

6 Evaluation of Strategic Options

6.1 Introduction

On Walney Island, the linkages between coastal defence and flood protection, coastal processes, habitat diversity, land drainage and land use are complex. Economic indicators alone are not sufficient to appraise how successful a particular strategic solution is likely to be. In this multi-criteria analysis of issues, an objective system primarily based on expert judgement is essential. Such a system must also include a methodology for weighting the importance of the various indicators or assessment criteria. The assessment criteria presented below were developed from the objectives for the Strategy:

- ◆ **Technical effectiveness:** An option that effectively manages coastal erosion and flood risk will score highly. Options that address the coastal defence issues raised in Section 3 (Key Issues) will score highly. Also, an option that contributes to island wide sustainable coastal management aims will score well. An option that would result in significant adverse effects elsewhere on the island will score poorly.
- ◆ **Environmental acceptability and benefits:** A good environmental acceptability score for an option comes from likely maintenance of the “favourable” status of key environmental habitats across the majority of the shoreline. Examples of environmental benefits vary. Increased habitat diversity and extent of existing habitats are aspects of an option that will score well. The assessment criteria needs to consider the requirements of Habitat Regulation 48 and the need (if any) for an Appropriate Assessment in addition to the requirement to maintain the European sites and others in favourable status). Other environmental issues include how much energy an option consumes.
- ◆ **Sustainability:** Closely linked to environment and technical effectiveness. This is a collective score to represent how much investment in maintenance and asset replacement a particular option would require in the future. It indicates how compatible the option is with natural processes – an option that is more ‘sustainable’ is one which tends to work with rather than fights against natural processes. It is also a general indicator of whether the option would meet society’s objectives for the future in allowing sustainable development and would not tie future generations into unwarranted long term expenditure.
- ◆ **Impact on people:** Sufficient knowledge of the drivers of key stakeholders has been assimilated through consultation with the public of Walney Island. This criterion is difficult to score as stakeholders have diverse needs and opinions depending on their use of the shoreline and backing hinterland.
- ◆ **Economic indicator:** This tests how worthwhile the project is from a national economic perspective taking into account implementation costs, and value of assets protected. An option that provides high economic benefit compared to its cost will score well.
- ◆ **Risk / uncertainty:** An option will score highly if it allows for key risks and provides for flexibility in approach that can deal with change in physical conditions (due to uncertainty in our understanding of coastal processes or unforeseen changes such as accelerated climate change) or political circumstances (e.g. through government guidance/legislation).

The relative importance of the various criteria is shown in the figure 6.1.

Assessment Criteria Weighting

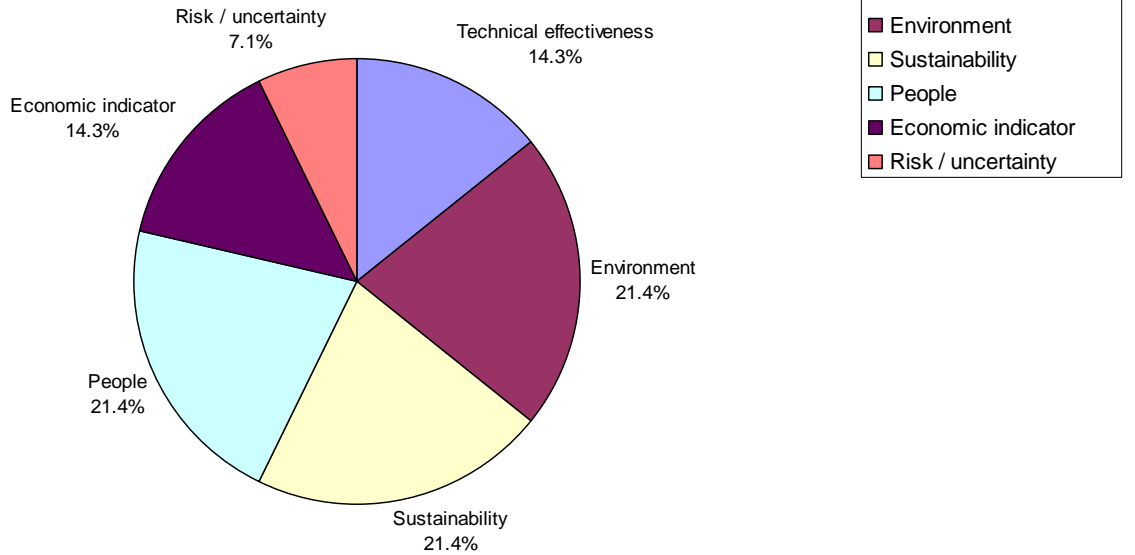


Figure 6.1 Assessment Criteria Weighting

The approach used to balance the performance of the options against the criteria listed above is based on a matrix type assessment. Scores were given against key criteria and then weightings applied in order to provide an overall score for each option. This approach was then developed into a diagrammatic form in order to provide a more direct visualisation of the performance of each option. An example of this diagram is presented in Figure 6.2.

