



**CLEAN**

FRAMDAGEN: TROMSØ 16 NOV 2023

**GEOHAZARDS**

*Klimadrevne endringer og samlet risiko for marine økosystemer i nord*

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# *Climate change and cumulative risk*

- hazards, exposure, sensitivity **risk**

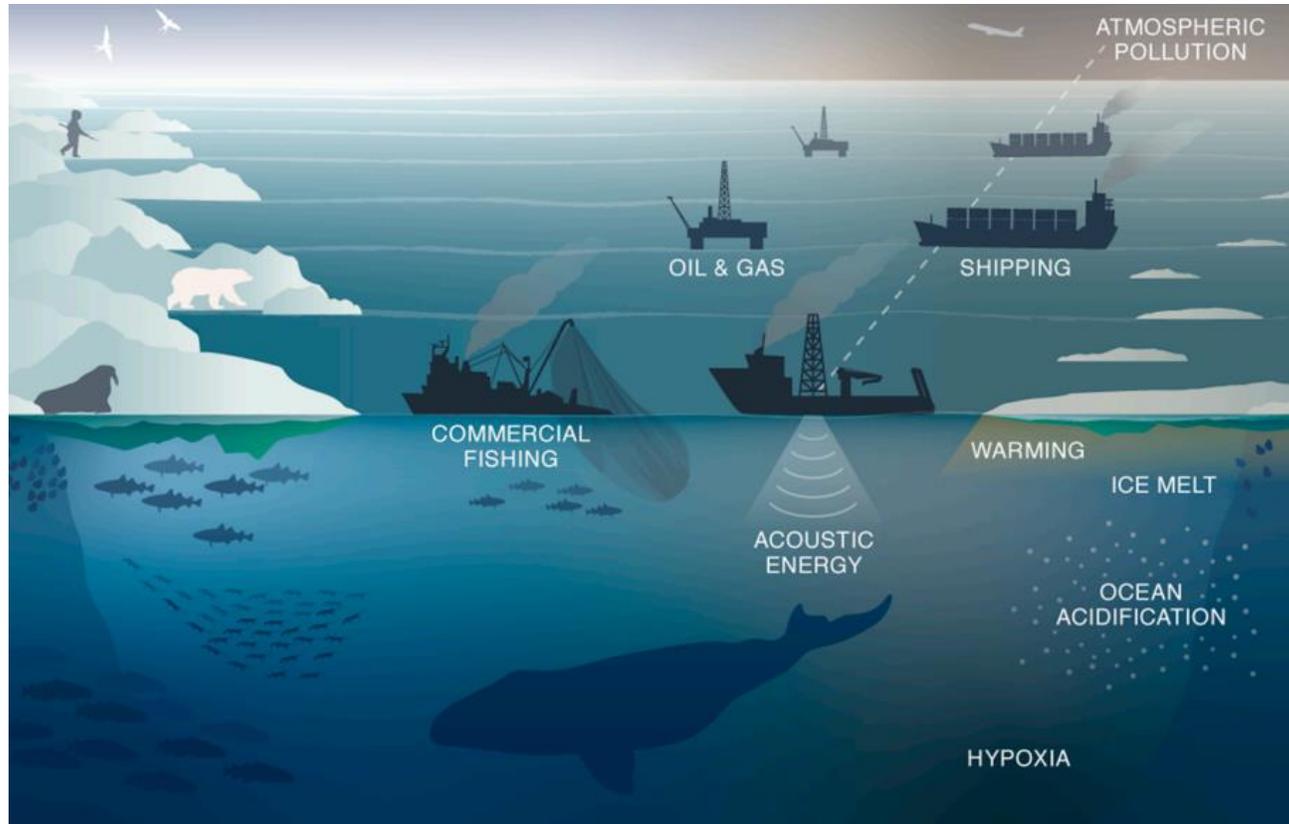


