

Estuarine, Coastal and Marine
Science and Management:
'broad thoughts from (at) home'

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THE UNIVERSITY OF HULL

Institute of Estuarine & Coastal Studies (IECS)

DPSIR Approach (NB cyclical to helical)



Fulfil 'The Ecosystem Approach'

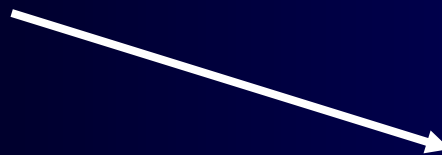


(D+P)+R ≠ (S+I) Approach

Drivers (human activities responsible)



Pressures (suite from each driver)

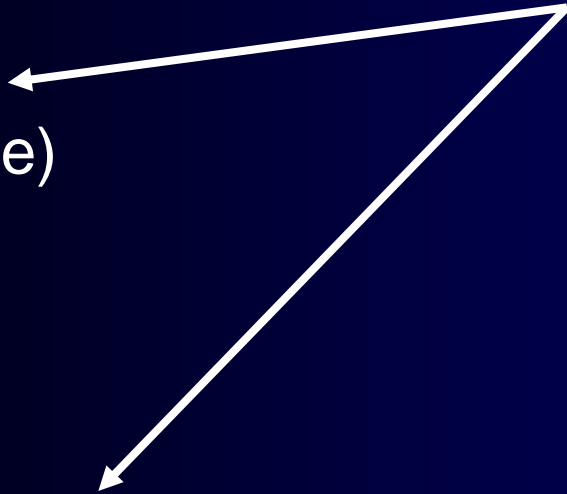


State (environmental variables)

Response (economic, governance actions, etc)

Impact (on human uses and on users)

Is it a definition or a tool for the EcoApp?



Therefore:

Manage for both **ecology** and **economy** (reason)

Using both **technology** and **administrative** bodies (tools)

Within both **laws** and **governance** (drivers)

For both **society** and **politics** (drivers)

Hence we need:

Drivers for management

Tools for management

Endpoints/Outcomes of management

Aim (economic & ecological goods & services)

Outcome!

Fulfil 'The Ecosystem Approach'

Set objectives (ecological, economic, legislative)

Tool!

Action required (defined in advance)

Action not required

Measure status (EII, habitat mapping)

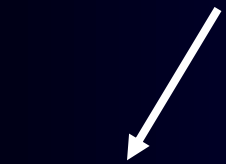
Tool!

Set indicators (birds/fishes; tonnage/wealth creation; quality of life/nature conservation)

