

Opportunities of Climate Change(?!)

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Main Messages

Emphasise many of the messages are hypothetical, not encouraging or endorsing Climate Change

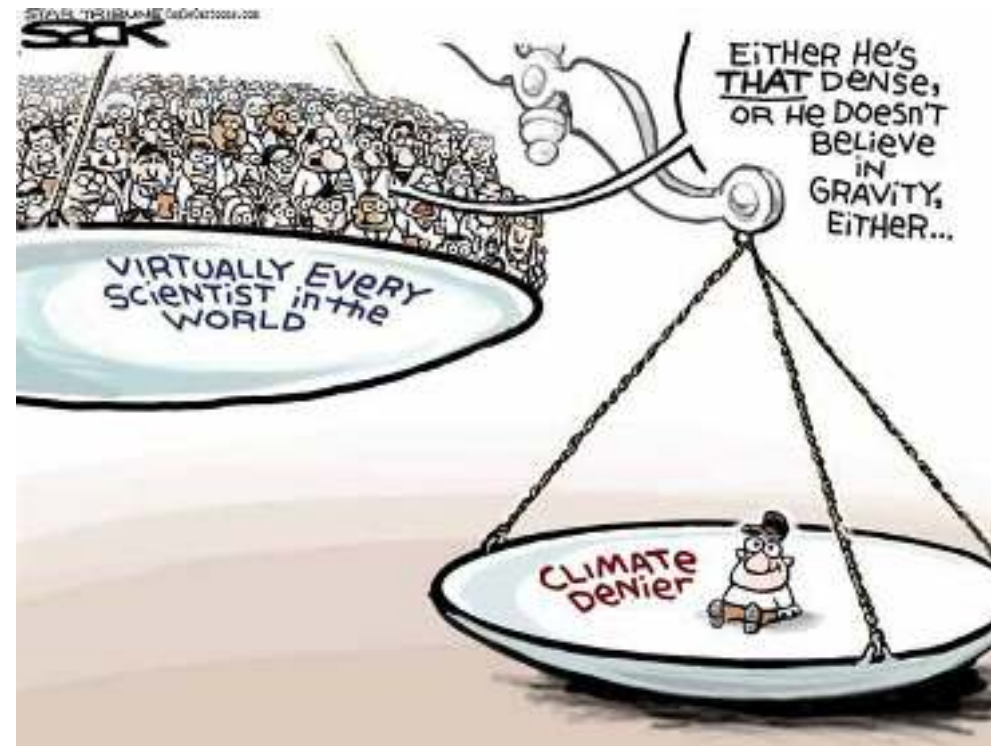
Methods for risk and opportunity assessment and management

Does every adverse consequence have a positive consequence?

Problems for humans not the natural ecology?

Scientists should help to give solutions not just problems

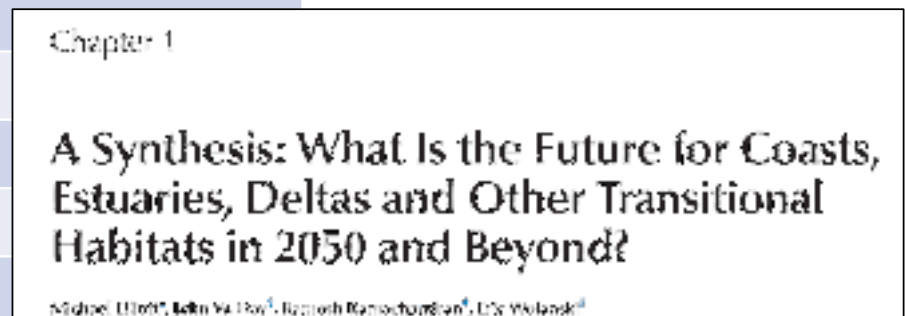
Opportunities from the adaptation measures as well as from Climate Change

