
CEA Preliminary Results: Morphology and Biodiversity Benefits

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Relevant WFD Objectives

- For good status need to address those changes in morphological conditions which impact on biology
- No standards for morphology as very site specific – but are screening conditions
- No deterioration: avoiding and mitigating effects of current and new physical modifications
- Improvement/restoration to good status or potential: tackle past morphological change
- HMWB and AWB, Article 4.7 new physical modifications and 4.6 temporary deterioration for floods

Extent of Environmental Gap: 2005 initial assessment results

Percentage of English water bodies “at risk” or “probably at risk” of failing to meet GES by 2015 as a result of morphological pressures risk:

Rivers	53.5
Lakes	60.1
Estuaries	89.4
Coastal Waters	76.0

Pressures/sectors covered

This chapter considers morph pressures from

- Flood risk and land drainage
- Coastal defence
- Inland and marine navigation
- Agriculture

[Separate chapter on planning]

Extent of the Gap: Uncertainties

- Objectives: Designation of HMWB/AWB, definition of GEP, and use of Article 4.7
- Lack of data on extent and nature of pressure eg National Flood and Coastal Defence Database not fully populated
- Science gap on biological impacts caused by morphological pressures
- Impacts of other policies/trends – eg flood management, navigation, urbanisation
- Apportionment for restoration measures – changes of use and ownership since morphological change was made

Measures Considered

Aggregated into types of measure.

EA flood risk mgmt	“WFD proof” flood risk appraisal and delivery Research understanding of pressure/response Manage flood risk management assets differently Reduce maintenance Replace assets with ones which meet WFD requirements Tackle redundant flood defences Maintain status of protected areas with improved defences or alternative habitat
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Measures Considered

TBC	<ul style="list-style-type: none">Make barriers passable for all fish, and eelsProvide screens for fish by abstractionsPrevent bankside erosion by purchase and lease back of landRestore in stream featuresRestore river and remove structures in protected areasRemove and dispose of accumulated silt in protected area lakes
LAs and IDBs	<ul style="list-style-type: none">Update coastal defence informationAssess relationships between coastal defences and coastal morphologyPiloting and monitoring measures to improve understandingManage assets differentlyTackle redundant defencesWorks to maintain status

Measures Considered

Inland navigation	Make barriers passable Hydromorphological evaluation Remove bank protection and reprofile mitigate hard bank defences or replace with soft bank protection Modify dredging techniques or disposal options
Marine navigation	Remove navigation related structures Habitat creation Modify navigation management measures Sediment management (beneficial use) Constraints on dredging or disposal

Measures Considered

Agriculture	Funding for alternative use of land Funding for agri-environment schemes to prevent run off Prevent bankside erosion of rivers and lake protected areas Control inputs of silt through land management Control sediment inputs to lakes by sensitive farming Livestock fencing and buffer strips
EA other	Piloting, monitoring and analysis to reduce uncertainty Further characterize the coast New mechanism for no-deterioration consenting Put in place new delivery mechanism for restoration measures

Measures Most Likely to Be Cost Effective

- Measures to reduce uncertainty – improving pressure data, science on pressure/impact relationship and testing/piloting measures.
- Making barriers to migration passable
- Reducing maintenance to allow natural recovery
- Protection of the riparian zone eg anti-livestock fencing to allow natural recovery from overgrazing
- Removal of unnatural deposits of silt from selected shallow lakes
- Blocking grips and drains to restore upland wetland source areas
- For lakes: reduction of stock density, fencing to exclude stock from lake margins, and changes of land use (eg away from intensive arable or forestry).
- Developing or amending dredging / disposal strategies for maritime navigation
- Beneficial use of dredged material

Measures Likely to be Disproportionately Costly

- Wholesale restoration or removal of flood and coastal defences, and other engineered or reinforced channels
- Removal of major infrastructure, bridges and culverts under buildings
- Some sediment management for the ports and navigation sector
- Hull design or other modifications to vessels

Key Assumptions for Scenarios

The scenarios assume that:

- A morphological pressure will lead to a corresponding impact on biology.
- The measures required to achieve good status will be the same as those required to achieve good potential.
- 'Best estimates' of costs provided by the working groups are correct.
- Restoration measures will be needed in 18000km (35%) of the extent of river water bodies by length. This is calculated as 45% (top end of the HMWB range) reduced by arbitrary 10% for those water bodies which will not actually be failing.
- Measures will only be needed in protected area lakes.
- Further characterization of coast is needed before we can make assumptions about extent of measures needed.

