



Project part-financed by the European Union (European Regional Development Fund)



## 'Kilnsea Wetlands'

Measure analysis 35  
in the framework of the Interreg IVB project TIDE

S. Manson <sup>1</sup>, N. Pinnington <sup>2</sup>

<sup>1</sup> Environment Agency

<sup>2</sup> Halcrow - A CH2M Hill Company'

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Susan Manson  
Nancy Pinnington

Environment Agency, UK

<http://www.environment-agency.gov.uk/>

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## Part 1: Measure description

**Measure category:** Biology/Ecology

**Estuary:** Humber

**Salinity zone:** polyhaline zone

**Pressure:** Habitat loss and degradation during the last about 100 years: Intertidal

**Country:** United Kingdom

**Specific location:** Kilnsea Wetlands, Kilnsea, Humber Estuary

**Responsible Authority:** The Project is collaboration between the Environment Agency, Natural England, South Holderness Countryside Society and Yorkshire Wildlife Trust and guided by the Environment Agency, Natural England, Yorkshire Wildlife Trust, South Holderness Countryside Society, Spurn Bird Observatory and Local community representatives, including the chair of the Spurn, Kilnsea and Easington Area Local Studies (SKEALS) Group, the Clerk to Easington Parish Council, an elected member of Easington Parish Council and a local farmer who presently stocks and manages much of the pasture land in the area.

**Costs:** < 1,000,000€

**Measure technical factsheet (link):** N/A

**Downloads:** N/A

**Links:** N/A

**Map/Picture:**



Figure 1: Creation of the Kilnsea Wetlands



Figure 2: Creation of the Kilnsea Wetlands



Figure 3: Creation of the Kilnsea Wetlands





Figure 4: Kilnsea Wetlands being used by wetland birds

## 1.1 Description of the issue and measure

The Kilnsea Wetlands (the Wetlands) Site of Special Scientific Interest (SSSI) forms a constituent part of the Humber Estuary Special Protection Area (SPA) and Ramsar site and is located on a section of the rapidly eroding coastline on the Spurn Peninsula, between the villages of Easington, to the north, and Kilnsea, to the south (See Figure 1).

The Wetlands contain a variety of coastal habitat types and is designated as part of the SPA because it provides key functional habitat as a high tide roost for significant numbers of overwintering and migratory coastal wading birds, whilst also providing breeding grounds for little terns, a rare species with an endangered population at this site.

A study into the impact of coastal erosion at the Wetlands predicts that the barrier beach will recede, squeezing the Wetlands and the sand and shingle ridge against the line of the coastal flood defence. The study predicts that the habitats that support the internationally important coastal bird population found at the site will gradually deteriorate and will be lost within 30 years.

The Kilnsea Wetlands project was driven by the Humber Flood Risk Management Strategy (Humber FRMS) and associated Shoreline Management Plans (SMPs). The Humber Flood Risk Management Strategy and subsequent studies have set out the immediate need to provide replacement habitat for the coastal erosion losses at the Wetlands. The replacement fulfills a legal obligation under the Habitats Directive, as set out in Defra policy, to provide suitable habitat for critically endangered little