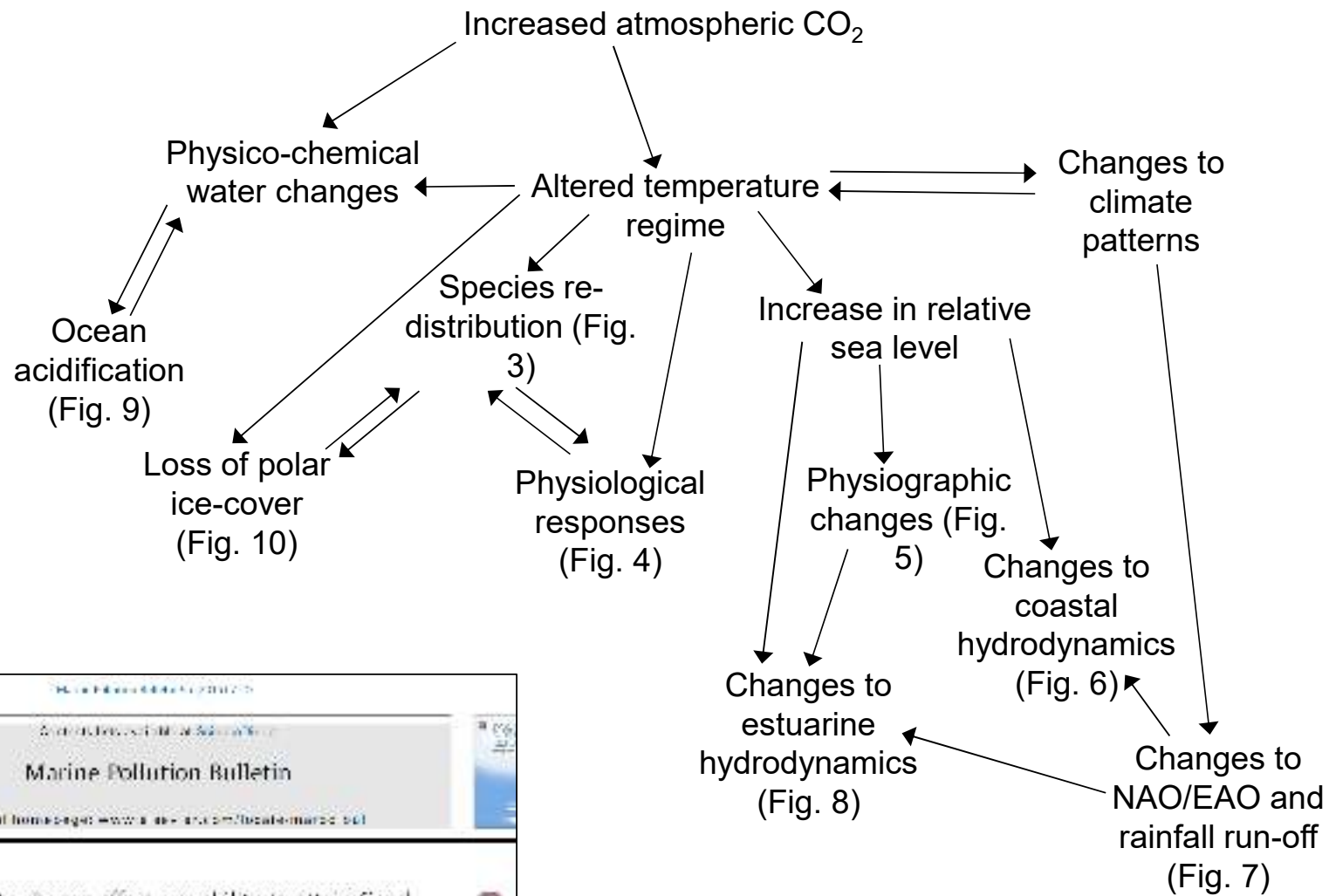


Hazard leading to Risk (depending on assets)

- A) Surface hydrological hazards
- B) Surface physiographic removal by natural processes - chronic/long-term
- C) Surface physiographic removal by human actions - chronic/long-term
- D) Surface physiographic removal - acute/short-term
- E) Climatological hazards - acute/short term
- F) Climatological hazards - chronic/long term
- G) Tectonic hazards - acute/short term
- H) Tectonic hazards - chronic/ long term
- I) Anthropogenic microbial biohazards
- J) Anthropogenic macrobial biohazards
- K) Anthropogenic introduced technological hazards
- L) Anthropogenic extractive technological hazards
- M) Anthropogenic acute chemical hazards
- N) Anthropogenic chronic chemical hazards
- O) Anthropogenic acute geopolitical hazards
- P) Anthropogenic chronic geopolitical hazards

Hazard & Risk Typology:





Primary drivers and consequences of marine global climate change (cross-referring to other figures)

Basic Premise:

In managing an area (estuary, coastline, sea region), we use **Risk Analysis and Risk Management**:

For the *Endogenic Managed Pressures* – we manage the causes and the consequences;

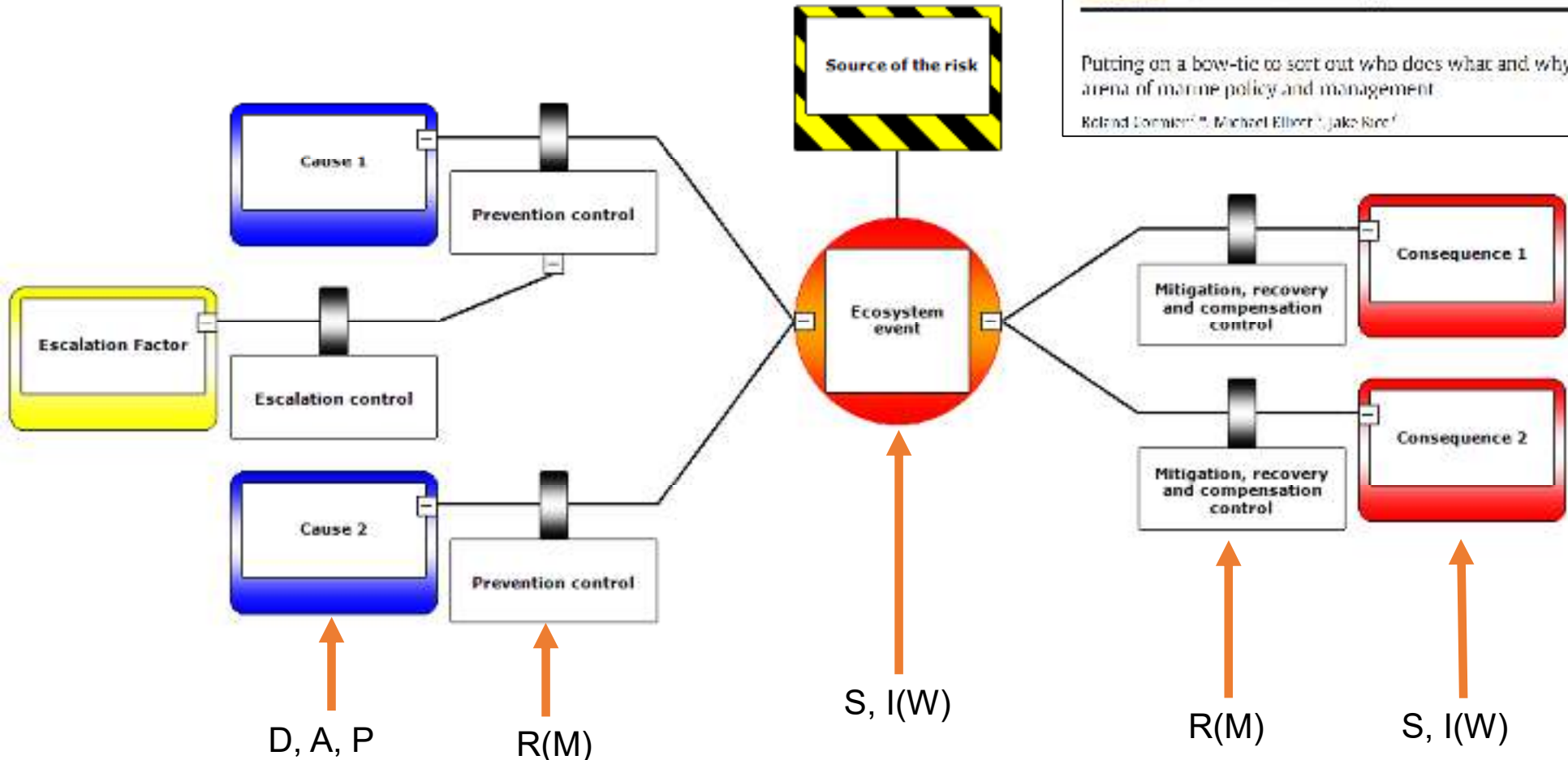
For the *Exogenic Unmanaged Pressures* – we only manage and respond to the consequences as the causes have to be tackled at a wider (e.g. global) scale;

From the DAPSI(W)R(M) framework – we **measure and assess** the Pressures, State changes and Impacts on human Welfare but we **manage** (using Responses and Measures) the Drivers and Activities;

