Joint Defra/EA Flood and Coastal Erosion Risk Management R&D Programme

Annex C:

Report of the workshop on approaches to scoring in the context of the MCA component of the economic appraisal for flood and coastal erosion risk management

R&D Project Record FD2013/PR2

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Statement of use
This report provides guidance on the use of MCA and ASTs to assist in the appraisal of flood and coastal erosion risk management projects, strategies and policies. It should be noted that it does not constitute official government policy or guidance, which is unlikely to be available until work to develop the methodology and identify appropriate sources of data has been undertaken through pilot studies.

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The research team also included: Colin Green (Flood Hazard Research Centre, Middlesex University); Alan Pearman (University of Leeds); Ron Janssen (The Institute of Environmental Studies, Free University, Amsterdam), Terry Oakes and Hugh Payne (Independent Consultants)

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1. Introduction

In order to further explore the approaches to scoring being proposed as part of the MCA-based component, a workshop was organised to facilitate discussion with stakeholders in order for their views and personal experiences to be considered in the final outputs of the research.

The workshop was held on the 1st October 2004 in the Water UK Building, in London and had the following objectives:

- to discuss how impacts within MCA can be robustly and consistently scored;
- to review the scoring systems created to date; and
- to generate recommendations on the type of approach that can carried forward.

In addition to four RPA staff, namely, Meg Postle, John Ash, Teresa Fenn and Susana Dias, a total of 24 participants from a range of interested organisations attended the event (Table 1.1).

Table 1.1 List of workshop attendees

Name	Organisation
David Richardson	Defra – FM
Kevin Andrews	Defra - Economics
Matt Crossman	Defra – FM
Keith Cole	West Dorset District Council
Paula Orr	Environment Agency
Bernard Ayling	Environment Agency – Flood and Coastal Defence
Liz Galloway	Environment Agency – Environmental Impact Assessment
Sue Reed	Environment Agency – Environmental Impact Assessment
David Murphy	Environment Agency – CFMP
Trevor Linford	Environment Agency – CFMP
Colin Foan	Environment Agency
John Corkindale	Environment Agency
Roger Morris	English Nature
Stuart Pasley	Countryside Agency – Landscape and Amenity Impacts
Mikael Down	HM Treasury – Flood and Coastal Defence
Peter Brooks	Canterbury City Council
Ron Eckersley	Lancaster City Council
David Southcott	Arun District Council
Alison Atkinson	Halcrow Group – SMP
Paul Sayers	HR Wallingford – MDSF
Steve Wade	HR Wallingford – Sustainable Flood and Coastal Defence

Jackie Leslie	WS Atkins – Water
Katie Prebble	Black & Veatch Consulting
Colin Green	Middlesex University (FHRC)

The agenda for the day is shown in Table 1.2.

Table 1.2 Workshop timetable

Time	Function	Speaker
9h30 – 9h45	**Coffee and Registration**	
9h45 – 10h00	Introduction	Matthew Crossman (Defra)
10h00 – 10h20	Presentation on the MCA methodology	John Ash (RPA)
10h20 – 10h40	General discussion.	
10h40 – 10h55	Presentation on the First Round of Scoring Approaches	Teresa Fenn (RPA)
10h55 – 11h20	**Coffee break**	
11h20 – 12h35	First Breakout Session – Applying the First Round of Scoring Approaches	
12h35 – 13h00	Feedback from First Breakout Session	
13h00 – 14h00	**Lunch**	
14h00 – 14h15	Presentation on the Second Round of Scoring Approaches	Teresa Fenn (RPA)
14h30 – 15h15	Second Breakout Session – Identifying Characteristics and Recovery Times	
15h15 – 16h15	Feedback from Second Breakout Session	
16h15 – 16h30	Wrap Up	Meg Postle/John Ash (RPA)

The workshop was divided into three main parts:

- in the first part of the morning there were two main presentations to introduce the context of the workshop and inform the participants about the progress achieved in developing the MCA-based methodology. This was followed by an open discussion about the methodology itself;
- in the second part of the morning, there was another presentation that introduced the participants to the first set of scoring approaches and set the context for the first breakout session. After the first breakout session, there was time for feedback and discussion; and
- the afternoon commenced with a presentation on the second set of scoring approaches and the setting of the second breakout session. After the second breakout session, there was time for feedback and discussion.