Scenario 1 Higher certainty of achieving outcomes, no phasing - do all tried and tested technically feasible measures at once

- This scenario includes all of the costed measures for all sectors in the first RBMPs
- These are measures that the working groups agreed would contribute to achieving WFD objectives – but not really “tried and tested”
- There are some costs in further rounds of delivery as ongoing requirements as well as one-off activities

Scenario 2 Higher certainty of achieving outcomes, some phasing- do what is tried and tested and reasonable as soon as possible.

- Same measures as scenario 1 but more spread over 3 planning cycles
- Measures which have been phased are:
 - Flood risk management: tackling redundant flood defences (EA and LA), replacing flood risk assets with ones which meet WFD requirements,
 - TBC: making fish barriers passable, river restoration in SSSIs
 - Inland navigation: removing bank protection, and mitigating hard band defences or replacing with soft bank protection
 - Marine navigation: removing navigation related structures
 - Agriculture: funding for alternative use of land, controlling sediment inputs to lakes
- Costs have not been altered to take account of timing of implementation because working groups took different approaches to this. So total cost is the same for scenarios 1 and 2.

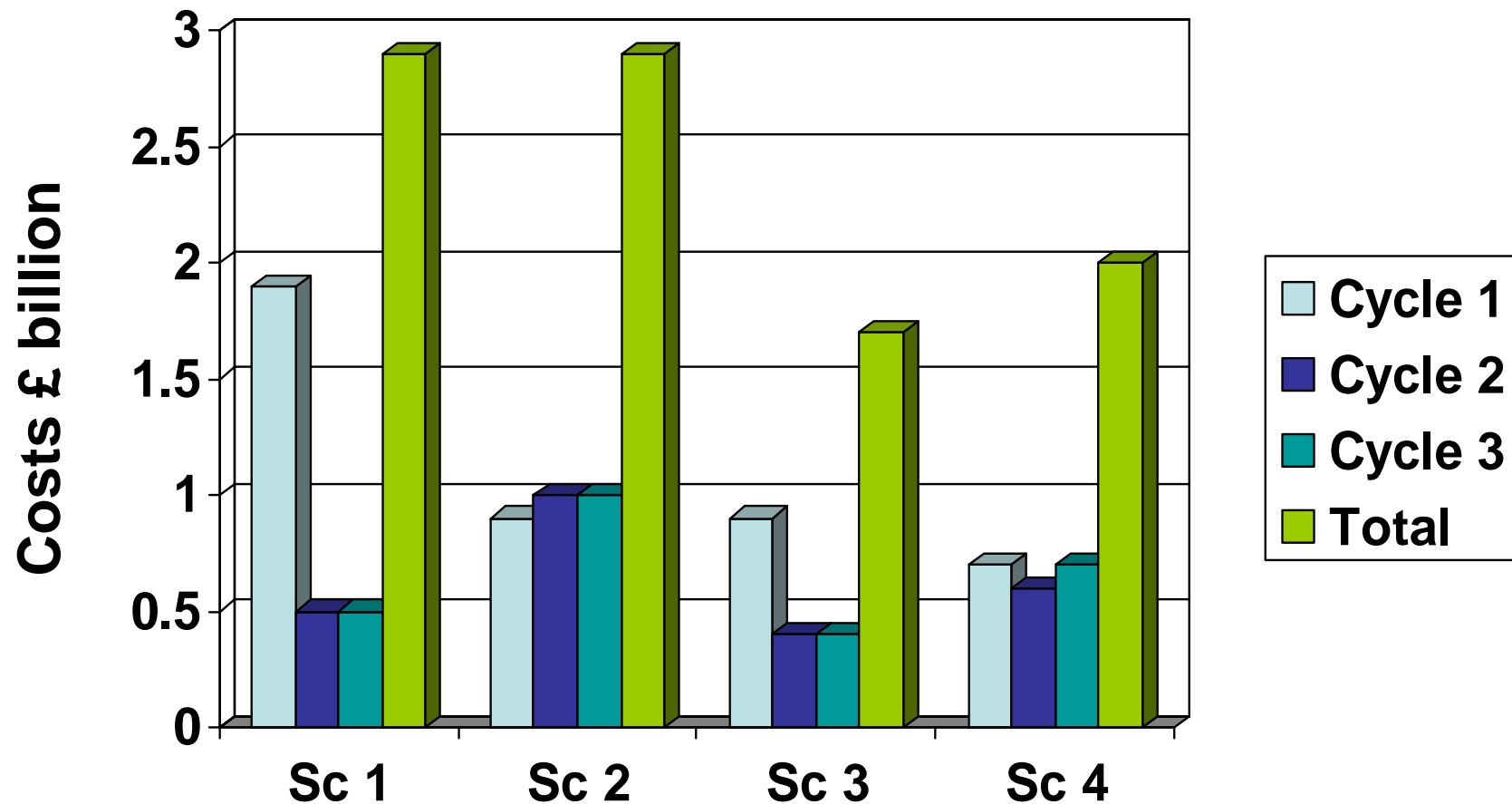
Scenario 3: Lower certainty of achieving outcomes, no phasing - do all technically feasible measures at once, use innovative measures.