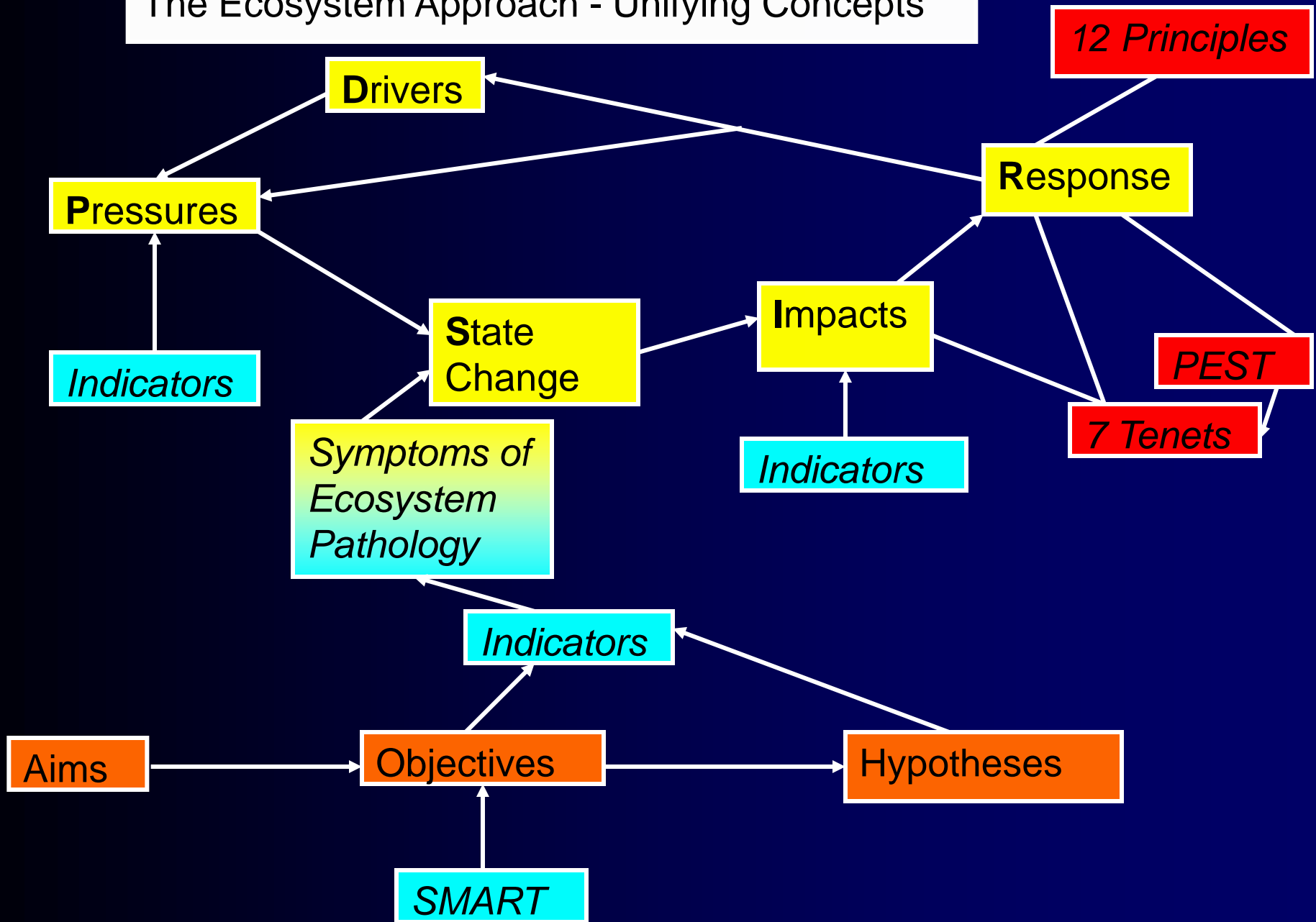
Tool!

Perform monitoring (surveillance, condition, compliance, investment)

Tool!



The Ecosystem Approach - Unifying Concepts



P.E.S.T analysis (modified)

- The organisation of an environment can be analysed by conducting a P.E.S.T analysis.
- This is a simple analysis of an environment's *Political, Economical, Social and Technological* organisation.

7 tenets for success in environmental management & habitat restoration:

- Environmentally sustainable (yes)
- Technologically feasible (yes)
- Economically viable (yes?)
- Socially desirable/tolerable (?)
- Administratively achievable (yes)
- Legally permissible (yes)
- Politically expedient (??)

(Elliott et al Mar Poll. Bull 2006)

