



# Economic Appraisal of Management Options for the Cuckmere Estuary, East Sussex

For East Sussex County Council

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## 1. Executive summary

The Cuckmere Coastal Change Pathfinder Project (CCCPP) is working with the Community to develop a consensus on a preferred solution for the long term management of the Cuckmere estuary.

A range of possible options for assessment have been agreed by the community as discussed further below. The research for phase 2 of this economics study examines the implications of the different options for the economic values flowing from the area.

In this report, we assess the potential impacts on visitor numbers that could arise under different scenarios for management of the Cuckmere Estuary. We use the results of two surveys to assess which features visitors and potential visitors value most, and how possible changes might impact on their future visit intentions. We then assess what this might mean for total visitor numbers, and estimate the potential costs and benefits of each of the future management options under consideration. We consider the impacts of the options on access, habitats and views. The calculations draw on estimates of capital and maintenance costs produced by Capita Symonds, and on the results of the surveys and the calculations in the previous section.

It is important to realise that each of the above steps involves assumptions and approximations. In particular, there are substantial inherent uncertainties in trying to predict the impact of possible future changes on individual visitor behaviour. Therefore the final estimates of the changes in visitor values to the local economy must be seen as indicative ideas about possible impacts, not as firm predictions.

Nevertheless, comparing these ballpark figures with the cost estimates does lead to some reasonably safe conclusions. The high capital cost options C, E and F have a big up-front cost disadvantage. Any visitor benefits under these options are not enough to compensate for this initial cost, and the net present values are negative. Of the lower capital cost options, option B is also loss making, because it results in a landscape less favoured by visitors, and therefore brings no economic benefits.

The two options that do perform better than the baseline are options A and D. These are low (A) or zero (D) capital cost options, with broadly similar levels of maintenance costs. They result in a landscape considered by visitors to be about as attractive as today's, and more attractive than that arising in time under 'do nothing'. These options return a positive net present value. The difference between them is relatively small, and given the important uncertainties involved in the assessment, we can not say with any confidence which option would yield greater economic benefits.

It should also be noted that we have considered only the economic value to the Sussex area, arising from visitors to the Cuckmere and from agriculture in the area. There are of course many other arguments that should be taken into account alongside these economic factors, though these are beyond the scope of this particular report.

## 2. Introduction

*The purpose of the Cuckmere Coastal Change Pathfinder Project (CCCPP) aims to work with the community in order to identify a preferred approach to the long term management of the Cuckmere Estuary. This report aims to assess the economic impacts of the different management options that are being considered. The impact of each of the management options will be evaluated and weighted against the baseline option of withdrawing maintenance of the defences (though keeping the river mouth clear), the current Environment Agency Flood Risk management strategy from April 2011. The costs and benefits related to each option over time will be estimated to predict the economic impact of the different management options on the area.*

The Cuckmere estuary in East Sussex is changing, with potential impacts on the local community, visitors, property and land owners, businesses as well as the landscape and habitats of the area. The Cuckmere Coastal Change Pathfinder Project (CCCPP) aims to work with the community in order to identify the best and most sustainable approaches for the long term management of the estuary. The project is one of 15 funded by Defra under the “Coastal Change Pathfinders” initiative, involving local authorities selected to explore new ways of adapting to and planning for coastal change, in partnership with their local communities.

Over the 16 months of the CCCPP, East Sussex County Council has been working and will continue to work with the local community and stakeholders to develop a consensus on preferred solutions for the estuary’s future management, taking into account the views of visitors to the area.

As part of this programme, CCCPP has commissioned eftec to carry out research to examine:

1. The current economic benefit Cuckmere Estuary brings to the local area, and
2. The economic costs and benefits associated with a range of management options for the estuary.

This report covers the **second part** of this research programme.

### 3. The proposed management options

*In December 2010, the Community agreed a list of possible options for the management of the Cuckmere Estuary. Those options are listed and summarised in this section.*

The CCCPP has been actively exploring a wide range of options. In December 2010, the Community agreed a list of options for the future management of the Cuckmere Estuary. These options are listed and briefly described below, drawing on the report by Capita Symonds (2011) that gives a detailed description of the changes to the estuary morphology which would result from the implementation of each option, and predicts changes over 3 different periods of time (0-20 years; 20-50 years; 50-100 years).

- Option A: Partial breach managed realignment
- Option B: Full breach managed realignment
- Option C: Engineered reactivation of meanders & meandering creeks
- Option D: Maintain the existing defences
- Option E: Sustaining the defences: raising banks as sea level rises
- Option F: Sustaining the defences: raising banks by 300mm
- Baseline option: 'Do Nothing' - this is the benchmark against which the other options have to be evaluated.

Although the 'do nothing' option was not proposed as a possible scenario for the Cuckmere Estuary, it was discussed during the workshop as a benchmark against which the other options should be assessed. For the purpose of this study it will be considered as a 'baseline option'. Doing nothing (or 'doing minimum', which includes stopping all maintenance of defences but keeping the river mouth clear) would result in failure of the defences, eventually recreating a naturally functioning intertidal estuary. The Strategic Environmental Assessment, (SEA) produced by the EA in 2008 estimates that 112ha of intertidal habitats would be created, for the most part replacing existing grazing marsh (75ha) and saline lagoons (13.3ha). The long term impacts would be broadly similar to those of the realignment option,

Options A and B produce planned and controlled breach(es) in the riverside flood embankments and a gain in intertidal habitat. In comparison to option A, Option B does not require maintenance of any flood banks and there is a predicted greater environmental gain.<sup>1</sup>

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<sup>1</sup> Based on the habitat modelling by Capita Symonds (2011). Please note the assumptions/limitations in Capita Symonds' report.

Option C would result in a fully functioning tidal estuary, which would change the landscape quite significantly. The current riverside flood embankments would be removed and so access to the beach would change. One advantage of this scheme over the other realignment schemes is that it would make possible the reconnection and restoration of remnants of the historic creek system.

Under option D, the existing flood embankments would be left unchanged and the river mouth cleared as it is at present. Maintenance work would be carried out at similar levels as under the pre-existing regime until the height of the current defences become inadequate to prevent flooding, which would result in the area being flooded over time.

Both options E and F would require raising the river embankments, to prevent a periodic inundation of the area. The main difference between those options is that for option E the embankments would be raised as sea level rises (by 300mm then by a further 300mm), whereas for option F, there would be a single raising of the embankments by 300mm, which would protect the area from sea level rise for the next 50 years.

## 4. Visitor numbers under different scenarios

*In this section, we assess the potential impacts on visitor numbers that could arise under different scenarios for management of the Cuckmere Estuary. We use the results of two surveys to assess which features visitors and potential visitors value most, and how possible changes might impact on their future visit intentions. We then assess what this might mean for total visitor numbers.*

The phase 1 report (“Current Economic Value of the Cuckmere Estuary”) demonstrated that at present the Cuckmere Estuary is providing important economic value for the local area, almost £4 million per year in income and around £1.6 million per year net direct benefits, after accounting for costs, but before allowing for any induced expenditure. Most visitor expenditure is quite local, but some accrues to the wider Sussex area: values for the larger area are a little higher at approximately £2m per year after accounting for costs.

Almost all of this is due to tourism to the area; there is also grazing on 79 hectares of land, but this accounts for less than 1% of the economic value. It should be noted that the calculation of the visitor expenditure values is very approximate: in particular, it is based on best available estimates of visitor numbers, but we know that these are only rough estimates. So the true economic value of tourism could be rather lower or rather higher, depending on actual visitor numbers.

Therefore the main economic impacts of the different options would come through (a) any changes in the number of visitors due to changes to the landscape and access conditions, and (b) the costs of capital works and maintenance.

