Type 1

Bay and Estuary

These dynamic maritime seascapes lie at the interface of land and sea, comprising wide and expansive mudflats, sea, marshes and beaches. The coastal edges tend to be soft and low lying with only a narrow strip of more exposed coast with high cliffs south of St Bees.

The estuaries stretch well inland and strongly interact with other landscapes. The sheltered waters of the upper estuaries are fringed by salt marshes. Long expansive views across open sea mix with shorter views across tidally inundated sand and mudflats within the estuaries, Solway Firth and Morecambe Bay. Movement is provided by water and the flocks of waders and seabirds who use the environment as feeding grounds. The character changes with the tide, seasons and the weather.

This was formerly called Estuary and Marsh in the Cumbria Landscape Classification, 1995 and the Cumbria Wind Energy Supplementary Planning Document, 2007.

Sub types:

1a Intertidal Flats

1b Coastal Marsh

Sub type 1a

Intertidal flats

Location

These seascapes are found in Morecambe Bay, the Duddon Estuary and the Solway Firth.

Key Characteristics

- Dynamic landscape changing rapidly with daily tides and through cycles of erosion and deposition
- Mudflats, sands, shingle and pebble beaches contrast with open water
- Predominantly flat and open topography
- Vast uncluttered skies and horizons
- Significant ecological interest – large intertidal habitat for invertebrates forms internationally important roosting and feeding grounds for wading birds and wildfowl
- Cultural artifacts and historical routes or 'waths' across the sands enrich this landscape and strengthen a sense of the past
- Cockle fishing, Haaf netting and other fishing activities provide a human presence

Physical character

This sub type comprises of wide beaches and expanses of mudflats within the estuaries and bays that are exposed at low tide. At high tide they are covered in sea water.

The areas are underlain by Triassic and Permian mudstone with fine sands and silts and pebbles forming the intertidal flats. These are dynamic high energy seascapes, changing with the daily tides but also through the centuries by processes of erosion and deposition. Mudflats have greatly increased over the centuries following progressive siltation. Inflowing rivers carry little suspended sediment load. Sediments derive mainly from the Irish Sea. River channels are constantly shifting thus affecting the extent of the salt marshes and channels in Morecambe Bay. On the open coast the processes of long shore drift operate.

Small islands and low lying coastal edges frame the mud and sandflats.

Land cover and land use

At low tide mudflats predominate. The wide estuaries and bays are dissected by river channels that are constantly changing position. This is particularly the case in Morecambe Bay. Sometimes patches of strewn boulders (scaurs) or pebbles and exposed bedrock occur.

As the tide rises water channels fill and sand banks are revealed until they too are covered in sea water. A simple and expansive water body then fills the seascape to the seaward horizon until the tide begins to fall. The beaches comprise mud, sand, shingle and pebbles, the latter tending to form the upper foreshore where they are associated with increased gradient. These often support cockle and mussel beds, some of which are harvested commercially. These support feeding grounds for vast numbers of birds.

Man made features are virtually absent limited to small viaducts, causeways and piers projecting into the seascape. Undeveloped coastline, sea defences and towns and villages fringe the area and are associated with adjacent sea and landscapes. In places large offshore wind turbines form a prominent feature to the setting across the Irish Sea.

Ecology

The intertidal sand and mudflats of the Cumbrian coast are some of the most important wildlife habitats in the UK. The flats support huge numbers of invertebrates such as cockles, lugworms, sandhoppers, small pink

baltic tellin and mud snails. They also provide the main feeding grounds for internationally important numbers of wintering and passage waders and wildfowl. These include shelduck, pintail, oystercatcher, grey plover, dunlin, bar-tailed godwit, curlew and redshank. The flocks of wading birds are particularly noticeable on the coming tide when the beach area becomes progressively restricted.

Between Maryport and Silloth and along the outer shore of Walney boulder scars support mussel beds and reefs formed by colonies of the polychaete worm Sabellaria alveolata, the former providing feeding areas for eider duck, oystercatcher, turnstone and purple sandpiper.