# Climate change and cumulative risk

## Multiple anthropogenic stressors

- hazards, exposure, sensitivity

**cumulative risk**  
for ecosystems

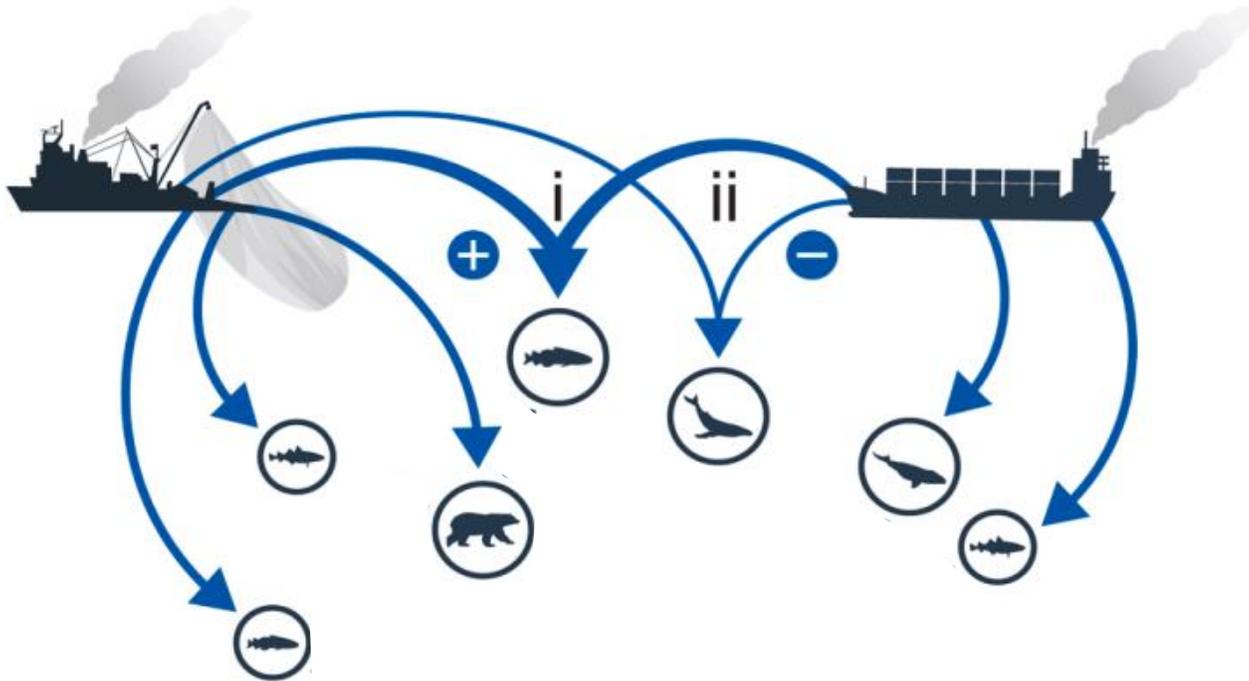


# *Climate change and cumulative risk*

## Multiple anthropogenic stressors

- hazards, exposure, sensitivity