2. Morning session

The first presentation was given by Matthew Crossman from Defra on the context and setting of the MCA project, as well as a brief summary of the progress of the project so far.

This introduction was followed by a presentation by John Ash from RPA. The first part of his presentation provided the aims and objectives of the MCA project and the context in which the MCA-based approach has been developed. The second part of his presentation introduced the MCA-based methodology, the key issues it is trying to resolve and the status of its development at present, including a brief summary of the case study work that had been carried out. Finally, he briefly ran through the different steps of the proposed approach and set out the challenges for the day.

Teresa Fenn (RPA) followed, with a talk on the approaches to scoring trialled in the first set of case studies. She started her presentation with the aims and objectives of scoring and then briefly summarised four different scoring approaches, namely, the 'zero to 100' approach, the 'relative to 100' approach, the 'likert scale' approach and the 'across unit' approach. Finally, Teresa summarised the findings from the application of the scoring approaches to the first set of cases studies, in terms of:

- being based on objective information;
- avoiding double counting;
- allowing for both small and large differences;
- respecting the proportionality of impacts;
- taking account of uncertainty; and
- being based on same/similar information as used to estimate monetary values.

2.1 Breakout session 1

The introductory presentations were followed by the first breakout session of the day. The objective of the first breakout session was to apply the 'zero to 100' and 'relative to 100' approaches to a case study, in order for the participants to discuss the advantages and disadvantages of such scoring systems.

The attendees were divided into four different groups, two of which (groups 1 and 3) were tasked with applying the 'zero to 100' approach, whilst the other two (groups 2 and 4) were tasked with applying the 'relative to 100' system. The composition of each of the groups is presented in Appendix C1.1.

The participants were provided with a handout setting out the task, some background information on both the scoring approach to be applied and the case study itself (i.e. summary of project area and geography of the area,

existing defences and the 'do-nothing' option), some points for discussion after the scoring has been undertaken, an Appraisal Summary Table (AST) and a Scoring AST for the groups to record their scores and the justifications for those scores. The handouts for Breakout Session 1 are presented in Appendix C1.2.

2.2 Conclusions from breakout session 1

After the first breakout session, there was a discussion on the group conclusions about the applications of the 'zero to 100' and 'relative to 100' scoring approaches.

There was a general feeling that there was a lack of objective information on which to base the scores. This conclusion was reached even when it was stressed that the background information provided was that available in a 'real' case study. This was put down to the fact that there is in general a lack of quantitative information at the high level of appraisal but it was also noted that the case study was based on information already available.

Also, it was concluded that the meaning of words (in the absence of numbers) is key to the scoring process, hence, the scoring was not based on objective information but there was an underlying structured subjectivity.

The scores applied to each of the impact categories being assessed by each group were not very consistent, and even within the same group there was not necessarily an agreement about how much each option would score for each impact category. Table 2.1 presents the different scores assigned by the different groups for two of the impact categories assessed, namely, physical habitats and equity.

Table 2.1 Different scores applied by three of the breakout groups to two of the impact categories

Category	'Do-nothing'	Maintain 1:20 (decreasing to 1:5)	Sustain 1:20	Improve 1:50	Improve 1:100
Group 1					
Physical habitats	0[#]	20	70	90	100
	100[*]	0	0	0	0
Equity	0	30-40	70-80	99	100
Group 3					
Physical habitats	0[#]	25	75	100	90
	100[*]	75	45	0	0
Equity	0	10	40-50	100	100
Group 4					
Physical habitats	0[#]	10	50-80	100	100
	100[*]	5	0	0	0
Equity	5	40-50	90	100	100

Notes: [#] Terrestrial freshwater habitats
[*] Intertidal habitats

As can be seen in Table 2.1, the scores provided by different groups for the same impact category under the same option can vary considerably. For example, the scores for impacts on equity under the Maintain option vary from 10 to between 40 and 50. Some groups felt more confident in providing ranges of scores in order to deal with uncertainty. This was more often the case when dealing with the social impact categories, where arguably the uncertainty is larger, than with the environmental categories. It is also interesting to note that the scores for the physical habitats category are closer together between groups.

The point was also made that although scoring of categories in relation to options was sometimes difficult, there was much less difficulty in ranking the options. This is made clear in Table 2.1 by the fact that there is a consistency between groups in which is the best and the worst option. Another interesting conclusion is that even those groups that were supposed to be applying the 'relative to 100' approach generally ended up applying scores between zero and 100 (this is because at least one option generally resulted in a 'loss' of something which needed the worst score possible, i.e. zero).

