DEPARTMENT OF ENERGY & CLIMATE CHANGE

# Appendices to the Habitats Regulations Assessment Site Report for Sellafield

EN-6: Revised Draft National Policy Statement for Nuclear Power Generation

**Planning for new energy infrastructure** **October 2010**

**Habitats Regulations Assessment of the revised draft Nuclear National Policy Statement**

Habitats Regulations Assessment (HRA) screening and Appropriate Assessment (AA) of the revised draft Nuclear NPS including potentially suitable sites, has been undertaken in parallel with the Appraisal of Sustainability (AoS). These strategic assessments are part of an ongoing assessment process that will continue with project level assessments. Applications to the IPC for development consent will need to take account of the issues identified and recommendations made in the strategic, plan level HRA/AA; and include more detailed, project level HRA as necessary.

**The Habitats Regulations Assessment is provided in the following documents:**

**HRA Non-Technical Summary**

**Main HRA Report of the revised draft Nuclear NPS**

- Introduction
- Methods
- Findings

**Annexes to the Main HRA Report: Reports on Sites**

- Site HRA Reports
- Technical Appendices

All documents are available on the website of the Department of Energy and Climate Change at www.energynpsconsultation.decc.gov.uk

This document is the Appendices to the HRA site report for Sellafield.

This document has been produced by the Department of Energy and Climate Change based on technical assessment undertaken by MWH UK Ltd with Enfusion Ltd and Nicholas Pearson Associates Ltd.

# Contents

# Appendix 1: European Site Characterisations

| Natura 2000 Site Identification | | | | |
|---|---|---|---|---|
| **Natura 2000 Designation** | **Radius (measured from central grid reference point, MAGIC)** | | | |
| | **5km** | **10km** | **15km** | **20km** |
| **SAC** | • None | • Drigg Coast<br>• River Ehen | • Wast Water<br>• Lake District High Fells | • River Derwent and Bassenthwaite Lake<br>• Borrowdale Woodland Complex |
| **SPA** | • None | • None | • None | • None |
| **Ramsar** | • None | • None | • None | • None |

All core site-specific information, unless otherwise stated, has been referenced from Natural England Sources (Natura 2000 Management Plans) (Nature on the Map) and the Joint Nature Conservation Committee website (Protected Sites).

# Natura 2000 Site Characterisations

**Special Areas of Conservation (SAC)**[1]

1. Drigg Coast
2. River Ehen
3. Wast Water
4. Lake District High Fells
5. River Derwent and Bassenthwaite Lake
6. Borrowdale Woodland Complex

**Special Protection Areas (SPA)**[2]

None

**Ramsar Sites**[3]

None

[1] **Special Areas of Conservation (SACs)** are classified under the Habitats Directive and provide rare and vulnerable animals, plants and habitats with increased protection and management.

[2] **Special Protection Areas (SPAs)** are classified under the Birds Directive to help protect and manage areas which are important for rare and vulnerable birds because they use them for breeding, feeding, wintering or migration. Together SAC's and SPA's make up the Natura 2000 series.

[3] **Ramsar sites** are designated under the Convention on Wetlands of International Importance. The broad objectives are to stem the loss and progressive encroachment on wetlands now and in the future. These are often coincident with SPA sites designated under the Birds Directive. Although RAMSAR sites are not considered part of the Natura 2000 network, they are treated the same way as Natura 2000 sites.

# Special Areas of Conservation

## Site Name: Drigg Coast

- **Location 032547W/542102N**
- **JNCC Site Code UK0013031**
- **Size: 1397.44 (ha)**
- **Designation: SAC**

| | Drigg Coast SAC |
|---|---|
| **Site Description** | Drigg is an example of a small, bar-built estuary on the north-west coast of England. It is fed by three rivers (the Irt, Mite and Esk) which discharge through a mouth that has been narrowed by large sand and shingle spits. The sediments within the estuary are largely muddy within the Rivers Irt and Mite, while those of the Esk are more sandy, particularly towards the mouth. There is a substantial freshwater influence in the upper reaches of all three rivers, with good development of associated animal communities. Within the site are some of the least-disturbed transitions to terrestrial habitats of any estuary found in the UK.<br><br>Drigg represents Atlantic decalcified fixed dunes (*Calluno-Ulicetea*) in north-west England. There are substantial areas of the habitat type, showing a wide range of ecological variation. Some areas are dominated by heather *Calluna vulgaris* and bell heather *Erica cinerea*. Within the dry dune heath are wetter areas in which cross-leaved heath *Erica tetralix* is prominent. There are large areas of acidic dune grassland with a prominent lichen component and also areas where sand sedge *Carex arenaria* grows in carpets of the moss *Racomitrium canescens*.<br><br>Drigg contains a number of dunes with *Salix repens* ssp. *argentea*. These span a range of hydrological conditions from very wet to relatively dry. The slacks also grade into more acidic 2190 Humid dune slacks with some interesting intermediate types. This site is representative of dunes with *Salix repens* ssp. *argentea* in north-west England. |

<table>
<tr><th></th><th>Drigg Coast SAC</th></tr>
<tr><td></td><td></td></tr>
<tr><td>Qualifying Features</td><td>Annex I habitats that are a primary reason for selection of this site<br>1130 Estuaries<br>2150 Atlantic decalcified fixed dunes (Calluno-Ulicetea) * Priority feature<br>2170 Dunes with Salix repens ssp. argentea (Salicion arenariae)<br><br>Annex I habitats present as a qualifying feature, but not a primary reason for selection of this site<br>1140 Mudflats and sandflats not covered by seawater at low tide<br>1310 Salicornia and other annuals colonising mud and sand<br>1330 Atlantic salt meadows (Glauco-Puccinellietalia maritimae)<br>2110 Embryonic shifting dunes<br>2120 Shifting dunes along the shoreline with Ammophila arenaria (`white dunes`)<br>2130 Fixed dunes with herbaceous vegetation (`grey dunes`) * Priority feature<br>2190 Humid dune slacks</td></tr>
<tr><td>Conservation Objectives</td><td>Subject to natural change, maintain the estuaries in favourable condition, in particular:<br>• Intertidal mudflat and sandflat communities<br>• Saltmarsh communities<br>• Boulder and cobble scar communities</td></tr>
<tr><td>Component SSSIs</td><td>Component SSSI (27 units) condition status<br><br>
<table>
<tr><th>SAC component site</th><th>Favourable</th><th>Unfavourable recovering</th><th>Unfavourable no change</th><th>Unfavourable declining</th><th>Destroyed, part destroyed</th></tr>
<tr><td></td><td>90.12%</td><td>3.07%</td><td>4.53%</td><td>2.27%</td><td>0.00%</td></tr>
</table>
</td></tr>
<tr><td>Key Environmental Conditions (factors that</td><td>• Maintain morphological equilibrium of the estuary, including sedimentation patterns<br>• Maintain temperature and salinity levels within natural range</td></tr>
</table>