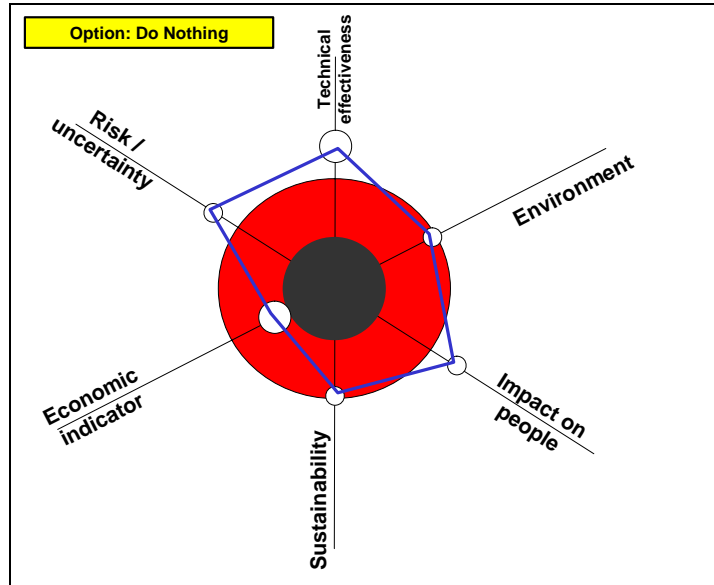


Figure 6.2 Example Visual Representation of Option Scoring

As shown above, the criteria are represented by spokes. The analysis is completed by placing a circle on each of the spokes, to represent scoring against each of the key criteria. It is not always possible to mark the option with a high degree of certainty. To represent this, the size of the scoring circle is increased to represent scores which may require further analysis or consultation (a smaller scoring blank circle indicates that there is more certainty in the scoring). The closer the scoring blank circle is to the “bull’s eye”, the better the option is performing. The outer grey (red if viewing in colour) circle represents where the option is thought to score acceptably against the criteria. The inner “bull’s eye” represents where the option is predicted to meet all objectives for the key criteria. Where the performance against criteria is thought to be poor, the scoring circle is placed outside the outer grey/red circle. The score on each spoke is then joined together by a line in order to give an overall impression of how successful the option is.

6.2 Results - Matrix Assessment

The table below summarises the overall appraisal of the options in tabular form.

Criteria	Relative weighting	Marks out of 'x'	Option Score (out of 3 and weighted score)					
			Do nothing		Wide-scale intervention		Selective intervention	
			Score	Weighted score	Score	Weighted score	Score	Weighted score
1 Technical effectiveness	2	6	0	0	3	6	1	2
2 Environment	3	9	1	3	1	3	2	6
3 Sustainability	3	9	1	3	1	3	2	6
4 People	3	9	0	0	2	6	3	9
5 Economic indicator	2	6	2	4	0	0	2	4
6 Risk / uncertainty	1	3	0	0	2	2	2	2
Total (max score)		42	Agg. Score (%)	24%		48%		69%

Notes: Weight and scoring are both 'x' out of 3. 3 is a high score, 0 is low.

Table 6.1 Matrix Assessment of the Strategic Options

6.3 Results - Visualisation

Figure 6.4 below summarises the overall appraisal of the options in a figurative form.