**cumulative risk**



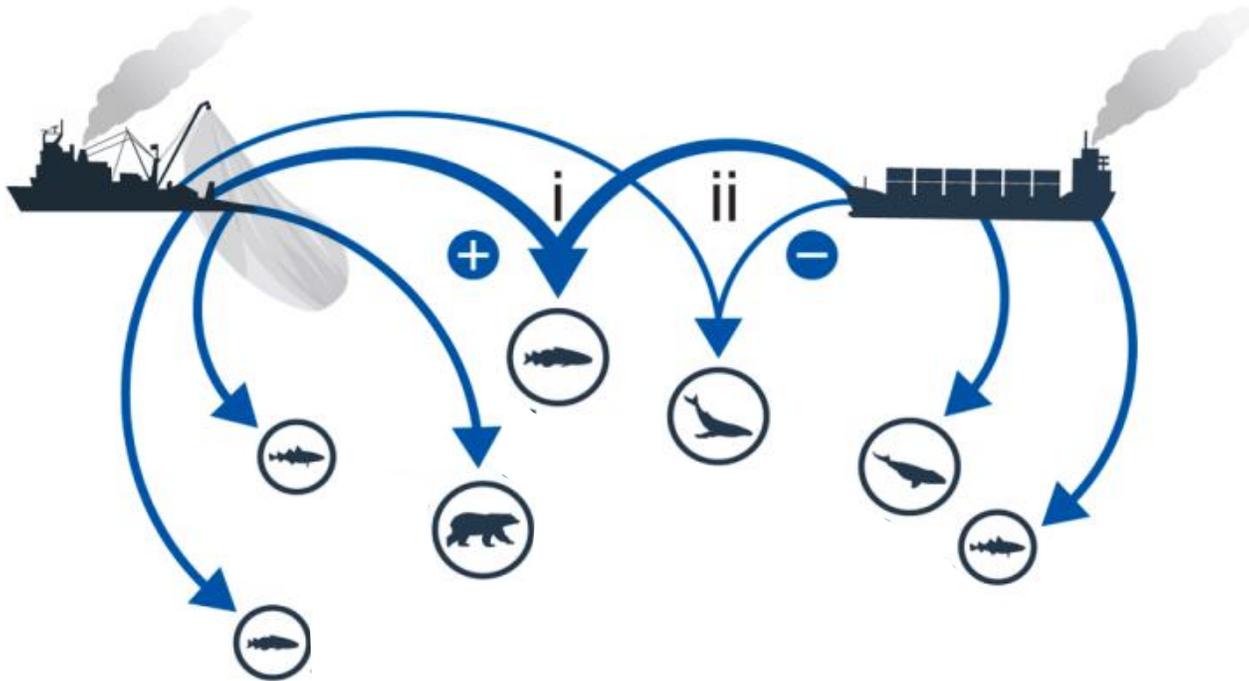
- direct effects

# *Climate change and cumulative risk*

## Multiple anthropogenic stressors

- hazards, exposure, sensitivity

**cumulative risk**



- direct effects
- indirect effects

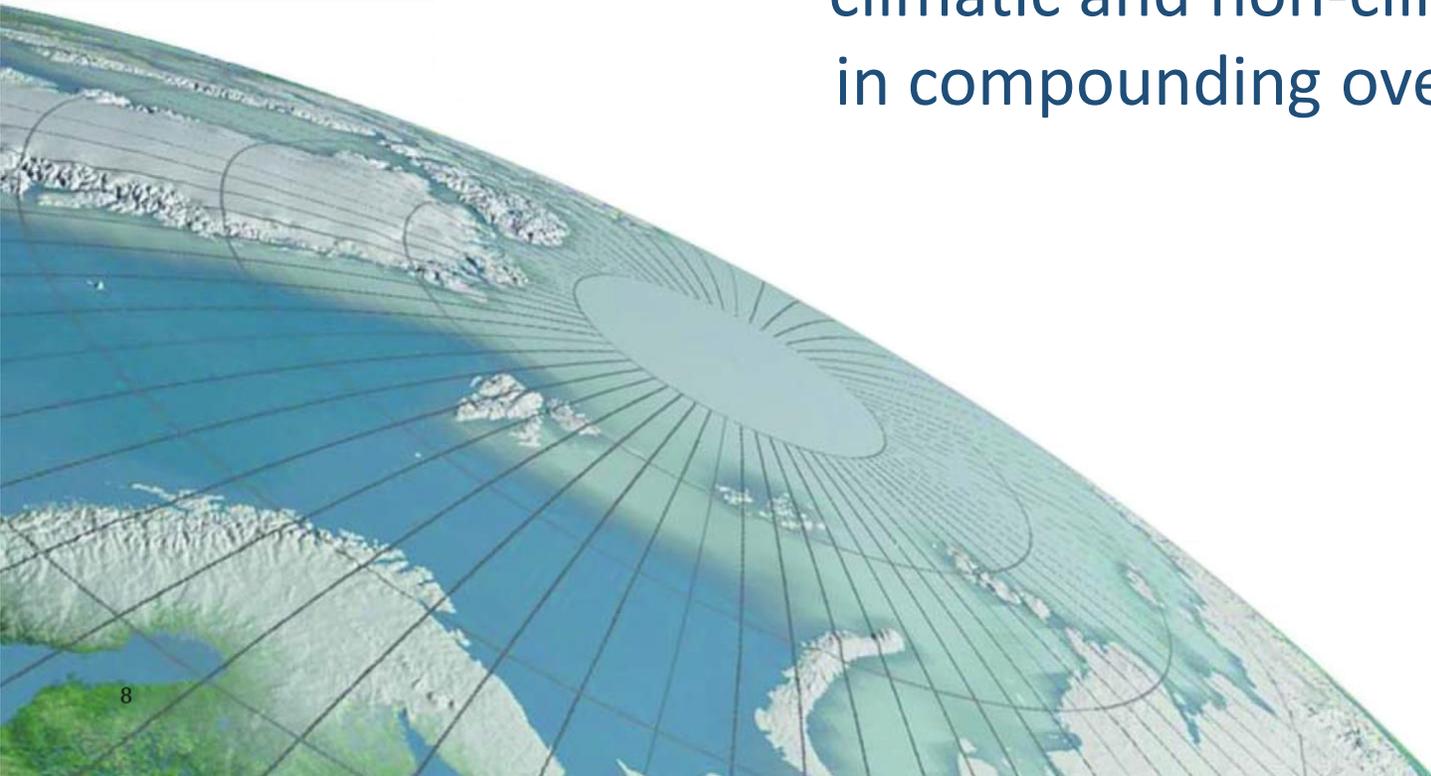