| | Drigg Coast SAC |
|---|---|
| **maintain site integrity)** | • Avoidance of pollution<br>• Avoidance of nutrient enrichment<br>• Appropriate grazing of saltmarsh communities<br>• No physical constraints to natural migration of mobile habitats such as dunes<br>• Maintain minimal impact of fishing, bait digging and dredging<br>• High enough water table for dune slacks<br>• Avoidance of damaging levels of erosion from human activities<br>• No increase in organic matter in sediments<br>• No physical constraints to managed realignment if required in response to coastal squeeze<br>• Control of bracken/ scrub<br>• Control of invasive and/or non-native species<br><br>(Habitats Regulations Assessment of the North West Regional Spatial Strategy, September 2008 Consolidated Report Prepared for the Government Office for the North West) |
| **SAC Condition Assessment** | See SSSI condition status |
| **Vulnerabilities (includes existing pressures and trends)** | The estuary and sand dunes systems are still relatively 'natural' and there is no threat at present of any development that may affect estuarine processes. Much of the sand dune area is under Countryside Stewardship Agreements or managed as a Cumbrian Wildlife Trust Reserve. The vulnerability of the marine site will be further identified through English Nature's work to develop and promote the necessary conservation measures for UK marine SACs. English Nature has developed guidance on setting and reviewing conservation objectives, identified key human activities which may affect Annex I and Annex II interests, identified the necessary survey management and monitoring systems, and increased the awareness of those most closely involved in the use and management of marine SACs. English Nature's advice under Regulation 33 has been issued and a brief management scheme statement drafted.<br><br>Vulnerabilities for the interest features of the Drigg Coast European marine site are listed below. |

| | Drigg Coast SAC |
|---|---|
| | **Physical loss**<br>All the sub-features are sensitive to physical loss, particularly through removal. Removal of saltmarshes may occur through direct land claim, coastal construction, and, for the boulder and cobble scar communities, through the harvesting of species such as mussels. Coastal development could create a barrier to the inland expansion of saltmarsh in response to sea level rise, and thus may result in loss of the important transitions to terrestrial habitats which currently occur on the Drigg Coast European marine site. Changes to coastal processes can alter the tidal regime, which may also result in the loss of elements of the estuary complex. Whilst such activities have occurred on the site in the past and have affected the condition of the features, for example depletion of mussel populations, currently the sub-features of the site are not exposed to activities resulting in their physical loss, and hence are not currently considered to be vulnerable.<br><br>**Physical damage**<br>The boulder and cobble scars with mussel beds are highly sensitive to physical damage through siltation. These epifaunal communities can be damaged by siltation of fine material which may clog their feeding or respiratory structures. However the current exposure to siltation within the estuary is low, and hence the vulnerability score of estuaries to this form of operation is low.<br><br>**Toxic contamination**<br>Both intertidal mudflat and sandflat communities and boulder and cobble scar communities are highly sensitive to toxic contamination from introduction of synthetic and non-synthetic compounds such as PCBs and heavy metal based compounds. Saltmarsh communities are highly sensitive to the introduction of nonsynthetic compounds. Such contaminants may have lethal or sub-lethal effects on marine organisms and this will vary according to the state and availability of the compound and the characteristics of the organisms of the receiving systems. Lethal effects can remove more pollution sensitive individuals and species, leaving pollution tolerant and opportunistic species. Sub-lethal effects may alter functions of organisms such as reproduction, physiology, genetics and health which will ultimately reduce their fitness for survival (Elliot and others 1998). Sheltered low energy |

| | Drigg Coast SAC |
|---|---|
| | areas such as estuaries tend to concentrate these pollutants which bind to fine particles and settle out onto mudflats and sandflats. Current exposure to toxic contamination within the Drigg Coast European marine site is low and hence the vulnerability is currently considered to be low. The Drigg Coast European marine site (the estuary at Ravenglass) is an area where fine sediments are deposited on the sheltered, low energy inter-tidal mudflats and the peripheral saltmarshes. It is known that such fine sediments have an enhanced capacity to adsorb radionuclides discharged to sea (for example from Sellafield) (IAEA, 1985; Cole and others 1999). These habitats are, therefore, areas of increased radiation exposure from external sources. The local organisms can also accumulate the radionuclides either in association with ingested sediments or by metabolic incorporation into tissues (MAFF, 1999) leading to internal radiation exposure. The magnitude of the potential effects is dependent on the level of contamination. Historic radionuclide discharges from Sellafield (Woodhead, 1984, 1986) have resulted in increased levels of radionuclides in some locations of the north-east Irish Sea. Recent reviews have been published on the effects of increased radiation exposure on wild organisms, including effects on mortality rate, reproductive capacity and mutation rate (IAEA, 1992; UNSCEAR, 1996). These indicate that, on the basis of current understanding, and for those organisms where we have reliable radiation exposure information, the existing levels of contamination should not give rise to effects on populations in the Irish Sea.<br><br>**Non-toxic contamination**.<br>Intertidal mudflat and sandflat communities are sensitive to nutrient and organic enrichment. An increase in the nutrient loading within the estuary, as a result of, for example, domestic sewage discharges, can result in increased growth of algae and phytoplankton. Increased levels of opportunistic algae such as *Enteromorpha* spp. may result in algal mats, with anoxic conditions in the sediment beneath the algal mats, and consequent reduction in diversity and abundance of infauna (Simpson, 1997). Increased organic material content of the water column and sediments can also result in reduced oxygen levels due to the increased activity of aerobic bacteria which break down organic material. This can have knock-on effects for marine animals which require oxygen for |

| | Drigg Coast SAC |
|---|---|
| | their healthy functioning. Given the current exposure of the estuary sub-features to nutrient enrichment, they are currently considered to be moderately vulnerable to this operation.<br><br>**Biological disturbance**<br>Saltmarsh communities are sensitive to biological disturbance in the form of expansion of the invasive species cord grass *Spartina anglica*. This species currently occurs in very small amounts on the site, probably spread from elsewhere, and its current distribution within the site appears to be stable. However, given the right conditions, it can be a robust and aggressive plant, and there are concerns about any increases in its distribution on the site. |
| **Landowner/ Management Responsibility** | English Nature (Natural England), Cumbrian Wildlife Trust, Environmental Stewardship Agreements |
| **HRA/AA Studies undertaken that address this site** | • Habitats Regulations Assessment of the North West Regional Spatial Strategy, September 2008 Consolidated Report Prepared for the Government Office for the North West<br>• Habitat Regulations Assessment: Cumbria Wind Energy – Supplementary Planning Document (SPD), revised June 2007 see details: http://www.cumbria.gov.uk/elibrary/Content/Internet/538/755/2789/39435142953.pdf<br><br>Concluded that significant effects on European sites are possible according to this document although little explanation is given.<br><br>• Habitat Regulations Assessment: Cumbria Minerals and Waste Development Framework: Submission Draft Core Strategy and Generic Development Control Policies: Details: http://www.cumbria.gov.uk/elibrary/Content/Internet/538/755/1929/39518145940.pdf<br><br>Significant effects of the Cumbria MWD Framework on Drigg Coast SAC are assessed as possible. |