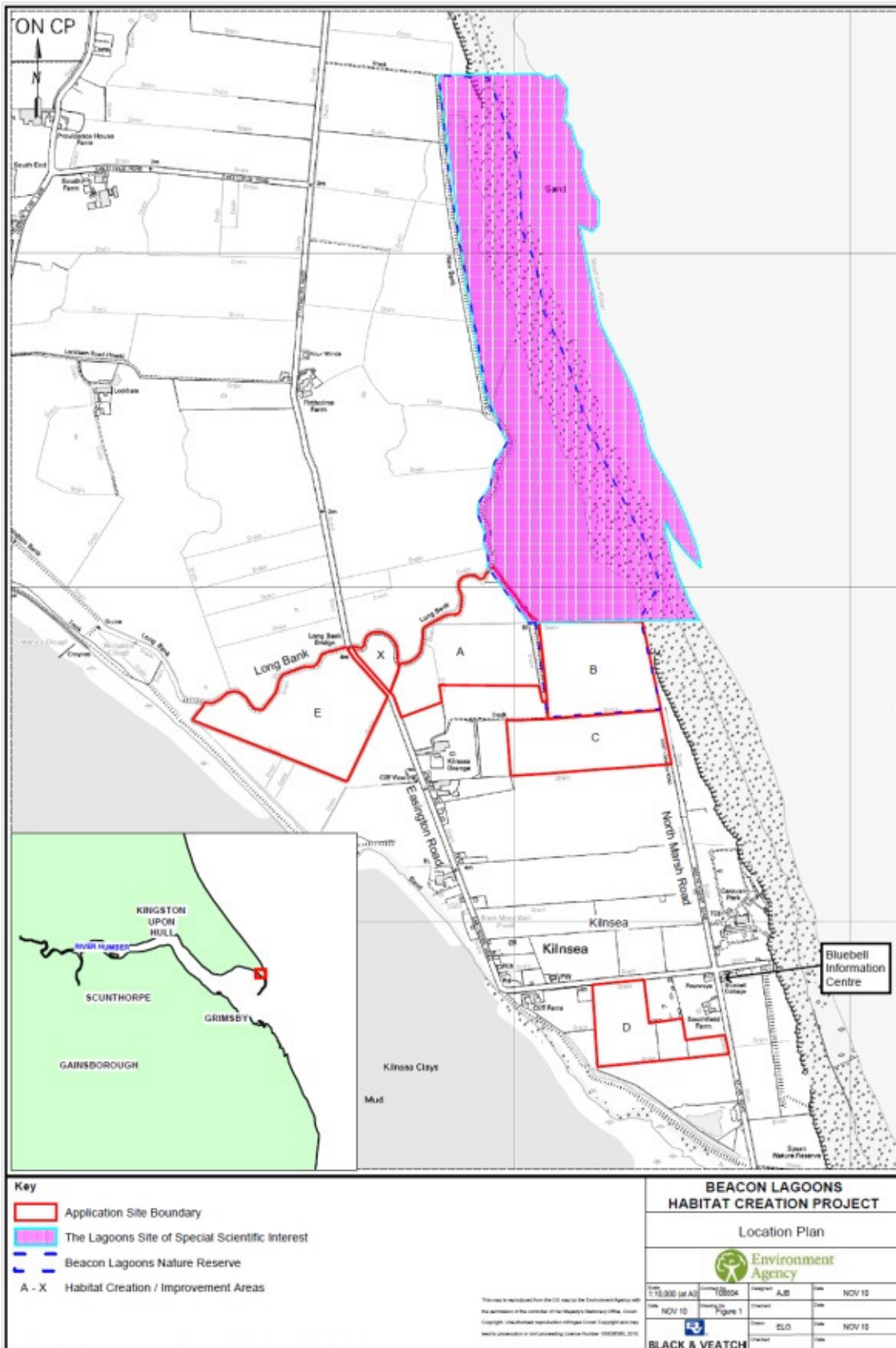
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terns at the site. It also meets Environment Agency Outcome Measure 4 targets by bringing 70ha of The Wetlands SSSI back into favourable condition, as well as providing 43ha of functional replacement coastal wetland habitat. Table 1 displays a summary of habitat creation and improvement measures by field compartment. The scheme also contributed to national and regional outcome Measure 5 targets through the creation of BAP habitat within minimal additional cost.