It is impossible to say with certainty what the impacts of the options on visitor numbers would be. There are two main ways in which we can try to estimate these impacts: by asking (potential) visitors how they think their visit intentions would vary with the different scenarios, and by comparisons with other areas where similar changes have taken place, and for which data are available on visit numbers. This section of the report deals with the first of these approaches, and the second is discussed in the following section.

### 4.1 Survey method

In order to help determine the potential economic impacts of each management options, two online surveys were conducted by Tourism South East. One was a ‘follow-up’ survey with individuals who had answered the visitor survey during a visit to the Cuckmere Valley in 2010 and had agreed to be re-contacted. The second was with a group of randomly selected individuals from the Regional Tourist Board’s consumer database.<sup>2</sup> The surveys aimed to identify the importance of

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<sup>2</sup> This is a database of enquirers who have expressed an interest in visiting the South East of England for holiday and leisure day visits.



different features of the area in determining visit frequency, and to assess how the number of visitors to the area might change under the different management options. Some of the options are very similar in terms of their impacts on the landscape. Therefore the questionnaires included 4 different ‘views’ of potential future Cuckmere landscapes (note that no engineering structures were shown in the different views).

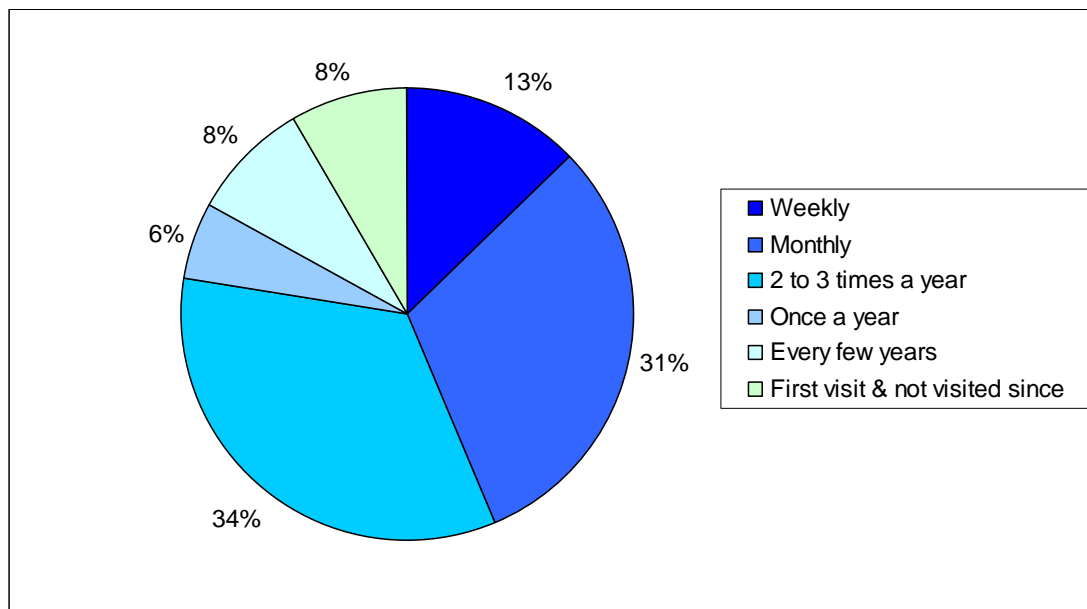
<b>Table 1: Comparison of survey views and flood management options</b>		
View	Short description (for full details, see questionnaires in TSE reports)	Options represented broadly
1	What the Cuckmere estuary looks like now (current landscape).	Option D: (short term) Option E: (short term) Option F: (short term) Baseline (short term)
2	In this image the floodplain would be partially flooded according to the tide, having some impact on the features of the Cuckmere estuary and access to the beach.	Option A: (short, mid and long term) Baseline (mid term) Option D: (mid-long term) Option F: (long term)
3	In this image, the floodplains would be allowed to flood naturally according to the tide. This would have a more significant impact on the features of the Cuckmere estuary and access to the beach.	Option B: (short, mid and long term) Option C: (short, mid and long term) Baseline (long term)
4	In this final image, the floodplain is fully protected from any future flooding. Over time, it is expected that the meanders will dry up.	Option E: (mid-long term) Option F: (first 50 years)

#### 4.2 Response to follow-up survey

The recreational visitor follow up survey was emailed to 300 individuals who had previously visited the Cuckmere estuary. Out of 300 questionnaires sent, 71 were returned, a 24% response rate, which is acceptable in the context of online surveys, which typically have an even lower response rate. This number of responses is enough to detect broad trends in opinions about the options, but is not sufficient to allow precise statistical estimation of future visit numbers.

Individuals were questioned about their past visits to the Cuckmere area and how often they thought they would visit the estuary if changes occurred; in addition to a written description of the changes, pictures displaying those modifications were included in the survey and respondents could therefore have a good idea of what the area might subsequently look like.

Figure 1: Frequencies of current visits by those in follow up survey



Fifty nine percent of the respondents lived within the East Sussex / Brighton and Hove area. The majority of visitors visited from home for a leisure day out (52%) or for a routine walking trip (24%). Figure 1 shows that the majority of respondents are quite frequent visitors to the Cuckmere area, with over three-quarters visiting at least 2-3 times per year: 34% said 2-3 times per year, 31% said monthly and 13% said weekly.

### Importance of Features

Table 2 presents the full list of features used in the survey. To allow an approximate comparison of these results, we have calculated a weighted average of the 'essential', 'important' and 'slightly important' responses, to create an *ad hoc* index of importance. This has been calculated based on 3 points for 'essential', 2 points for 'important' and 1 point for 'slightly important', with the total divided by 3, so the lowest possible score is 0 and the highest is 1. This is just a convenient way of combining the responses, but it has no specific statistical significance.

**Table 2: Importance of specific features for the follow-up survey**

Feature	Essential	Important	Slightly important	Not important	Not sure	Index
Walk	54%	41%	4%	1%	-	0.83
Car parking	60%	28%	10%	1%	-	0.82
Footpaths alongside river/estuary	51%	41%	6%	1%	-	0.80
Views of the cliffs	43%	51%	4%	1%	-	0.78
Views of the river	39%	53%	9%	-	-	0.77
Well maintained footpaths	39%	46%	14%	1%	-	0.74
Access to the beach	38%	49%	10%	1%	1%	0.74
Views of the meanders	30%	53%	13%	1%	3%	0.70
Toilets	35%	30%	22%	13%	-	0.62
Views of grazing animals	25%	41%	26%	9%	-	0.61
Bus service	25%	36%	19%	17%	3%	0.55
Info. boards explaining landscape/wildlife	12%	48%	33%	7%	-	0.55
Visitor centre	14%	48%	22%	16%	-	0.53
Bird watching	18%	40%	25%	13%	3%	0.53
Views of Coastguard Cottages	22%	25%	39%	14%	-	0.52
A meal in a local pub or restaurant	12%	29%	33%	25%	1%	0.42
Wheelchair/pushchair access	11%	33%	24%	26%	6%	0.41
Cafe facilities on the site	10%	32%	28%	28%	1%	0.41
A drink in a local pub	7%	34%	30%	27%	1%	0.40
Cycling paths	6%	31%	34%	28%	1%	0.38
The 19th Century Cut	9%	27%	31%	19%	14%	0.37
Military defence features	3%	26%	40%	25%	6%	0.34
Picnic tables	3%	21%	42%	32%	2%	0.31
Canoe launch	10%	13%	26%	44%	6%	0.27
Cycle rental	4%	18%	26%	47%	4%	0.25
Other	10%	8%	14%	12%	55%	0.20

Overall there is a clear sense that features relating to *access for walking* (including the availability of car parking) and *views of natural features* have the highest priorities.