It was also agreed that, overall, the scoring systems were easy to use and that it would be easy to apply sensitivity analysis to the scores in order to test their importance to the selection of the preferred option.

In relation to the issue of double counting, it was agreed that there was the potential for it to occur. However, it could be dealt with by using more precise definitions of what each impact category includes and potentially breaking down some of the impact categories. It is believed that some of the issues that were raised in relation to the definitions of impact categories stemmed on one hand, from the lack of familiarity with the definitions but also because the exercise was focused on four of these impact categories, with a tendency to ignore the remaining 12 categories. For example, the recreation aspects of physical habitats are assessed under the recreation impact category rather then under the physical habitats category.

The potential need to collapse some of the impact categories in order to avoid double counting was also voiced by some participants. This was particularly the case for the 'sense of community' and 'equity' impact categories as well as 'business development'.

The attendees agreed that the scoring approaches trialled allowed for marginal changes between options to be captured in the scores. There seemed to be no particular concern in relation to this issue. Proportionality between scores of different options did not seem to raise any concerns, as long as the problem is broken down, i.e. the impact categories are divided into sub-categories.

In relation to the issue of transparency, there was agreement that the use of scoring ASTs would ensure that the reasons behind the scoring would be clear and available for each individual impact criteria. There was, however, some

concern relating to transparency in the overall assessment, i.e. how to bring the individual criteria together. Most participants agreed that transparency was

being maintained by the fact that there was space for recording the justifications for the scores.

There was some concern that the scores were impact based rather than risk based. It was evident that the focus of attention was not on the differences between options but on the impact of each option in absolute terms. Also, the scoring approach did not explicitly take probabilities into account, even if probability was considered implicitly in an ad hoc manner. The question of how to include probability in such scoring systems was raised.

When asked whether the group would be willing to validate the scores in a decision-making situation, there were mixed feelings. Some of the groups were not concerned about the subjectivity of such scores; others were concerned given the uncertainty and subjectivity of the numbers.

It is believed that the fact that the scoring exercise was performed in a group meant that the people were, in general, reasonably satisfied with the scores. This could mean that scoring by committee, i.e. carry out the scoring of a project in a group, could be another viable scoring approach.

3. Afternoon session

The afternoon session started with a second presentation by Teresa Fenn on the approaches to scoring trialled in the second set of case studies. Following from her first presentation, Teresa introduced the different levels at which the assessment of projects was undertaken, providing definitions for SMP level, Strategy and Scheme level, and went on to focus on the strategy level appraisal. In the second part of the presentation, Teresa introduced and summarised a new approach to scoring based on characteristics and recovery times, the 'ChaRT' scoring system.

Although no time was allocated for discussion after the presentation, some concern arose from the definitions of the three levels of appraisal, i.e. high level, strategy and scheme. It became clear that there is not one 'universally' accepted definition for each of these levels and what they include. This is important and needs to be explored further as a clear understanding of different levels of the appraisal is vital.

3.1 Breakout session 2

The afternoon presentation and discussion were followed by the second breakout session of the day. The objective of the second breakout session was to apply the 'ChaRT' scoring approach to the Humber Estuary (Management Unit 6) case study, in order for the participants to discuss the advantages and disadvantages of the ChaRT scoring system and in particular compare it to the approaches used in the morning.

The attendees were, once again, separated into the four groups and were tasked with defining a characteristic that represented each impact category under assessment and, secondly, the time it would take a characteristic to recover after the flood.

The participants were provided with a handout setting out the task, some background information on the scoring approach to be applied, some points for discussion for after the scoring had been undertaken, a Characteristic Summary Table and a Recovery Time Summary Table to record the results of their exercise. The handouts for Breakout Session 2 are presented in Appendix C1.3.

3.2 Conclusions from breakout session 2

The second breakout session did not run as smoothly as the session in the morning. It became apparent right from the start of the session that only a few of the attendees could fully understand the exercise. The participants still seemed to be trying to use scoring, rather then trying to define a characteristic and recovery time for each flood event as had been proposed. There was also some confusion between the definition of 'flood event return period' and the

different options being appraised. People were taking the return periods as if they were the options rather than as possible flood events under a no defence situation.