## Site Name: River Ehen

- **Location 032951W/ 543055N**
- **JNCC Site Code UK0030057**
- **Size: 24.39 (ha)**
- **Designation: SAC**

<table>
<tr><th></th><th>River Ehen SAC</th></tr>
<tr><td>Site Description</td><td>The River Ehen supports the largest freshwater pearl mussel Margaritifera margaritifera population in England. Exceptionally high densities (greater than 100 $m^2$) are found at some locations, with population estimates for the entire river exceeding 100,000. The conservation importance of the site is further enhanced by the presence of juvenile pearl mussels, indicating recruitment since 1990.</td></tr>
<tr><td>Qualifying Features</td><td>Annex II species that are a primary reason for selection of this site:<br>1029 Freshwater pearl mussel Margaritifera margaritifera<br><br>Annex II species present as a qualifying feature, but not a primary reason for site selection:<br>1106 Atlantic salmon Salmo salar</td></tr>
<tr><td>Conservation Objectives</td><td>At the time of preparing this HRA report, the conservation objectives for this site had not been published.</td></tr>
<tr><td>Component SSSIs</td><td>Component SSSI (2 units) condition status<br><br>
<table>
<tr><th>SSSI Component Sites</th><th>Favourable</th><th>Unfavourable recovering</th><th>Unfavourable no change</th><th>Unfavourable declining</th><th>Destroyed, part destroyed</th></tr>
<tr><td>River Ehen</td><td>0.00%</td><td>0.00%</td><td>100.00%</td><td>0.00%</td><td>0.00%</td></tr>
</table>
</td></tr>
<tr><td>Key Environmental Conditions (factors that</td><td>• Avoidance of water pollution (for example sheep dip)<br>• Maintenance of natural course of river</td></tr>
</table>

| | River Ehen SAC |
|---|---|
| **maintain site integrity)** | • Maintenance of sufficient flow<br>• Avoidance of nutrient enrichment<br>• Control of invasive and/or non-native species<br>• No physical barriers to fish migration<br>• Control of angling/netting; no pearl mussel fishing<br>• Controlled introductions of fish<br>• Clean gravel/hard rock substrate in some areas, silt and sand in others<br>• Low suspended solids (less than 10mg/l)<br>• Cool, soft water, well oxygenated<br>• Minimum disturbance to mussels by walking in river<br><br>(Habitats Regulations Assessment of the North West Regional Spatial Strategy, September 2008 Consolidated Report Prepared for the Government Office for the North West) |
| **SAC Condition Assessment** | See SSSI condition status |
| **Vulnerabilities (includes existing pressures and trends)** | Freshwater Pearl Mussels are likely to be adversely affected by the apparent decline in salmonid fish populations and by major eutrophication of the river from sewage works and agricultural run-off. Water quality issues are addressed through the review process under the Habitats Regulations and at a catchment level by local Environment Action Plans. Practices associated with sheep-dipping pose a potential threat at this site, and are currently under investigation. Further research is required to determine the extent of any problems arising from pearl fishing. Possible concerns over the flows within the river will also be addressed through reviews of abstraction licences where these are considered to be causing a problem.<br><br>Freshwater Pearl Mussels declines have been attributed to:<br>i) changes in the physical and chemical conditions of their habitat (for example. poor water quality, including nutrient enrichment; sedimentation caused by catchment overgrazing, forestry activities and other land management practices; acidification, exacerbated by conifer afforestation; habitat removal and alteration through drainage schemes, flow |

| | River Ehen SAC |
|---|---|
| | regulation and fisheries management);<br>ii) amateur pearl fishing, aided by improved accessibility; and;<br>iii) a decline in the numbers of juvenile salmon and trout, which provide the hosts for pearl mussel larvae. |
| **Landowner/ Management Responsibility** | Unknown / private |
| **HRA/AA Studies undertaken that address this site** | • Habitats Regulations Assessment of the North West Regional Spatial Strategy, September 2008 Consolidated Report Prepared for the Government Office for the North West<br>• Habitat Regulations Assessment: Cumbria Wind Energy – Supplementary Planning Document (SPD), revised June 2007 see details: http://www.cumbria.gov.uk/elibrary/Content/Internet/538/755/2789/39435142953.pdf<br><br>Concluded that significant effects on European sites are possible according to this document although little explanation is given.<br><br>• Habitat Regulations Assessment: Cumbria Minerals and Waste Development Framework: Submission Draft Core Strategy and Generic Development Control Policies: Details: http://www.cumbria.gov.uk/elibrary/Content/Internet/538/755/1929/39518145940.pdf<br><br>Significant effects of the Cumbria MWD Framework on River Ehen SAC are assessed as possible. |

## Site Name: Wast Water

- **Location 031721W/ 542638N**
- **JNCC Site Code UK0030063**

- **Size: 286.21 (ha)**
- **Designation: SAC**

<table>
<tr><th></th><th>Wast Water SAC</th></tr>
<tr><td>Site Description</td><td>Wast Water is a relatively large and deep example of an oligotrophic waterbody (Type 3) in the Lake District, north-west England. Except for a small portion on Eskdale granite, Wast Water lies entirely on Borrowdale Volcanics rocks, and rocky substrates predominate along 73% of its shoreline. The submerged macrophyte communities of Wast Water are typical of oligotrophic lakes. Species such as bulbous rush Juncus bulbosus, quillwort Isoetes lacustris, shoreweed Littorella uniflora, awlwort Subularia aquatica and stoneworts Nitella spp. are known to occur. Least bur-reed Sparganium natans and floating bur-reed Sparganium angustifolium occur in more sheltered bays and are more typical of mesotrophic situations. Blunt-leaved pondweed Potamogeton obtusifolius has been recorded and bog pondweed P. polygonifolius occurs in the stream outlets. The macro-invertebrates of Wast Water are typical, including gastropod species (wandering snail Lymnaea peregra and river limpet Ancylus fluviatilis), the leech Erpobdella octoculata and the triclad Polycelis nigra. Arctic charr Salvelinus alpinus occur in the lake.</td></tr>
<tr><td>Qualifying Features</td><td>Annex II species that are a primary reason for selection of this site<br><br>3130 <u>Oligotrophic to mesotrophic standing waters with vegetation of the Littorelletea uniflorae and/or of the Isoëto-Nanojuncetea</u></td></tr>
<tr><td>Conservation Objectives</td><td>At the time of preparing this HRA report, the conservation objectives for this site had not been published.</td></tr>
<tr><td>Component SSSIs</td><td>SSSIs including condition status:<br><br>
<table>
<tr><th>SSSI Component Sites</th><th>Favourable</th><th>Unfavourable recovering</th><th>Unfavourable no change</th><th>Unfavourable declining</th><th>Destroyed, part destroyed</th></tr>
</table>
</td></tr>
</table>