# *Climate change and cumulative risk*

## Multiple anthropogenic stressors

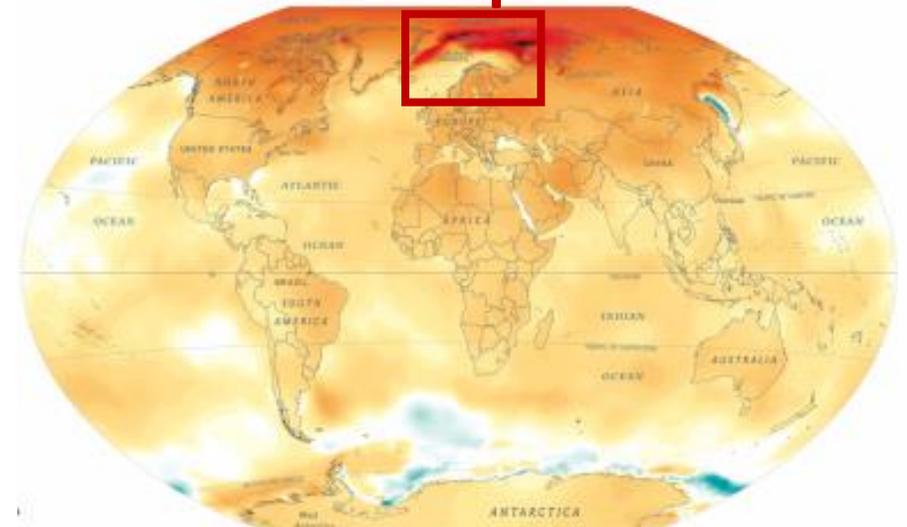
- **Climate change**, pollution, habitat degradation, harvesting, biological invasions

“climatic and non-climatic risks will interact, resulting in compounding overall risk”