Some of the participants also felt uncomfortable with the naming of a ‘characteristic’ to represent the impact category. The same problem was found for ‘recovery time’. There was concern among some of the attendees that one characteristic only would limit the assessment of the impact category. In fact in group 3, participants thought there was a need to define 3 or 4 characteristics for each impact category, and this was after the category itself was divided into many subcategories. In this case, it was almost impossible to convey to the participants the need to focus on one characteristic that reflects the critical element for measuring the difference between the options. There was also some concern in relation to the definition of recovery times. For example, for the historical environment, the fact that an important site or monument might never fully recover from the flood, created some problems when defining a recovery time.

After some discussion it was considered that the word ‘vulnerability’ may be a more appropriate name for recovery time, whilst for ‘characteristic’ there was no obvious conclusion.

It is believed that for the participants to truly understand the concepts behind the ChaRT system they needed some familiarity with the tools and concepts used in current project appraisal such as the guidance provided by FCDPAG 3 and its spreadsheets, the concepts of annual average damage, flood return period and probability.

For these reasons, the scoring approaches used in the morning seemed more acceptable in the sense that they were easy to understand and better reflected the uncertainty attached to the scores. There was concern that with ChaRT a number (being a characteristic or recovery time) was trying to be attached to the impact category at any cost, in the same way that CBA always tries to value those impacts that are not easily valued.

It was interesting to note that, for those people with some direct experience of dealing with flood and coastal defence appraisals, the concepts proposed for the ChaRT system were less of a concern and in general the system was accepted as a viable option, in particular because it reflected a more risk based approach to the whole process.

At the end of the second breakout session Teresa Fenn demonstrated briefly how the results for the characteristics and recovery times for the four impact categories could be introduced in the ‘ChaRT spreadsheets’ and the scores calculated from these.

4. Conclusions from the workshop

The workshop was successful in highlighting the problems that surround the different scoring approaches. However, it did not give a clear indication of which approach is the preferred one and should be carried forward.

There are three possible quantitative scoring approaches:

- the ‘zero to 100’ scoring system;
- the ‘ChaRT’ scoring approach, in particular for the strategy level of appraisal[1]; and
- the ‘scoring by committee’ approach.

It is believed that at this stage it would be better to go forward with all three scoring methodologies, being aware of their advantages and disadvantages, and leave the decision about which scoring systems should be used until after they have been trialled in pilot projects. Only when trying different scoring systems in real time situations, with those applying them fully aware of all the flood and coastal issues and concepts, can one system or combination of systems be recommended.

[1] Although this may need to be modified in order to take into consideration ‘vulnerability’ instead of ‘recoverability’ into account.

Appendix C1.1:

Breakout session groups' composition

Workshop on approaches to scoring in the context of the multi-criteria analysis component of economic appraisal for flood and coastal erosion risk management

Groups for breakout sessions

Group 1 (Meg Postle)
Kevin Andrews (Defra – Economics)
Keith Cole (West Dorset District Council)
David Murphy (EA – CFMP)
Colin Foan (EA – Forecasting)
Mikael Down (HM Treasury)
Katie Prebble (Black & Veatch)
Group 2 (Teresa Fenn)
David Richardson (Defra - FM)
Liz Galloway (EA – EIA)
Alison Atkinson (Halcrow – SMP)
Roger Morris (English Nature)
Peter Brooks (Canterbury City Council)
Group 3 (Susana Dias)
Matt Crossman (Defra – FM)
Paula Orr (EA – Social Policy)
Trevor Linford (EA – CFMP)
Stuart Pasley (Countryside Agency)
David Southcott (Arun District Council)
Jackie Leslie (WS Atkins)
Steve Wade (HR Wallingford – Sustainable Flood and Coastal Defence)
Group 4 (John Ash)
Bernard Ayling (EA – FM)
John Corkindale (EA)
Sue Reed (EA – EIA)
Ron Eckersley (Lancaster District Council)
Paul Sayers (HR Wallingford – CFMP)
Colin Green (FHRC)

Appendix C1.2:

Handouts for breakout session 1

Breakout session 1:

Groups 1 & 3

Applying the ‘Zero to 100’ quantitative scoring approach

Task

Using the 0 to 100 scoring system, the first task is to score the Humber Estuary Case Study (Management Unit 6) based on the qualitative and quantitative information provided in the Appraisal Summary Table (AST). The scoring will be applied to four impact categories, two representing environmental issues (‘physical habitats’ and ‘historical environment’) and two representing social issues (‘equity’ and ‘sense of community’).