<table>
<tr><th></th><th colspan="6">Wast Water SAC</th></tr>
<tr><td></td><td colspan="6"><table>
<tr><td>Wasdale Screes</td><td>0.00%</td><td>100.00%</td><td>0.00%</td><td>0.00%</td><td>0.00%</td></tr>
<tr><td>Wast Water</td><td>100.00%</td><td>0.00%</td><td>0.00%</td><td>0.00%</td><td>0.00%</td></tr>
<tr><td>Greendale Mires</td><td>0.00%</td><td>100.00%</td><td>0.00%</td><td>0.00%</td><td>0.00%</td></tr>
</table></td></tr>
<tr><td>Key Environmental Conditions (factors that maintain site integrity)</td><td colspan="6">• Absence of water pollution<br>• Absence of atmospheric pollution<br>• Maintain poor to moderate nutrient levels<br>• Maintain current range of fluctuations in lake levels (in particular avoiding excessive drawdown in summer months)<br><br>(Habitats Regulations Assessment of the North West Regional Spatial Strategy, September 2008 Consolidated Report Prepared for the Government Office for the North West)</td></tr>
<tr><td>SAC Condition Assessment</td><td colspan="6">See SSSI condition status</td></tr>
<tr><td>Vulnerabilities (includes existing pressures and trends)</td><td colspan="6">There are no known threats, human pressures or otherwise, which will adversely affect the water quality of Wast Water. British Nuclear Fuels Limited abstracts water from the lake for the existing Sellafield site, but it is not thought that present rates of abstraction adversely affect the special interest.</td></tr>
<tr><td>Landowner/ Management Responsibility</td><td colspan="6">Private ownership, United Utilities, National Trust and Forestry Commission</td></tr>
<tr><td>HRA/AA Studies undertaken that address this site</td><td colspan="6">• Habitats Regulations Assessment of the North West Regional Spatial Strategy, September 2008 Consolidated Report Prepared for the Government Office for the North West<br>• Habitat Regulations Assessment: Cumbria Wind Energy – Supplementary Planning Document (SPD), revised June 2007 see details: http://www.cumbria.gov.uk/elibrary/Content/Internet/538/755/2789/39435142953.pdf<br><br>Concluded that significant effects on European sites are possible according to this document although little explanation is given.</td></tr>
</table>

| | Wast Water SAC |
|---|---|
| | • Habitat Regulations Assessment: Cumbria Minerals and Waste Development Framework: Submission Draft Core Strategy and Generic Development Control Policies: Details: http://www.cumbria.gov.uk/elibrary/Content/Internet/538/755/1929/39518145940.pdf<br><br>No significant effects of the Cumbria MWD Framework on Wast Water are anticipated. |

## Site Name: Lake District High Fells

- **Location 030451W/ 544034N**
- **JNCC Site Code UK0012960**
- **Size: 26999.36 (ha)**
- **Designation: SAC**

| | Lake District High Fells SAC |
|---|---|
| **Site Description** | Lake District High Fells has many upland tarns throughout, representing the habitat type in the uplands of north-west England. The tarns are typically species-poor, but species occurring throughout include water-starwort *Callitriche hamulata*, quillwort *Isoetes lacustris*, shoreweed *Littorella uniflora*, water lobelia *Lobelia dortmanna* and floating bur-weed *Sparganium angustifolium*. Awlwort *Subularia aquatica*, a locally rare species, occurs in Sprinkling and Styhead Tarns (Scafell Pikes), Dock and Blea Tarns (Armboth Fells). The rare powan *Coregonus lavaretus* (locally called 'schelly') occurs in Red Tarn in Helvellyn and Fairfield.<br><br>Lake District High Fells is representative of wet heath in the uplands of north-west England. The habitat generally occurs throughout the complex in a mosaic of other habitats such as 7130 Blanket bogs and 4030 European dry heaths. Armboth Fells, Shap Fells, Skiddaw Group and the Buttermere Fells have good examples of M15 *Scirpus cespitosus – Erica tetralix* wet heath characteristic of the north and west. Shap Fells also has an area of M16 *Erica tetralix – Sphagnum compactum* wet heath. Heather *Calluna vulgaris* is dominant, with cross-leaved heath *Erica tetralix* and *Sphagnum* species. Purple moor-grass *Molinia caerulea* can be locally abundant.<br><br>The Lake District High Fells complex is representative of European dry heaths in north-west England. The site comprises of acidic rocks, predominantly of the Borrowdale Volcanic Series and Skiddaw Slates. Dry heath occurs throughout the site, and it is very extensive on a number of component SSSI such as Buttermere Fells, Skiddaw Group, Armboth Fells and to a lesser extent |

| | Lake District High Fells SAC |
|---|---|
| | Pillar and Ennerdale Fells. Smaller areas are found throughout the other sites. The principal NVC types present is H12 *Calluna vulgaris* – *Vaccinium myrtillus* heath, however at higher altitudes the subalpine H18 *Vaccinium myrtillus* – *Deschampsia flexuosa* heath is present. There are good transitions to 4060 Alpine and Boreal heaths and grasslands on many sites. Smaller amounts of H9 *Calluna vulgaris* – *Deschampsia flexuosa* and H10 *Calluna vulgaris* – *Erica cinerea* heath and H21 *Calluna vulgaris* – *Vaccinium myrtillus* – *Sphagnum capillifolium* heath are found at Scafell Pikes and Pillar and Ennerdale Fells. Heather *Calluna vulgaris* and locally bilberry *Vaccinium myrtillus* are the dominant species present. Associated species include cowberry *V. vitis-idaea*, and locally bearberry *Arctostaphylos uva-ursi* and crowberry *Empetrum nigrum*. Pillar and Ennerdale Fells is bryophyte-rich with a number of oceanic species present including *Anastrepta orcadensis*, *Herbertus aduncus*, *Bazzania tricrenata*, *Lepidozia pearsonii* and *Ptilidium ciliare* in higher altitude dry heath. Dwarf juniper *Juniperus communis* ssp. *nana* is found in some of the heaths on Buttermere Fells.<br><br>Alpine and boreal heaths form an important component of the Lake District High Fells. Whilst they cannot be compared to those of the Scottish Highlands in terms of diversity and development they are an important geographical element, representing some of the most southerly examples of this vegetation type in Britain. The main NVC type present is H19 *Vaccinium myrtillus* – *Cladonia arbuscula* heath, a very local type south of Scotland. H19 tends to occur on the steeply-sloping, less-exposed ground below some of the summits of the Fells, mainly within the Buttermere Fells and Skiddaw Group. There are good transitions to the subalpine heath community H18 *Vaccinium myrtillus* – *Deschampsia flexuosa* heath and at lower altitudes to H12 *Calluna vulgaris* – *Vaccinium myrtillus* heath, as well as to U10 *Carex bigelowii* – *Racomitrium lanuginosum* alpine grasslands on the summits.<br><br>The Lake District High Fells represents *Juniperus communis* formations on upland acid substrates in north-west England. Three of the component upland SSSIs have extensive areas of juniper *Juniperus communis*, whilst scattered juniper occurs on many of the inaccessible cliffs and slopes throughout the complex. The NVC type is W19 *Juniperus communis* ssp. communis – *Oxalis* |