Table 1: Summary of habitat creation and improvement measures by field compartment

Area	Target Habitat Type	Habitat Are (ha)	Works Required
A	Freshwater scrapes & islands	7.4	Land forming to create water bodies Water level control structures (low level weirs) Break & block field drains Screen sources of disturbance with 1.5m high earth field bunds.
	Wet grassland with seasonal scrapes	3.3	
B	Saline scrapes, lagoons and islands	5.1	Lower sections of the redundant internal field bund to increase connection to the Wetlands.
	Wet grassland with seasonal scrapes	1.2	Break & block field drains Excavation to create ditches and foot drains Land forming to create scrapes
C	Saline scrapes	1.9	Break & block field drains Land forming to create scrapes
	Wet grassland with seasonal scrapes	5.8	
D	Wet grassland with seasonal scrapes	5.8	
E	Wet grassland with seasonal scrapes	11.6	
X	Wet grassland and pond	0.9	Excavation to create dipping pond (Reduce disturbance from Provision of new parking area)





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Figure 5: Displays the areas A to E in which the works are occurring in relation to the Kilnsea

## 1.2 Status of the measure

This measure substantially completed in December 2011, with minor ancillary works undertaken in early 2012, e.g. fencing for stock management.

## 1.3 Habitat Creation Area Description

### Habitat Creation Area A

This is a 10.7ha area of land presently in agricultural use as a mix of rough pasture and arable. The following works have been undertaken:

- Alteration to field drainage (breaking or blocking);
- Land forming works to create a freshwater lagoon approximately 3.8ha in area; shallow seasonally wet scrapes up to 0.2m in depth, which connect with deeper areas to form a single waterbody during wet periods; and a connecting ridge and furrow ditch system to hold water on the land. Islands of raised ground have been provided within the deeper areas of the Wetlands to provide areas for wading birds safe from predators. A new drain has been constructed along the southern boundary of this area to ensure that drainage of the agricultural land to the south is not affected, which connects with the existing ditch network at the drain that runs parallel to Easington Road. A new ditch and bund screen have also been provided along the southern (north of the new drain) and western boundary adjacent to Easington Road. The bund screen has been set back by a minimum of 10m from the highway boundary to maintain the line of sight along the road from the existing field access points;
- Installation of 0.3m high containment bunds, with inset overspill weirs to manage water levels and to divert excess water to the existing drainage network in controlled manner;
- Provision of stock proof fencing: the area will continue to be grazed by sheep or cattle or cut to keep vegetation short;
- Provision of a single storey bird hide of timber construction;
- New foot crossing over existing drain to give foot access into Habitat Creation Area A; and
- The existing agricultural access track from Easington Road, along the southern boundary of the area, has been retained.

Baseline studies identified a number of potential historical assets within or adjacent to Area A. In response to this issue, the design deliberately didn't propose any excavation within 20m of the outer boundary of these features, in order to minimise the risk of damage to, and further truncation of, these assets. Tracking of heavy machinery was similarly avoided within 20m of these assets.

### Habitat Creation Area B

This is a 6.3ha area comprising improved grassland in the areas landward of an internal field bund and dune grassland in areas seaward of an internal field bund. The area is adjacent to the southern boundary of the Wetlands SSSI and forms the most southerly component of the Kilnsea Wetlands Nature Reserve.

Discussions with Natural England and South Holderness Countryside Society, who presently own and manage the land, identified this was a potential area for biodiversity enhancement through the



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creation of a number of brackish and saline waterbodies. Creation of these waterbodies comprised works to:

- Lower sections of the redundant internal field bund to allow water from the seasonal tidal flooding of the Wetlands to enter an existing low point on the area to create a new saline lagoon;
- Excavation of a 1m deep and 1m wide ‘Haha’ adjacent to the southern perimeter of the new saline lagoon. This will prevent livestock entering the new lagoon area;
- Create a series of foot drains, a total of 3.0m wide and a maximum of 0.4m deep, with 30 degree slope to hold water on gently sloping land;
- Create two further waterbodies, of maximum depth 1.0m in the centre surrounded by shallower seasonally wet areas up to 0.4m deep, which collect rainwater and sea spray and are located in higher areas of land within the field;
- Excavate a series of linear ditches of 1.0m maximum depth, in addition to those already created by the South Holderness Countryside Society, adjacent to the southern field boundary;
- Minor works to break internal field drains; and
- Provision of stock proof fencing: the area will be grazed by sheep or cattle or cut to keep vegetation short.
- 

Baseline studies identified the potential existence of a barrow in the northwest corner of Area B. No excavation took place within 20m of the outer boundary of this feature in order to minimise the risk of damage to this asset. Tracking of heavy machinery was also similarly avoided within 20m of this asset.

