MANAGING THE MARINE ENVIRONMENT...
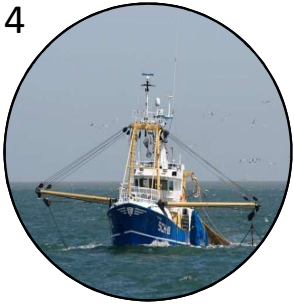
A Bayesian network model for assessing ecological risk and economic impacts for spatial marine management options

Patricia Breen, Oliver Tully, Stephen Hynes, Christine Loughlin, Yves Reecht, Terry Morley
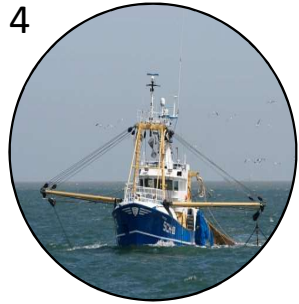
@PatriciaABreen

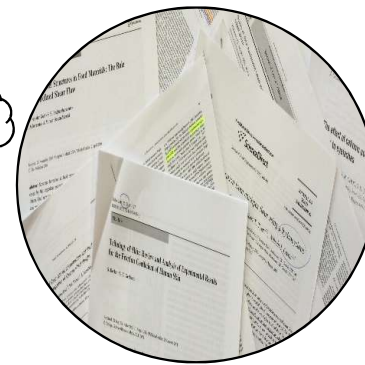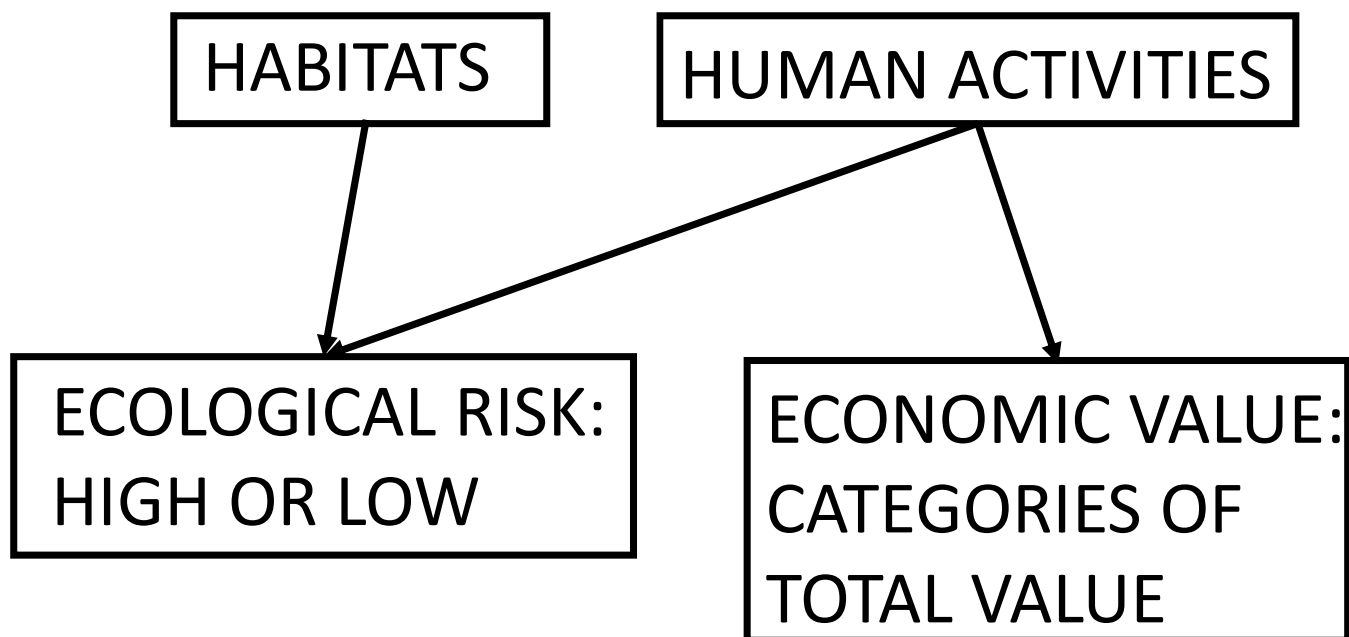# BACKGROUND