| | Lake District High Fells SAC |
|---|---|
| | *acetosella* juniper woodland. Birk Fell supports the most extensive stand of juniper in the Lake District. The juniper is associated with open silver birch *Betula pendula* woods with scattered rowan *Sorbus aucuparia*, ash *Fraxinus excelsior*, bird cherry *Prunus padus*, holly *Ilex aquifolium*, hawthorn *Crataegus monogyna* and dog rose *Rosa canina*. Bracken *Pteridium aquilinum* or fescue – bent grassland with bryophytes and wood sorrel *Oxalis acetosella* predominate over the woodland floor, although locally there are richer areas. There are good transitions to upland oak woodland and upland habitats such as dry heath and blanket bog. Helvellyn and Fairfield and Skiddaw Group support extensive stands of juniper. Associated species here include ash *F. excelsior*, sessile oak *Quercus petraea*, birch *B. pendula* and rowan *S. aucuparia*. The ground flora is either *Nardus* – *Festuca* – *Agrostis* grassland or dry heath.<br><br>Siliceous alpine and boreal grasslands are widely distributed through the Lake District High Fells above 0.7km. The acidic rocks are of the Borrowdale Volcanic series and Skiddaw Slates. Some of the summits (particularly Helvellyn and Skiddaw) have frequent areas of disturbed ground due to frost-heave and solifluction. The NVC type present is the species-poor U10 *Carex bigelowii* – *Racomitrium lanuginosum* moss-heath. Wavy hair-grass *Deschampsia flexuosa* and sheep's fescue *Festuca ovina* dominate the sward, with bilberry *Vaccinium myrtillus*, woolly fringe-moss *Racomitrium lanuginosum*, stiff sedge *Carex bigelowii*, fir clubmoss *Huperzia selago* and the lichens *Cladonia uncialis*, *C. coccifera*, *C. squamosa*, *C. subcervicornis*, *Cornicularia aculeata* and *Cetraria islandica*. Dwarf willow *Salix herbacea*, *R. lanuginosum* and alpine clubmoss *Diphasiastrum alpinum* can be locally abundant, the latter particularly where there is late snow-lie.<br><br>This site is representative of hydrophilous tall herb fringe communities in England. Although the communities are not as rich in species as high-altitude sites in the Scottish Highlands, a representative montane flora is present including a number of rare arctic-alpine species. The Lake District High Fells include the largest continuous areas of land above 0.76km in the Lake District. Rocks of the Borrowdale Volcanic Series form the underlying geology of much of the area. Although these rocks are generally acidic, many cliffs are particularly rich in base minerals and weather to |

| | Lake District High Fells SAC |
|---|---|
| | produce pockets of fertile soil. Many of the high-altitude gills also support this vegetation type. It is these areas of moist, basic soils that support species-rich tall herb vegetation. It is these areas of moist, basic soils that support species-rich tall herb vegetation. Tall herb ledge communities are mainly found in Helvellyn and Fairfield (probably one of the most important areas in England for calcareous montane flora found on the extensive cliff ledges), Honister Crag, Scafell Pikes, Pillar and Ennerdale Fells and Wasdale Screes, with scattered species rich ledges elsewhere. The tall herb communities are characterised by wood crane's-bill *Geranium sylvaticum*, wild angelica *Angelica sylvestris*, water avens *Geum rivale*, and globeflower *Trollius europaeus*. Often associated with these ledges but also found on the bare outcrops and ledges are many montane and northern species such as roseroot *Sedum rosea* and mountain sorrel *Oxyria digyna*. Scarcer plants that occasionally occur throughout include alpine saw-wort *Saussurea alpina*, alpine meadow rue *Thalictrum alpinum*. The gill ledges support a wide range of ferns including lemon-scented fern *Oreopteris limbosperma*, beech fern *Phegopteris connectilis* and oak fern *Gymnocarpium dryopteris*. A number of rare arctic-alpine species occur, including alpine cinquefoil *Potentilla crantzii* and alpine meadow grass *Poa alpina*, black alpine sedge *Carex atrata* and alpine saxifrage Saxifraga *nivalis* at Helvellyn and Fairfield. Buttermere Fells is also a locality for the rare alpine catchfly *Lychnis alpina*.<br><br>Lake District High Fells represents blanket bog in north-west England. Blanket bogs are generally scarce in the SAC as there is so little flat land where peat can form; however there are relatively extensive areas of blanket bog in a number of the component SSSI (Armboth Fells, Shap Fells and Skiddaw Group) with smaller areas in Buttermere Fells and Birk Fell. The main NVC type present is M19 *Calluna vulgaris – Eriophorum vaginatum* blanket mire but M18 *Erica tetralix – Sphagnum papillosum* raised and blanket bog is also present at Shap Fells and M17 *Scirpus cespitosus – Eriophorum vaginatum* blanket mire is found in Buttermere Fells. Much of the bog is dominated by heather *Calluna vulgaris* and hare's-tail cottongrass *Eriophorum vaginatum* with varying amounts of cross-leaved heath *Erica tetralix*, deer-grass *Trichophorum cespitosum* and crowberry *Empetrum nigrum*. There are often carpets of *Sphagnum* and *Sphagnum*-filled hollows with species such as *S. papillosum* and *S. magellanicum*. Other species found locally in the bogs include bog rosemary |