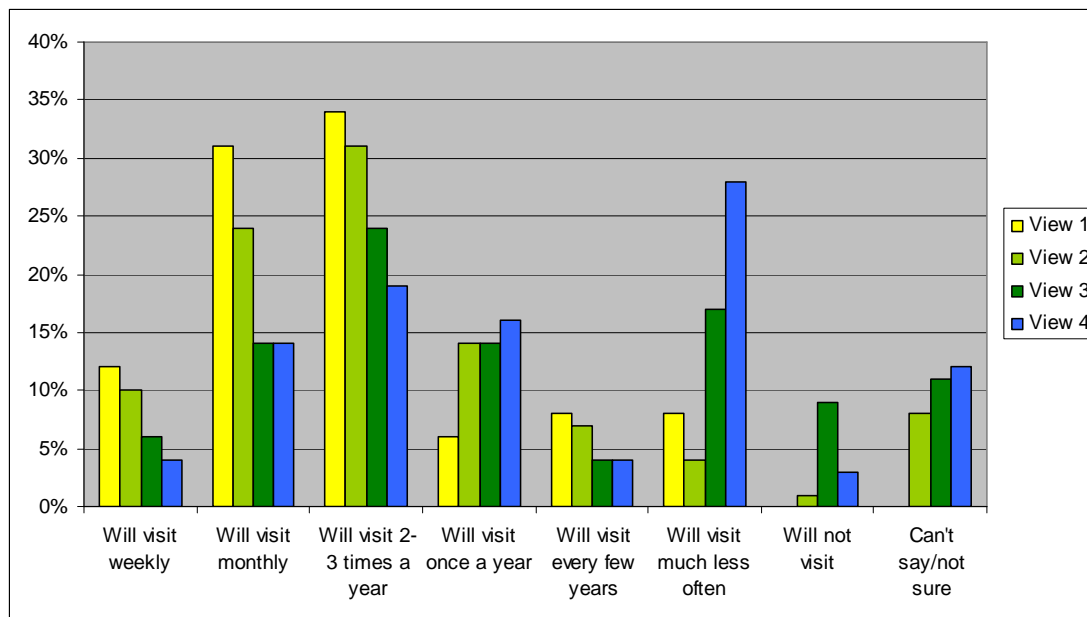
*Heritage features* come much lower down the list: views of the iconic Coastguard Cottages are picked out, but the 19th Century cut and military defence features score quite low: only 9% and 3% respectively said these features were 'essential', while 27% and 26% said they were 'important'. One respondent contrasted these with "the wildlife interest which is the most interesting because it changes. Once you have seen the heritage assets these do not change." These figures do not imply that the heritage features are unimportant to people, but that they are not as central to regular enjoyment of the area as the natural views are.

*Built facilities* such as cafes, picnic tables, cycle paths and even the visitor centre also scored quite low down the list. The survey revealed some negative views of such facilities, with many respondents stressing the 'unspoilt' character of the area. One stated "People enjoy walking through countryside that remains largely uncontaminated with concrete paths, toilet blocks, and additional buildings. If this area is developed into a 'visitor attraction' I will be much less likely to visit."

It should be noted that some respondents may be expressing preferences not only for features that they *personally* use, but for features that they think *ought* to be present. For example bus service, canoe launch and cycle rental may fall into this category: although most visitors do not use these features, nevertheless they give some weight to their presence.

### **Visit intentions**

Responses on visit intentions under future management options reveal a general pattern of reduced visit frequency that is especially marked for the "full protection" scenario. There is some uncertainty, with 8%-12% of respondents unsure how the changes would affect their visit frequency. Figure 2 summarises the responses.



**Figure 2: Stated visit intentions for the follow-up visitor survey.<sup>3</sup>**

It is interesting also to observe the pattern of changes in responses. These are reported in Table 3 and summarised below.

- For view 2, 70% of respondents would not change, 8% are uncertain, 7% would visit more often and 14% would visit less often
- For view 3, 43% would not change, 11% are uncertain, 4% would visit more often, and 40% would visit less often.
- For view 4, 39% would not change, 12% are uncertain, 1% would visit more often, and 42% less often.

<sup>3</sup> Note that the response “will visit much less often” was meant to imply “less often than once every few years”, appearing in the response list between “will visit every few years” and “will not visit”. However the pattern of responses and comments in the survey suggest that some respondents *may* have interpreted this as “much less often than at present”.

**Table 3: Changes in visit intention for the follow up survey**

Current frequency	Weekly	Monthly	2-3 times per year	Once per year	Every few years	Much less often
<b>VIEW 2</b>						
Weekly	6	1				
Monthly		17				
2-3 times a year		3	19			
Once a year		1	2	4	1	2
Every few years					4	1
Much less often	3					
Will not visit			1			
Can't say/not sure			2		1	3
<b>VIEW 3</b>						
Weekly	3	1				
Monthly	2	8				
2-3 times a year		6	10			1
Once a year			5	4	1	
Every few years					3	
Much less often	1	3	6			2
Will not visit	2	1	1		1	1
Can't say/not sure		3	2		1	2
<b>VIEW 4</b>						
Weekly	3					
Monthly	1	9				
2-3 times a year		5	8			
Once a year		1	6	4		
Every few years			1		1	1
Much less often	2	5	7		3	2
Will not visit	1					1
Can't say/not sure	2	1	2		1	2

Note: entries in **red** are respondents who would visit less than at present; entries in **blue** are those who would visit more than at present.

### Comments made in the survey

A deeper understanding of the responses is possible through considering the explanatory comments made by respondents. Full sets of quotes are presented in the Tourism South East report of the surveys. Below, we note the main themes arising in the statements.

There are clearly very diverse and in many cases deeply held views on what is desirable for the area. Many people express the view that it doesn't matter too much what the area looks like, provided access is maintained, and this can be seen as an important driver for the generally maintained level of visit intentions under view 2.

"As long as I can get to the beach."

"We will continue to visit come what may."

"Providing the paths are maintained through the middle, would have to accept changes brought by nature and not man."

However possible congestion was flagged as an issue, if only some footpaths are maintained, and others noted the possible inconvenience if it became necessary to consider the tides when planning visits.

"I would consider the tides more and visit at lower tides. At the moment I can visit at any time I wish without considering this factor."

Many respondents expressed an active interest in wildlife and natural scenery, both from the perspective of viewing pleasure, and also for conservation reasons:

"I would be happy to visit to see this scenario and an increase or change to the wildlife would be welcome and may increase my visits for that reason."

"A changing landscape and increased wildlife would be more attractive to me and therefore I may visit more often."

Others expressed a preference for naturalness over man-controlled environments, and for dynamic, changing environments:

"I'd prefer money spent elsewhere and let nature take its course here."

"Providing the changes are natural and not man-made, we shall still enjoy being there."

But some frequent visitors were strongly or passionately against any changes:

"I would like this valley of the Cuckmere to remain as it is for as long as possible....It cannot be replaced."

"The meanders are one of the features of the valley and have been so to our knowledge for over 60 years. To force them to dry up would be vandalism."

"We would be so distressed that we would probably not visit."

However it is important to note that this desire to protect the Cuckmere did not translate to a "keep the sea out at all costs" position. In fact, the view representing full protection was the least preferred overall, due to silting up of the meanders and reduced wildlife interest:

"This would be for us the worst option. Silted up meanders would have little attraction. We would mourn the loss of something beautiful, and probably not visit very often at all. We also love the wildlife, wading birds that are attracted to this area as it currently is."

