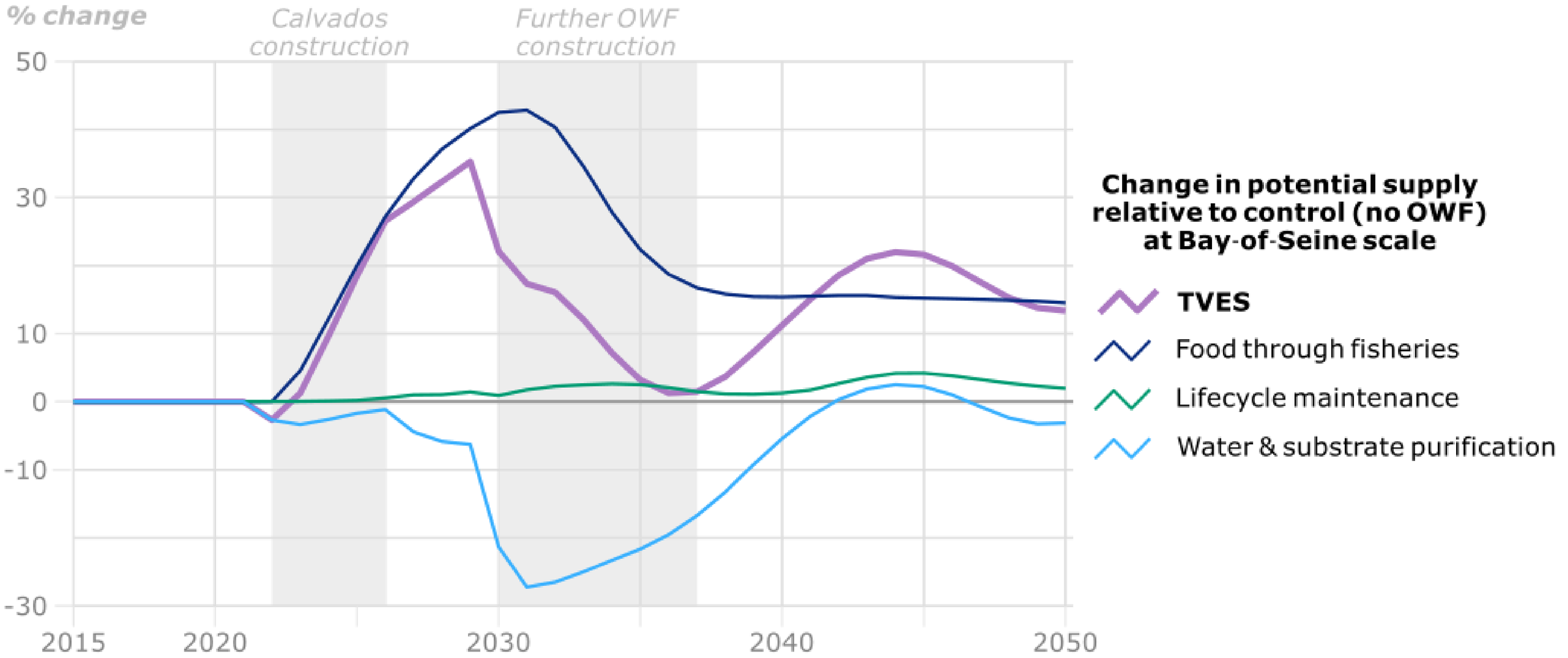
**2021**
*Pre-OWF*



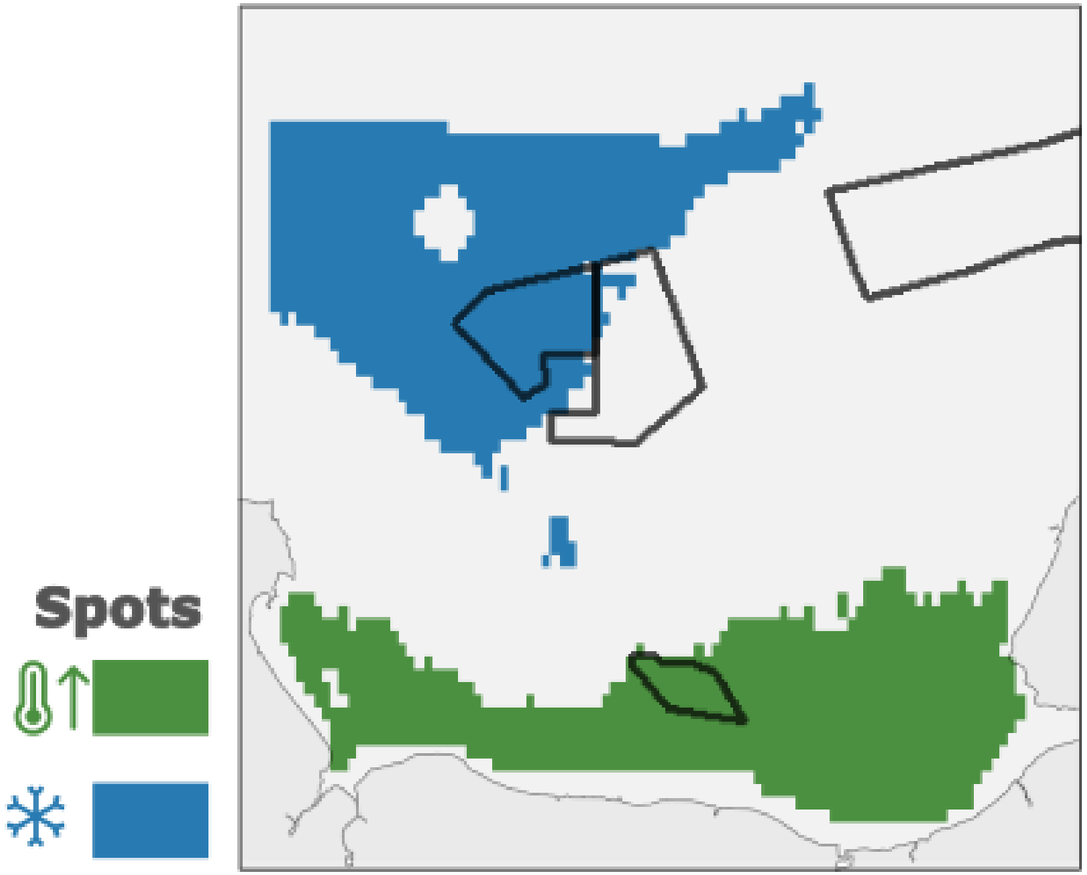

## *TVES change (OWF) vs control scenario (no OWF)*



# Results: temporal dynamics of TVES and ES supply



# Turning ES maps into decisions: hotspots, coldspots & uncertainties




## Spatial occurrence of TVES hotspots and coldspots (robustness map)

**Hotspots =** top 25% TVES values;
**Coldspots =** bottom 25%.

*Based on 6,400 simulations; only areas consistent in **>90%** of runs are shown.*

# Marine spatial planning – an ES-based operational definition

ES mapping contributes 4 ***building blocks for*** marine spatial planning:

1. **Leverage points** - gain/risk areas, spillovers
2. **Timing** – phase-specific pathways (construction, operation)
3. **Confidence** - uncertainty and sensitivity analysis
4. **Positive framing of the ES concept –** to support collective action

**Marine spatial planning:** the ability to turn ES trajectories into shared, actionable choices – by making trade-offs visible, pinpointing where and when options emerge, and supporting collective action of planning options

# Perspectives for MSP – 10 stakeholders feedback

## ESTIMATIONS

**Ready!**

- Identify priority areas
- Support stakeholder dialogue
- Compare OWF scenarios

→ **Apply in new areas**

**To improve …**

- Map multi-ES sensitive areas
- Scenario planning for Bay of Seine

→ **Assess ES demand and cultural ES**

**Not ready!**

- Use in formal planning
- Set conservation priorities
- Support long-term management

→ **Broaden pressures; link outputs to actions**

# THANK YOU!

## When Offshore Wind Reshapes MSP

Baulaz. Y, Bourdaud P., Araignous E. Aguelal H., Niquil, Le Guyader D., Tissot C., Halouani G., Mouchet M., (in prep.) Mapping long-term offshore wind farm impacts on marine ecosystem service supply: a scenario-based, spatially explicit approach. Ecological Indicators.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