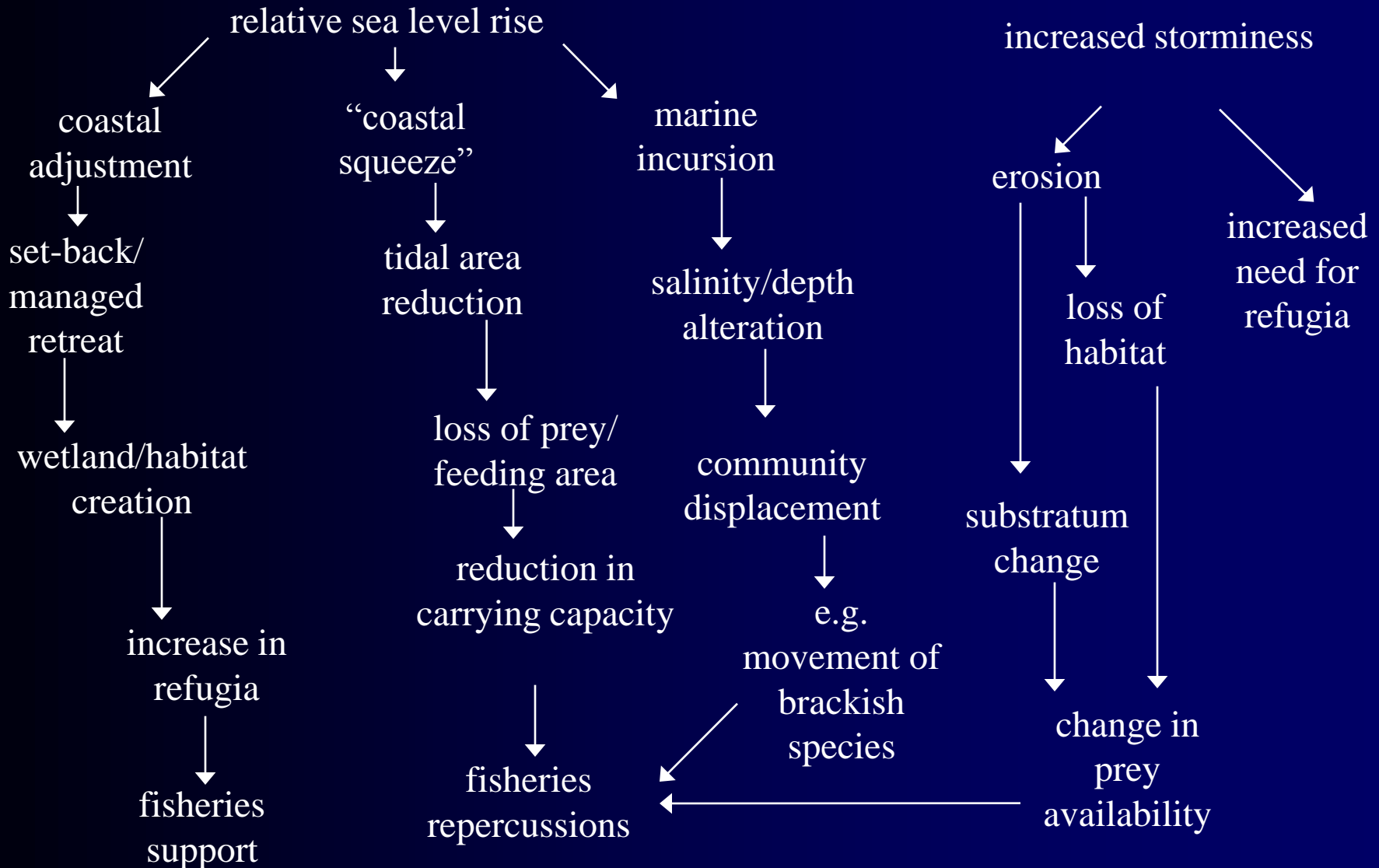
7 tenets of environmental management

Environmentally sustainable	That the measures will ensure that the ecosystem features are safeguarded
Technologically feasible	That the methods and equipment for ecosystem protection are available
Economically viable	That a cost-benefit assessment of the environmental management indicates sustainability
Socially desirable/tolerable	That the environmental management measures are as required or at least are understood by society as being required
Legally permissible	That there are regional, national, European or international agreements and/or statutes which will enable the management measures to be performed
Administratively achievable	That the statutory bodies such as governmental departments, environmental protection and conservation bodies are in place and functional to enable the successful and sustainable management
Politically expedient	That the management approaches and philosophies are consistent with the prevailing political climate

	Env.	Econ.	Tech.	Soc.	Leg.	Admin.	Polit.
1 Societal choices				✓			✓
2 Subsidiarity					✓	✓	
3 Inter-ecosystem effects	✓		✓				
4 Economic management		✓					✓
5 Maintain ecosystem services	✓	✓					
6 Maintain ecosystem functioning	✓						
7 Appropriate spatial & temporal scales	✓						
8 Long-term management	✓						
9 Manage for variability	✓						
10 Manage to conserve & use biodiversity	✓	✓		✓			
11 Use best practice, all 'data'	✓	✓	✓				
12 Stakeholder input, incl. science	✓	✓	✓	✓	✓	✓	✓

(✓ explicit, | implicit)

Example: Climate Change - Effects on Estuarine Processes



'Exogenic Unmanaged Pressures'