"Without the river meanders, birds and wildfowl, there would be less point to visit at all, I can get good walks and beach facilities elsewhere along the coast."

"My suggestion is to promote tidal coastal marsh south of the road, to complement the grazing marsh/tidal river north of Exceat. It will improve the biodiversity of the valley. The Sussex coast has lost so much biodiversity and interesting coastal habitat over the past 100 years - let's claw some back."

"This would be a terrible blow for the wildlife in the area and would be worst case it would leave little reason to visit)."

### **4.3 Response to random sample survey**

In total, 828 respondents responded to the email invitation to take part in the random sample survey of which 744 were eligible to complete the questionnaire. Respondents who stated they did not visit the countryside or beach for leisure purposes were excluded from taking part.

#### **Site features**

Table 4 summarises the views on specific features expressed by the random sample. These are broadly similar to the views expressed in the follow-up survey. The presence of footpaths, being able to walk, and park their car were also stated as essential facilities. Again we have used the index as calculated for the visitor survey in order to combine the responses. As for the previous visitors, access, parking and views are the most important features for the random group.



**Table 4: Importance of specific features for random sample**

Feature	Essential	Important	Slightly important	Not important	Not sure/ Can't say	Index
Footpaths alongside river/estuary	47%	45%	6%	1%	1%	0.79
Walk	44%	41%	9%	3%	2%	0.74
Well maintained footpaths	38%	45%	14%	2%	1%	0.73
Car parking	43%	38%	12%	5%	1%	0.72
Toilets	40%	36%	19%	4%	1%	0.70
Access to the beach	35%	44%	18%	3%	1%	0.70
Views of the river	31%	48%	18%	2%	1%	0.69
Views of the cliffs	31%	47%	19%	2%	1%	0.69
Views of the meanders	25%	48%	22%	4%	1%	0.64
Info. boards explaining landscape/wildlife	19%	50%	25%	4%	1%	0.61
Cafe facilities on the site	17%	40%	30%	11%	1%	0.54
A meal in a local pub or restaurant	13%	40%	33%	13%	1%	0.51
Visitor centre	15%	34%	38%	12%	1%	0.50
Views of grazing animals	13%	37%	37%	11%	2%	0.50
The 19th Century Cut	12%	40%	32%	12%	5%	0.49
A drink in a local pub	13%	38%	31%	17%	1%	0.49
Military defence features	12%	35%	31%	18%	4%	0.46
Picnic tables	12%	31%	38%	19%	1%	0.45
Bus service	17%	29%	25%	27%	2%	0.45
Bird watching	13%	32%	30%	23%	2%	0.44
Views of Coastguard Cottages	8%	32%	39%	19%	2%	0.42
Wheelchair/pushchair access	16%	24%	18%	38%	4%	0.38
Cycling paths	8%	26%	28%	34%	3%	0.35
Cycle rental	3%	16%	32%	45%	4%	0.24
Canoe launch	3%	13%	24%	56%	4%	0.20
Other	2%	7%	14%	16%	60%	0.11

### Visit intentions

The pattern of visit intentions is broadly similar to that in the follow-up survey. The current situation is preferred (70% likely or highly likely to visit), view 2 is seen as almost as good (66%), with less interest in visiting view 3 (45%) and especially view 4 (35%).

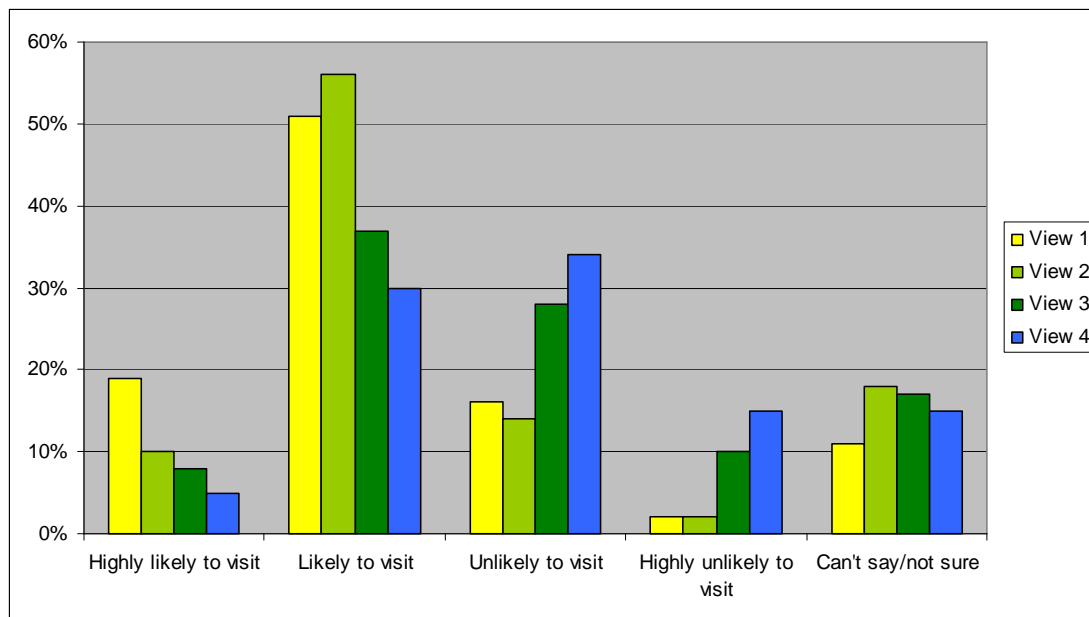


Figure 3: Stated visit intentions, random sample.

Table 5: Changes in visit intentions, random sample						
Current view:	Highly likely	Likely	Unlikely	Highly unlikely	Not sure	TOTAL
VIEW 2						
Highly likely	53	11	3	6	3	76
Likely	74	323	27	1	12	437
Unlikely	4	22	76	2	8	112
Highly unlikely	7	1	4	5	1	18
Not sure	11	46	19	0	64	140
TOTAL	149	403	129	14	88	783
VIEW 3						
Highly likely	43	13	2	3	1	62
Likely	53	200	20	2	14	289
Unlikely	23	107	70	2	13	215
Highly unlikely	10	31	24	7	6	78
Not sure	16	50	12	0	52	130
TOTAL	145	401	128	14	86	774
VIEW 4						
Highly likely	25	11	2	3	1	42
Likely	48	155	18	3	8	232
Unlikely	43	128	71	3	24	269
Highly unlikely	20	63	18	5	10	116
Not sure	12	46	18	0	44	120
TOTAL	148	403	127	14	87	779

Note: entries in red are respondents who are less interested in visiting than under the current situation; entries in blue are those who are more interested in visiting.

#### 4.4 Implications for visit numbers

Overall the surveys suggest that the current situation is preferred by most, though not all, actual and potential visitors. View 2 is seen as almost as attractive. View 3 is less preferred. Perhaps surprisingly, view 4 is clearly the least preferred, both for the regular visitors and the random sample.

However it should also be stressed that these results are only indicative. It is to be expected that there will be some 'status quo bias' in any survey of this sort, because people generally distrust radical changes in familiar and well-loved landscapes. Several respondents, however, did stress the potential gains in wildlife and viewing interest under some future scenarios. As discussed in the next section, there is evidence to support the idea that new intertidal areas can draw new visitors in. Hence although it is clear that some current visitors are strongly against prospective changes, and may reduce or stop visits, there may be new

potential visitors to compensate. Of course there would be winners and losers - some prefer the status quo, others prefer change - but from the perspective of the economic value flowing from the area it is the total number that matters.

