ClimeMarine

Project findings

Swedish Agency
for Marine and
Water Management

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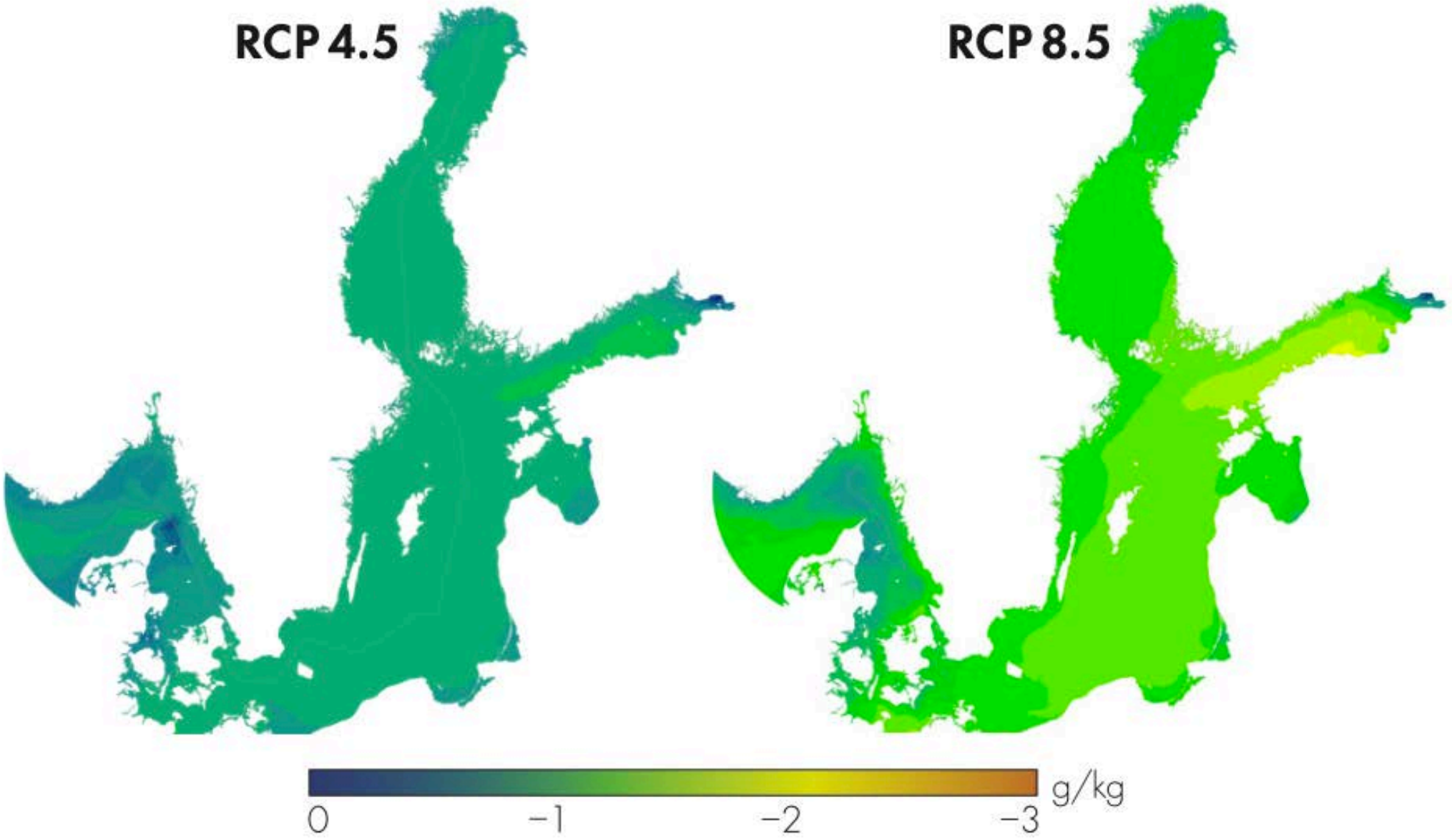
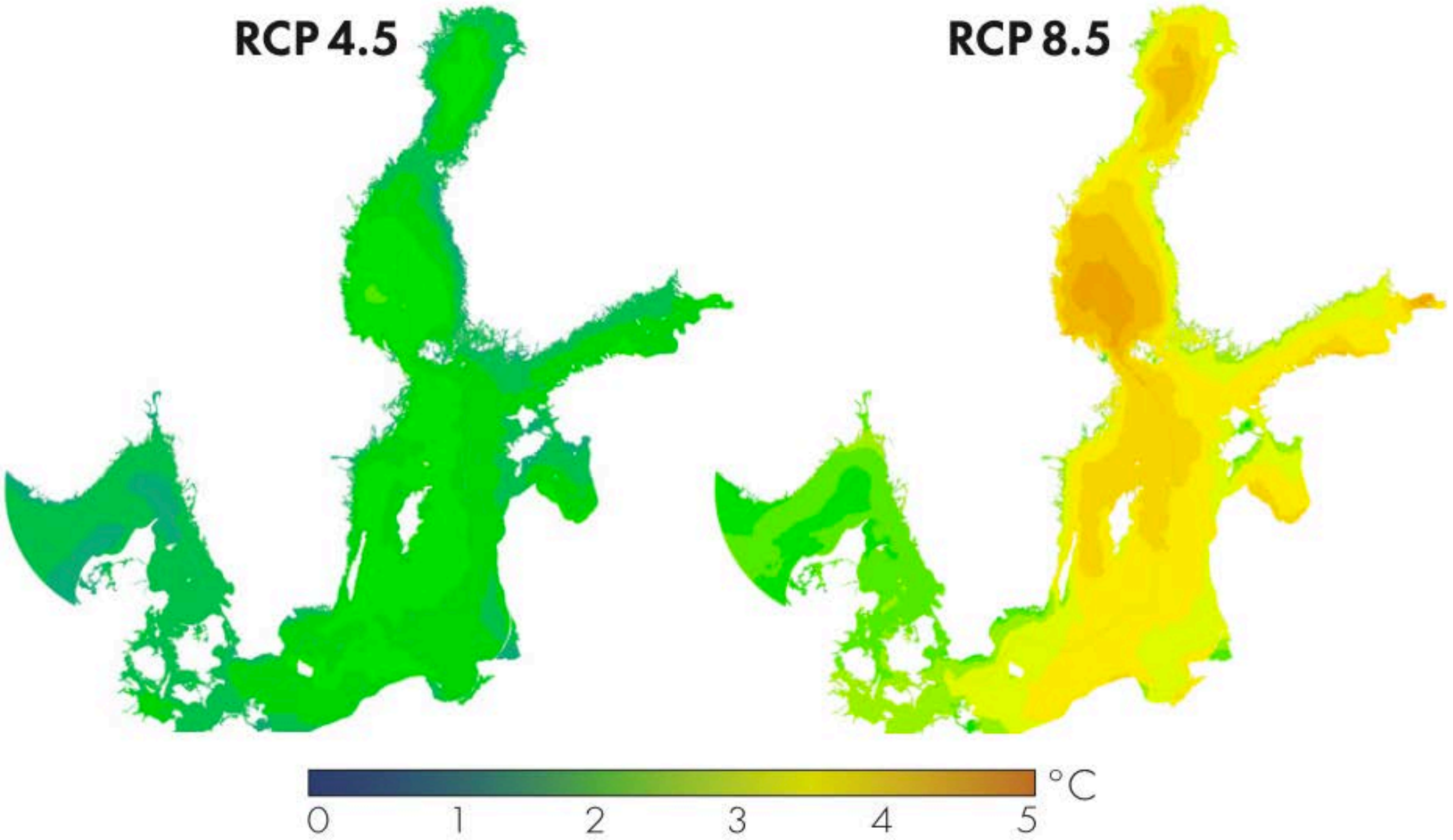
MARINE SPATIAL PLANNING IN A CHANGING CLIMATE