A Scoring AST is provided for you to record the scores and the justifications for the scores given.

Points for discussion

Once the scoring is finished, consider the following points:

- Is the scoring based on objective information?
- Is double counting avoided?
- Does the system allow for small and large difference to be reflected in the scores?
- Does the approach reflect proportionality of impacts?
- Does the approach take account of the uncertainty in the scoring?
- Are the scores based on same/similar information as used to estimate the monetary damages (and benefits) (i.e., risk of flooding, flood damages and probability)?
- Does it ensure transparency and stakeholder acceptability?

Breakout session 1:

Groups 2 & 4

Applying the ‘100 relative’ quantitative scoring approach

Task

Using the 100 relative scoring system, the first task is to score the Humber Estuary Case Study (Management Unit 6) based on the qualitative and quantitative information provided in the Appraisal Summary Table (AST). The scoring will be applied to four impact categories, two representing environmental issues (‘physical habitats’ and ‘historical environment’) and two representing social issues (‘equity’ and ‘sense of community’).

A Scoring AST is provided for you to record the scores and the justifications for the scores given.

Points for discussion

Once the scoring is finished, consider the following points:

- Is the scoring based on objective information?
- Is double counting avoided?
- Does the system allow for small and large difference to be reflected in the scores?
- Does the approach reflect proportionality of impacts?
- Does the approach take account of the uncertainty in the scoring?
- Are the scores based on same/similar information as used to estimate the monetary damages (and benefits) (i.e., risk of flooding, flood damages and probability)?
- Does it ensure transparency and stakeholder acceptability?

Background Information

The ‘100 relative’ scoring approach:

In the ‘100 relative’ scoring system the best performing option is given a score of 100. All other options are then scored relative to the best performing option such that the worst performing option is not fixed at a score of zero.

Summary of the project area:

Management Unit 6 of the Humber Estuary Case Study runs from South Ferriby Cliff to North Killingholme and is mainly comprised of medium grade agricultural land for up to 3km inland. The main settlement in the area is Barton-upon-Humber. Clay pits immediately behind the defences between Chowder Ness and New Holland are important environmental and recreation sites, with some designated for their environmental value. There are also a number of small industrial areas, including New Holland Dock. The area is categorised as Land Use Band C, with an indicative standard of 1:10 to 1:100[2].

Existing defences

About half of the defences between South Ferriby and New Holland Dock provide protection against a 1 in 50 year event. Around Barton Creek, some lengths of the defences give significantly lower standards. East of New Holland Dock, around 70% of the defences protect against an event with a return period of 1 in 20 years. In 50 years, the standard of defence is expected to fall such that about 50% of the defences will no longer protect against a 1 in 10 year event. The overall condition of the defences is fair to good. There is concern that erosion of mudflats may threaten the stability of the defences. There are also some lengths where the crest level of the embankment is low.

The 'do-nothing' option

The 'do-nothing' option assumes that there will be a breach in the defences by year 10, with a current probability of breaching of 0.1. A breach would result in inundation of much of the area, such that 1,615 residential properties, 100 non-residential properties and 1,085 ha of agricultural land would be written off. Sea level rise would result in the number of properties written off by year 99 increasing to 1,730 residential properties, 103 non-residential properties and 1,221 ha of agricultural land. Around the area written-off, there are additional residential and non-residential properties, and agricultural land that would face intermittent flooding and, hence, damages.

Geography of the area

Management Unit 6 is very flat, such that a large area is flooded on all flood events. Modelling of the area shows that the following proportions of the management unit would be flooded under different return period events:

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[2] According to the Flood and Coastal Defence Project Appraisal Guidance (FCDPAG 3), indicative standards for flood and coastal defence are provided for five different land use bands (A to E) as an aid to authorities to help in establishing the range of options to be considered in the appraisal. Land use band C corresponds to typically large areas of high-grade agricultural land and/or environmental assets of national significance requiring protection with some properties also at risk, including caravans and temporary structures.