It must also be noted that the status quo is not actually an option 'on the table' as change in Cuckmere is inevitable.

It is difficult to translate the survey results into strong predictions about future visits. We know from the 2010 visitor survey that visit frequencies break down approximately as follows:

- Daily/weekly: 16%
- Monthly: 15%
- 2/3 times per year: 22%
- Once per year: 15%
- Less often: 32%

Comparing this with Figure 1 shows that the present survey has a higher proportion of more frequent visitors (as we might expect, if we consider more frequent visitors are likely to be more motivated to give their views).

It is possible to use these frequencies to 'deconstruct' the annual visit number estimates, reasoning (for example) that if 15% of visitors visit monthly, 15% of 460,000 annual visitors is 69,000, and to reach 69,000 annual visits from monthly visitors, we require approximately 5,750 *visitors* (i.e. individual people) each making approximately 12 *visits* in the year. To complete this calculation, we have to assume what "less often" means: this category covers anything from just under once/year to once in a lifetime. We have assumed on average it is once every four years. We assume that "weekly" means 52 visits per year, and "monthly" is 12 per year. Table 6 shows the very approximate results of doing this.

	Weekly	Monthly	2-3/yr	Once/yr	Once/4yrs	Total
Proportion	16%	15%	22%	15%	32%	100%
Visits	73600	69000	101200	69000	147200	460000
Visitors	1415	5750	40480	69000	588800	705445

Of course these are very rough approximations, and the numbers of visits and visitors shown in the table are purely illustrative. But the basic reasoning holds: the figures imply that the total annual visits to Cuckmere come from a 'pool' of visitors that includes a small number of very frequent visitors, and a very much larger number of very occasional visitors.

We can then take these population estimates and combine them with the changed propensities to visit, as revealed by the survey. When we do this, however, an important asymmetry is revealed. Table 7 illustrates.

<b>Table 7: Estimating future visits under view 3</b>						
	Visit frequency under current situation					
<i>Visit intentions</i>	Weekly	Monthly	2-3/yr	Once/yr	Once/4yrs	Total
<i>Weekly</i>	27600	15737	0	0	0	43337
<i>Monthly</i>	4246	29053	0	0	0	33299
<i>2-3/yr</i>	0	4539	46000	0	163556	214095
<i>Once/yr</i>	0	0	9200	69000	65422	143622
<i>Once/4yrs</i>	44	227	2760	0	114489	117520
			Total predicted annual visits			551873

For this calculation, the survey predicts that 12.5% of weekly visitors will switch to “much less often”, here taken to imply a visit every 4 years. This represents 177 visitors, who instead of visiting 9200 times per year, now visit only 44 times. This is a huge proportional change: these represents people who really do not like the change, and radically alter their visiting behaviour. However, 11% of the “once every four years” visitors switch to yearly visits. And, because the total pool of occasional visitors is so much bigger, there are over 65,000 people estimated to make this shift. Where previously they made around 16,350 visits per year, now they make 65,000. This impact completely swamps the change in the very frequent visitors. But both are based on a small number of responses: one of eight in the first case, and one of nine in the other.

This impact is not an artefact - it is the case that a small change in attractiveness for a site, applied over a large pool of potential visitors, could lead to large changes in visit numbers. However the extent of this impact can not be determined statistically based on the survey results. The calculation predicts an increase in annual visits under view 3, from 460,000 to 550, 000, but this can not be taken as statistically reliable. There is too much uncertainty in the results to allow us to derive estimates of visitor numbers in this way.

What we can draw from this, however, is the conclusion that the main drivers of the economic impact of changes in the Cuckmere could be changes in the attractiveness of the site to the very large pool of potential occasional visitors, more than changes in the attractiveness to the much smaller pool of frequent visitors.

Looking at the random sample survey, we can make very approximate estimates of the extent of such impacts. We do not know exactly what frequency of visits corresponds to being “likely” or “unlikely” to visit, but we do know that the

current number of visits is approximately 460,000 per year. And in the random sample, 70% of respondents said they would be “highly likely” or “likely” to visit. The actual number of visits will of course depend to a great extent on where people live, and it is clear from the comments given in the survey that many respondents took this into account when answering (“I live too far away to visit” and similar comments). We can make rough estimates based on linear extrapolation:

- For the current situation, 70% of people report being likely/highly likely to visit, corresponding to 460,000 visits per year
- For view 2, 66% of people say they are likely/highly likely to visit:  $(66/70)*460,000 = 434,000$ .
- For view 3, 45% of people say they are likely/highly likely to visit:  $(45/70)*460,000 = 295,000$ .
- For view 4, 35% of people say they are likely/highly likely to visit:  $(35/70)*460,000 = 230,000$ .

These are clearly ballpark figures. They can not be used as ‘raw’ in estimates of the economic impacts of the different options, because we need also to consider the timing element (some of the options take many years before reaching one or other of the above ‘views’) and possible mitigation options (for example to maintain access). Before drawing final conclusions about possible changes to visit numbers, we consider comparisons with some other areas in which coastal change has taken place.

#### 4.5 Comparisons with other areas

An alternative approach to considering the likely impacts of changes at the Cuckmere Estuary is to look at actual impacts from comparable sites that have undergone a similar process of rapid coastal change. Where there is rapid change - for example, a realignment - it is possible to look at the change in visitor numbers and be reasonably confident that this is a result of the realignment scheme. Where the coast remains more static, in a ‘maintain the defences’ situation for example, there is only gradual change in the landscape, and if visitor numbers vary over long periods, it’s not possible to say with confidence that this is linked to the coastal changes - it could be for a number of other reasons (for example population changes, opening or closing of alternative sites, changes in transport availability). It’s only really where there is a big intervention that radically changes the site that it is possible to pick out a sudden change in visitor numbers and be reasonably confident that the two are linked. This is why Table 8 below focuses on realignment sites.

Generally these are areas that were not previously heavily used for tourism, unlike the Cuckmere. So the comparison is not perfect. Nevertheless, these sites do demonstrate that realignment and creation of intertidal habitat, attractive to wildlife and wading birds, can also attract large numbers of visitors.

The visitor numbers to those sites suggest that bird watchers are attracted to sites offering a large number and a wide variety of birds. The proximity to other sites is also important: Snettisham for example is quite small and close to Tichwell, which is larger and more varied, and attracts many more visitors. At Frampton Marsh Nature Reserve, the annual number of visitors increased from 10,000 to 40,000<sup>4</sup> due to a large variety of rare birds being attracted by the natural wetland habitat.

The Cuckmere Estuary could potentially attract large numbers of bird watchers especially because of the low number of comparable alternative sites in East Sussex. RPA (2005) estimates that an additional 45,000 visitors could be attracted to the Cuckmere area following managed realignment. Those calculations are based on the assumption that visitors are attracted at the same proportions as for Freiston Shore site (0.1% of people travelling from up to 120km to the site).

It could be argued that these impacts should already be reflected in the surveys, since changes to wildlife and birds were noted in the option descriptions. On the other hand, bird watchers do travel sometimes long distances to visit major sites, and the strong draw of an important bird-watching site may not be fully reflected in the simple “highly likely”... “highly unlikely” range used in the survey.