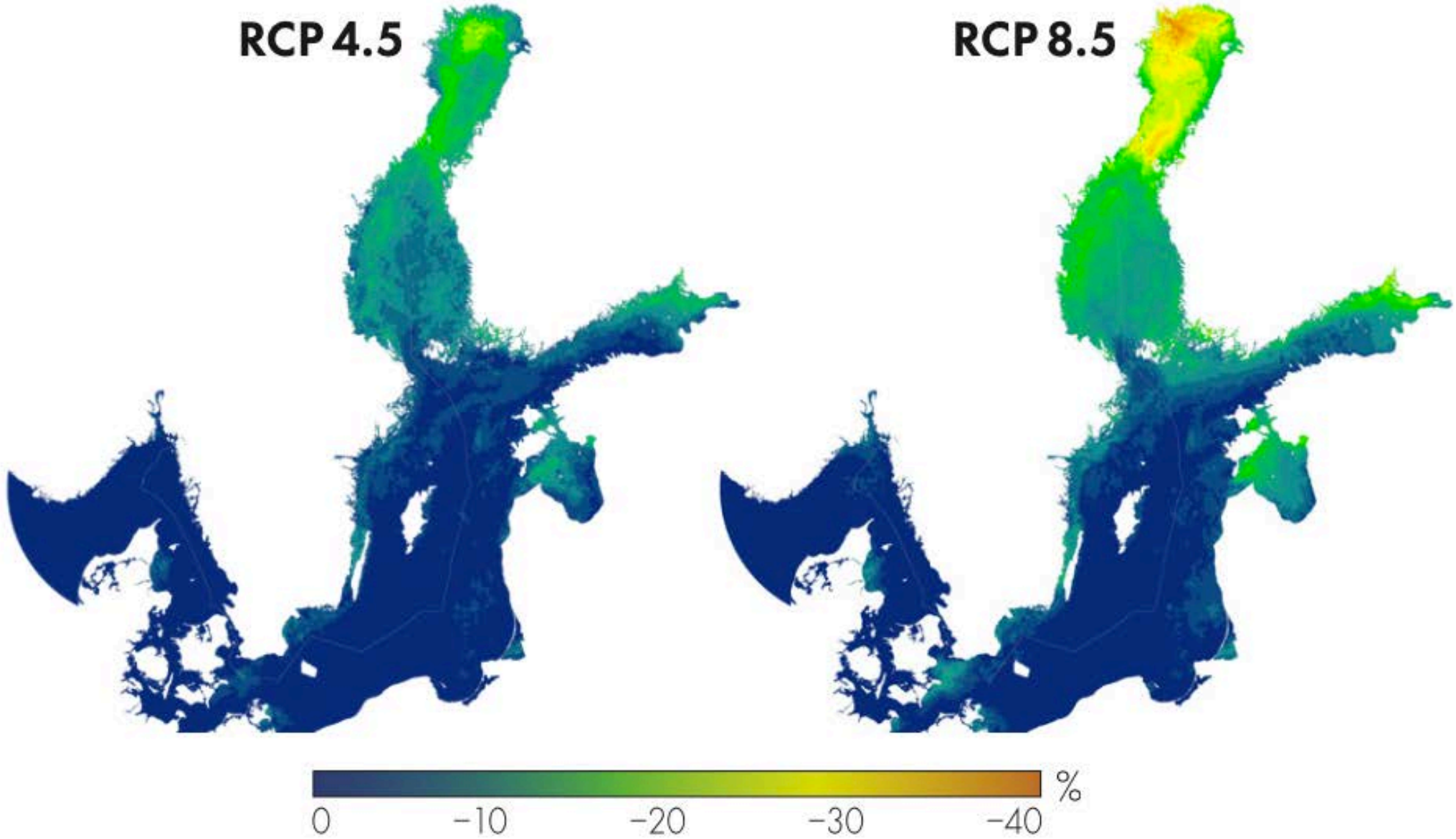
The ClimeMarine project encourages ecosystem-based management of the Swedish sea with consideration of climate change; through close contact with stakeholders and decision-makers.