### **Habitat Creation Area C**

This is a 7.7ha area of rough pasture, part of which is within the boundary of the Humber Estuary SSSI. Natural England has advised that the habitats and wildlife interest of this area can be enhanced. The proposed works comprised:

- Minor works to break internal field drains;
- Shallow land-forming to create a network 3 No. wetland scrapes. These are seasonal waterbodies, expanding and contracting dependent on the supply of water, with 0.7m deep permanently wet areas;
- Creation of new bund to a maximum height of 0.2m above existing ground level, using the material excavated to form the scrapes, to divert surface water away from the agricultural land to the south; and
- Provision of stock proof fencing: the area will continue to be grazed by sheep or cattle to keep vegetation short.

### **Habitat Creation Area D**

Area D is a 5.8ha parcel of improved grassland, recently acquired by the Yorkshire Wildlife Trust (YWT). YWT is managing the land to create wet grassland habitat for waders, but YWT has advised that the biodiversity interest of this land can be further enhanced by creating additional habitats. Works to create these habitats comprised:

- Shallow land-forming to create two seasonally wet shallow scrapes with an average depth of 0.25m;



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- Minor alterations to the existing field drainage comprising blocking/breaking or removal of internal field drains through excavation and backfilling of a ditch within the perimeter of the field, and replacement of a perforated pipe drain with a closed pipe drain; and
- Provision of stock proof fencing: the area will continue to be grazed by sheep or cattle to keep vegetation short.

### Habitat Creation Area E

This is a 13ha area of rough pasture land at Long Bank Marsh, which is managed for nature conservation by Natural England under a long-term lease agreement with Associated British Ports. The proposed works to create and improve habitats comprised:

- Minor drainage alteration works to make it wetter by breaking remaining field drains through excavation and backfilling of a slit trench around the perimeter of the field;
- Shallow land-forming to create a network 6 No. wetland scrapes, which will be seasonally wet up to a depth of 0.3m;
- Creation of ditch and bund screen in the east section of the field; and
- Provision of stock proof fencing: the area will continue to be grazed by sheep or cattle to keep vegetation short.

Figure 6 displays the Kilnsea Wetlands Habitat Creation Project Site Plan.

