

4 Evaluation of the ‘Do Nothing’ Scenario

4.1 Introduction

The ‘do-nothing’ scenario is defined in FCDPAG3 as:

- ◆ where there is an existing defence, walk away: cease all maintenance, repairs and similar activities immediately;
- ◆ where there is no existing scheme, do nothing, do not intervene in natural processes.

The resulting damages (most likely economic and social) and gains (possibly environmental) can then be established. For clarity, the do nothing scenario means that once a breach or failure event (man made defence or natural cliff/dune) has occurred, no remedial action would be taken, and flooding, continued erosion, or pollution from landfills for example, would continue unabated. This is generally seen to be an unrealistic scenario and, in practice, some remedial measures would be taken on health and safety grounds (removal of dilapidated defence works) or to prevent risk to human life. However, this notional do-nothing scenario is a useful tool to determine the value of providing coastal defence, and a nationally consistent approach (compliant with PAG3) provides a baseline for national prioritisation of coastal defence works.

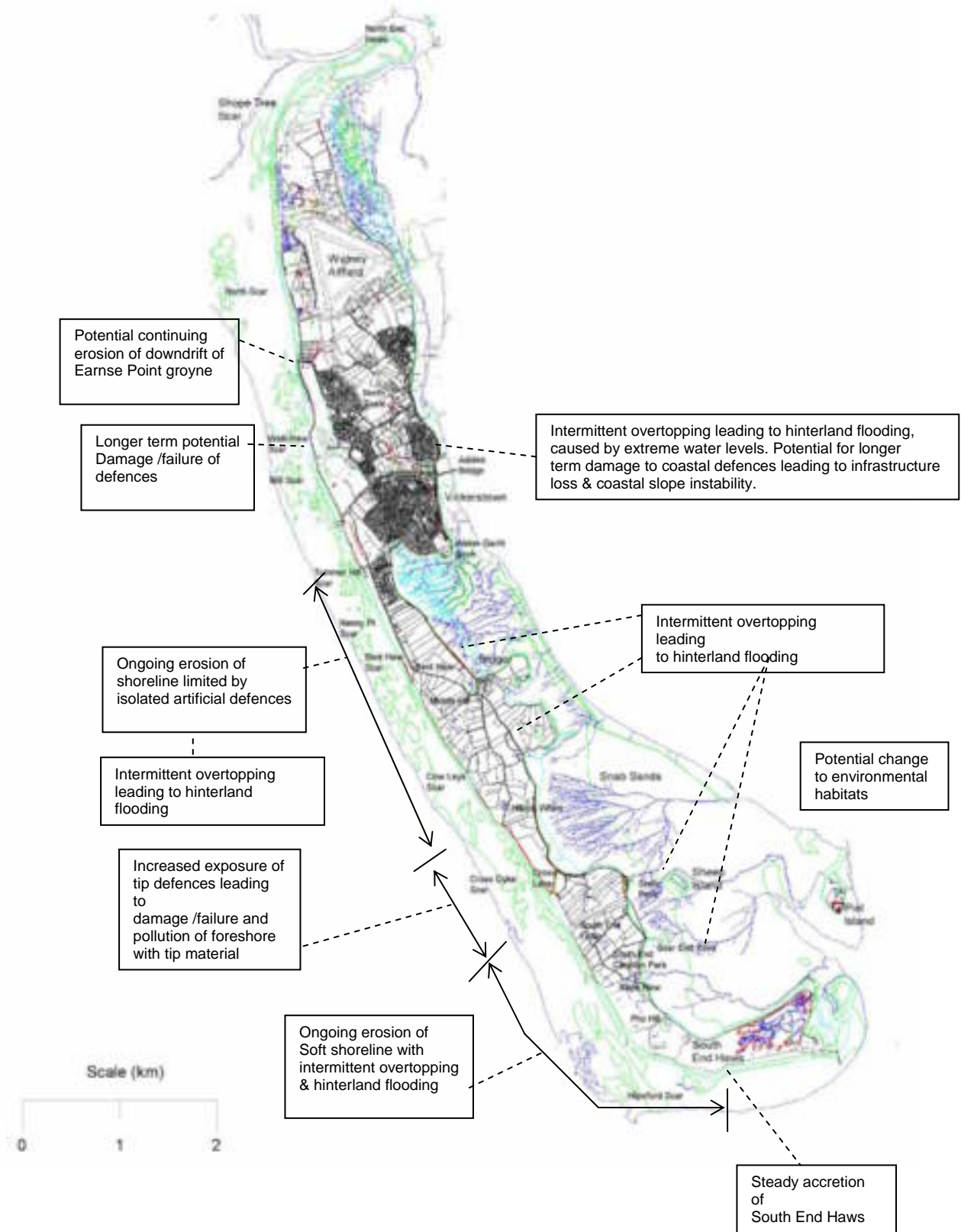
Do nothing impacts can be split broadly as follows:

- ◆ Economic (impacts that can readily be assessed in economic terms)
- ◆ Environmental (impacts on the natural environment, excluding man)
- ◆ Human / social (intangible impacts on man and communities)

This section of the report presents the assessment of the do-nothing scenario for Walney Island over the next 50 years. The economic appraisal implications are further extended to cover a 100 year time frame to reflect recent Defra Guidance (March 2003). It draws on the work presented in the previous section, indicating likely future changes to key assets (human or natural). Figure 4.1 is produced to represent do nothing scenarios for the most significant strategic unit (in terms of future management) on the island.

In order to fully establish future unconstrained evolutionary trends, it is useful here to consider the main findings of the Shoreline Evolution Report (Appendix D) which focuses on medium to long term coastal evolutionary patterns observed based on data from aerial photographs, ground investigations, and other data records. These changes are an indicator of the scale of future shoreline evolution which can be expected. Key points are as follows:

- A sediment drift divide does occur along the west coast of the island, though it is postulated that the location of the divide should be regarded as a wider zone centred at a more southerly location (in vicinity of Bent Haw – Cow Leys Scar) than previously thought.
- In general the upper beach is in recession, whereas lower beach shows a net gain overall. However, the lower beach environment is highly dynamic and largely comprised of mobile sands, so simple measurements of loss/gain of sediment in this part of the foreshore are not a good indicator of shoreline evolution.
- There is a previously un-quantified sediment contribution to the littoral drift regime from scar erosion on the lower beach, although the magnitude of this input cannot be assessed accurately at present.
- Current erosion rates along Walney Island’s west coast vary and are not considered a significant issue north of Sandy Gap. Erosion rates to the south are currently less than 1m pa, typically 0.3 to 0.6m pa. However, based on this study the rate is likely to increase by up to 5% pa due to sea level rise, climate change and foreshore erosion/depletion. Assuming a 2% growth pa, this means that a current erosion rate of 0.4m pa would increase to 1m pa by the end of a 50 year Strategy timeframe. Beyond 50 years, it can be assumed erosion rates are potentially in excess of 1m per year. This is subject to uncertainties due to the vagaries of weather patterns and as a result erosion rates will need careful monitoring.



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Figure 4.1 Summary of Do Nothing Scenario

Before discussing the economic, environmental, social and strategic impacts in more detail (section 4.3 to 4.6), it is worthwhile presenting an overview of the key likely observations associated under a do nothing scenario.

4.2 Timeline of Key Do Nothing Impacts

Table 4.1 - Strategy Unit 1

Timeframe	Likely Observations
2004 – 2009	<ul style="list-style-type: none"> Contemporary erosion rates continue. No immediate change to current conditions.
2010 – 2014	<ul style="list-style-type: none"> Likely change in fore-dune condition. Possible plan view changes to dune system at distal end of island.
2014 – 2033	<ul style="list-style-type: none"> Sea level rise may start to further effect the stability of the fronting dune system. Risk of pollution from eroding landfill sites to the south.
2034 – 2054	<ul style="list-style-type: none"> Continued natural degradation of the dune system. Breaching may occur, but little or no risk in economic / human terms on the mainland is expected. Increase in sediment feed in the unit as defences in SU2/3 fail and erosion increases. Risk of increasing pollution from eroding landfill sites to the south. Alteration to salt marsh habitat biodiversity on the east coast. Potential accretion as sea level rises (subject to future rates of sea level rise).

Table 4.2 - Strategy Unit 2

Timeframe	Likely Observations
2004 – 2009	<ul style="list-style-type: none"> Low erosion rates continue (circa 0.1m pa). No immediate change to current conditions.
2010 – 2014	<ul style="list-style-type: none"> Risk of increased rate of beach level depletion immediately north of Earnse Point groyne, leading to regular exposure of mobile homes to damage from north westerly storms. Selected signs of defence deterioration in the unit
2014 – 2033	<ul style="list-style-type: none"> Further increase in risk to mobile homes due to sea level rise. Possible break up of "T" shaped rock groyne plus defence wall repair. Ongoing low level erosion may impinge on golf course as beach levels lower and defences fail.
2034 – 2054	<ul style="list-style-type: none"> With exact timing dependant on the magnitude of the effects of climate change, Earnse Point groyne and all other defences will fail. The level of risk to the mobile homes will increase to a point where the site is no longer sustainable. Erosion will accelerate and beach lowering continues. Should erosion rates increase as predicted, the landfill site at Sandy Gap will be at risk of erosion toward the end of the Strategy timeframe. The access route north of Earnse Point groyne will be at increased risk of erosion.