Surface salinity decrease by the end of the century under RCP 4.5 and RCP 8.5 in the sea surrounding Sweden.



Surface water temperature increase by the end of the century under RCP 4.5 and RCP 8.5 in the sea surrounding Sweden.



Winter sea ice cover reduction by the end of the century under RCP 4.5 and RCP 8.5 in the seas surrounding Sweden.

Recommendations to MSP-planners

- Be aware how climate change will affect different areas of the sea in different ways.
- Plan marine activities to make sure the cumulative environmental impact takes climate change into account.
- Plan with adaptive management, as the best available data is continually improving

Symphony

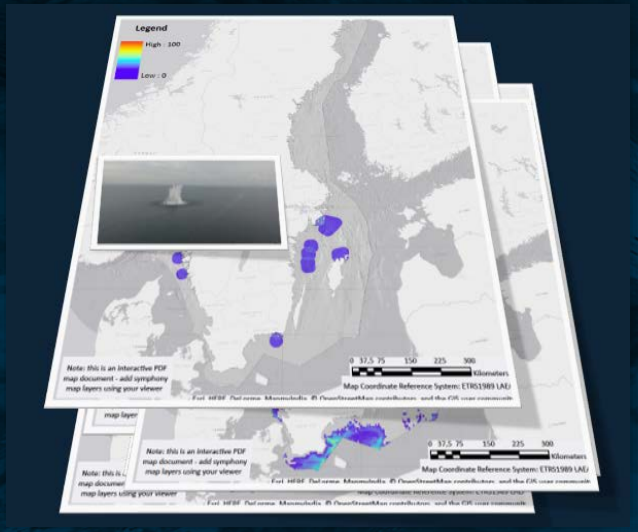
Equation

$$P_{sum} = \sum_{i=1}^{n} \sum_{j=1}^{m} B_i \times E_j \times K_{i,j}$$

Cumulative impact (*P*) is calculated as the sum of the product of all pressures' (*B*) effects on all ecosystem components (*E*), given the particular sensitivity (*K*) of every ecosystem component to every pressure.

Pressures

from human activities
40 maps



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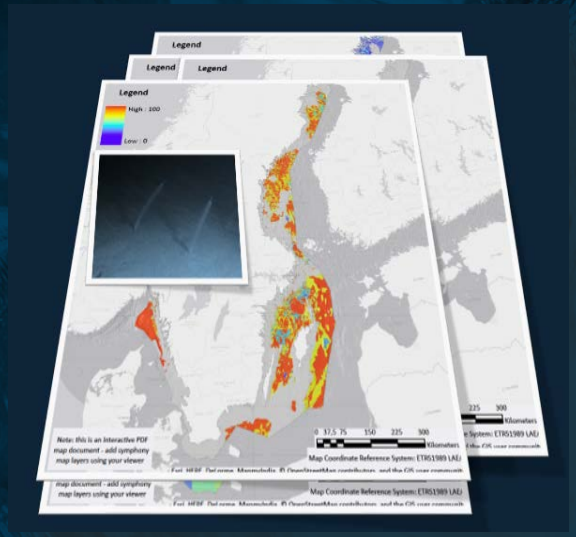
Nature values

Ecosystem components
34 maps



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Sensitivity matrix

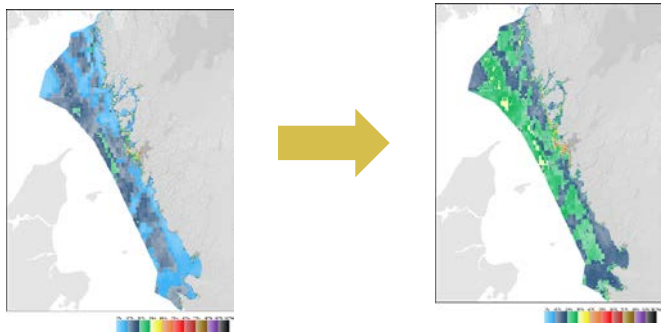
Effect of each pressure on each nature value

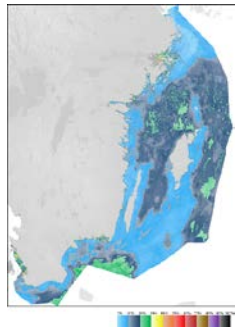
=

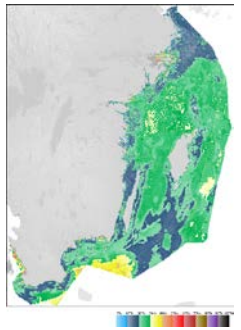
Result

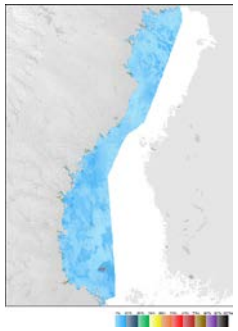
maps & tables

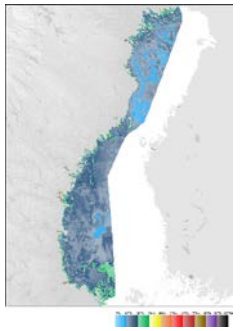
RCP 4.5 : MID model difference to current state