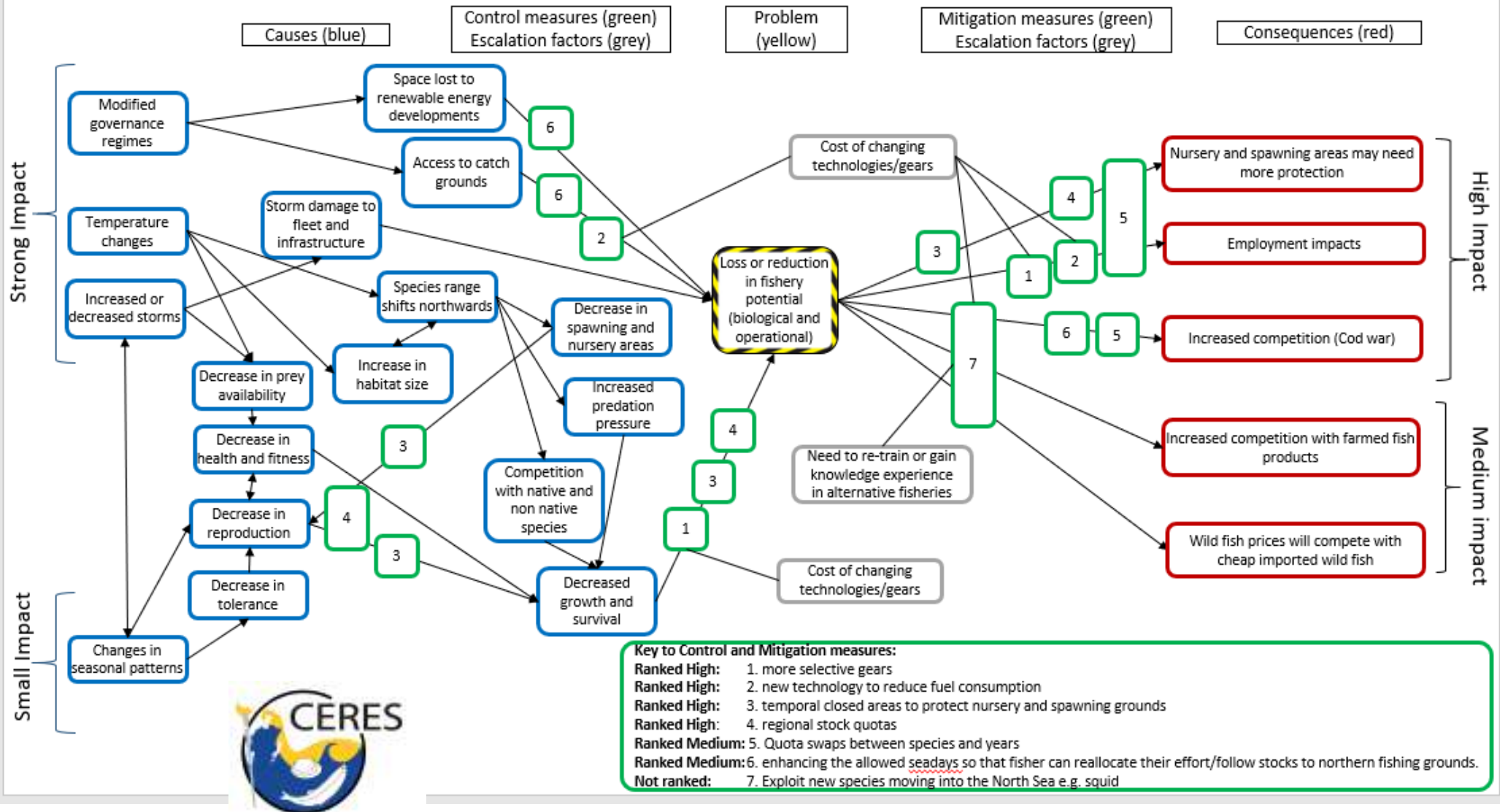
But:

We can also use the same framework and tools for **Opportunity assessment and Opportunity management**

Bow-Tie Analysis linked to **DAPSI(W)R(M)** Framework for Risk Assessment and Risk Management



Stakeholder consultation – to determine causes & consequences and to agree the responses throughout the sequence





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Possible Opportunities - Aquaculture

Alternative areas and species:

- alternative species,
- northerly farms,
- change from native to imported species (oyster),
- changes to fish species being farmed (sea bass/sea bream);
- more aquaculture (salmon) than beef due to lower carbon footprint

Industry and Company Structure, Practices, Competition and Employment:

- diversify production and employment
- high initial economic investment leading to benefits
- increased customer choices and the reputation of the sector
- change to larger farms operating cage systems and processing plants
- move from cage culture to closed or semi-closed production
- increased employment due to risk management
- more competition with other areas





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Markets:

- increased market price (oysters) due to lower production (a short-term benefit)
- more environmentally-friendly products
- increasing size of markets, possibly caused by greater offshore production
- may lead to a stability in markets as firms consolidate
- may change export market

Biodiversity, ecology and food webs:

- Offshore farms with less effect on coastal biodiversity

Culture, Traditions, Values and Tourism:

- positive effect on aquaculture development and economic benefits
- Tourism could create economic benefits
- aquaculture facilities are moved offshore
- increased promotion of alternative shellfish to tourists.



Possible Opportunities - Fisheries

Alternative Areas, Stocks and Species:

- exploit other stocks (in the Mediterranean, sardinella; anchovy and hake in North Sea; NE Atlantic mullet, gurnard and squid)
- move to different pelagic resources or to deeper water, thermophilic or introduced species
- less fishing pressure on previous target species

Industry, Market and Employment Opportunities:

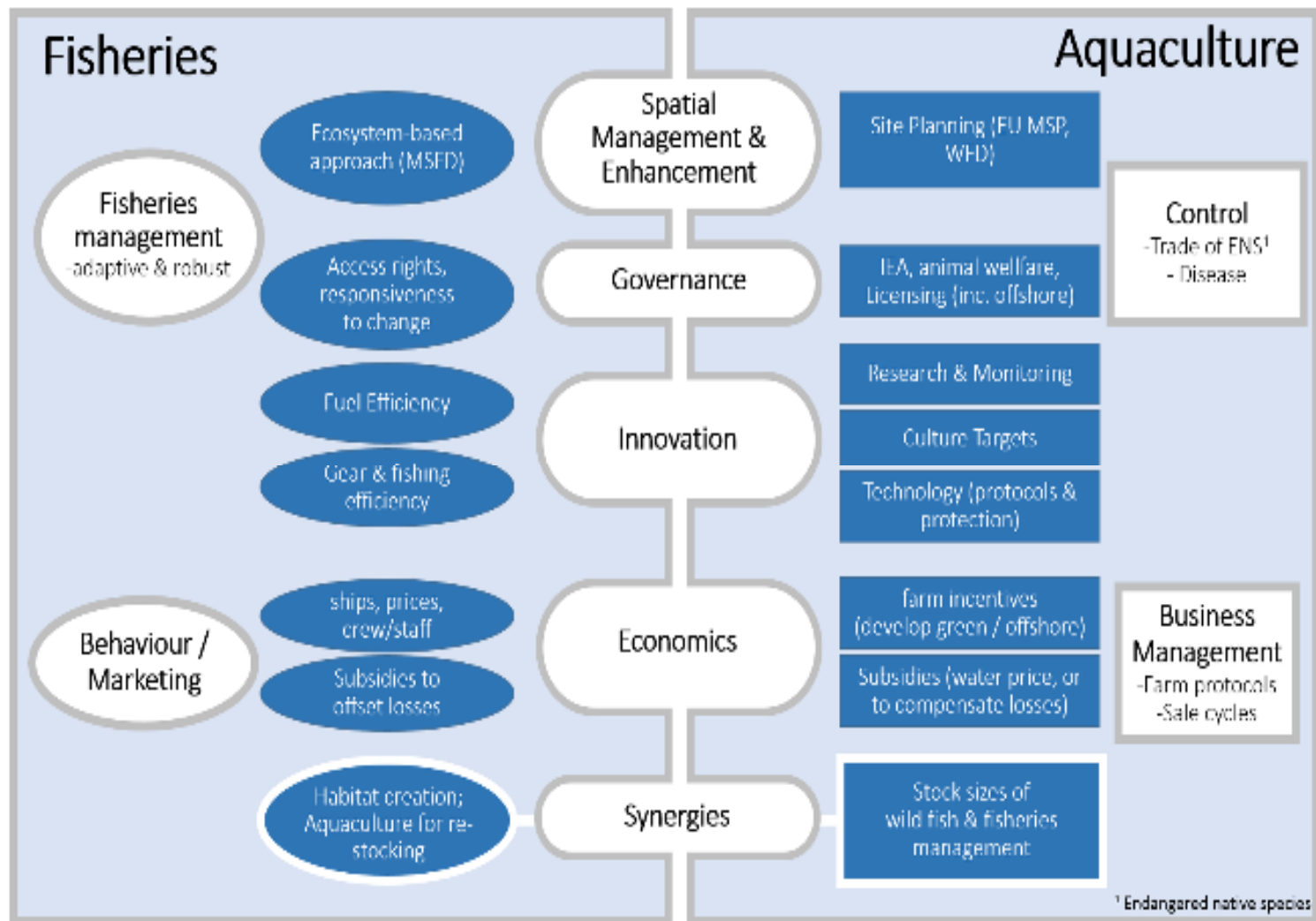
- increased employment due to increased abundance and access
- short-term increase in market price
- increase in market size, regions and length of fishing seasons
- increase in ex-vessel prices
- expansion of new markets through increased globalisation
- market prices remain high due to stock changes in different areas