Historic and cultural character

Throughout the county there is evidence relating to shipping and trade. Within the intertidal zone of Morecambe Bay there are a number of wrecks dating throughout history. The water logged conditions ensure excellent organic preservation, particularly of wood, leading to the survival of artefacts ranging from preserved prehistoric forests to fish traps.

The route across "Kent Sands", latterly "Morecambe Bay", was described by numerous writers including Ann Radcliffe, Elizabeth Gaskell in "The Sextons Hero", Edwin Waugh in "Over Sands to the Lakes", Melvyn Bragg in "The Maid of Buttermere" and in "The Lonsdale Magazine. It is too an area well documented through the work of artists including J.N.W Turner, David Cox, Thomas Sunderland. Poets such as Sir Walter Scott, William Wordsworth and Norman Nicholson have all been inspired by these landscapes.

Perceptual character

The unique attraction of this landscape centres on its dynamic nature with shifting patterns of texture, colour and play of light across its surfaces. The scene rhythmically changes with the tide from shimmering water to golden sands or shining silt. It has big skies and a mix of open panoramic uninterrupted seaward horizons and mountainous landward horizons to Scottish, Lakeland and Bowland fells.

The weather and tides often dictate the mood both at different times of day and through different seasons. A calm day may be tranquil and restful with gliding tides over smooth sands, a stormy day invigorating and dangerous with surging tides and dark expansive skies. Clouds cast shadow patterns adding to the dynamics of the landscape and windblown salt spray can fill the air. The shifting nature or the weather, tidal conditions and sands ensure people venture here with care. Tranquillity is enhanced by the expansive vistas, lack of people and the strong presence of birds and wildlife.

The majestic scale and openness of these landscapes can inspire a sense of freedom, remoteness and wildness, especially when looking out to uninterrupted views across the open sea. In other areas shorter views are gained across the Solway Firth, Duddon Estuary and Morecambe Bay providing a more intimate experience. The lack of development on the horizons reinforces these experiences.

Sensitive characteristics or features

The largely undeveloped horizons, naturalness and tranquillity of the wide open seas and mudflats contribute to its sensitivity. Daily inundation provides a feeling of wildness and remoteness which is sensitive to man made development. Nature conservation and birds reinforce the naturalness of area and is sensitive to significant changes in management and use. The large and expansive backdrop of the Lakeland and Scottish fells add to the drama of the area.

Vision

The open unspoilt qualities of these estuaries, bays and beaches and the rich variety of wildlife associated with them will be conserved. Statutory designations are currently in place protecting the vast array of important wildlife in these intertidal areas, and within estuaries for example, developments must be of high quality and meet strict tests laid down in the planning system. Major energy or other infrastructure will be carefully controlled and undergrounded where acceptable. A balance will be met between the protection and management of environmental interests and the sustainable growth of

fisheries, rural economies and settlements. There will be a response to the potential threat of flooding and coastal erosion reducing the landscape and ecological impacts of climate change and the environmental impacts of coastal and flood defence schemes will be balanced against the economic and social benefits to local communities and will recognise the dynamic characteristics of the areas.

Changes in the Landscape

Over the next 10 – 20 years this landscape could be subject to the following changes or issues:

Climate Change and Coastal Processes

- Natural processes in these highly dynamic areas will continue to shape and change their character.
- The threat of increased storminess and possibly sea level rise may change the natural processes of erosion and deposition. There could be the potential to damage dunes, highways and natterjack habitats (erosion), particularly in the Solway area.
- The introduction of new shoreline and flood risk management techniques to combat climate change could have major impacts on the coastline and adjacent farmland.
- Increases in rainfall and temperature could change habitats and species. More extreme run off events could possibly increase siltation levels.

Management Practices

- Pollution occurs in the form of marine rubbish and sewage which spoils beaches. Cockle or mussel fishing can directly affect birdlife on the mudflats through disturbance and indirectly by reducing the quality of their feeding areas.