ECOLOGY

ECONOMY

CONFLICTS

COMMUNITY

4

HISTORICAL

SCIENTIFIC LITERATURE

EXPERT JUDGEMENT

BAYESIAN NETWORK MODEL
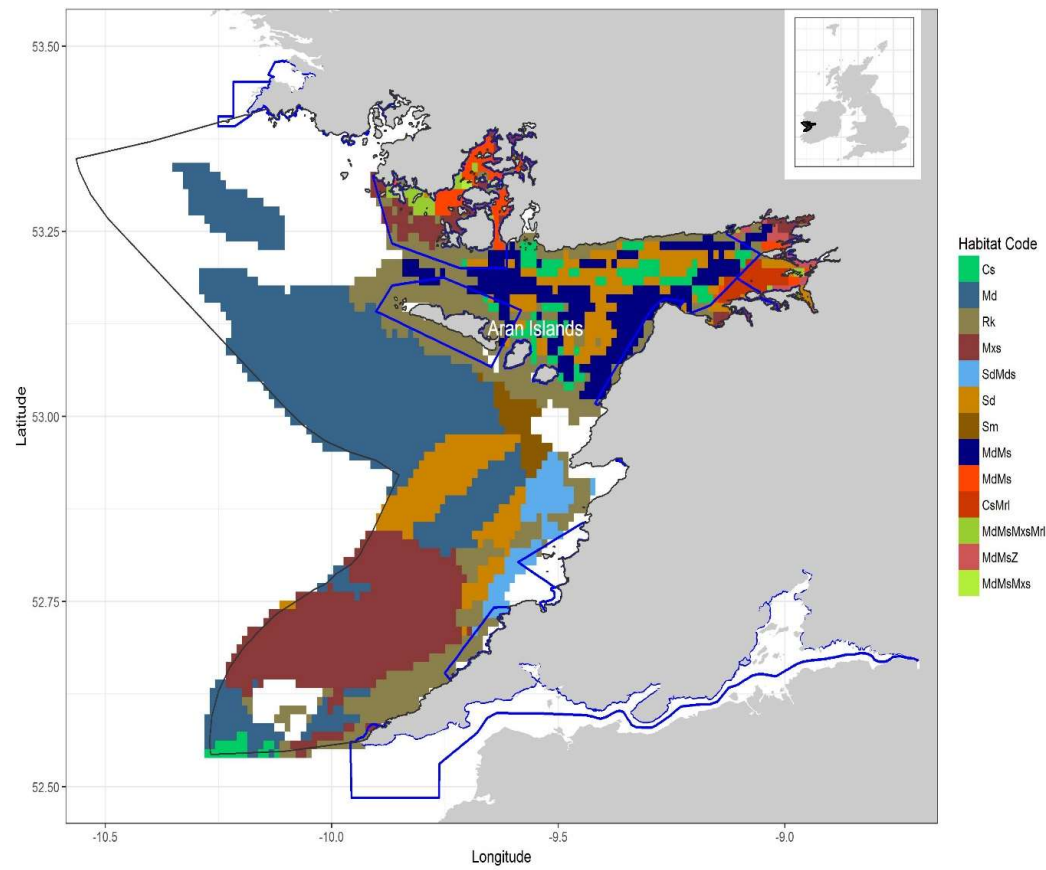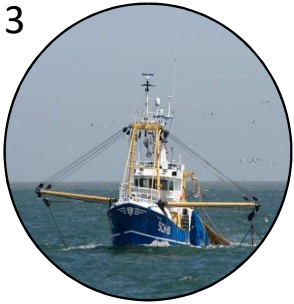
CASE STUDY