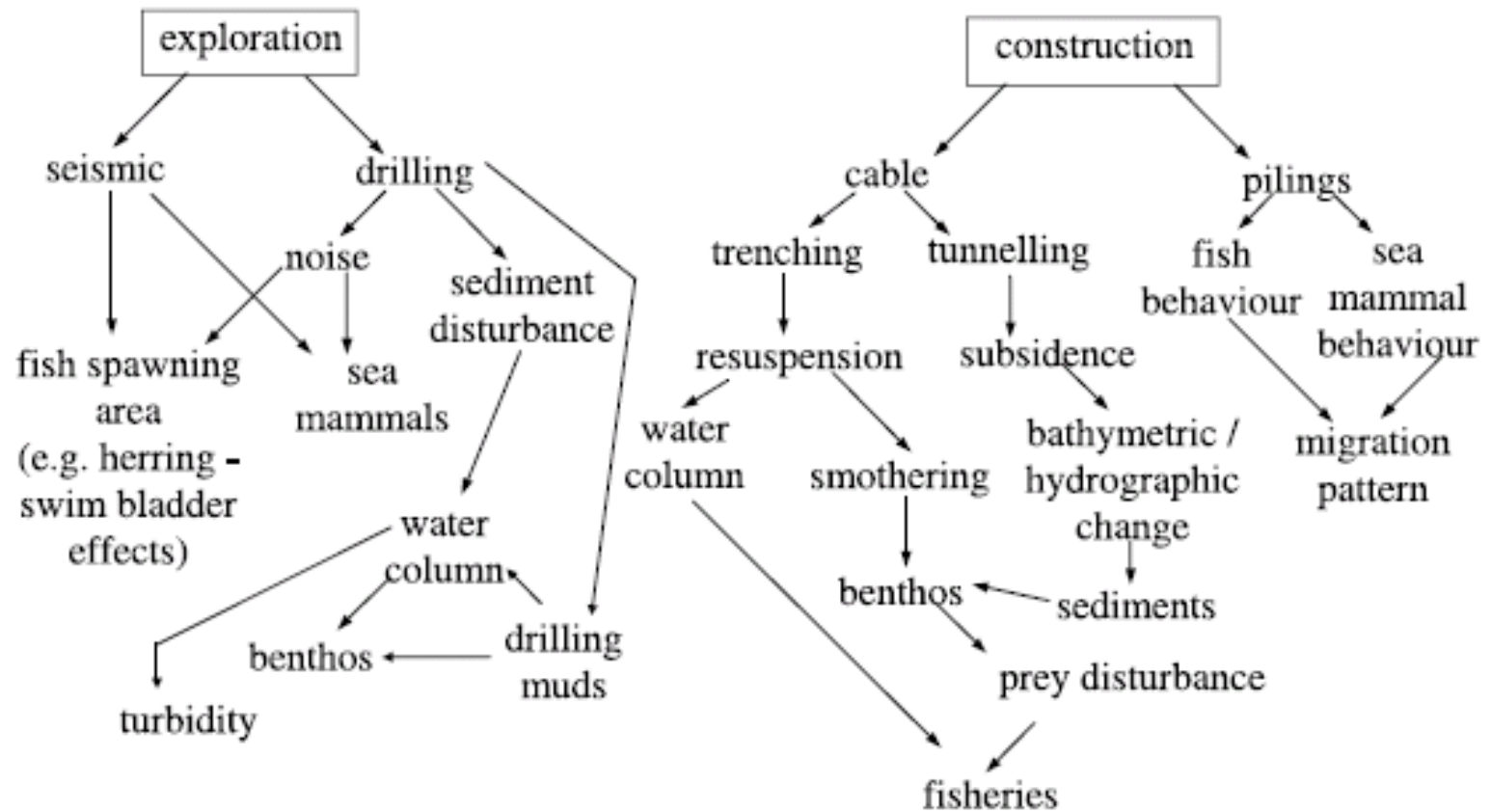


Fig. 1. Environmental consequences of offshore wind power generation I.