- Assumes SSSI objectives delivered by another route and National Flood and Coastal Defence Database is developed without WFD support – so not included here
- Takes out less cost effective measures (eg restoration of in-stream features) and relies on withdrawal of maintenance from redundant defences rather than specific effort to tackle them
- Not really innovative measures, but innovative ways of delivering WFD requirements (eg could include innovative ways of delivering restoration programmes through community led partnerships. Not quantified at present but may be an effective way of delivering TBC measures).

Scenario 4 Lower certainty of achieving outcomes, with phasing - do what is reasonable as soon as possible. Implement innovative measures over a longer timescale.

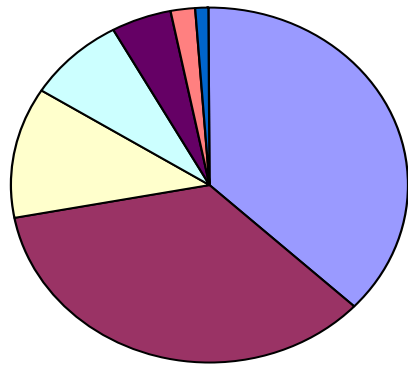
- Basically scenario 3, with the costs spread over 3 river basin planning cycles
- As with scenario 2, costs of delivery not altered to take account of timing of implementation
- Total costs higher for scenario 4 than 3 because scenario 3 does not include measures to remove effectiveness of flood defences, whereas scenario 4 assumes action to reduce uncertainty in first planning cycle will show removing the effectiveness of flood defences to be cost effective, and so re-introduces it in third cycle (leading to higher agricultural costs)

Costs of the 4 scenarios over 3 cycles

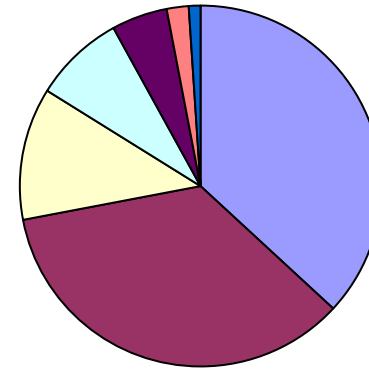


Sectoral cost distribution for 4 scenarios

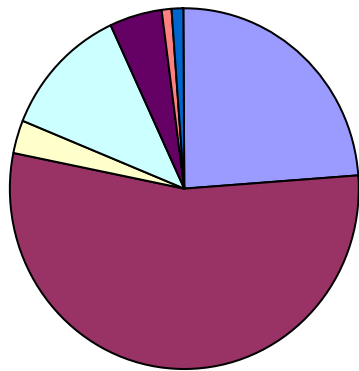
Scenario 1: total cost £2.9 billion



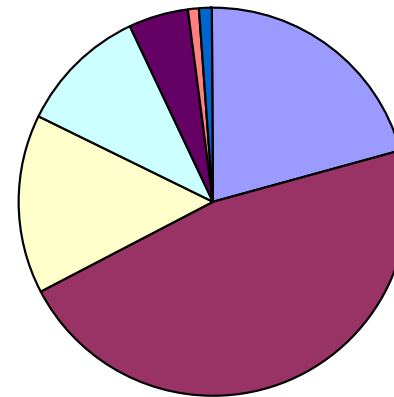
Scenario 2: Total cost 2.9 billion



Scenario 3: Total cost £1.7 billion



Scenario 4: Total cost £2 billion



Conclusions

- Even more uncertainty surrounding this pressure than others. Although we have 2 “more certain” and 2 “less certain” scenarios, all 4 are likely to be less certain than those for other pressures.
- Overall scale of costs for tackling morphology is £1.7 to 2.9 billion. This is higher than the transposition RIA estimate of £0.1 to 0.7 billion – though that was only for river habitat restoration not all morphological pressures.
- Relatively little variation in total cost between these 4 scenarios compared with other pressures. Perhaps because of the approach we have taken, or perhaps because there are fewer options about what to do?
- We really need feedback!

Discussion points

These are 4 possible scenarios but there are many possible variations. Have we done the right thing? In particular -

- Phasing costs: Should we make an assumption about reduction in costs as a result of phasing to reflect the advantages of co-ordinating measures with planned works (eg the replacement of flood risk management assets) and discounting effects? If so, what should the rule be?
- Certainty: for the less certain scenarios (3 and 4) we have taken out the less cost effective measures. Many of the measures left out are the optional rather than the obligatory ones. Is this right? It doesn't really fit with idea that these scenarios should include more innovative approaches.