CASE STUDY

RISK ASSESSMENT
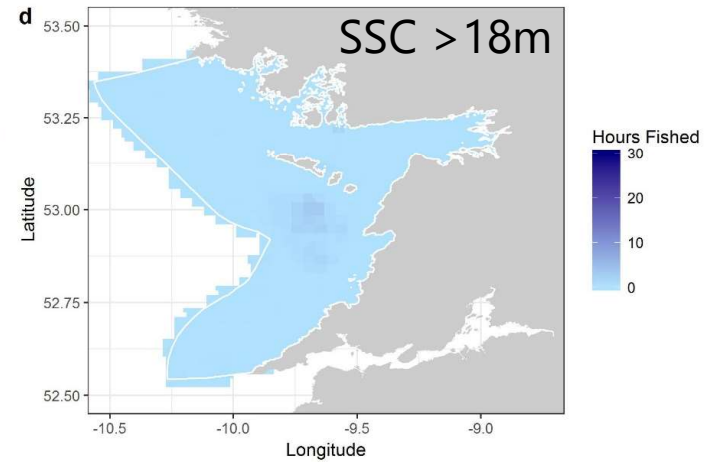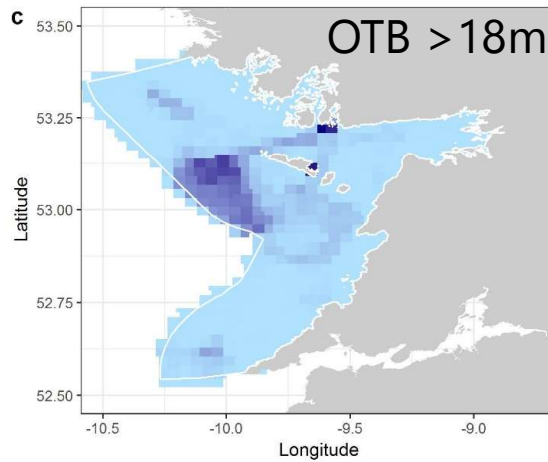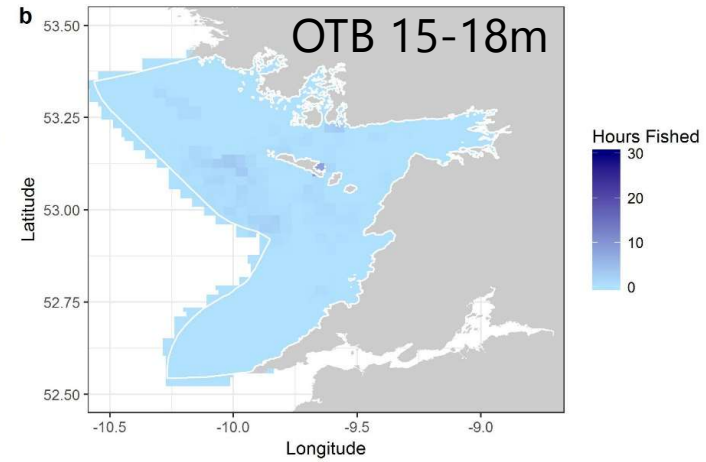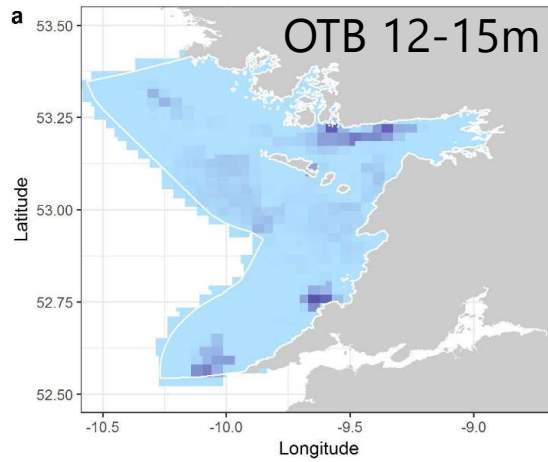## BENTHIC HABITATS