Local Culture, Traditions, Tourism and Values:

- realignment of the industry reinforcing traditional (cultural) values
- increased tourism to increase seafood consumption
- changes to cultural heritage and societal priorities based on fishing



Climate Change Mitigation, Compensation, Adaptation and Control Measures (identified from Bow-tie Analysis)



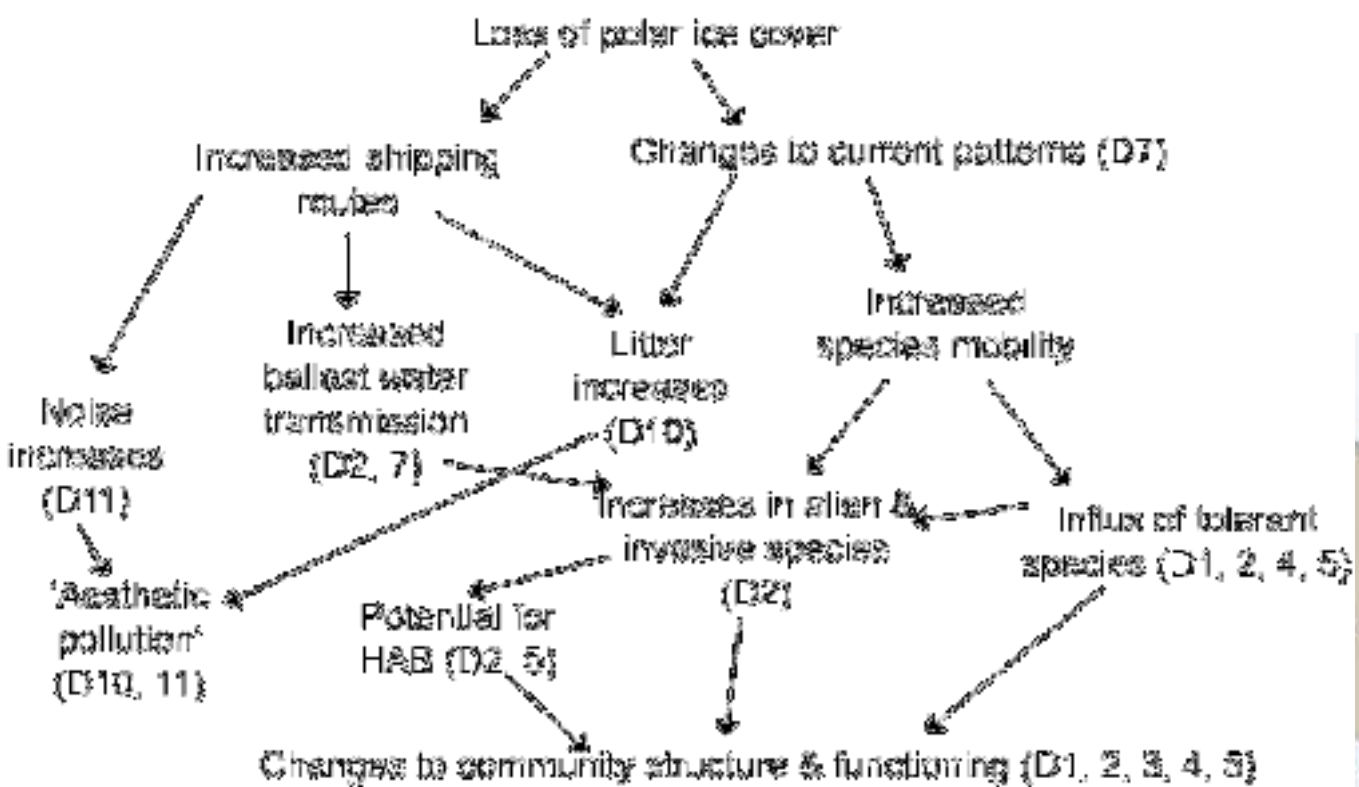


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Benefits for wildlife – species and habitats:

- Habitat creation of saltmarsh, seagrass beds, mangroves, etc. for wildlife – shore protection
- Substrata for epifauna around offshore energy structures
- Reduced polluting discharges from fossil fuel mitigation measures





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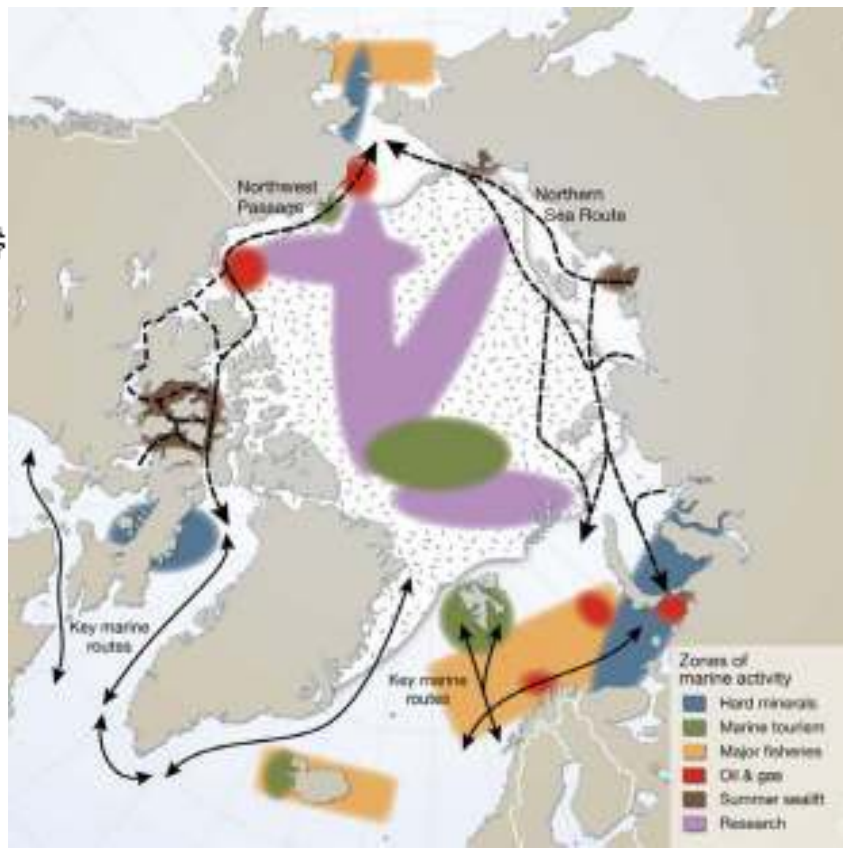
Marine Pollution Bulletin

journal homepage: www.elsevier.com/locate/marpolbul

Viewpoint

Force majeure: Will climate change affect our ability to attain Good Environmental Status for marine biodiversity?

Michael Elliott^{a,*}, Ángel Borja^a, Abigail McQuatters-Collop^a, Krystia Mazik^a, Silvana Birchenough^a, Jesper H. Andersen^a, Suzanne Painting^a, Myrnn Peck^a



- Lower energy demands from COVID and lowered oil and gas extraction in line with national and international policies
- Opportunities for offshore renewables
- Increased wave energy with storminess – can it be harnessed with wave energy?
- Technology benefits in developing mitigation measures for coastal and offshore infrastructure
- Forcing companies to change operation – vision cf. legal imperative

Ancillary 'Kite-flying':





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The 10 tenets:

To be successful, management measures or responses to changes resulting from human activities and climate change should be:

- Ecologically sustainable
- Technologically feasible
- Economically viable
- Socially desirable/tolerable
- Legally permissible
- Administratively achievable
- Politically expedient
- Ethically defensible (morally correct)
- Culturally inclusive
- Effectively communicable

Question – is an opportunity from climate change and its adaptation possible, successful and sustainable?