Development

- Coastal protection and flood defence works should be considered in terms of their aesthetics and environmental sustainability. Managed retreat may be an option in places. In others the west coast rail line, roads and sea dykes may continue to form hard edged coastal protection.
- Development pressures include major infrastructure and energy infrastructure proposals, which can be highly intrusive particularly as the waters-edge naturally attracts attention and is a focal point. The need to develop renewable energy sources to help mitigate climate change could include tidal energy schemes and on and off shore large scale wind energy developments. These could have significant effects on natural coastal processes, habitats and the open seascape character.
- Extraction of sand and shingle along the foreshore and waste tipping has also affected natural processes.
- Natural dynamic processes of erosion and deposition are sensitive to the introduction of man-made coastal flood defences, which can increase erosion effects on adjacent soft unprotected coast.
- Litter and old industrial waste and spoil can be spread along the coast and have an unsightly effect on the beaches.

Access and Recreation

- The planned implementation, over the next decade, of enhanced access to the whole of the English coast could result in some disturbance to wildlife in sensitive locations at certain times of the year.

Guidelines

Climate Change and Coastal Processes

- Avoid the use of 'hard' defences against erosion along the outer soft coast favouring 'soft' accretion solutions. Within the estuaries flood defences such as sea dykes need to be carefully planned to minimise environmental damage and selectively protect the most ecologically valuable areas.
- Coordinate coastal protection approaches around the Cumbrian coast through the development of Shoreline Management Plans.
- Consider the scope for managed retreat of flood and coastal defences allowing reversion of farmland to marsh, mudflat or beach.

Coastal Features

- Actively manage the intertidal zone including the careful removal of marine rubbish along beaches avoiding damage to strandline vegetation.
- Provision of information and interpretation of wildlife and related interest.
- Ensure adequate regulation of commercial fishing for cockles and mussels to minimise disturbance to birdlife and damage to their feeding areas.
- Conserve and enhance historic sites through avoiding disturbance and removal of structures, levelling, excavation and tipping.

Development

- Avoid developments that damage features of ecological, archaeological or landscape interest or require long term protection through new coastal defences.
- Protect the more intimate character of inner estuaries from inappropriate development, particularly with regard to sites in adjacent landscapes.
- Retain open views across the intertidal flats, and to sensitive horizons, through the careful control, siting and design of infrastructure or energy developments.
- Ensure that the design and siting of all development is of a high standard which enhances its surroundings and habitats are carefully restored after construction.
- Ensure the development decisions respect long distance views to adjacent landscapes in the Lake District, Forest of Bowland and Dumfries and Galloway fells and within the Hadrian's Wall buffer zone.
- Encourage the deep burial of cables to reduce the need for vertical structures both in this and adjacent seascapes that form the backdrop to this type, especially the Solway Coast and Arnside and Silverdale AONBs, and the Hadrian's Wall buffer zone.

Access and Recreation

- In areas where coastal access will introduce new routes, appropriate access management may be needed in sensitive locations, at certain times of the year, to minimise disturbance to wildlife.

Sub type 1b

Coastal Marsh

Location

This sub type is found around Morecambe Bay, Walney Channel, Duddon Estuary and the Solway Firth.

Key Characteristics

- Salt marshes in sheltered parts of estuaries and bays
- Hedge topped sea dykes
- Closely grazed fine sward
- Creeks and channels form a dendritic pattern
- Higher marshes dissected by streams
- Sporadic scrub and remnant field hedges

Physical character

The geology is a mixture of Triassic mudstone, Carboniferous limestone, with some Silurian slates/ siltstones around the Duddon. Extensive areas of saltmarsh occur around the sheltered waters of the County's estuaries and bays. This is a dynamic seascape with the saltmarshes constantly changing size and location. There is accretion by sediment at high tides.

The seaward edge is characterised by a system of dendritic creeks and erosion cliffs up to 3m high. A series of terraces within the marshes can be related to isostatic uplift and creek migrations. Sections of creeks can be cut off leaving isolated sections of water known as pans or fleshes. River channels constantly cut new courses. The area of marsh can be considerably reduced or enlarged by the changing course of a river or inundation of the sea.