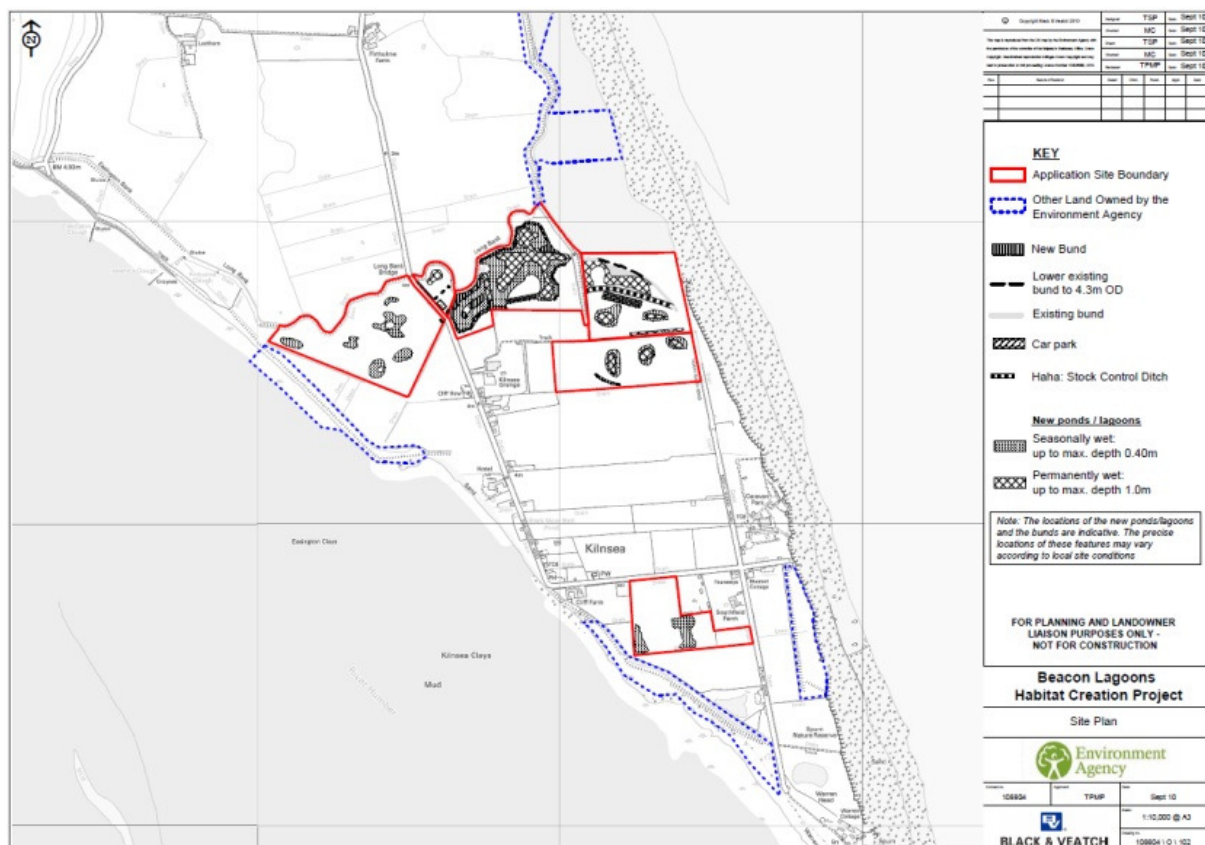


Figure 6: Displays the Kilnsea Wetlands Habitat Creation Project Site Plan.

## 1.4 Monitoring

Following discussion with Natural England it was proposed that monitoring of the sites, by the Spurn Bird Observatory, should be undertaken to provide data equivalent to that collected for the Humber Wetland Bird Survey (WeBS) counts at the Wetlands. The monitoring programme covered the migratory and wintering periods and considered the Wetlands and the new habitat creation areas in conjunction with each other.

There are also opportunities for additional monitoring to be undertaken by project partners, notably SHCS naturalists, to monitor land with respect to vegetation, entomology and conchology within Area B and potentially on other land areas within the habitat creation areas. This has not yet been undertaken as far as is known.



## Part 2: Execution of main effectiveness criteria

### 2.1 Impact on ecosystem services

#### Targeted Ecosystem services

The primary purpose of the Kilnsea Wetlands Habitat Creation Project was to provide habitat with vegetation characteristics and a landscape type to meet the “Favourable conditions status” targets set for the Humber Estuary SPA.

This is linked with ecosystem services ‘landscape maintenance’ and ‘biodiversity’, and also ‘flood water storage’ and ‘dissipation of tidal and river energy’. It also provides ‘opportunities for recreation and tourism’ through becoming a tourist and bird watching attraction.

Table 2: Targeted ecosystem services

Measure	
Food: animals	
Water for industrial use	
Water for navigation	
Climate regulation: carbon sequestration	
Regulation extreme events or disturbance: flood water storage	X
Regulation extreme events or disturbance: water current reduction	
Regulation extreme events or disturbance: Wave reduction	
Water quantity regulation: drainage of river water	
Water quantity regulation: dissipation of tidal and river energy	X
Water quantity regulation: landscape maintenance	X
Water quantity regulation: transportation	
Water quality regulation: transport of pollutants and excess nutrients	
Water quality regulation: reduction of excess loads coming from the catchment	
Erosion and sedimentation regulation by water bodies	
Erosion and sedimentation regulation by biological mediation	
"Biodiversity"	X
Aesthetic information	
Opportunities for recreation & tourism	X
Inspiration for culture, art and design	
Information for cognitive development	

#### Involved habitats

Intertidal mudflat, saltmarsh and grassland were created as a result of this measure.