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[http://www.bostonstandard.co.uk/community/visitors\\_flock\\_to\\_rspb\\_frampton\\_marsh\\_reserve\\_1\\_23\\_93455](http://www.bostonstandard.co.uk/community/visitors_flock_to_rspb_frampton_marsh_reserve_1_23_93455)

<b>.Table 8: Comparison of sites with the Cuckmere Estuary</b>			
<b>Location</b>	<b>Description</b>	<b>Estimated Visitor Numbers</b>	<b>Estimated Local Visitor Spending</b>
<i>The Cuckmere Estuary, East Sussex</i>	<i>Potential creation of 112ha of intertidal habitat under managed realignment scenario.</i>		
Wallasea Island, Essex	Managed realignment (creation of 115ha of intertidal habitat), year-round bird interest.	65,000 (in 2008/09)	£228,000
Titchwell, Norfolk	Year-round wildlife interest, marine and reedbed species, Area of Outstanding Natural Beauty, visitor centre.	130,000 (in 2008/09)	£1,326,000
Snettisham, Norfolk	Wader and wildfowl interest, basic visitor facilities, no saltmarsh.	19,000 (in 2003/04)	£220,000
Minsmere, Suffolk	Year-round wildlife interest, visitor centre.	100,000 (in 2006/78)	£800,000
Blacktoft, Yorkshire and the Humber	Wader and waterfowl species, some inter-tidal species, reedbed, visitor centre, small site.	35,000 (in 2003/04)	£113,340
Dungeness, Kent	Year-round waders and coastal species, reedbed and freshwater species.	41,000 (in 2003/04)	£252,000
Vane Farm, Perthshire	Breeding waders and wintering waterfowl, migrant and wintering waders, no coastal species	58,000 (in 2003/04)	£290,000
Freiston Shore, Lincolnshire	Managed realignment (66ha of intertidal habitat created, basic visitor facilities).	60,000 (in 2003/04)	£153,000
Frampton Marsh, Lincolnshire	Saltmarsh and wetland. Year-round wildlife interest, visitors facilities.	40,000 (in 2009/10)	About £100,000

Source: Adapted from eftec, 2008.

Notes: Figures for Tichwell and Minsmere from WTE Report - North Norfolk & the Wash, Cuckmere\_estuary\_eftec\_Draft\_Phase\_2\_report\_v2.doc.

Information on Frampton Marsh from Dickie, 2005 and

[http://www.bostonstandard.co.uk/community/visitors\\_flock\\_to\\_rspb\\_frampton\\_marsh\\_reserve\\_1\\_2393455](http://www.bostonstandard.co.uk/community/visitors_flock_to_rspb_frampton_marsh_reserve_1_2393455)

#### 4.6 Conclusions on visitor numbers under the survey views

Taking all the above factors into account leads to the following very approximate conclusions.

- View 2 sees a small decrease in basic attractiveness, but this would likely be compensated for by an increase specifically for bird-watching interest on



the new intertidal part of the area. The themes here are modest changes overall, with well-maintained access, and some new habitat areas, leading to a varied and multi-functional landscape with something for most visitors, and limited impacts on heritage features. In such a situation, we assume that visitor numbers will not change substantially, staying around 460,000 per year.

- View 3 sees more substantial changes with creation of much larger areas of intertidal habitat, a more dynamic landscape, and significant bird-watching and wildlife interest. However there is loss of access through the middle of the area, and for many potential visitors the wetter landscape is seen as less attractive. Although many new visitors are brought in, in particular for bird-watching, there is loss of many others, and we assume approximately 330,000 visitors per year under this scenario.
- View 4 sees maintained defences against flooding, but this leads to loss of wildlife interest, and silting up of the meanders, leading many potential visitors to feel the landscape is less interesting to visit. There is no draw for bird-watchers. Visitor numbers fall substantially to 230,000 per year. If, however, the meanders are mechanically cleared periodically, at cost, this would mitigate to some extent, resulting in visitor numbers somewhere between the estimates for view 4 and those for view 3.
- The translation of these assessments from the surveys to possible visitor scenarios for the management options is considered in the next section.

## 5. The costs and benefits of the management options

*In this section, we assess the potential costs and benefits of each of the future management options under consideration. We consider the impacts of the options on access, habitats and views. The calculations draw on estimates of capital and maintenance costs produced by Capita Symonds, and on the results of the surveys and the calculations in the previous section.*

The costs and benefits of the management options are estimated using the assumptions and calculations set out below. The full calculations are in the accompanying spreadsheet.

The costs and benefits are estimated for each year from 2012 to 2111, and discounted to present values using official HM Treasury discount rates (3.5% for the first 30 years, 3% from year 31 to year 75, and 2.5% from year 76 to year 100).

The resulting present value figures have been summed over 20, 50 and 100 years to give an analysis of the net impacts over different time horizons. In the tables below, PV means 'present value' (the discounted sum of a particular benefit or cost) and NPV means 'net present value' (the discounted sum of benefits minus costs). The numbers immediately after PV or NPV refer to the time horizon of 20, 50 or 100 years.

### 5.1 Capital and maintenance costs

The costs of the options have been estimated by Capita Symonds (2011) based on the modelled capital and maintenance cost requirements of each option. We have used the cost figures from their report, but have recalculated the totals in order to take account of discounting.

**Table 9: Present values of capital and maintenance costs over 20, 50 and 100 years.**

	BASELINE	OPTION A	OPTION B	OPTION C	OPTION D	OPTION E	OPTION F
<b>Capital costs</b>							
PV20	£0.0	£1.1	£1.4	£11.0	£0.0	£8.4	£8.4
PV50	£0.0	£1.1	£1.4	£11.0	£0.0	£8.9	£8.4
PV100	£0.0	£1.1	£1.4	£11.0	£0.0	£8.9	£8.4
<b>Maintenance costs</b>							
PV20	£0.0	£0.4	£0.5	£0.1	£0.5	£0.5	£0.5
PV50	£0.0	£0.9	£1.0	£0.1	£0.9	£0.9	£0.9
PV100	£0.0	£1.1	£1.5	£0.2	£1.4	£1.1	£1.4

The defence raising options (E, F) and the tidal estuary engineering (C) have high up-front capital costs.

Two of the options (A and E) also have capital costs in the future: this is why the capital costs for these options differ from the PV20 (looking only at the first 20 years) to the PV100 (looking at 100 years). These additional capital works are lower cost in absolute terms, and, because of discounting, become quite minor considerations in present value terms.

Most of the options have significant maintenance costs, for annual inspections, and periodic repairs to embankments. The exception is “do nothing” which by definition has no costs.

Option C, Engineered reactivation of meanders & saltmarsh creeks, has only minor maintenance costs, because this option involves recreating a natural estuary, but (as noted below under “impacts on access”) there is some risk of scour damage to the bridge/A259 under this option and that could require additional maintenance work.

## 5.2 Impacts on visit numbers

The options do not map exactly on to the images presented in the surveys. There are three reasons for this:

1. Presenting seven different scenarios in the survey would have been too many;
2. Some of the options result in rather similar situations that would not have looked very different in the survey; and,
3. Most fundamentally, the options do not result in instantaneous changes from the current situation to a specific future configuration. Rather, the landscape evolves more or less rapidly towards different views under the different options.

Table 1 on page 8 compares the survey views with the management options.

In order to refine the assumptions about visitor numbers, we consider the two main sources of potential impact on visit numbers that have been addressed in the option modelling: changes in *access* and changes in the *views and habitats* offered under the scenario. These aspects both featured strongly in the survey responses about important features and in the comments explaining visit intentions.

### Impacts on access

The modelling concluded that there would be no significant impact on flood risk upstream of the A259 crossing as a result of changes to the way the estuary is managed. There are some changes in the risks of flooding to the A259 itself, but these relate to rare extreme events (1 in 100 years, but becoming more frequent due to climate change) and although such flooding would effectively cut off access

for a short period, the overall effect in the context of total visit numbers would be negligible (noting, in addition to the point about low frequency, that extreme flooding events tend to coincide with periods of heavy rain and/or wind that would themselves be enough to dissuade most visitors).