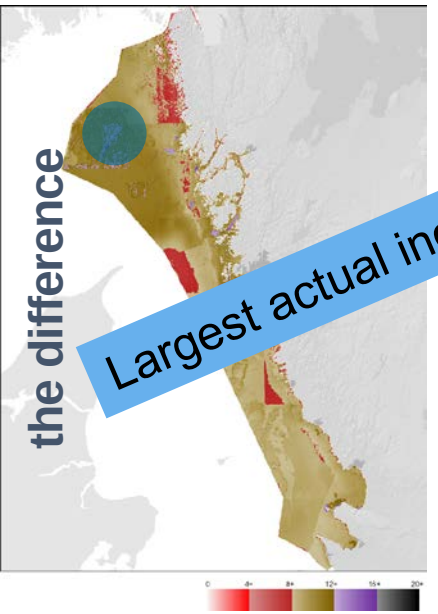








the difference



Largest actual increase (per area)

Western Seas
RCP 45

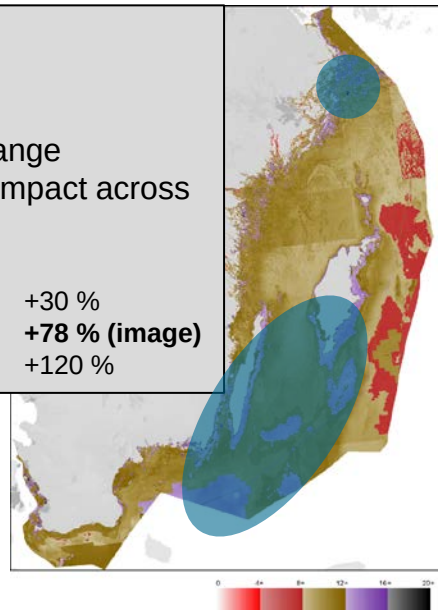
Clima… …mpact across …

LOW	+43 %
MID	**+78 % (image)**
HIGH	+111 %

Baltic Sea
RCP 45

Climate Change **additional** impact across space

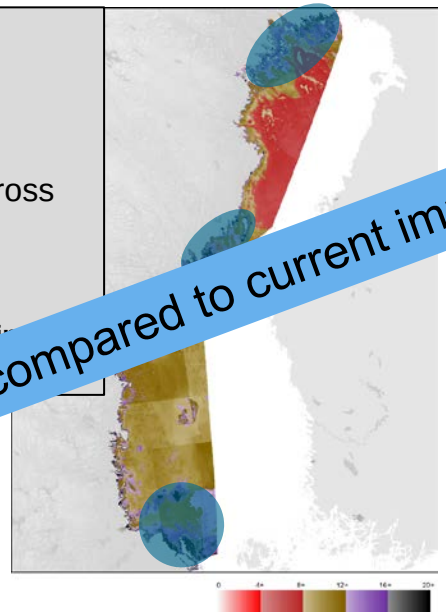
LOW	+30 %
MID	**+78 % (image)**
HIGH	+120 %



Botnian Bay
RCP 45

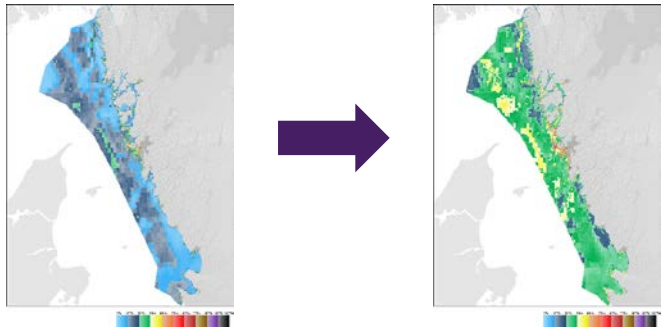
Climate Change **additional** impact across space