Aim to quantify the links in this horrendogram

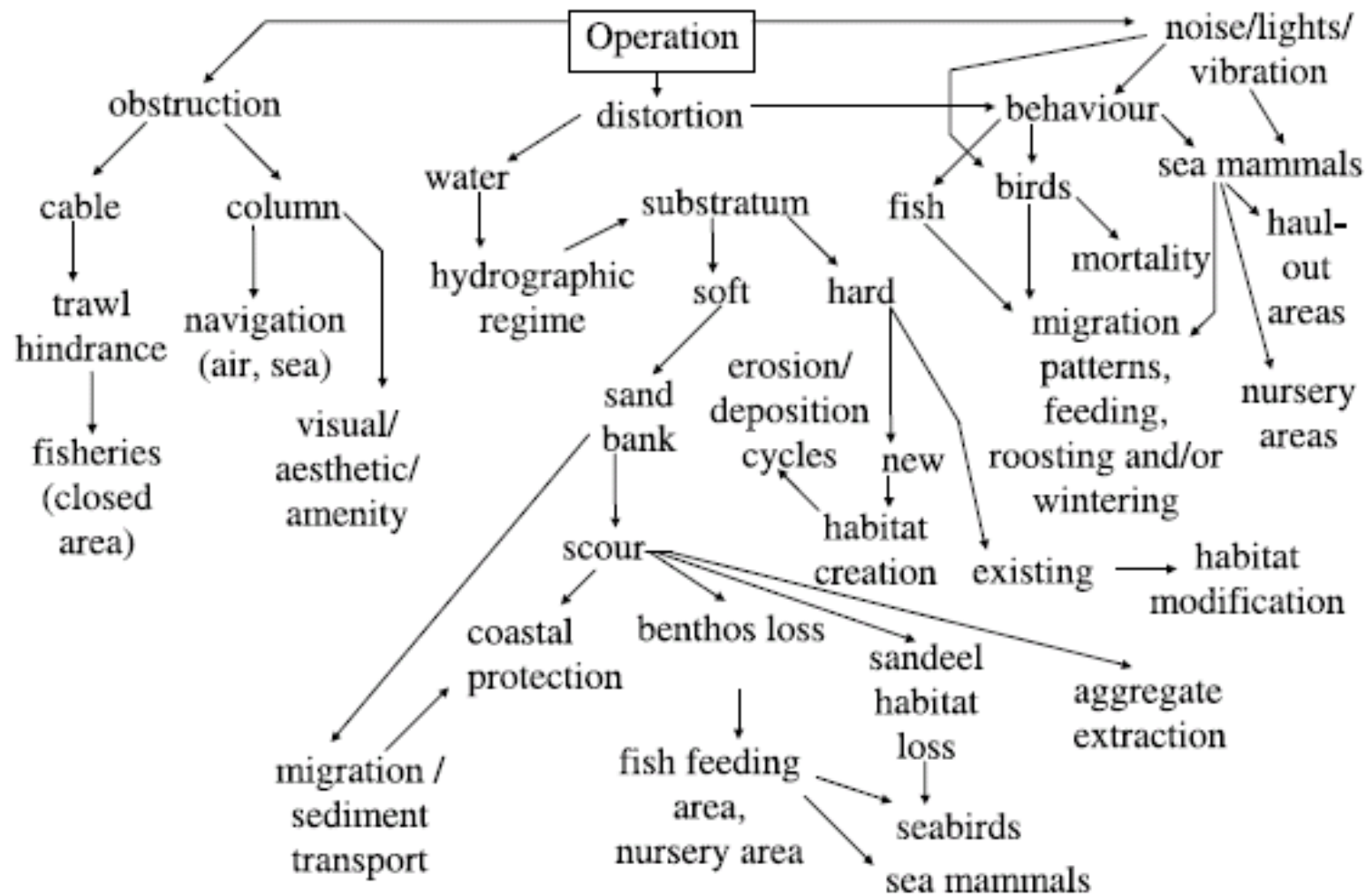
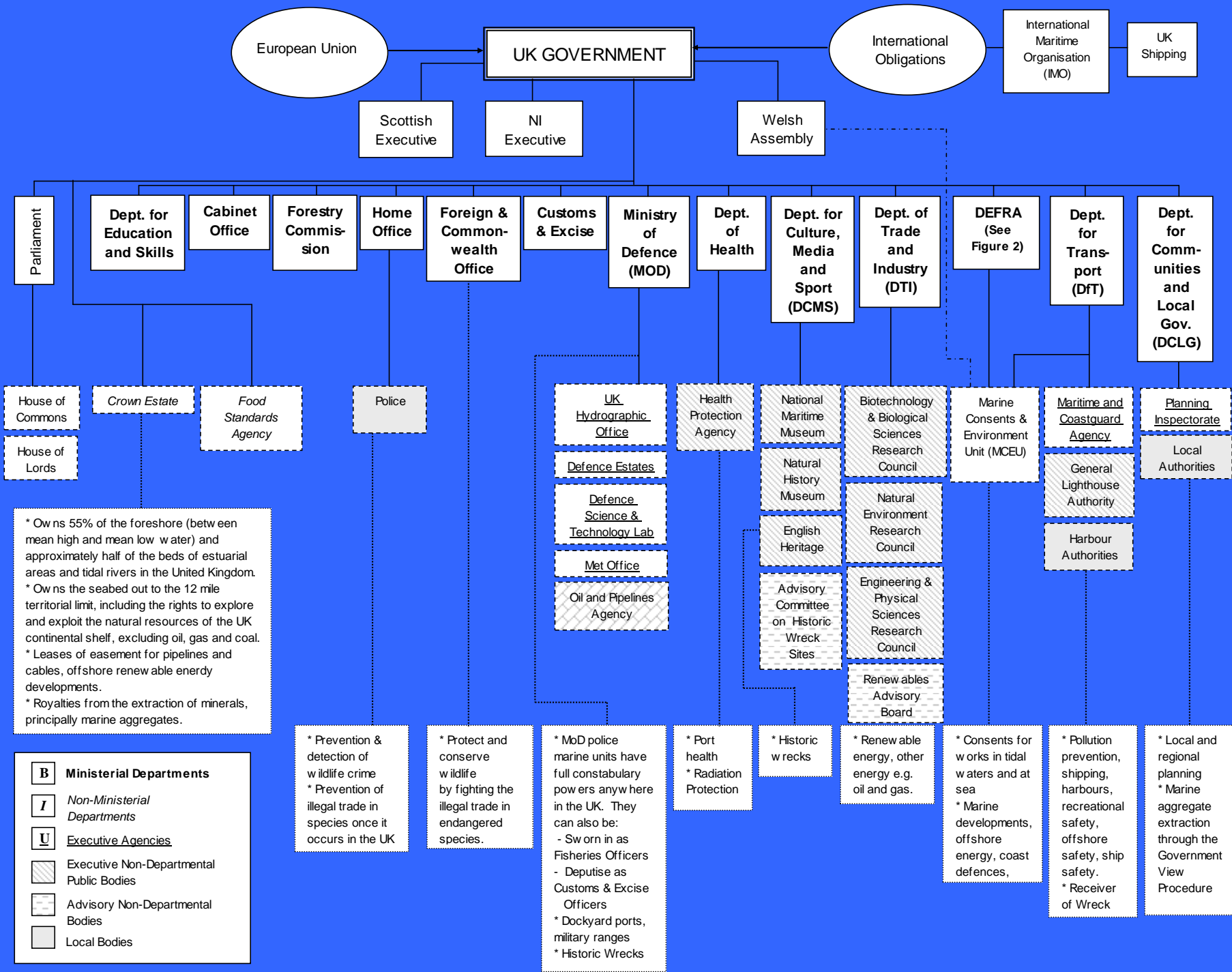