Land cover and land use

The marshes lie above the average daily tides. The higher the marsh, the less frequent is tidal inundation. This results in a transitional seascape character.

On the seaward edge, lower saltmarshes are characterised by a closely grazed fine sward etched by an intricate maze of creeks and channels in a dendritic pattern. This gives way to higher, older saltmarshes dissected by streams meandering towards the sea and frequently colonised by gorse scrub. The tide and streams have etched out an intricate and changing pattern of channels across a plain of seawashed turf. In the Solway Firth turf cut grooves add a linear regular pattern across the saltmarshes.

The marshes are essentially open except for patches of scrub and remnant field hedges on the higher marshes. The marshes are usually enclosed by manmade sea dykes. These provide a strong enclosure that contrasts with the open character of the marshes, particularly where they are topped by hedges which are left to grow taller to act as windbreaks.

Common grazing rights occur on some of the marshes where sheep and cattle wandering freely across them have been an essential feature for centuries. Other than the sea dykes, manmade elements are noticeably absent.

Ecological character

All the coastal marsh in Cumbria is of international ecological importance. The saltmarshes support a range of plants including glasswort, sea lavenders, sea aster, sea purslane and thrift. They provide feeding grounds for wildfowl and roosts for waders, including pink-footed geese, Bewick's swan, whooper swan, wigeon, teal, barnacle geese, curlew, knot, bar-tailed godwit, redshank, lapwing and golden plover. Peregrine falcon and merlin hunt over coastal grazing marsh during the winter months. Other birds breed on saltmarshes, including redshank, lapwing, black-headed gull and terns. Saltmarshes support a number of uncommon and rare invertebrates, whilst upper saltmarshes are important for natterjack toads and great-crested newts. The prolific birdlife on the marshes is an integral part of their character.

Historic and cultural character

The highly dynamic nature of the environment has resulted in the remains of former settlements being lost to the sea, as well as former marine features, such as quays, becoming land locked. The coastal marshes also contain the remains of salt pans.

William Wordsworth, amongst other local poets, took inspiration from the Duddon estuary. In 1307 Edward the first anticipated the invasion of Scotland. His strategy was to invade via the Solway Mosses. He died before the invasion took place at Burgh-by-Sands where today there stands a monument in his memory. In May 1568 Mary Queen of Scots fled the rebellion in Scotland and escaped by boat down the Solway Firth.

Perceptual character

The intrinsic beauty of this seascape type lies in its unspoilt simplicity, wildness and remoteness. The remote qualities are reinforced by birdlife and the presence of grazing stock complements the peaceful scene.
This landscape makes a valuable contribution to the wider seascape and has striking relationships with neighbouring landscape types. The open marshes and expansive mudflats and long horizons create a strong sense of space and freedom. The inner estuaries become more intimate with the protecting enclosure of land and fells. Here the simple flatness of the marshes contrasts dramatically with the verticality and complexity of the fells. The green colour of the marshes is a distinctive characteristic which contrasts with the grey and sandy colours of the estuary. Gorse scrub provides colourful contrasts on the landward edges of the marshes. The changing weather that can sweep across the adjacent estuaries and bays can switch from a calm and tranquil to an exposed and elemental experience.

Sensitive characteristics or features

The sheltered salt flats and intricate pattern of creeks lie adjacent to open flats/sea. The open and undeveloped nature makes them sensitive to development and significant changes to the largely undeveloped horizon. There is a high degree of naturalness and tranquillity and a feeling of wildness and remoteness that is also sensitive to development. The large number of birds reinforce the naturalness of the area and the habitats are sensitive to changes in sea dynamics, marsh management and fishery activities. The organic form and line along the coastal edge could be sensitive to hard realignment and changes in sea level and coastal dynamics. The large and expansive backdrop of the seas and Lakeland and Scottish fells could be sensitive to significant infrastructure development.

