ANALYSING CONFLICTS AND SYNERGIES BETWEEN ANTHROPOGENIC USES IN THE MARINE ENVIRONMENT

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Maritime activities

- Aquaculture
- Fishing
- Oil
- Cruise ships
- Dredging
- Windfarms
Synergy-conflict relationships

Offshore wind farms impacting seabirds

Tourism + aquaculture: multi-use

Offshore wind farms constituting artificial reefs

Tourism + aquaculture: too high environmental impacts?
Use-use interaction and MSP

1. Locate use-use interactions
   - Spatial-temporal link details
     - Use-use interactions overall
     - Location links
     - Environmental links
     - Technical links
     - User links

2. List synergies and conflicts
   - Synergy details
     - Spatial compatibility and conflicts
     - Synergies and conflict
     - Synergy types: Mutualism and commensalism
     - Conflict types: Amensalism, antagonism, and competition

3. Weight synergies and conflicts
   - Weighting method
     - Binary weighting
     - Ranking of scores
Use-use conflicts & synergies

\[ S = \sum_{A_1=1}^{n} \sum_{A_2=A_1+1}^{n} A_1 \times A_2 \times s_{A_1,A_2} \]

Conflict-synergy scores deduced from existing international MSP research projects synthesized into a matrix comparing use versus use.

[Activity 1]


[Activity 2]

[expert-based pairwise score]

| Compatible synergy overlaps | 3 |
| Compatible synergy overlaps | 2.75 |
| Compatible neutral overlaps | 2.5 |
| Conditionally compatible synergy neighbours | 2 |
| Conditionally compatible synergy neighbours | 1.75 |
| Non-compatible synergy neighbours | 1.5 |
| Non-compatible synergy neighbours | 1.25 |
| Conditionally compatible neutral neighbours | 1 |
| Non-compatible neutral neighbours | -1 |
| Conditionally compatible conflicting neighbours | -2 |
| Non-compatible conflicting neighbours | -3 |

Use-use conflicts & synergies

Conflict-synergy scores are ranked based on a combination of spatial compatibility degree and conflict-synergy degree.

Pairwise use-use interaction example:

Wind farms and commercial fishing are non-compatible but with potential neighbourhood synergies through artificial reef effects (category score = +1.25)

Conflict-synergy scores

- Compatible synergy overlaps: 3
- Compatible synergy overlaps: 2.75
- Compatible overlaps: 2.5
- Conditionally compatible synergy neighbours: 2
- Conditionally compatible synergy neighbours: 1.75
- Non-compatible synergy neighbours: 1.5
- Non-compatible synergy neighbours: 1.25
- Conditionally compatible neutral neighbours: 1
- Non-compatible neutral neighbours: -1
- Conditionally compatible conflicting neighbours: -2
- Non-compatible conflicting neighbours: -3
MYTILUS – conflict analysis
MYTILUS – synergy analysis
Conclusions and further steps

• MSP aims at allocating marine space for “blue economy” without severe impacts on the marine ecosystems
• This is addressed in cumulative impact assessment
• Maritime activities compete for the limited marine space giving room for conflicts – but also synergies
• Tools for conflict and synergy analysis provide additional knowledge before decision-making on the use of marine space in MSP
Delivering MSP
Interactions and Capacities Across All Levels