Mortality **:** Recovery

Mortality *per fleet*

Swept area *per fleet* — Mortality *per habitat*

Recovery Time *per habitat* — Recovery frequency *per habitat*

High >1 **:** Low <1

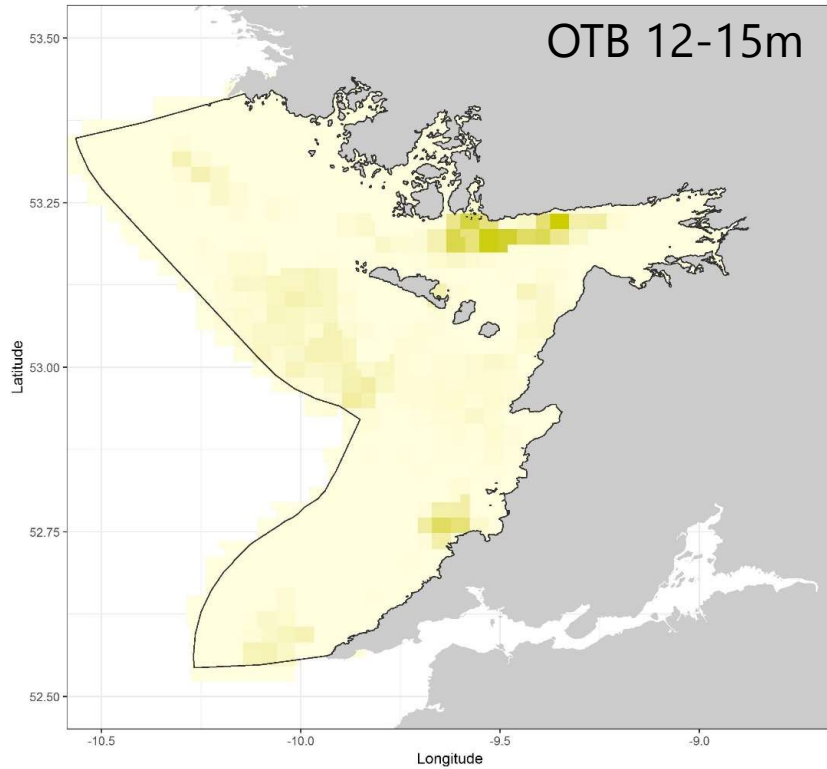Stelzenmüller, V. et al. 2015. Quantitative environmental risk assessments in the context of marine spatial management: current approaches and some perspectives. - ICES J. Mar. Sci. J. du Cons. 72: 1022–1042.
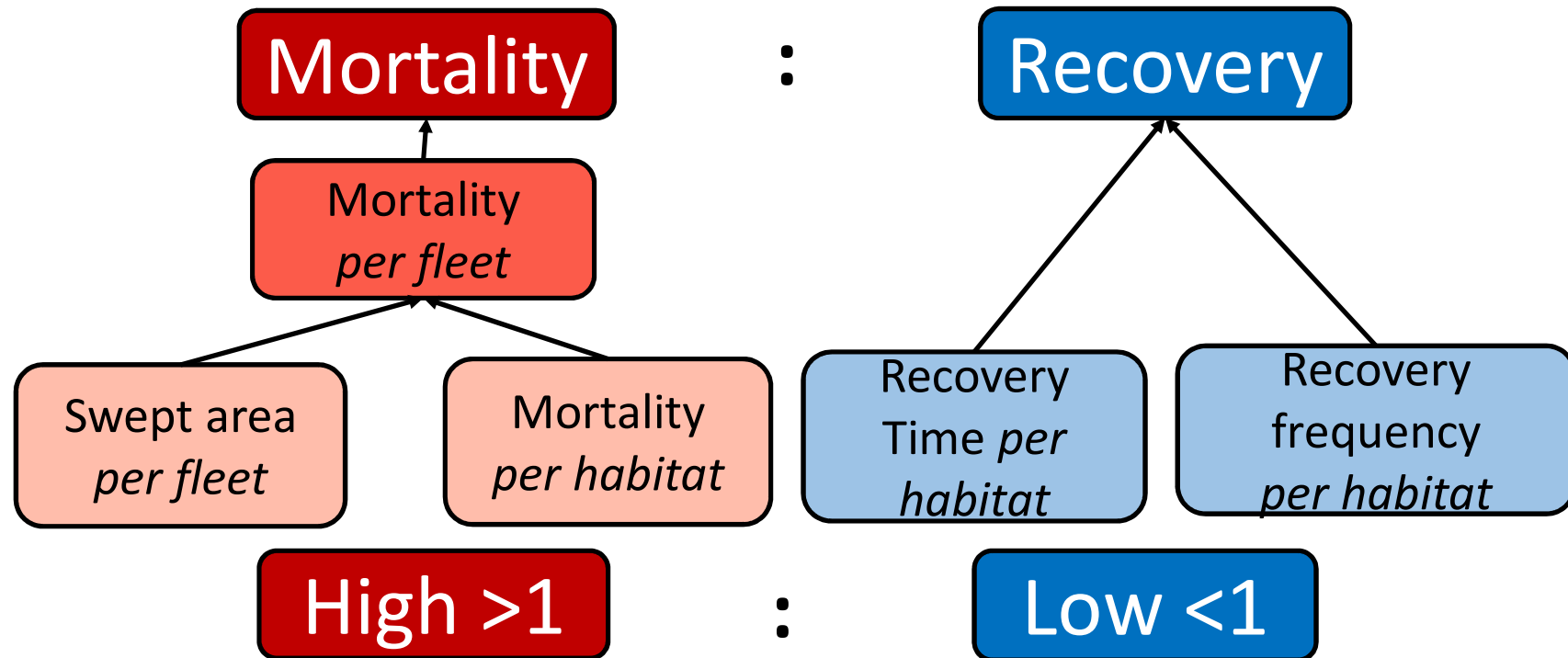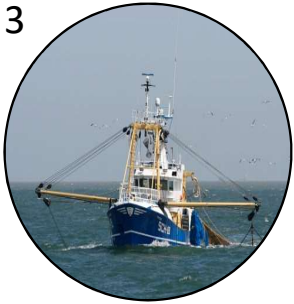
ECONOMIC ANALYSIS