| | Lake District High Fells SAC |
|---|---|
| | *Andromeda polifolia* and cloudberry *Rubus chamaemorus*, particularly on the higher ground. On some bogs purple moor grass *Molinia caerulea* and bog myrtle *Myrica gale* can be locally abundant and are typical of bogs in the western part of their range. The site also has transitions to many other upland habitats including dry heath, rock and lake habitats.<br><br>This complex is representative of siliceous scree communities found at high altitude in north-west England. The site has the most extensive development of screes with parsley fern *Cryptogramma crispa* in the UK. The main rock, the Borrowdale Volcanic Series (but more locally Skiddaw Slates), varies much in base-status, but the screes are chiefly base-poor. Siliceous screes are one of the most extensive habitats within the Lake District High Fells, covering large areas on moderately steep ground, always interspersed with other habitats. The screes vary from recently-formed loose scree in lower sections of gullies and below cliffs to stable areas colonised by grasses, bryophytes and ferns. The main scree NVC type present is U21 *Cryptogramma crispa – Deschampsia flexuosa* community. It is found throughout the complex, but major scree areas occur in Wasdale Screes, Helvellyn and Fairfield, Buttermere Fells, Scafell Pikes, Pillar and Ennerdale Fells and Skiddaw Group. The communities are well-developed and diverse with a wide range of characteristic species, including an abundance of parsley fern *Cryptogramma crispa* with associated species such as alpine lady's mantle *Alchemilla alpina*, stone bramble *Rubus saxatilis*, heath bedstraw *Galium saxatile*, sheep's fescue *Festuca ovina* and common bent *Agrostis capillaris*. Lemon-scented fern *Oreopteris limbosperma* is also found on the screes within Pillar and Ennerdale Fells. Bryophytes such as woolly hair-moss *Racomitrium lanuginosum*, *R. fasciculare*, *Rhytidiadelphus loreus* and *R. squarrosus* can be frequent. The screes provide a suitable microclimate for many oceanic moss and liverwort species such as *Scapania ornithopiodes* and *Kiaeria starkei*, found in Helvellyn and Fairfield.<br><br>Lake District High Fells represent high-altitude siliceous slopes with chasmophytic vegetation in northern England. These communities are found throughout the complex, but predominantly in Helvellyn and Fairfield, Wasdale Screes, Scafell Pikes, Pillar and Ennerdale Fells, Honister Crag, |

| | Lake District High Fells SAC |
|---|---|
| | Buttermere Fells and Armboth Fells. The communities have developed on long lines of cliffs and coves formed largely of acidic rocks of the Borrowdale Volcanic Series, with considerable amounts of calcite in the eroding gullies. On the predominantly acid crags, there are extensive communities of silicicolous vegetation. The species present are characteristic of north-west England and include alpine lady's mantle *Alchemilla alpina*, starry saxifrage *Saxifraga stellaris* and stiff sedge *Carex bigelowii*. Crevices and wet rock faces support a number of uncommon ferns including green spleenwort *Asplenium viride*, brittle bladder fern *Cystopteris fragilis* and Wilson's filmy fern *Hymenophyllum wilsonii*. Scattered trees on crags include aspen *Populus tremula* and rock whitebeam *Sorbus rupicola*. Wasdale Screes also has many more typical lowland species such as royal fern *Osmunda regalis*.<br><br>This site includes Side Wood, Ennerdale, an example of old sessile oak woods with rich bryophyte and lichen communities. There are large tussocks of the moss *Polytrichum strictum* mixed with bog-moss *Sphagnum* spp. Birkrigg and Keskadale Oaks and Young Wood are also included within the site. These are on steep south-facing slopes near the altitudinal limit for oak in Cumbria. In Birkrigg and Keskadale bryophytes and lichens are abundant and include species such as *Hedwigia integrifolia*. Birk Fell also includes substantial areas of bryophyte- and fern-rich oak woodland. Notable bryophyte species include *Breutelia chrysocoma*, *Saccogyna viticulosa* and *Pleurozia purpurea*. Fragments of this habitat also occur elsewhere throughout the site, mostly in gills or other areas less accessible to grazing animals. |
| **Qualifying Features** | Annex I habitats that are a primary reason for selection of this site<br><br>**3130 Oligotrophic to mesotrophic standing waters with vegetation of the *Littorelletea uniflorae* and/or of the *Isoëto-Nanojuncetea***<br>**4010 Northern Atlantic wet heaths with *Erica tetralix***<br>**4030 European dry heaths**<br>**4060 Alpine and Boreal heaths**<br>**5130 *Juniperus communis* formations on heaths or calcareous grasslands** |

<table>
<tr><th></th><th>Lake District High Fells SAC</th></tr>
<tr><td></td><td>
6150 Siliceous alpine and boreal grasslands<br>
6430 Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels<br>
7130 Blanket bogs * Priority feature<br>
8110 Siliceous scree of the montane to snow levels (Androsacetalia alpinae and Galeopsietalia ladani)<br>
8220 Siliceous rocky slopes with chasmophytic vegetation<br>
91A0 Old sessile oak woods with Ilex and Blechnum in the British Isles<br><br>
Annex I habitats present as a qualifying feature, but not a primary reason for selection of this site<br><br>
6230 Species-rich Nardus grassland, on siliceous substrates in mountain areas (and submountain areas in continental Europe) * Priority feature<br>
7230 Alkaline fens<br>
8210 Calcareous rocky slopes with chasmophytic vegetation<br><br>
Annex II species present as a qualifying feature, but not a primary reason for site selection<br><br>
1393 Slender green feather-moss Drepanocladus (Hamatocaulis) vernicosus
</td></tr>
<tr><td>Conservation Objectives</td><td>At the time of preparing this HRA report, the conservation objectives for this site had not been published.</td></tr>
<tr><td>Component SSSIs</td><td>SSSIs including condition status:<br><br>
<table>
<tr><th>SSSI Component Sites</th><th>Favourable</th><th>Unfavourable recovering</th><th>Unfavourable no change</th><th>Unfavourable declining</th><th>Destroyed, part destroyed</th></tr>
<tr><td>Buttermere Fells</td><td>0.00%</td><td>88.31%</td><td>11.69%</td><td>0.00%</td><td>0.00%</td></tr>
<tr><td>Ennerdale</td><td>8.32%</td><td>0.00%</td><td>91.68%</td><td>0.00%</td><td>0.00%</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><th></th><th colspan="6">Lake District High Fells SAC</th></tr>
<tr><td></td><td colspan="6"><table>
<tr><td>Honister Crag</td><td>8.44%</td><td>91.56%</td><td>0.00%</td><td>0.00%</td><td>0.00%</td></tr>
<tr><td>Pillar and</td><td>0.00%</td><td>97.74%</td><td>2.26%</td><td>0.00%</td><td>0.00%</td></tr>
<tr><td>Scafel Pikes</td><td>0.00%</td><td>100.00%</td><td>0.00%</td><td>0.00%</td><td>0.00%</td></tr>
</table></td></tr>
<tr><td>Key Environmental Conditions (factors that maintain site integrity)</td><td colspan="6">• Absence of water pollution<br>• Absence of nutrient enrichment<br>• Absence of atmospheric pollution<br>• Prevention of fire on bog and alpine heath habitats<br>• Maintenance of water levels and natural hydrological regime<br>• Avoidance of anthropomorphic sediment input to lakes<br>• High rainfall<br>• Control of invasive and non-native species and disease outbreaks<br>• Appropriate grazing<br>• Control of scrub and/or bracken<br>• Avoidance of damaging levels of erosion from trampling, vehicles etc<br><br>(Habitats Regulations Assessment of the North West Regional Spatial Strategy, September 2008 Consolidated Report Prepared for the Government Office for the North West)</td></tr>
<tr><td>SAC Condition Assessment</td><td colspan="6">See SSSI condition status</td></tr>
<tr><td>Vulnerabilities (includes existing pressures and trends)</td><td colspan="6">The European habitats on this site, other than acidic scree, are threatened by grazing and more locally grazing combined with visitor pressure. A very high proportion of the site occurs on unfenced common land where control of grazing is difficult to achieve and pressure of sheep threatens to destroy or prevent favourable condition from being achieved. These pressures have been significantly reduced over much of the site by entry into the Lake District ESA scheme, but this largely only slows or possibly arrests decline. Siliceous scree is possibly the least-threatened habitat and is widespread, albeit in a modified state.</td></tr>
<tr><td>Landowner/ Management Responsibility</td><td colspan="6">High percentage common land landowner/management responsibility unknown</td></tr>
</table>