**Table 10: Summary of impacts on access**

	BASELINE	OPTION A	OPTION B	OPTION C	OPTION D	OPTION E	OPTION F
<b>Riverside paths</b>	eventually disappear	west unusable, east OK	unusable due to breaches, but option of footbridges	unusable, embankments removed	usable in short term, becoming hazardous	usable throughout	usable until after 2060, then as D
<b>Vanguard way</b>	regular flooding by 2060	regular flooding by 2060, part rerouted and raised	regular flooding by 2060, part rerouted and raised	regular flooding by 2060, part rerouted and raised	shallow flooding from 2060	largely protected	largely protected, then shallow flooding from 2060
<b>East bank track</b>	south end becomes unusable	south end raised, access to S.Down's Way	south end raised, access to S.Down's Way	south end raised, access to S.Down's Way	occasional flooding, esp. from 2060	largely protected	protected, then shallow flooding from 2060
<b>Canoe club house / car park</b>	rarely flooded	rarely flooded	2060: sometimes flooded on high tide		rarely flooded	largely protected	largely protected, then some flooding from 2060
<b>A259/bridge</b>	occasional flooding	occasional flooding	occasional flooding	occasional flooding, possible risk from scour		occasional deeper flooding	occasional deeper flooding
<b>Overall</b>							
<b>short term</b>	little change	loss of west route, otherwise maintained	assume footbridge maintains one central route	central route lost	little change	access maintained	access maintained
<b>mid term</b>	declining access	access maintained	access maintained, except on very high tides	access maintained	central routes become hazardous	access maintained	access largely maintained
<b>long term</b>	significant loss of access	access maintained	access maintained, except on very high tides	access maintained	access largely maintained	access maintained	access largely maintained

### Impacts on habitats

The modelling has predicted how the habitats in the area would evolve based on the water levels, including the fate of key features such as the meanders, and the creation or loss of areas of habitat important to wildlife. The impacts are summarised in Figure 4 and Table 11.

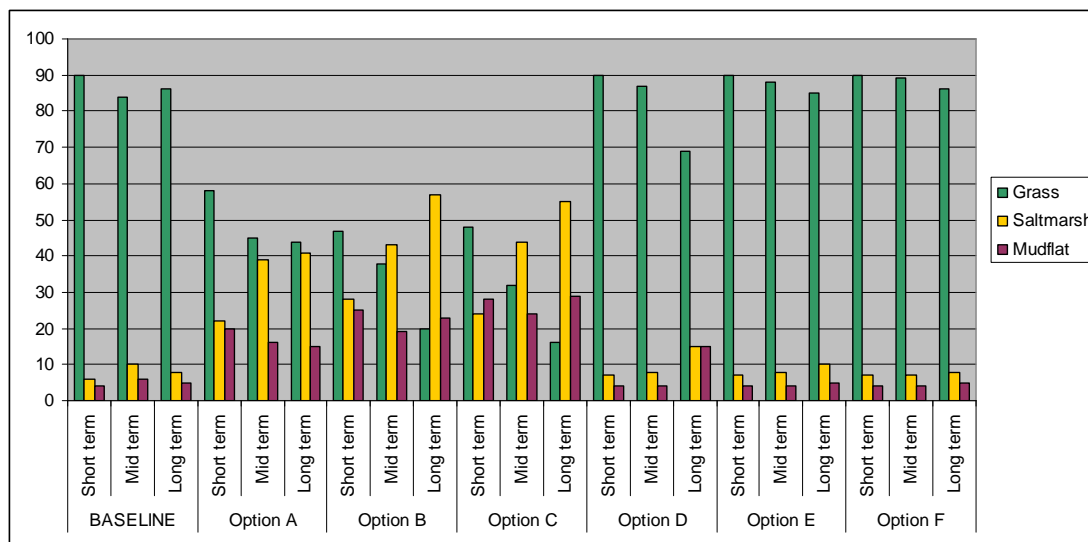


Figure 4: Predicted potential percentages of main habitat types over time for the 7 options

Table 11: Summary of impacts on attractiveness							
	BASELINE	OPTION A	OPTION B	OPTION C	OPTION D	OPTION E	OPTION F
Evolution of grassland	90-85%	55%-45%	45-20%	50-15%	90-70%	90-85%	90-85%
Evolution of mudflats/saltmarsh	10-15%	45-55%	55-80%	50-85%	10-30%	10-15%	10-15%
State of meanders	eventually lost, integrated in tidal creeks	gradual silting up	more water	re-engineered	gradual silting up	silting up in mid-term	silting up in mid-term
Wildlife interest	eventually increased	increased	greatly increased	greatly increased	reduced	reduced	reduced
Dynamism of landscape	initially static, may become more tidal	tidal over part of area	tidal over large area	tidal over large area	mostly static	static	static
View from survey	initially current, then more like view 3	rapidly becoming similar to view 2	rapidly becoming similar to view 3	rapidly becoming similar to view 3	initially current, becoming view 4	initially current, becoming view 4	initially current, becoming view 4
Overall	initially limited impact, becoming of gradually declining attractiveness. No attempts to maintain features.	rapid shift to view that is as attractive as at present. Loss of meanders partly detracts.	rapid shift to state thought less attractive than present; wildlife/natural interest may partly compensate	rapid shift to state thought less attractive than present; wildlife/natural interest may partly compensate	initially similar to present, but gradual loss of wildlife and meanders leading to less attractive landscape	initially similar to present, but gradual loss of wildlife and meanders leading to less attractive landscape	initially similar to present, but gradual loss of wildlife and meanders leading to less attractive landscape

### Assumptions on net visitor impacts

Drawing on all the above assessments, we derive the following assumptions for how the visitor number might change over time under the different options.

**Table 12: Assumptions on evolution of visitor numbers (thousands)**

	BASELINE	OPTION A	OPTION B	OPTION C	OPTION D	OPTION E	OPTION F
2012	100%	100%	75%	80%	100%	100%	100%
2032	80%	100%	75%	80%	100%	100%	100%
2062	65%	80%	75%	80%	75%	75%	75%
2112	50%	80%	75%	80%	50%	50%	50%
2012	460	460	345	368	460	460	460
2032	368	460	345	368	460	460	460
2062	299	368	345	368	345	345	345
2112	230	368	345	368	230	230	230

There may also be temporary fluctuations in visitor numbers during the period of any works, and immediately afterwards. Impacts could be both negative (area closures, noise, less attractive views) and positive (interesting / educational). It is hard to specify exactly what temporary impacts may occur and we focus here on the implications for visitor numbers, based upon the response to the broad representation of outcomes from all of the options over different time scales.

These results are based on rather uncertain assumptions. In particular, the survey method relies on respondents expressing opinions on how they might behave in future hypothetical scenarios. People often express unwillingness to see change, but may subsequently become more comfortable with the new situation, and this can drive a wedge between ex ante and ex post evaluations of options. Furthermore, since the future visitors in the mid to long term will be different individuals, with different expectations, the impact might be less marked. If this were the case, the impacts on visitor numbers could be lower.

### 5.3 Agricultural values

The agricultural values have been approximated using the habitat projections from the Capita report (see above). The approximation used is that the agricultural values are linearly related to the area of grass habitat. This is very rough, but agriculture is a small contributor to the overall values in the area and any refinement of the estimations here would in any case be lost in the overall margins of error associated with the visitor values estimates.