Editorial

Marine science and management means tackling exogenic unmanaged pressures and endogenic managed pressures – A numbered guide.



Editorial

The 10-tenets for integrated, successful and sustainable marine management



The 10-tenets of adaptive management and sustainability: An holistic framework for understanding and managing the socio-ecological system

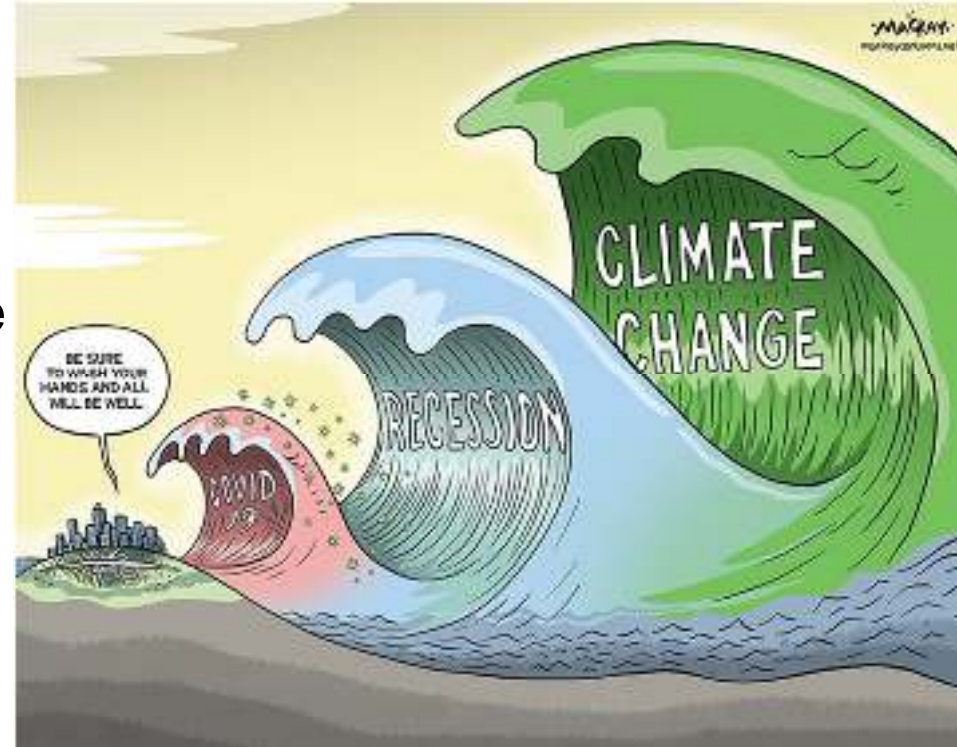
Steve Damard¹, Michael Elliott



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Main messages for future changes and challenges:

- Think Global, Act Local!
- Essence is Risk & Opportunity Assessment & Management
- Environmental realism – to slow climate change while adapting
- To emphasise the problems and take part in solutions
- Use local, regional, national, European, international (OSPAR) and global initiatives (importance of leverage!)
- Need for long-term vision, objectives, definition of success built into a management plan



Three premises:

“changing systems are not a problem for the ecology as it will adjust to any new situation and create a new equilibrium, they are only a problem for society, i.e. we might not be able to obtain the societal benefits from ecosystem services that we wish to and we may not like the new ecology but eventually we will have to accept it”

“climate change will be the biggest get-out clause for meeting environmental obligations”

“adaptation and responses to climate change brings opportunities for technology, economics, industry and science”

Discuss!

Marine Pollution Bulletin

Viewpoint

Is climate change an unforeseen, irresistible and external factor – A force majeure in marine environmental law?

Roxanne Said^a, Richard Barnes^b, Michael Elliott^{a,*}

This is a screenshot of a journal article page from Marine Pollution Bulletin. The page features the Elsevier logo and the journal title. The article title is "Is climate change an unforeseen, irresistible and external factor – A force majeure in marine environmental law?". The authors listed are Roxanne Said, Richard Barnes, and Michael Elliott.

Marine Pollution Bulletin

Viewpoint

Force majeure: Will climate change affect our ability to attain Good Environmental Status for marine biodiversity?

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