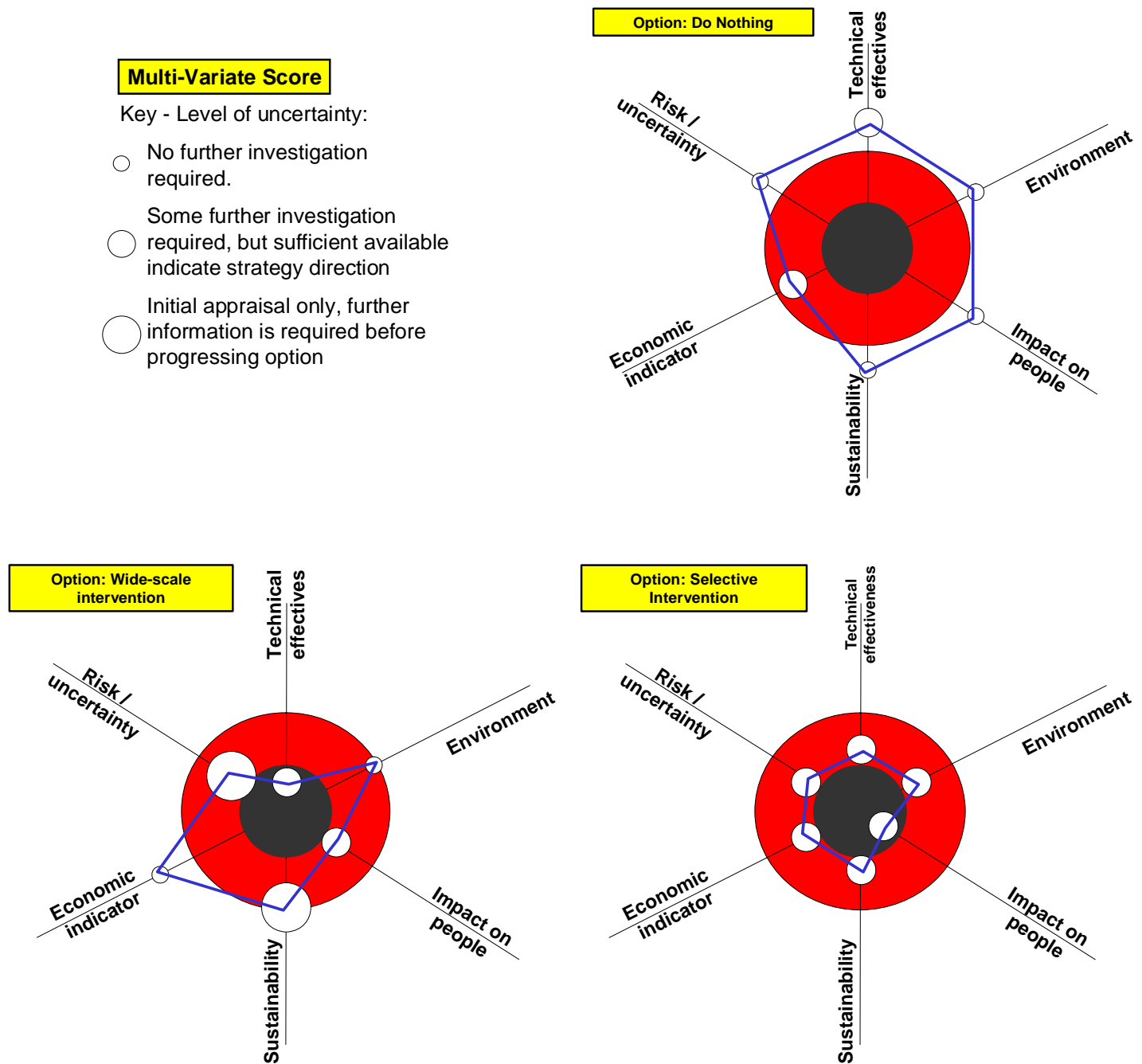


Figure 6.4 Visualisation of Overall Option Appraisal

6.4 Preferred Strategy

The justification of the options' scoring is provided below, though none of the options achieve consistent high levels of success against all the criteria. However, it is clear that the selective intervention option appears to offer the best overall performance.

Technical effectiveness: Whilst it is difficult to assess the performance of this option without a detailed discussion of how it will be implemented (what scheme will be implemented where), it is likely that with relatively low expenditure (compared to the wide-scale intervention option) that coastal erosion and flood risk at key locations can be successfully addressed. For example, redistribution of rock from unsuitable revetments along the west coast to protect land fill sites would, in the short term at least, prevent erosion and pollution of the foreshore.

Environmental acceptability and benefits: A selective intervention approach offers the best overall performance against this criterion. If a do nothing policy was adopted, then although this would result in no interference with natural processes (desirable), it would also result in pollution of the foreshore from eroding landfill sites. This would obviously be unacceptable. Also, whilst the wide-scale intervention option would ensure the integrity of the landfill sites, it would also result in interference with natural coastal processes and be unacceptable as a result. Therefore, a more cautious selective intervention approach to intervention scores well. However, strong debate will occur as to what schemes to implement where (e.g. should erosion to the golf course defences be managed by 'managed realignment' or 'hold the line') and this influences the scoring and hence the uncertainty represented in the larger scoring disk. The habitat audit presented in Appendix C provides back up information on this assessment. It is worth noting that if the landfill sites were totally removed of all contaminants, a do nothing policy would become favoured for this criterion.