IPCC AR6 WGII 2022

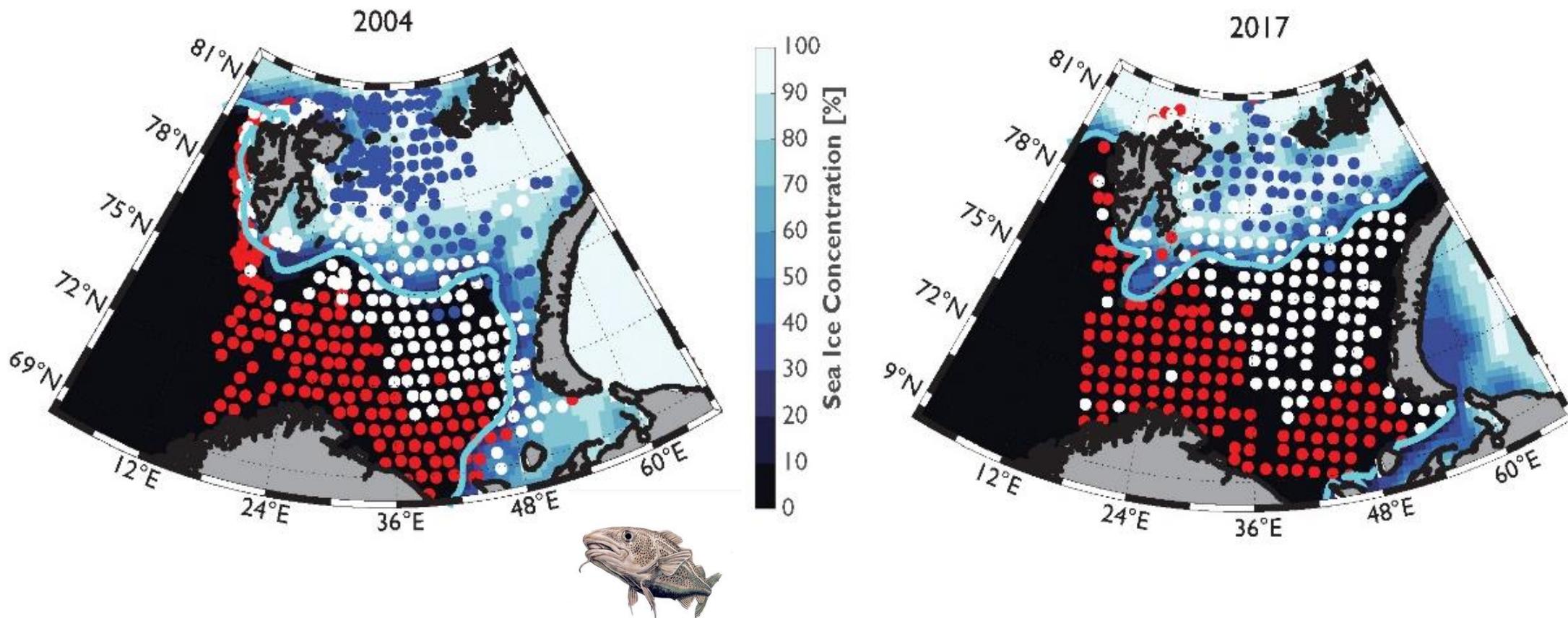


**hot spot of warming**



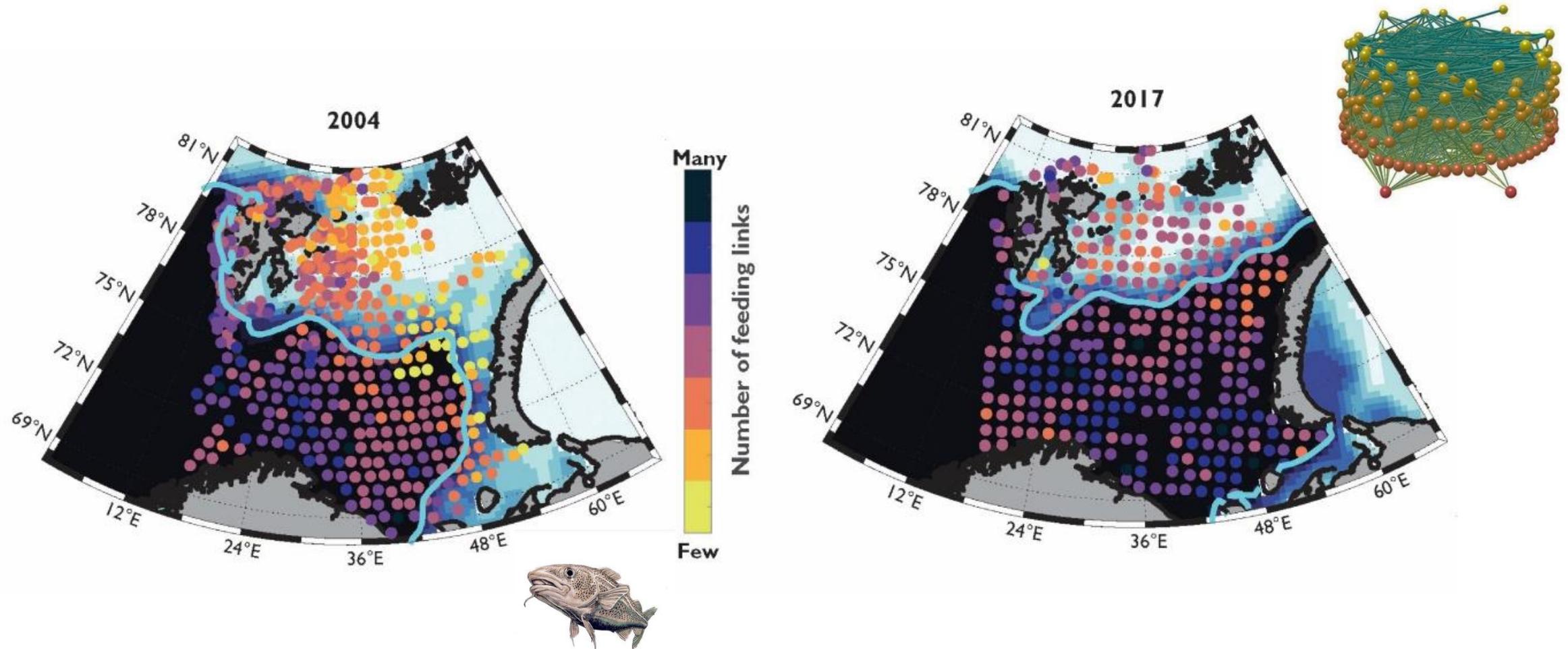
# Climate change and cumulative risk

- species redistributions – exposure, **direct effects**



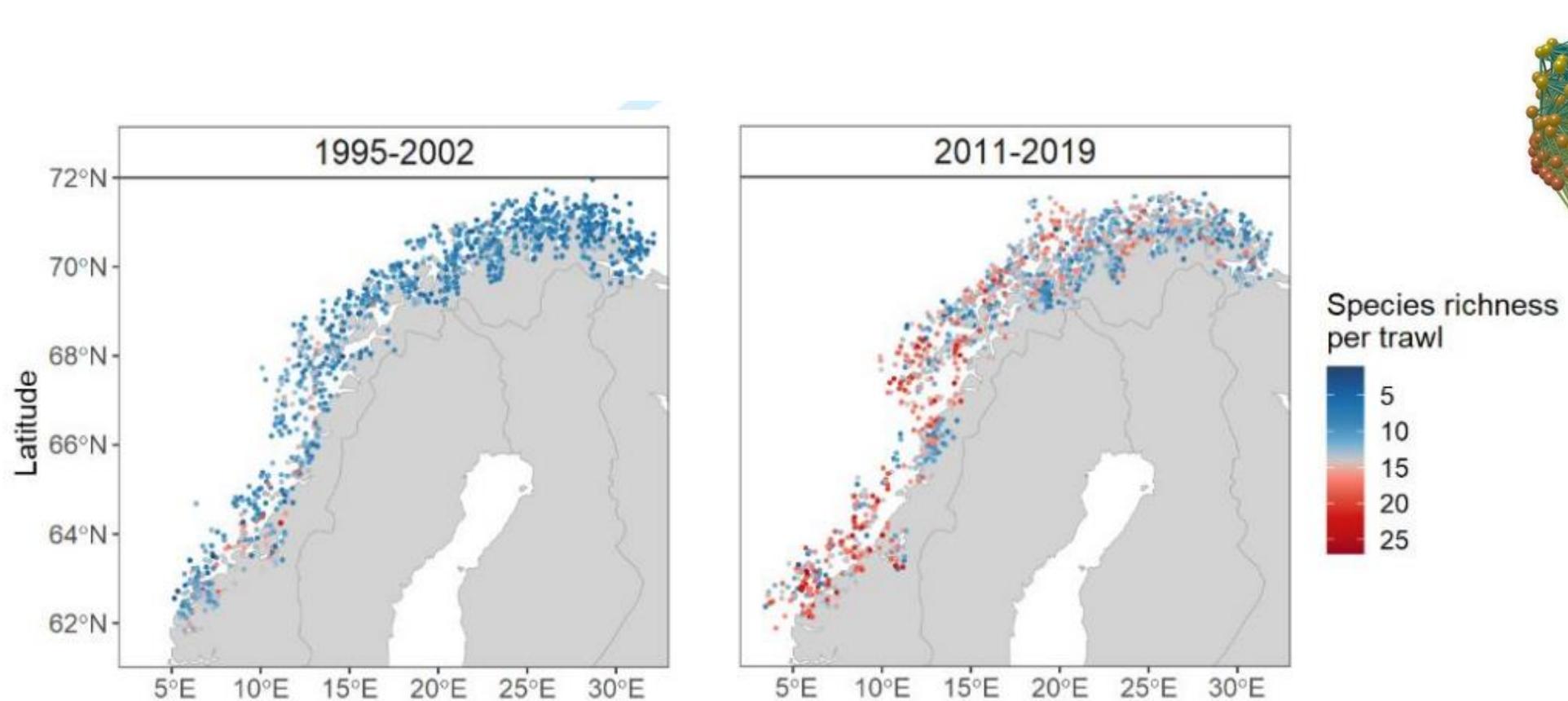
# Climate change and cumulative risk

- species redistributions – new links, **indirect effects**



# Climate change and cumulative risk

- species redistributions – new links, **indirect effects**



## *Climate change and cumulative risk*

- Climate change modifies direct and indirect effects of multiple anthropogenic stressors
- Climate-driven food-web reorganization affects interactions between stressors and systemic risk
- Climate adaptation must account for cumulative risk to promote sustainable management in the High North