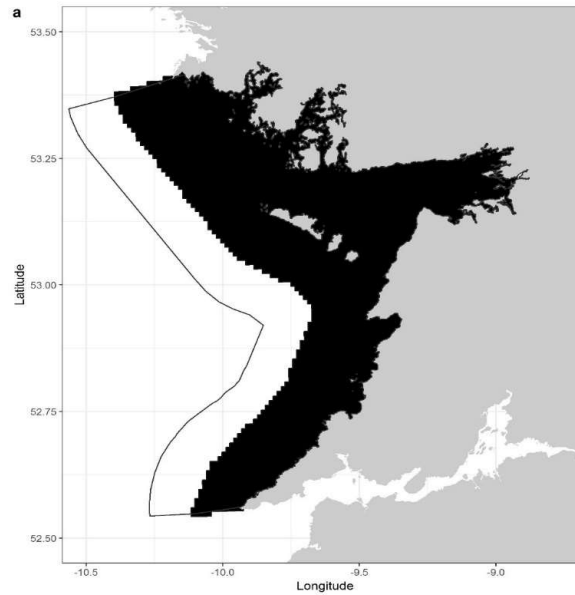**Landings value**

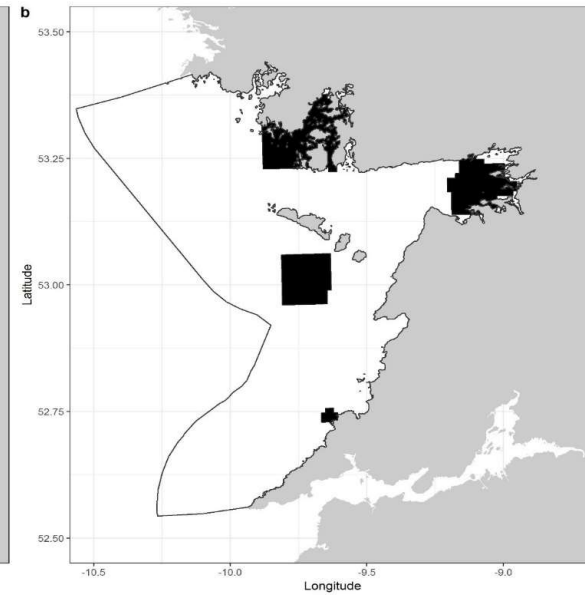Multipliers for Indirect output and FTE
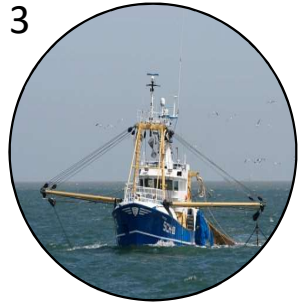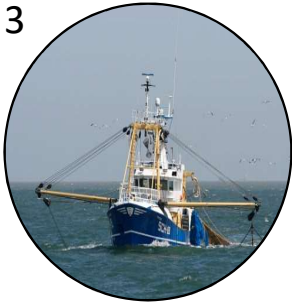
SCENARIOS