Table 4.3 - Strategy Unit 3

Timeframe	Likely Observations
2004 – 2009	<ul style="list-style-type: none"> • In the short term, contemporary erosion rates on the west coast will continue. • The Biggar Dyke embankment quickly fails and higher tides will cause further breaching. Approximately 20 ha of agricultural land between Middle Hill, Biggar and Tummer Hill becomes unworkable and is abandoned. Isolated low lying properties near Biggar are also abandoned (e.g. stables). • Roads linking Vickerstown to Biggar become impassable during higher high tides, and south half of the island becomes more isolated. • Erosion of the landfill site at Bent Haw results in local pollution to the foreshore and a risk of more widespread pollution. • Erosion south of Hare Hill and rising sea levels increasing risk of flooding to low lying land. • Hilpsford Point groyne field will continue to dilapidate and be removed by the sea. • Erosion of upper beach at Hilpsford Point at contemporary rates.
2010 – 2014	<ul style="list-style-type: none"> • Lowering beach levels, sea level rise and continued degradation of the existing revetment protecting the northern end of the Low Bank landfill result in defence failure and significant pollution of the foreshore and wider marine and tidal habitats. • Continued pollution from Bent Haw landfill. • Defences at Cow Leys and Middle Hill continue to fail, allowing increased erosion and marginally increased flood risk to agricultural land. • Increased risk of a breach to the shingle ridge on the west coast opposite South End Caravan Park during storm events. • Groyne at Hilpsford Point is likely to be completely redundant.
2014 – 2033	<ul style="list-style-type: none"> • Flood risk to properties at Tummer Hill increases as sea levels rise. • Likely breach to the shingle ridge on the west coast opposite the caravan site, resulting in approx 20 ha of agricultural land becomes unworkable / abandoned. • Erosion of up to 15m of public open space near The Roundhouse and agricultural land to the south. • Sea level rise causes retreat of salt marsh habitats on the east coast, but new habitats form in the low lying area behind Biggar Bank. • Vegetated shingle habitats may be affected by roll back and depletion of shingle beaches. • Continued erosion south of Hare Hill and risk of flooding.
2034 – 2054	<ul style="list-style-type: none"> • Loss of a 30 to 100m wide a strip of low grade agricultural land along the west coast due to erosion. It is worth noting that the island is 400m to 1km wide. • Continued erosion at Low Bank results in up to 600,000m³ of landfill being potentially released into the marine environment. Regional scale pollution incident likely. • Flood risk at Tummer Hill increasing from current (0.5-4% annual flood probability) to 2-10% annual flood probability. • Depending on increased erosion rates in future, tidal linkage of the east and west coast on most spring high tides may become common at Biggar and South End Farm. Note – this does not mean the island has been 'breached' by erosion – only that erosion of higher land along the west coast would result in an increased risk of occasional tidal inundation. • The caravan Park at South End farm may become subject to increased flooding (4-20% annual flood probability, compared to 2-10% annual flood probability at present). • Increased salt water intrusion altering biodiversity of saline lagoons at South End Haws. • Potential for increased deposition of sand and shingle material at South End Haws as a result of the coastline being 'released' (defence failures) and erosion rates increase.

Table 4.4 - Strategy Unit 4

Timeframe	Likely Observations
2004 – 2009	<ul style="list-style-type: none"> No expected change to contemporary conditions. Continued high level of flood risk to limited no. of properties along the Promenade (e.g. The Ferry public house is subject to an annual flood risk of between 5 and 20%). Road access to properties behind the Promenade is flooded during flood events.
2010 – 2014	<ul style="list-style-type: none"> Increased flood risk to road, properties. Increasing risk of failure of the revetment protecting the Promenade.
2014 – 2033	<ul style="list-style-type: none"> Following the failure of the Promenade revetment, the highway and any services underneath are subject to a risk of erosion. Access to the properties north of Jubilee Bridge would be lost and pollution of the foreshore may result from exposure of failure of foul sewers and other services. Increasing, but unquantifiable risk of cliff / slope failure at North Scale. Such a failure may result in the loss of life and property (5 – 10).
2034 – 2054	<ul style="list-style-type: none"> Flood risk to highway and property has increased significantly as a result of sea level rise. Some property may be abandoned (e.g. The Ferry). Tidal mudflat/saltmarsh habitats will be subject to squeeze against hard defences.