**Table 13: Calculation of agricultural values (£ million)**

	BASELINE	OPTION A	OPTION B	OPTION C	OPTION D	OPTION E	OPTION F
PV20	£0.3	£0.2	£0.2	£0.2	£0.3	£0.3	£0.3
PV50	£0.5	£0.3	£0.2	£0.2	£0.5	£0.5	£0.5
PV100	£0.6	£0.4	£0.3	£0.3	£0.6	£0.6	£0.6

#### 5.4 Net present values

**Table 13: Calculation of Present Values and Net Present Values (£ million)**

	BASELINE	OPTION A	OPTION B	OPTION C	OPTION D	OPTION E	OPTION F
PV20	£0.0	£2.4	-£5.0	-£3.6	£2.5	£2.5	£2.5
PV50	£0.0	£5.8	-£4.9	-£2.5	£5.6	£5.6	£5.6
PV100	£0.0	£7.9	-£3.3	-£0.3	£6.2	£6.2	£6.2
NPV20	£0.0	£0.8	-£6.9	-£14.6	£2.0	-£6.4	-£6.4
NPV50	£0.0	£3.8	-£7.2	-£13.6	£4.7	-£4.2	-£3.7
NPV100	£0.0	£5.7	-£6.2	-£11.5	£4.9	-£3.7	-£3.5

Present values in the table means the discounted sum of a future flow of benefits, all expressed in today's money. Net present values are net impacts, i.e. benefits minus costs, that have also been discounted and summed.

Note that the above calculations consider only the economic impacts: the engineering and maintenance costs, the economic impacts of tourism, and agriculture. We have not considered the environmental impacts in particular, nor have we considered the surplus value to the visitors themselves (i.e. the benefit over and above costs paid) of using the Cuckmere area for recreation.

#### 5.5 Impact on bus services

There are different bus services serving the Cuckmere Valley. Bus services between Seaford and Eastbourne include the Brighton and Hove service 12/12A, which operates daily, several times per hour, all year around. Fares for buses to Seaford on this route are:

- From between Brighton and Saltdean, £2.50 Single, £4.00 Return.
- From Peacehaven, £2.00 Single, £3.30 Return.
- From Newhaven is £1.50 Single, £2.00 Return.

- From Eastbourne is £2.50 Single, £4.00 Return.

Along a similar route, the Tourist Trail 13X operates hourly on Sundays and public holidays during winter months. It also operates Saturdays, Sundays and public holidays between April and June, and every day from mid-June until the end of September. The timetable notes that "The views from the top deck are exceptional especially through the Cuckmere Valley and around Birling Gap and Beachy Head" so if the views at Cuckmere were less attractive this could somewhat reduce this feature.

There is also a service operated by Cuckmere Community Bus Ltd. The bus services are run entirely by volunteers and the company holds the Queen's Award for Voluntary Service. The award winning 'Cuckmere Valley Ramblerbus Service 47' runs hourly at weekends and public holidays on a circular route from Berwick station via Alfriston, Seaford and the Seven Sisters Country Park. Fares are from £1.40, or £5 for unlimited all-day travel; family tickets are £12 for 2 adults and 2 children. At Berwick and Seaford the service connects with trains to/from Eastbourne, Hastings, Lewes and Brighton. The company also runs buses on routes from Alfriston - Lewes (service 25, operates five times each way on Saturdays, and does not go nearer to Cuckmere than Alfriston), and Eastbourne - Alfriston - Seaford (service 126, 5 times each way on Sundays & Bank Holidays, goes down the west side of the valley to Seaford but does not go to the visitor centre).

The Cuckmere Valley Visitor Survey (Tourism South East, 2010), which was conducted for the first phase of the project, found that 9% of the respondents arrived at the site by bus. This includes both public transport and bus trips for holiday makers or educational visits. But the survey also found that 10% (summer) and 11% (winter) gave bus services as a facility used during their visit. This discrepancy could be explained by people arriving on foot and taking the bus home. For the sake of argument, we assume that approximately 10% of visitors use a local bus service. In a worst-case scenario, if visitor numbers drop by 50%, this could suggest a decline of about 23,000 bus passengers per year. Assuming approximately 40% of passengers pay half-fare (based on the age distribution of visitors in the survey) and counting full-fare for a return trip as £3, this could imply a reduction in bus fare income of approximately £55,200 per year. A reduction in visitors of 25% could imply a fall in bus fare income of £27,600 per year. However, the buses serve routes with other tourist attractions (for example the 13X timetable notes "The Tourist Trail bus serves attractions such as Paradise Park in Newhaven, Exceat Park Centre, Friston Forest, Seven Sisters Sheep Centre, Birling Gap and Beachy Head") and it is likely that some of the visitors arriving at and/or leaving Cuckmere by bus may also visit one or more of these attractions during a day out; the attractiveness of these features would not be affected by changes at Cuckmere and this suggests that the overall effect may be lower. Figures for the Cuckmere Valley Ramblerbus Service 47, show that out of a total of 4000 bus rides on this service between January 2010 and December 2010, 270 people got on or off



at Seven Sisters<sup>56</sup>. This represents approximately 7% of the total number of bus rides; a worst-case reduction of 50% in these bus users would mean a loss of a little over 100 passengers, which is unlikely to have a major impact on this community service.

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<sup>5</sup> Personal communication with the Cuckmere Community Bus Ltd.

<sup>6</sup> 128 users got off and 142 got on at Seven Sisters between January and December 2010, with 105 getting off and 113 getting on at Seven Sisters between April and September 2010.

## 6. Conclusions

The calculations presented above are clearly very approximate.

- They are based in the first place on a rough estimation of total visitor numbers per year.
- This number is then projected into the future under assumptions about changes in the access, habitat and visual aspects of the Cuckmere under the different management options, based on modelling carried out by Capita Symonds.
- Assumptions about attractiveness to visitors were derived from surveys. Mock-up views and descriptions based on the models were used in two surveys, one with previous visitors who had responded to the 2010 visitor survey, and one with a random group. Respondents were asked about their interest in visiting the area under these hypothetical future views.
- The results were used to derive assumptions about visit numbers under these different future 'views'.
- For each management option, we compared the possible evolution of the site over time (based on Capita Symonds modelling) with the static views presented in the surveys, and constructed a set of assumptions about visitor numbers over the future.
- These projected visitor numbers were converted to economic impacts using another very approximate figure, a net value to the economy per visitor of £4.35, based on the calculations carried out in phase 1 of the economics research.

It is important to realise that each of the above steps involves assumptions and approximations. In particular, there are substantial inherent uncertainties in trying to predict the impact of possible future changes on individual visitor behaviour. Therefore the final estimates of the changes in visitor values to the local economy must be seen as indicative ideas about possible impacts, not as firm predictions.

Nevertheless, comparing these ballpark figures with the cost estimates does lead to some reasonably safe conclusions.

Firstly, the high capital cost options, C, E and F, have a big up-front cost disadvantage. Any visitor benefits under these options are not enough to compensate for this initial cost, and the net present values are negative. Of the lower capital cost options, option B is also loss making, because it results in a landscape less favoured by visitors, and therefore brings no economic benefits.

The two options that do perform better than the baseline are options A and D. These are low (A) or zero (D) capital cost options, with broadly similar levels of maintenance costs. They result in a landscape considered by visitors to be about

as attractive as today's, and more attractive than that arising in time under 'do nothing'. These options return a positive net present value.

With the assumptions used here, option A (Partial breach managed realignment) performs slightly better than option D (Maintain the existing defences). However the difference is relatively small and, given the important uncertainties involved in the assessment, we can not say with any confidence which option would yield greater economic benefits.

It should also be noted that we have considered only the economic value to the Sussex area, arising from visitors to the Cuckmere and from agriculture in the area. There are of course many other arguments that should be taken into account alongside these economic factors, though these are beyond the scope of this particular report.

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