| | Lake District High Fells SAC |
|---|---|
| **HRA/AA Studies undertaken that address this site** | • Habitats Regulations Assessment of the North West Regional Spatial Strategy, September 2008 Consolidated Report Prepared for the Government Office for the North West<br><br>• Habitat Regulations Assessment: Cumbria Wind Energy – Supplementary Planning Document (SPD), revised June 2007 see details: http://www.cumbria.gov.uk/elibrary/Content/Internet/538/755/2789/39435142953.pdf<br><br>Concluded that significant effects on European sites are possible according to this document although little explanation is given.<br><br>• Habitat Regulations Assessment: Cumbria Minerals and Waste Development Framework: Submission Draft Core Strategy and Generic Development Control Policies: Details: http://www.cumbria.gov.uk/elibrary/Content/Internet/538/755/1929/39518145940.pdf<br><br>No significant effects of the Cumbria MWD Framework on the Lake District High Fells are anticipated. |

## Site Name: River Derwent and Bassenwaite Lake

- **Location 030832W/ 543435N**
- **JNCC Site Code UK0030032**
- **Size: 1832.96 (ha)**
- **Designation: SAC**

| | River Derwent and Bassenwaite Lake SAC |
|---|---|
| **Site Description** | Bassenthwaite Lake in the Lake District, north-west England, is an example of a mesotrophic waterbody (Type 5), an unusual type in mountain areas. It is a large lake with an extensive catchment area and consequently is subject to rapid through-flow of water and moderate nutrient status. A wide variety of pondweeds *Potamogeton* spp. are found, including perfoliate pondweed *Potamogeton perfoliatus*, small pondweed *P. berchtoldii* and curled pondweed *P. crispus*, which are widespread, whilst red pondweed *P. alpinus*, various-leaved pondweed *P. gramineus* and lesser pondweed *P. pusillus* are more locally distributed. Uncommon species present in the community are autumnal water-starwort *Callitriche hermaphroditica* and six-stamened waterwort *Elatine hexandra*. The shorelines are extensive and relatively undisturbed compared with other major Cumbrian lakes. Much of the shore is of shingle or gravel, but soft peat has accumulated around Bowness Bay. Several sedge species are found in such areas, including a local northern species, water sedge *Carex aquatilis*. On stony shores common spike-rush *Eleocharis palustris* is locally abundant amongst species such as globeflower *Trollius europaeus*, saw-wort *Serratula tinctoria* and the nationally rare thread rush *Juncus filiformis*. The lake also supports one of only two surviving UK populations of a rare fish, vendace *Coregonus albula*. Now extinct in Scotland, the only other known surviving population of vendace is found in Derwent Water, also in the Lake District. |
| **Qualifying Features** | Annex I habitats that are a primary reason for selection of this site<br>**3130 Oligotrophic to mesotrophic standing waters with vegetation of the *Littorelletea uniflorae* and/or of the *Isoëto-Nanojuncetea*** |

| | River Derwent and Bassenwaite Lake SAC |
|---|---|
| | Annex I habitats present as a qualifying feature, but not a primary reason for selection of this site<br>**3260 Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation**<br><br>Annex II species that are a primary reason for selection of this site<br><br>**1065 Marsh fritillary butterfly *Euphydryas* (*Eurodryas*, *Hypodryas*) *aurinia*** This site supports the largest area of appropriate habitat, M25 *Molinia caerulea – Potentilla erecta* mire, in Cumbria. The **marsh fritillary *Euphydryas aurinia*** population is spread over four habitat patches where numbers fluctuate annually but collectively form a moderate-sized and stable population.<br><br>**1095 Sea lamprey *Petromyzon marinus*** The Derwent represents **sea lamprey *Petromyzon marinus*** in a high-quality oligotrophic river in northern England. The extensive occurrence of gravels and silts in the middle to lower reaches of this river means that it is able to support a large population of sea lamprey.<br><br>**1096 Brook lamprey *Lampetra planeri*** The Derwent represents **brook lamprey *Lampetra planeri*** in a high-quality, oligotrophic river in northern England. Good populations of the species are known to occur, and this river has features that provide the necessary conditions for both spawning and nursery areas – extensive gravel shoals, good water quality and areas of marginal silt.<br><br>**1099 River lamprey *Lampetra fluviatilis*** The Derwent represents **river lamprey *Lampetra fluviatilis*** in an oligotrophic river in northern England. Good numbers of this species are known to occur and this river has features that provide the necessary conditions for both spawning and nursery areas – extensive gravel shoals, good water quality and areas of marginal silt.<br><br>**1106 Atlantic salmon *Salmo salar*** The Derwent represents **Atlantic salmon *Salmo salar*** populations in north-west England and is a particularly good example of a large oligotrophic river |