The economic, environmental and human impacts of the do nothing scenario are now discussed in turn.

4.3 Economic Impacts

A detailed presentation of the economic impacts of the do-nothing scenario is presented in Appendix H and a summary is presented below.

The economic impact of the do nothing scenario was assessed on a Strategy Unit basis. Where island wide significance took precedence, this was followed for priority scoring purposes (see section 7). Two assessments were completed to indicate the range of feasible damages. The key parameters included in each scenario are as follows:

- ◆ **'Mid range' scenario.** The key feature of this scenario is that the impacts were examined for the 'mid range' assessment of erosion rates for the west coast (see Shoreline Evolution Report in Appendix D). Other key features centred on timing of events, such as existing defence failure, or uncertainty in flood risk assessment. In each case, for this scenario the most likely eventuality was examined.
- ◆ **'Upper bound' scenario.** The key feature of this scenario is that the impacts were examined for the 'upper bound' assessment of erosion rates for the west coast (see Shoreline Evolution Report in Appendix D). Other key features centred on timing of events, such as existing defence failure, or uncertainty in flood risk assessment. In each case, for this scenario a 'worst case' eventuality was examined.

The following further key assumptions should be noted:

- ◆ No economic gains were appraised, as might occur through environmental based tourism if low lying farmland were to revert to grazing marsh.
- ◆ The economic consequences of allowing landfill sites to fail was established using a proxy value for damages based on the cost of moving the landfill, which was assessed as £30 per m³, assuming a suitable disposal method / location was available. Because of the paramount importance of this issue to the human and natural environment, a more robust (and costly) economic assessment of environmental damage is not required: no successful option would be chosen that would allow a significant risk of pollution of the marine and inter-tidal environments from landfill sites.
- ◆ The economic consequences of the loss of highways (e.g. the road link to Biggar) were assessed based on the cost of replacing / re-routing the road rather than the 'write off' value of the properties affected (properties that can no longer be accessed). This will underestimate actual do-nothing damages, but is in line with FCDPAG3.
- ◆ An appraisal life of 100years was assumed, in line with Defra advice in their supplementary note on economic appraisal, (March 2003).
- ◆ A discount rate for future damages of 3.5% for year 0-30, 3.0% for year 31-70 and 2.5% for year 71-99 was assumed, in line with new Defra guidance (March 2003). This assumption also applies to the economic analysis of options (see Section 7).
- ◆ An Optimism Bias factor of 70% is applied on the best estimate costs

The results of the analysis are presented below. Note that there are no tangible economic impacts of the do-nothing scenario on SU1, hence no table is presented for this unit.

Type	Damages – Present Value (£'000s)		Comment
	Mid range	Upper bound	
<u>Flooding</u>			
Agricultural	0	0	These damages are associated with the eventual failure of the defences at Earnse Point ("T" shape groyne and wall).
Highways / infrastructure	0	0	
Properties	0	0	
Caravan parks	88	82	
<u>Erosion</u>			
Landfill	0	29	There is a risk of erosion of landfill toward the end of the timeframe, assuming the 'upper bound' erosion assessment. After defence failure and cliff erosion commences, safety issues would need to be addressed at the golf course. The damages are associated with erosion of the road at Earnse Point toward the end of the timeframe, assuming the 'upper bound' erosion rate.
Property	0	0	
Caravan	0	0	
Agricultural / open space	9	2	
Golf course	9	2	
Highways / infrastructure	0	10	
Total PV of Damages	£106k	£125k	

Table 4.5 SU2 Do Nothing Economic Damages

Type	Damages – Present Value (£'000s)		Comment
	Mid range	Upper bound	
<u>Flooding</u>			
Agricultural	185	189	These damages are mainly associated with flooding and land "write off" around Biggar / Middle Hill, but also at South End Farm (70/30 split). This is associated with Breaching of Biggar Dyke embankment and the subsequent loss of road access to Biggar (damage assessed as cost of road improvements). For the 'mid range' assessment, the damages are mainly associated with the loss of the stables at Biggar. The 'upper' assessment is mainly associated with flood risk at Tummer Hill. The latter point reflects the uncertainty on flood risk assessments at present.
Highways / infrastructure	67	82	
Properties	112	522	
Caravan parks	0	0	
<u>Erosion</u>			
Landfill	6424	8733	This is associated with erosion of the landfill at Bent Haw and, more especially, Low Bank. The value is a 'proxy' value and is based on the cost of moving the landfill that would be eroded (cost £30 / m ³). Associated with erosion of the west coast.
Property	0	0	
Caravan	0	0	
Agricultural / open space	15	27	
Golf course	0	0	
Highways / infrastructure	0	0	
Total PV of Damages	£6797k	£9553k	