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Table 3: Ecosystem service analysis for Kilnsea wetlands: Indication of habitat surface and quality change, i.e. situation before versus after measure implementation

MEASURE		before		after	
		surface (%)	Quality (1-5)	surface (%)	quality (1-5)
Marsh habitat	above mean high water, floods at spring tide	0	0	25	3
Intertidal steep habitat	floods every tide, mainly steep zones at marsh edges	0	0	32	3
Intertidal flat habitat	floods every tide, flat zones	0	0	0	0
Subtidal shallow habitat	never surfaces, less deep than 2m	0	0	0	0
Subtidal moderately deep habitat	never surfaces, 2m-5m	0	0	0	0
Subtidal deep habitat	never surfaces, deeper than 5m	0	0	0	0
ADJACENT LAND	NON FLOODED LAND	100	3	43	3
		100		100	

Quality
1 = very high quality
2 = high quality
3 = medium quality
4 = low quality
5 = very low quality

The measure Beacon Lagoons in the polyhaline zone of the Humber estuary was about the creation of intertidal habitat by transforming a part of the adjacent land into marshland and intertidal steep habitat with a moderately high change in the habitat quality.

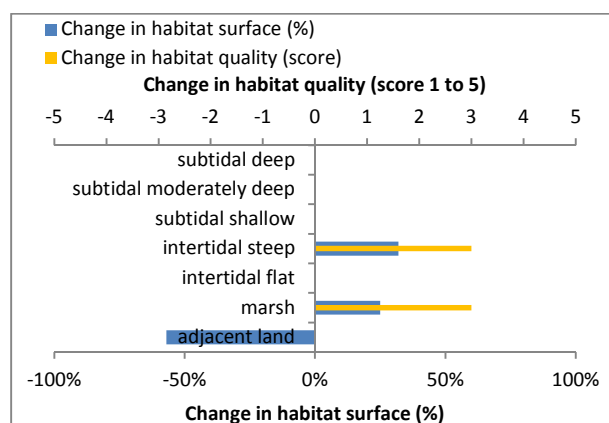


Figure 7: Ecosystem service analysis for Kilnsea Wetlands: Indication of habitat surface and quality change, i.e. situation before versus after measure implementation:

From the ES assessment it is concluded that this measure generates overall a slightly positive expected impact for many ES, mainly for:

- “biodiversity”
- Cultural services
- Some regulating services: Erosion and sedimentation regulation (by water bodies); Water quality regulation: reduction of excess loads coming from the catchment; Erosion and



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sedimentation regulation by biological mediation; Climate regulation: Carbon sequestration and burial; Regulation extreme events or disturbance: Wave reduction.

The expected impact for the development target “biodiversity” is slightly positive.

The expected impact for the different beneficiary groups is slightly positive for indirect and future use and for local and region use.

Table 4: Ecosystem services analysis for Beacon Lagoons: (1) expected impact on ES supply in the measure site and (2) expected impact on different beneficiaries as a consequence of the measure.