Vision

Conservation will be the main priority in this landscape of distinctive high landscape and ecological value. The restoration of drained agricultural land to saltmarsh will be encouraged, with some enhancement of coastal margins as changes in coastal flood defences come forward. The visitor experience within these landscapes will be enhanced and managed to reduce any impacts.

Changes in the Landscape

Over the next 10 – 20 years this landscape could be subject to the following changes or issues:

Climate Change and Coastal Processes

- The saltmarshes are in a constant cycle of erosion and deposition. They are added to by sediment following high tides and the same forces are continuously eroding them. The dramatic change in the extent and position of the saltmarshes over time is well illustrated in historical maps.
- Predictions of increased storminess and possibly sea level rise could have serious implications for the extent of low-lying saltmarshes, especially if hard sea defences prevent an inland retreat.
- Coordinate coastal protection approaches around the Cumbrian coast through the development of Shoreline Management Plans.
- Consider the scope for managed retreat of flood and coastal defences allowing reversion of farmland to marsh, mudflat or beach.
- The raising of sea dykes as part of the shoreline management process could destroy hedges and marsh habitat.

Development

- Energy infrastructure including tidal, large scale wind and pylons could be considered in the adjacent estuary and bay areas. These could have significant effects on natural coastal processes, habitats and the open seascape character.
- Major and medium scale development in adjacent landscapes including coastal defences, energy infrastructure, communication masts and caravan site extensions could compromise the remote qualities of these areas.

Management Practices

- The balance of saltmarsh grazing, by which sheep modify the vegetation to a close cropped turf, could be upset by changes in the grazing regimes. Turf cutting is a traditional management practice but if excessive can scar and erode the marshes.

Access and Recreation

- Without proper management recreation (and sea fisheries activities) can lead to localised visual intrusion of parked cars, erosion of the turf by vehicles particularly on the narrower more accessible saltmarshes and disturbance to birdlife and livestock from vehicles.
- The planned implementation, over the next decade, of enhanced access to the whole of the English coast could result in some disturbance to wildlife in sensitive locations at certain times of the year.

Guidelines

Climate change and Coastal Processes

- Any improvement of sea dykes needs to be carefully planned to minimise environmental damage whilst selectively protecting the most valuable farmland and residential areas.
- Economic and social benefits need to be carefully weighed against the likely environmental impacts of flood defence schemes including loss of dyke hedgerows and marshy habitats.
- Consider the re-creation of saltmarsh on land, which in the past has been reclaimed to agriculture, in instances where managed retreat of coastal defences is inevitable.

Coastal Features

- Conserve and enhance the marsh through the continuation of traditional grazing to maintain the open peaceful landscape qualities and maximise botanical and birdlife interest.
- Develop management programmes to provide optimum conditions for birds and to improve the variety of salt tolerant grasses and herbs.
- Resist commercial scale turf cutting or access by vehicles to prevent damage to the saltmarsh.

Development

- Protect the periphery of saltmarshes from the intrusion of large and medium scale development within neighbouring landscape types.
- Ensure large scale development does not cause significant harm to natural coastal processes and habitats.
- Resist the clutter and obstruction of views by minor development such as signs and fencing.
- Ensure that the design and siting of all development is of a high standard which enhances its surroundings and any saltmarsh habitat disturbed by construction is carefully restored.

Access and Recreation

- Improve information for visitors to encourage the protection of sensitive saltmarsh habitats and minimise wildlife disturbance.
- Ensure car parks and lay-bys are sensitively sited and well designed being appropriate in size and form.
- Where appropriate provide well-designed vehicle barriers around car parking areas to prevent erosion of the saltmarsh.
- Ensure that planning decisions support increased recreation provision that is compatible with the remote and wild qualities of these landscapes.
- Support improved coastal access through waymarking, gates, gaps, bridges and appropriate surfacing and encourage wardening around areas of wildlife sensitivity.
- In areas where coastal access will introduce new routes, appropriate access management may be needed in sensitive locations at certain times of the year, to minimise disturbance to wildlife.