Table 4.6 SU3 Do Nothing Economic Damages

Type	Damages – Present Value (£'000s)		Comment
	Mid range	Upper bound	
<u>Flooding</u>			
Agricultural	0	0	This is associated with the frequent, but low impact, flooding of the Promenade north of Jubilee Bridge. This is associated with high flood risk to a limited number of properties along the 1km length of the Promenade. The range reflects uncertainty on flood risk assessment.
Highways / infrastructure	10	36	
Properties	94	362	
Caravan parks	0	0	
<u>Erosion</u>			
Landfill	0	0	This is associated with the failure of the revetment fronting the Promenade. The range reflects uncertainty over timing of failure and damages to services.
Property	0	0	
Caravan	0	0	
Agricultural / open space	0	0	
Golf course	0	0	
Highways / infrastructure	375	1123	
	Total PV of damages	£479k	£1521k

Table 4.7 SU4 Do Nothing Economic Damages

4.4 Environmental Changes

Appendix C highlights in more detail the outcome of the Habitat Audit carried out for Walney Island. The following provides a brief overview of the likely natural habitat evolution trends that are possible over the next fifty years.

In general, doing nothing will ensure the objectives of current environmental designations, including Morecambe Bay European Marine Site, cSAC, SPA South Walney and Piel Channel Flats SSSI (GCR) will remain unhindered. The natural morphodynamics of the island will change the appearance of the island (intertidal skears included) and the key habitats of importance, including coastal vegetated shingle, coastal saline lagoons, rocky shores, dune habitats (each set as a priority habitat within FCDPAG5) will evolve naturally.

The unprotected length of coast between Earnse Point in SU2 and Shope Tree Scar in SU1 is receding. Sediment is being lost from this stretch of coastline to feed the spit further north. The future rate of recession would be expected to increase due to the restrictions on sediment supply from the south and increases in incident wave energy due to global warming, impacting upon fore-dune habitat integrity, though the extent and form of the North End Spit will continue to grow in response to this.

Further south, sea level rise and increased storminess will result in increased erosion of the till cliffs and consequently more sediment will be supplied to the littoral system. There has been major loss of vegetated shingle material from most of this section of shore, with extensive exposures of clay and sand now showing. However, new areas of vegetated shingle would extend. There will also be continued erosion of the landfill site at Low Bank and adjacent to Cross Dyke Scar, releasing potential pollutants such as household, commercial and industrial waste (including asbestos, industrial effluent sludge, contaminated soil and gully arisings) into the marine environment.

Along the Walney Channel side (east) of the island, the integrity of the salt marsh on the east coast will depend upon general health of the system, natural inundation frequencies over time and surge erosion events. Sea level rise may also lead to increased accretion rates at South End Haws, due to the predicted increased erosion and sediment supply from the west coast, leading to increased growth of shingle ridge and dune habitats.

The natural risk of these habitats not being able to adapt to changing natural climates and sea level rise events, is likely to be directly linked to the space available for habitats to retreat/adapt into within a do nothing scenario. The current risk of natural change along the frontage represents a significant challenge for Biodiversity Actions Plan setting for Walney, and in particular in their implementation. Inevitably, coastal vegetation and saline lagoon habitat extent will change along the Walney frontage as littoral transport budgets change over time (see Appendix D).

4.5 Human / Social Changes

Whilst not quantified, it is inevitable that changes to land use policy would have to occur under a Do Nothing shoreline management Scenario. A key issue is related to existing land use practices (including future management of the landfill tip sites) and how these are likely to be forced to alter over time. It is anticipated, for example, that current agricultural land will be impacted upon along with the current location of recreational assets (caravan parks) along the shoreline.

A significant issue is the risk of communication network disruption due to flooding. Plate 1 shows the recent flood events that occurred in Biggar village during February 2002 and the damages/inconvenience that resulted. It is apparent that under a do nothing scenario, organisations such as the police, local authority, fire service and the Environment Agency will be under more frequent pressure to deal with events such as this, resulting in more resource time and expenditure, not to mention the increased risk to property owners and vulnerable groups who rely on assistance from the emergency services. The issue of flood routeing for example is covered in more detail within Sections 7 and 8.