Beacon Lagoon		
Cat.	Ecosystem Service	Score
S	"Biodiversity"	1
R1	Erosion and sedimentation regulation by water bodies	1
R2	Water quality regulation: reduction of excess loads coming from the catchment	1
R3	Water quality regulation: transport of pollutants and excess nutrients	0
R4	Water quantity regulation: drainage of river water	0
R5	Erosion and sedimentation regulation by biological mediation	1
R6	Water quantity regulation: transportation	0
R7	Water quantity regulation: landscape maintenance	0
R8	Climate regulation: Carbon sequestration and burial	1
R9	Water quantity regulation: dissipation of tidal and river energy	0
R10	Regulation extreme events or disturbance: Wave reduction	1
R11	Regulation extreme events or disturbance: Water current reduction	0
R12	Regulation extreme events or disturbance: Flood water storage	0
P1	Water for industrial use	0
P2	Water for navigation	0
P3	Food: Animals	0
C1	Aesthetic information	1
C2	Inspiration for culture, art and design	1
C3	Information for cognitive development	1
C4	Opportunities for recreation & tourism	1

Beneficiaries:	
Direct users	0
Indirect users	1
Future users	1
Local users	1
Regional users	1
Global users	0

X Targeted ES

Legend: expected impact*	
3	very positive
2	positive
1	slightly positive
0	neutral
-1	slightly negative
-2	negative
-3	very negative

\*: Indicative screening based on ES-supply surveys and estimated impact of measures on habitat quality and quantity. Quantitative socio-economic conclusions require local supply and demand data to complement this assessment.

## 2.2 Degree of synergistic effects and conflicts according to uses

The replacement fulfills a legal obligation under the Habitats Directive and meets Outcome Measure 4 targets (for December 2010) to bring SSSI back in to favourable condition.





## Part 3: Additional evaluation criteria in view of EU environmental law

### 3.1 Degree of synergistic effects and conflicts according to WFD aims

Provision of new freshwater scrapes and lagoons, saline scrapes and wet grassland will provide new habitats.

Table 5: Main pressures of the polyhaline zone of the Humber estuary

Indicator	code	Main pressures polyhaline zone Humber	Effect?					Description
			--	-	0	+	++	
S.I.	1.1	Habitat loss and degradation during the last about 100 years: Intertidal				X		Development of intertidal habitat.
S.I.	1.5	Gross change of the hydrographic regime during the last about 100 years				X		Opportunity for additional space along the Humber Estuary.
S.I.	3.1/3.2	Decrease of water and sediment chemical quality				X		Intertidal habitat and wetlands have the potential to improve water and sediment quality.
D.I.	1.3	Land claim during the last about 100 years				X		Land given back to the Humber Estuary.
D.I.	1.7	Relative Sea Level Rise				X		Opportunity to provide natural defence against flooding in line with increased sea level rise.
D.I.	2.4	Maintenance dredging				X		Fewer requirements for dredging as sedimentation occurring through accretionary trends in intertidal and saltmarsh habitats.

S.I. = state indicator; D.I. = driver indicator

### 3.2 Degree of synergistic effects according to Natura 2000 aims

The Kilnsea Wetlands project fulfills a legal obligation under the Habitats Directive to provide replacement habitat, suitable habitat for critically endangered little terns at the site and also meets Environment Agency Outcome Measure 4 targets by bringing 70ha of the Wetlands SSSI back into favourable condition, as well as providing 43ha of functional replacement coastal wetland habitat.

Table 6: Conservation objectives concerning the BHD

Conservation objectives (Humber)	Specification	Effect?					Short explanation
		--	-	0	+	++	
Protected Estuary Habitats:	Freshwater and saline scrapes, wet grassland and lagoons.				X		Newly created intertidal habitat associated with a SSSI and returning existing SSSI habitat back into favourable condition.

## Part 4: Crux of the matter

The “crux of the matter” refers to the basic, central or critical point of an issue. For example, in this context, the main issues relating to the development and progression of the specific measure detailed within this FAS Repost represent the crux of the matter.

The Kilnsea Wetlands project provides replacement habitat for the coastal erosion losses at the Wetlands and fulfill a legal obligation under the Habitats Directive, as set out in Defra policy, to provide suitable habitat for critically endangered little terns at the site. It also meets Environment Agency Outcome Measure 4 targets by bringing 70ha of the Wetlands SSSI back into favourable condition, as well as providing 43ha of functional replacement coastal wetland habitat.