- 1 in 5: 63% of the management unit would be flooded;
- 1 in 10: 67% of the management unit would be flooded;
- 1 in 20: 75% of the management unit would be flooded;
- 1 in 50: 93% of the management unit would be flooded;
- 1 in 100: 95% of the management unit would be flooded; and
- 1 in 500: 95% of the management unit would be flooded.

The main population centre, Barton-upon-Humber, is generally very low lying such that most of the town would be flooded on a 1 in 20 year event. Other villages are positioned on hilltops so are less vulnerable to flooding, except on the more extreme events. Recent census data has found that the population of the management unit is around 4,000 people, with approximately 2.4 people per household.

Important environmental and heritage sites are all located near to the frontage and are likely to be affected on all events greater than 1 in 3 years. This is especially true of the Barton and Barrow Clay Pits, which are located immediately behind the flood defences. Important archaeological sites are also located close to the defences, reflecting the important maritime history of the area.

Table 1 Appraisal summary table for the Humber Estuary - management unit 6 (South Ferriby Cliff to North Killingholme)

Impact category	'Do-nothing'	Maintain 1:20 (decreasing to 1:5 in year 99)	Sustain 1:20	Improve 1:50	Improve 1:100
Environmental impacts					
Physical habitats	Loss of 8 SNCIs, 6 Wildlife Trust sites and landward SSSI/SPA/Ramsar site (Barton and Barrow Clay Pits). Development of new intertidal habitat will maintain conservation status of the estuary.	8 SNCIs, 6 Wildlife Trust sites and 1 landward SSSI (Barton Clay Pits, approximately 50 ha) would be protected but flooded on a fairly frequent basis. (1 in 20 reducing to 1 in 5 year standard). Loss of intertidal habitat as a result of coastal squeeze and flood defence works encroaching on the foreshore will result in loss of 60ha, which will require replacing. Flooding of some areas with a frequency of 1 in 5 years may encourage localised development of saltmarsh where freshwater habitats cannot recover before flooding recurs. Such areas are likely to be very localised, however, and are not expected to exceed 5ha	8 SNCIs, 6 Wildlife Trust sites and 1 landward SSSI (Barton Clay Pits, approximately 50 ha) would be protected but flooded on average once every 20 years. This is likely to be sufficiently infrequent to allow recovery of freshwater habitats. Loss of intertidal habitat as a result of coastal squeeze and flood defence works encroaching on the foreshore will result in loss of 60ha which will require replacing.	8 SNCIs, 6 Wildlife Trust sites and 1 landward SSSI (Barton Clay Pits, approximately 50 ha) would be protected to a 1 in 50 year standard. Loss of intertidal habitat as a result of coastal squeeze and flood defence works encroaching on the foreshore will result in loss of 60ha, which will require replacing. Also if this option is shown to have an adverse impact on the integrity of the SPA it will be necessary to prove that there are no alternatives to this option.	8 SNCIs, 6 Wildlife Trust sites and 1 landward SSSI (Barton Clay Pits, approximately 50 ha) would be protected to a 1 in 100 year standard. Loss of intertidal habitat as a result of coastal squeeze and flood defence works encroaching on the foreshore will result in loss of 60ha, which will require replacing. Also if this option is shown to have an adverse impact on the integrity of the SPA it will be necessary to prove that there are no alternatives to this option.

Table 1 Appraisal summary table for the Humber Estuary - management unit 6 (South Ferriby Cliff to North Killingholme)

Impact category	'Do-nothing'	Maintain 1:20 (decreasing to 1:5 in year 99)	Sustain 1:20	Improve 1:50	Improve 1:100
Historical environment	Loss of areas of high archaeological potential, 1 Scheduled Ancient Monument and 5 listed buildings.	The Scheduled Ancient Monument and listed buildings will be protected but will still be flooded on a regular basis. The archaeological potential of the area is likely to be significantly affected, with potential loss of sites before they are discovered/ excavated.	The Scheduled Ancient Monument and listed buildings will be protected but will still be flooded on average once every 20 years. This may require on-going maintenance works to avoid deterioration of the building structure. The archaeological potential of the area may be affected by repeated flooding.	The Scheduled Ancient Monument and listed buildings will be protected to a high standard (1 in 50 years). The archaeological potential of the area will be secured.	The Scheduled Ancient Monument and listed buildings will be protected to a high standard (1 in 100 years). The archaeological potential of the area will be secured.