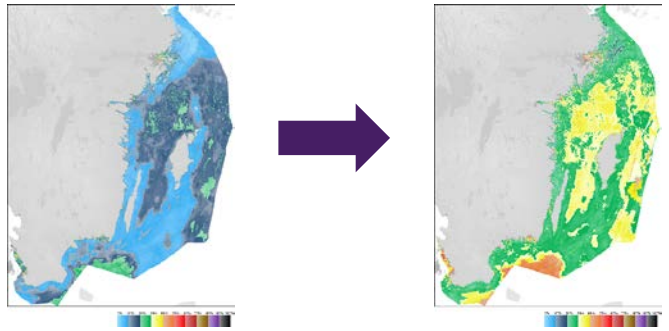
LOW	+130 %
MID	**+268 % (i…**
HIGH	+4…

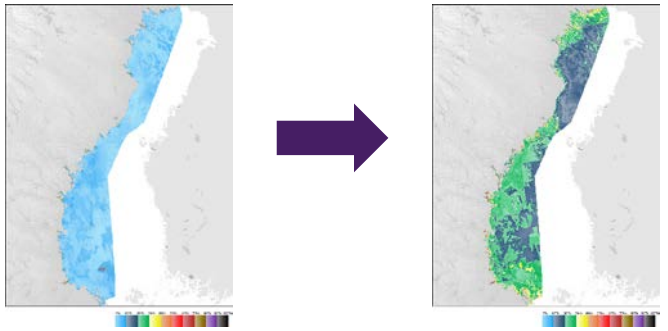


Largest increase compared to current impacts

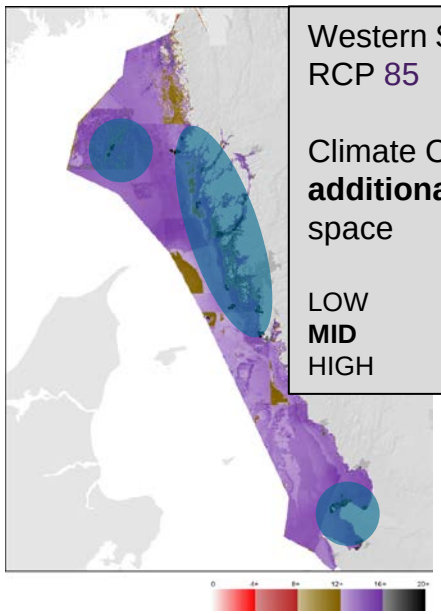
RCP 8.5 : MID model difference to current state







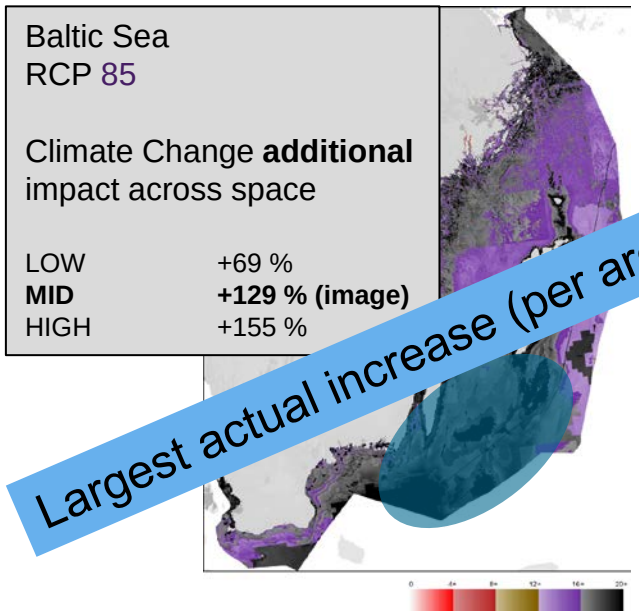
the difference



Western Seas
RCP 85

Climate Change **additional** impact across space

LOW	+85 %
MID	**+117 % (image)**
HIGH	+171 %

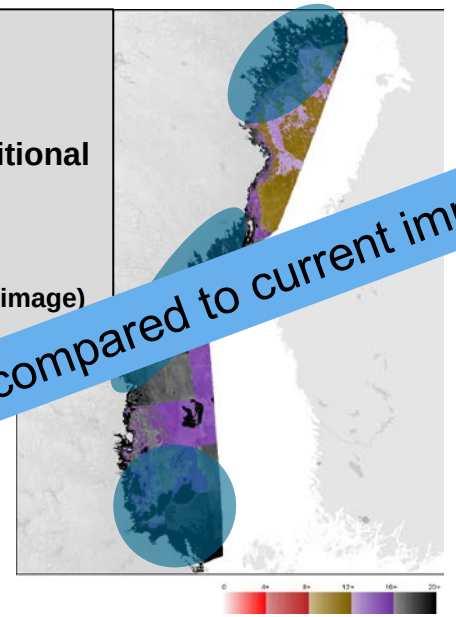


Baltic Sea
RCP 85

Climate Change **additional** impact across space

LOW	+69 %
MID	**+129 % (image)**
HIGH	+155 %

Largest actual increase (per area)



Botnian Bay
RCP 85

Climate Change **additional** impact across space

LOW	+236 %
MID	**+434 % (image)**
HIGH	+557 %

Largest increase compared to current impacts

Messages

- Climate change impacts at end of century = all other environmental pressures combined
- Many uncertainties and assumptions, but best available data
- Data will be available through SMHI, SwAM and HELCOM

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