Sustainability: Again, the selective intervention approach offers the most sustainable way forward during the Strategy timeframe. This approach (which includes social, economic and environmental sustainability criteria) is required to protect assets at risk and the landfill areas from erosion. The do nothing option is not sustainable on environmental grounds (ongoing pollution). The wide-scale intervention option may result in development in areas that would otherwise be at risk from coastal flooding or erosion and would tie future generations into expensive maintenance of defences. However, there is some doubt as to whether the selective intervention option is sustainable in the period beyond the Strategy timeframe, as eventually erosion of the island will need to be halted in order to protect the port and waterside at Barrow. Also, unless an alternative method of safe disposal of the material in the landfill areas can be found, due to the contents of the sites, they will need to be protected from coastal erosion for at least 100 years. Therefore, in the very long term, if the island is to be maintained as a natural breakwater to Barrow, wide-scale intervention is likely to be the only feasible solution. The question that needs to be answered at a high level (regional planning) is what minimum width of Walney Island is acceptable to sustain a thriving community.

Impact on people: Clearly, the do nothing option would be unacceptable to the inhabitants of Walney Island. It would result in undesirable consequences that could easily be mitigated with relatively low expenditure. For example, Biggar Bank/Dyke is in a poor condition and without improvements or road realignment access to the south of the island would be lost. Pollution from eroding landfill would also prevent bathing and other safe use of the island's beaches. The scoring shows the selective intervention option marginally outperforming the wide-scale intervention option, although this scoring is perhaps more subjective than other scoring. On balance it was decided that the heavily 'engineered' scene on the west coast that would be generated by the wide-scale intervention option would more than offset the extra 'peace of mind' that this option would result in compared to the selective intervention option. Consultation based on this report will confirm or refute this assumption.

Economic indicator: There are relatively few assets at risk within the Strategy timeframe. This means that the do-nothing option is relatively desirable compared with wide-scale intervention, as the high costs of the latter cannot be justified against damages avoided (ignoring the landfill issue). The visualisation of the assessment shows the selective intervention option marginally out performing the do nothing option. This is thought reasonable (hopefully costs of any schemes will be outweighed by damages avoided), but this emphasises that no option will score highly in any cost benefit analysis.

Risk / uncertainty: Clearly, complete inactivity (i.e. do nothing option) does not deal with uncertainty and future hazards in any way, hence the poor scoring. Little certainty can be assigned to the wide-scale intervention option scoring without detailed consideration of the type of defences that the option might entail. However, it is likely that large expenditure should result in a scheme that is flexible in the face of uncertainties on coastal processes for example. The selective intervention approach scores equally well, but more certainty is assigned to it, and perhaps a higher score, as less intervention in natural processes now allows for more flexibility in response in the future. The tables (Risk Registers) presented in Appendix G provide backup information for this assessment.

6.5 Sensitivity and Consultation

As indicated above, many of the strategic issues and scorings presented are subjective, weighing different perspectives against one another in order to come to an informed conclusion. For example, farmers on Walney Island would probably be in favour of a wide scale intervention solution because they recognise that the island's rural community is already coming under pressure (environmental and economic). In contrast, environmental stakeholders would urge caution before interfering with natural processes in order to protect valuable habitats and geomorphological processes. There will continue to be a range of views of this issue.

Further debate is also possible on the subjective relative weightings attributed to each assessment criteria. The weightings are easily adjusted to test the sensitivity of the decision and the preferred strategic approach is robust against change.

The table below presents a sensitivity assessment where variables (criteria importance and scoring of options) are skewed as far as feasible toward the wide scale intervention option. Although the gap narrows, the preferred strategic approach remains as the 'selective intervention' option.

Criteria	Relative weighting	Marks out of 'x'	Option Score (out of 3 and weighted score)					
			Do nothing		Wide-scale intervention		Selective intervention	
			Score	Weighted score	Score	Weighted score	Score	Weighted score
1 Technical effectiveness	3	9	0	0	3	9	1	3
2 Environment	2	6	1	2	1	2	2	4
3 Sustainability	2	6	1	2	2	4	2	4
4 People	2	6	0	0	3	6	3	6
5 Economic indicator	3	9	2	6	0	0	2	6
6 Risk / uncertainty	1	3	0	0	2	2	2	2
Total (max score)		39	Agg. Score (%)	26%		59%		64%

Notes: Weight and scoring are both 'x' out of 3. 3 is a high score, 0 is low.

Table 6.2 Matrix Assessment of the Strategic Options – Sensitivity Check

The acceptance of the 'selective intervention' option is, of course, subject to the views of key stakeholders and the inhabitants of Walney Island.