Business as usual
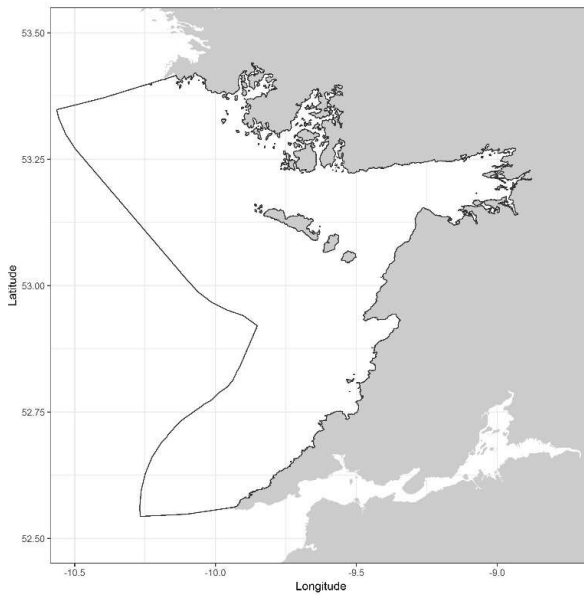
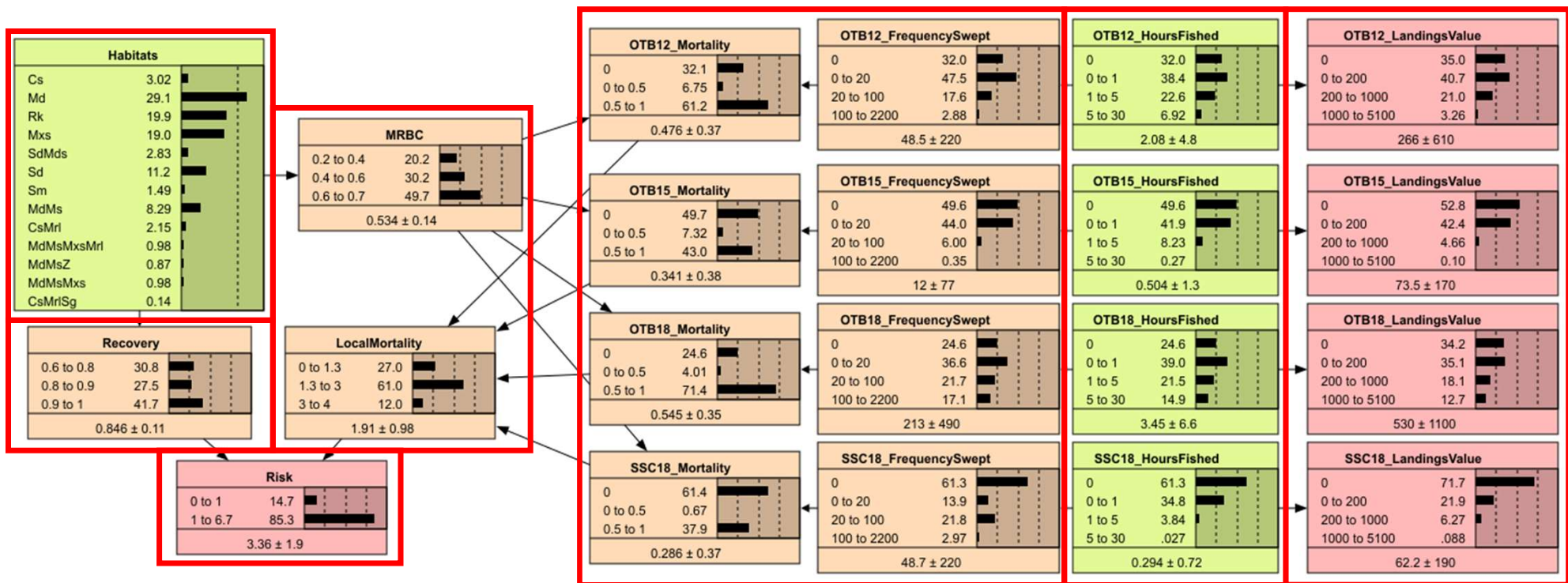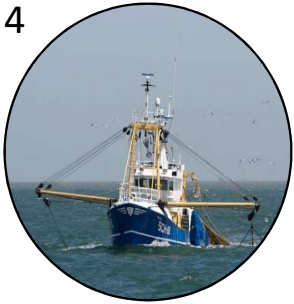**Exclusion 18m vessels within 6nm**