Fig. 2. Environmental consequences of offshore wind power generation II.

..... and this one!



B Ministerial Departments

I Non-Ministerial Departments

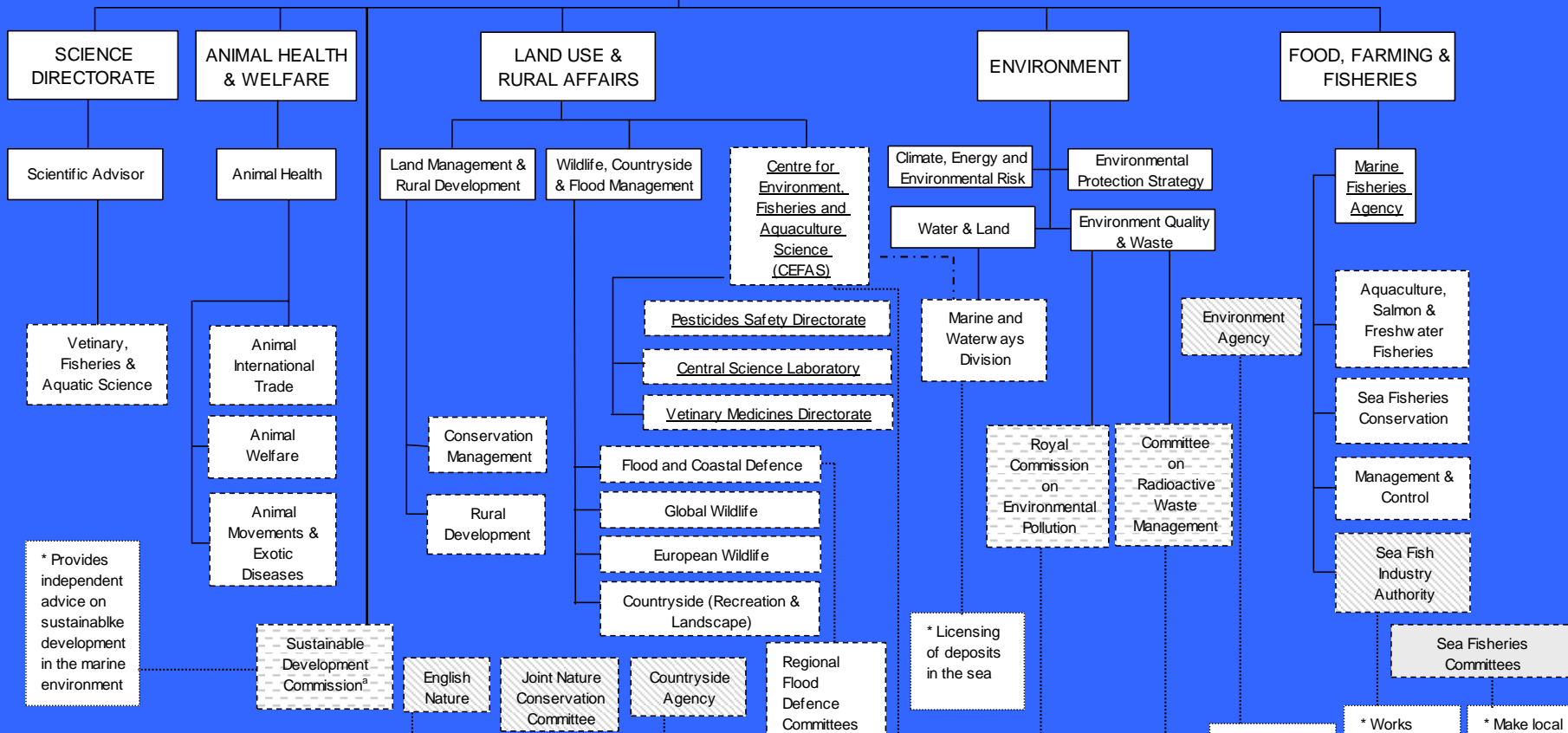
U Executive Agencies

Executive Non-Departmental Public Bodies

Advisory Non-Departmental Bodies

Local Bodies

Department for Environment, Food and Rural Affairs (DEFRA)



B Ministerial Departments

I Non-Ministerial Departments

U Executive Agencies

Executive Non-Departmental Public Bodies

Advisory Non-Departmental Bodies

Local Bodies

^a It is recognised that the Sustainable Development Commission will cut across many other departments within Government

* Nature conservation, protected areas e.g. SSSI, SPA, SAC, NNR, Ramsar, MNR, species protection

* Advisory body on marine policy
* Advice on marine conservation issues (marine protected areas) out to 200nm

* Conserve and enhance the countryside, promote social equity and economic opportunity. Rural conservation, recreation and amenity

* Flood defence, sea defence, coastal protection, emergency control centre, river and coastal engineering group

* Fisheries science and management, marine environmental protection, aquaculture, fish and shellfish disease, hygiene and cultivation

* Independent advice to the Queen, the Government, Parliament and the public on environmental issues

* Independent advice to Ministers on radioactive waste management issues

* Water resource management, pollution prevention, water quality, IPPC, waste, contaminated land, flood defence, fisheries, navigation, recreation, conservation, planning liaison, salmon fisheries

* Works across all sectors of the UK seafood industry (fishermen, fish farmers, processors, wholesalers, fish friers, caterers, retailers and the import-export sectors) to promote good quality, sustainable seafood

* Make local bylaws, regulate the method of fishing, set minimum sizes for seafish and protect breeding shellfish, restrict the taking of seafish to specific areas and times of year

	Land	Freshwaters	Estuaries	Coasts	Open Sea
IPPC					?
ELD	?	?	?	?	?
EIA					
SEA					
HSD					UK only
WFD					
ICZM			?		
Marine Strategy			?		
MFD?			?	?	

Waters where the EU ecosystem-based directives, recommendations and strategies apply; shows overlap in some environments; aim for ecosystem-based management from land to the open sea (estuaries includes all transitional waters; ? indicates an uncertainty in implementation)

(expanded from Apitz, Elliott, Fountain & Galloway (2006))