Impact category	'Do-nothing'	Maintain 1:20 (decreasing to 1:5 in year 99)	Sustain 1:20	Improve 1:50	Improve 1:100
Social impacts					
Equity	Impacts on area with deprivation index of 3,556 (neither affluent nor deprived). 95% of the area likely to be abandoned with people moving elsewhere with loss of property, livelihood and community. More than 4,000 people likely to be affected, of which 4% are unemployed, 5% are permanently disabled and 16% retired.	Frequent flooding may affect agriculture and industry and affect workforce who may not be in a position to move jobs or house. The movement of services to higher ground may make them less accessible to some groups and may increase their vulnerability.	Flooding on average once every 20 years is unlikely to affect most people. Some groups may be disadvantaged more than others where larger companies decide to move out of the area to protect their investments move to higher ground.	Area likely to retain current or improved status with protection afforded to all members of society.	Area likely to retain current or improved status with protection afforded to all members of society.
Sense of community	The loss of properties and jobs will result in an almost complete loss of sense of community with most people moving out of the area. Approximately 1730 properties will be written-off.	Sense of community could be significantly affected with many homeowners and businesses being flooded during their time in any one property. Those who are able to move out of the area may wish to do so, dividing the community.	Most homeowners would be unaffected by flooding once every 20 years. If larger companies move out of the area, this may force some employees to move with the companies but should have only a minor effect on sense of community.	Sense of community would be largely unaffected with most homeowners and businesses not being flooded during their time in any one property.	Sense of community would be unaffected with most homeowners and businesses not being flooded during their time in any one property.

Table 2: Scoring summary table						
Category	**Do-nothing**	**Maintain 1:20 (decreasing to 1:5)**	**Sustain 1:20**	**Improve 1:50**	**Improve 1:100**	**Justification**
Environmental impacts						
Physical habitats						
Historical Environment						

Table 2: Scoring summary table						
Category	**Do-nothing**	**Maintain 1:20 (decreasing to 1:5)**	**Sustain 1:20**	**Improve 1:50**	**Improve 1:100**	**Justification**
Social Impacts						
Equity						
Sense of community						

Appendix C1.3:

Handouts for breakout session 2

Breakout session:

Groups 1, 2, 3 & 4

Identifying characteristics and recovery times

Task:

Taking into consideration the background information and the conclusions from the scoring exercise preformed in the morning:

- identify the most appropriate characteristics of the category that is affected by flooding; and
- identify recovery time of that characteristic for each of the options being considered.

For this task use the characteristic and recovery time Tables provided.

Points for discussion

Once the scoring is finished, consider the following points:

- Is the scoring based on objective information?
- Is double counting avoided?
- Does the system allow for small and large difference to be reflected in the scores?
- Does the approach reflect proportionality of impacts?
- Does the approach take account of the uncertainty in the scoring?
- Are the scores based on same/similar information as used to estimate the monetary damages (and benefits) (i.e., risk of flooding, flood damages and probability)? And
- Does it ensure transparency and stakeholder acceptability?

Background information:

The aim of the ChaRT scoring system is to reflect the impacts of a flood on each category, with the scores calculated numerically using a more flood-focussed basis.

For each impact category, it is necessary to determine two factors in order to be able to assign a score:

- characteristic of the category that is affected by flooding, i.e. a measure of the amount of a particular category affected and could relate to an area, a number, etc.; and
- recovery time of that characteristic, which is defined as the minimum time required between events for impacts on that category to be reduced to zero. From this definition, it can be deduced that if a flood occurs before there has been time for full recovery, the impacts of an option would be much greater than if the next flood event occurs several years after full recovery has been achieved.

Once these two factors have been identified (or estimated), the scores can be calculated automatically using the same approach as is used in the Asset AAD worksheet of the FCDPAG 3 spreadsheets

Table 3 Characteristic summary table - management unit 6 (South Ferriby Cliff to North Killingholme

Impact category	Details of CHARACTERISTICS	Return periods of flood events							
		3	5	10	20	50	100	300	500
Environmental impacts									
Physical habitats									
Historical environment									
Social impacts									
Equity									
Sense of community									

Table 3 Recovery times summary table - management unit 6 (South Ferriby Cliff to North Killingholme

Impact category	Details of RECOVERY TIMES	Return periods of flood events							
		3	5	10	20	50	100	300	500
Environmental impacts									
Physical habitats									
Historical environment									
Social impacts									
Equity									
Sense of community									