MPA network excluding all fishing

BAYESIAN NETWORK MODEL

MOST PROBABLE STATE

85.3%
Business as usual

70.7%
Length closure

83.6%
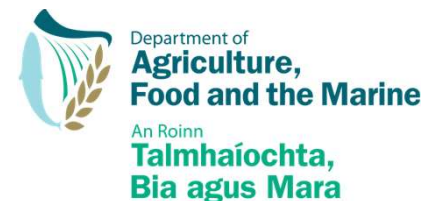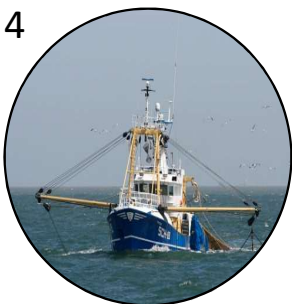**MPA network**
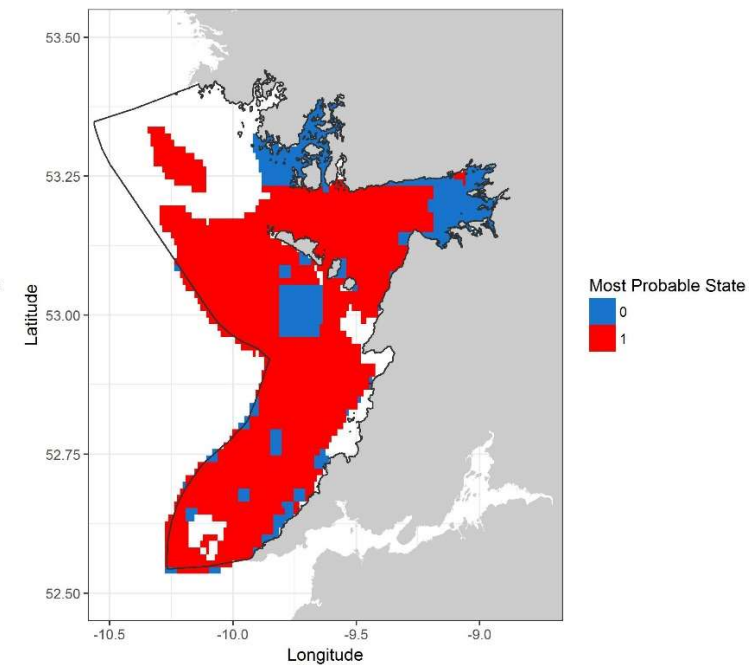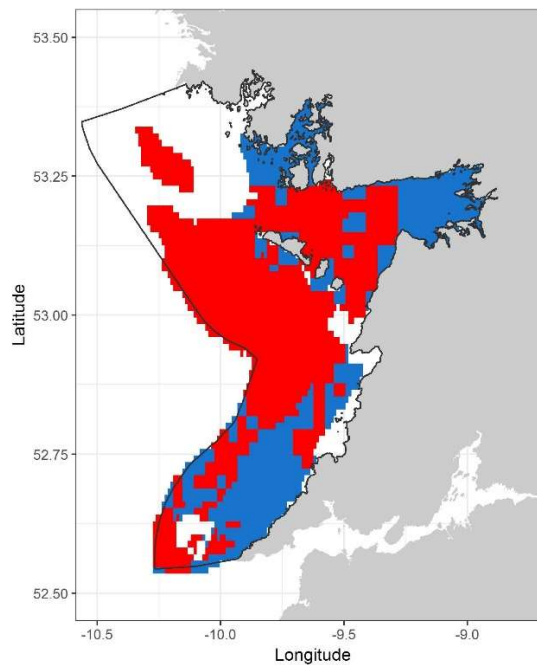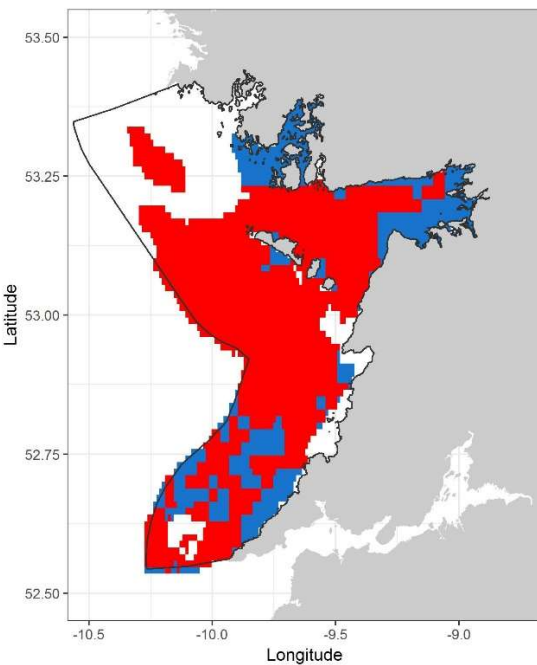
ECONOMIC CONSEQUENCES

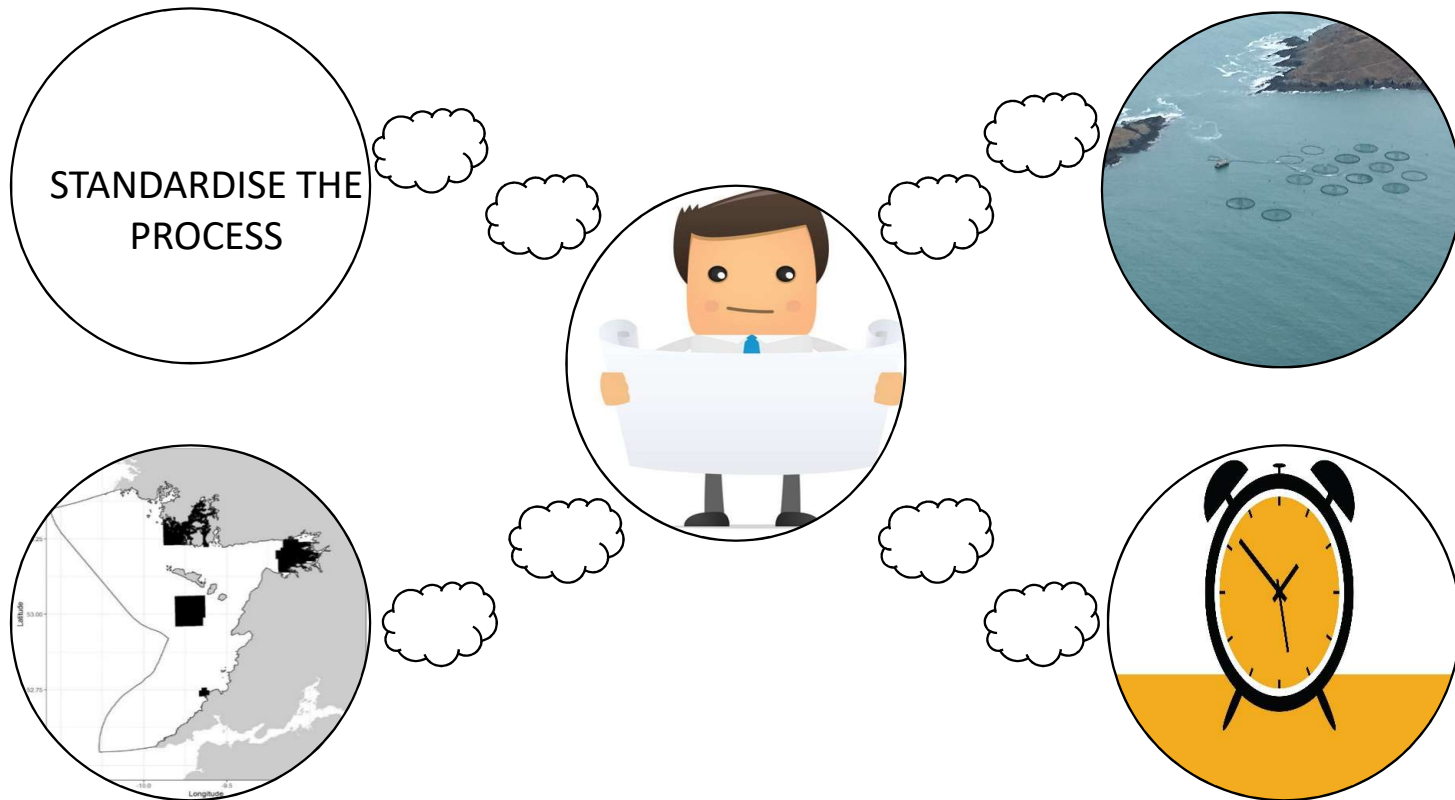| Scenario	Total landings value (€M)	Indirect output (€M)	Employment (Full time equivalent)
Business as usual	3.2	2.5	68
Length exclusion	2.3 (-0.9) **(-28%)**	1.8 (-0.7) **(-28%)**	49 (-19) **(-28%)**
MPA	3 (-0.17) **(-5%)**	2.4 (-0.13) **(-5%)**	65 (-3) **(-5%)**

CONCLUSIONS
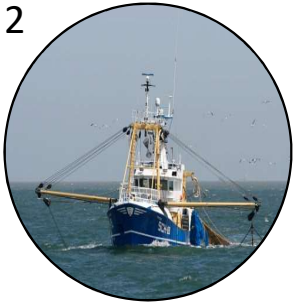
- CLOSING LARGE AREAS TO SOME VESSELS HAS POSITIVE EFFECTS ON MARGINALLY FISHED AREAS

- DIFFICULT TO QUANTIFY ECONOMIC COST STRUCTURE EFFECTS

- MPAS CAUSE LOCAL ECOLOGICAL IMPROVEMENTS BUT WILL HAVE KNOCK ON EFFECTS TO SURROUNDING AREAS

CONCLUSION

STANDARDISE THE PROCESS

THANK YOU!