<table>
<tr><th></th><th>River Derwent and Bassenwaite Lake SAC</th></tr>
<tr><td></td><td>flowing over base-poor geology, providing a contrast to the more mesotrophic River Eden. Low intensity land-use in the catchment means there is good water quality throughout much of the system. This water quality, coupled with the presence of extensive gravel shoals, makes it a particularly suitable river for breeding and enables it to support a large population.<br><br>1355 Otter Lutra lutra The River Derwent and Bassenthwaite Lake represent good quality otter Lutra lutra habitat in north-west England. Together, the lake and river represent a wide range of suitable conditions for otters in a relatively upland environment.<br><br>1831 Floating water-plantain Luronium natans This site represents the northern limit of floating water-plantain Luronium natans in the UK, and its occurrence in relatively shallow, oligo-mesotrophic lakes. Within the site, the species is found in two lakes, Derwent Water and Bassenthwaite Lake. Both of these lakes have healthy populations of the species in extensive, species-rich beds of aquatic macrophytes. In Bassenthwaite Lake it also occurs on muddy lake-shores. These are the only two known sites for Luronium in the Lake District.</td></tr>
<tr><td>Conservation Objectives</td><td>At the time of preparing this HRA report, the conservation objectives for this site had not been published.</td></tr>
<tr><td>Component SSSIs</td><td>SSSIs including condition status:<br><br>
<table>
<tr><th>SSSI Component Sites</th><th>Favourable</th><th>Unfavourable recovering</th><th>Unfavourable no change</th><th>Unfavourable declining</th><th>Destroyed, part destroyed</th></tr>
<tr><td>River Derwent and Tributaries</td><td>2.56%</td><td>2.75%</td><td>94.69%</td><td>0.00%</td><td>0.00%</td></tr>
<tr><td>Buttermere</td><td>100.00%</td><td>0.00%</td><td>0.00%</td><td>0.00%</td><td>0.00%</td></tr>
</table>
</td></tr>
<tr><td>Key Environmental Conditions (factors that maintain site integrity)</td><td>• Avoidance of water pollution (for example, sheep dip)<br>• Maintenance of sufficient flow<br>• Maintenance of natural course of river</td></tr>
</table>

| | River Derwent and Bassenwaite Lake SAC |
|---|---|
| | • Avoidance of nutrient enrichment<br>• Devils bit scabious- the larval food plant of Marsh Fritillary<br>• Marsh Fritillary requires low intensity grazing (preferably ponies or cattle as sheep damage the host plant)<br>• Avoidance of mowing and burning in areas of butterfly colonies<br>• Maintenance of all populations of Marsh Fritillary – linked populations are critical for this species<br>• Good weather conditions in flight period of butterfly<br>• Control of invasive and/or non-native species<br>• No physical barriers to fish migration or Otter movement<br>• Control of angling/netting<br>• Clean gravel/hard rock substrate in some areas, silt and sand in others<br>• Low suspended solids (less than 10 mg/l)<br>• Sufficient bankside breeding, foraging and resting habitat for Otters (for example cover, sites for holts)<br>• Avoidance of disturbance to Otter<br>• Maintenance of summer lake levels<br>• Some areas of overhanging vegetation, cover and still water used by fish<br>(Habitats Regulations Assessment of the North West Regional Spatial Strategy, September 2008 Consolidated Report Prepared for the Government Office for the North West) |
| **SAC Condition Assessment** | See SSSI condition status |
| **Vulnerabilities (includes existing pressures and trends)** | The wildlife of the River Derwent system is dependent upon the maintenance of high water quality, particularly its naturally low level of nutrients. There are problems with sewage, acidification (from rainfall) and pollution with synthetic pyrethroid sheep dips (leading to losses of insect life, the food of the Annex II fish species). Flow regimes and sedimentation patterns in the rivers are important, not least in providing suitable spawning grounds for fish. These are affected by flood defence works and abstraction for water supplies. The management of the land in the catchment is also important. Much of the land is heavily drained for agriculture or forestry, which results in increased run-off. As many of the surrounding hills are ecologically overgrazed, soil erosion can cause high sediment loads in the |

| | River Derwent and Bassenwaite Lake SAC |
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| | streams and river entering the lakes. Sediment and nutrients from such sources, as well as possibly point sources, have affected plant communities in the lakes. Phosphorous stripping is being undertaken on part of the site, although it is expected that full recovery may take a decade or more. The above issues are all recognised in the joint English Nature/Environment Agency Conservation Strategy for the river system, and all licensed activities which may be contributing to such problems will be addressed through the review process under the Habitats Regulations. |
| **Landowner/ Management Responsibility** | English Nature (Natural England)/Environment Agency |
| **HRA/AA Studies undertaken that address this site** | • Habitats Regulations Assessment of the North West Regional Spatial Strategy, September 2008 Consolidated Report Prepared for the Government Office for the North West:<br>• Habitat Regulations Assessment: Cumbria Wind Energy – Supplementary Planning Document (SPD), revised June 2007 see details: http://www.cumbria.gov.uk/elibrary/Content/Internet/538/755/2789/39435142953.pdf<br><br>Concluded that significant effects on European sites are possible according to this document although little explanation is given.<br><br>• Habitat Regulations Assessment: Cumbria Minerals and Waste Development Framework: Submission Draft Core Strategy and Generic Development Control Policies: Details: http://www.cumbria.gov.uk/elibrary/Content/Internet/538/755/1929/39518145940.pdf<br><br>Significant effects of the Cumbria MWD Framework the River Derwent and Bassenthwaite Lake SAC are assessed as possible. |

## Site Name: Borrowdale Woodland Complex

- **Location 031054W/ 543020N**
- **JNCC Site Code UK0012745**
- **Size: 667.63 (ha)**

- **Designation: SAC**

<table>
<tr><th></th><th>Borrowdale Woodland Complex SAC</th></tr>
<tr><td>Site Description</td><td>Borrowdale has the most extensive block of western old sessile oak woods in northern England, and has a diverse range of stand types, which contributes to conservation of habitat structure and function. Amongst the oak stands there are small patches of 91D0 Bog woodland (birch Betula sp. on peat), ash Fraxinus excelsior woodland and alder Alnus glutinosa stands. The woods are especially rich in bryophytes and lichens, and northern species occur, such as the moss Ptilium crista-castrensis. Rare plants, such as touch-me-not balsam Impatiens noli-tangere and alpine enchanter’s-nightshade Circaea alpina, also have important British occurrences here.</td></tr>
<tr><td>Qualifying Features</td><td>Annex I habitats that are a primary reason for selection of this site<br>91A0 Old sessile oak woods with Ilex and Blechnum in the British Isles<br><br>Annex I habitats present as a qualifying feature, but not a primary reason for selection of this site<br>8220 Siliceous rocky slopes with chasmophytic vegetation<br>91D0 Bog woodland * Priority feature</td></tr>
<tr><td>Conservation Objectives</td><td>At the time of preparing this HRA report, the conservation objectives for this site had not been published.</td></tr>
<tr><td>Component SSSIs</td><td>Component SSSI (1 unit) condition status<br><br>
<table>
<tr><th>SSSI Component Sites</th><th>Favourable</th><th>Unfavourable recovering</th><th>Unfavourable no change</th><th>Unfavourable declining</th><th>Destroyed, part destroyed</th></tr>
<tr><td>Scales Wood</td><td>0.00%</td><td>100.00%</td><td>0.00%</td><td>0.00%</td><td>0.00%</td></tr>
</table>
</td></tr>
<tr><td>Key Environmental Conditions (factors that maintain site integrity)</td><td>• Moderately high or high rainfall<br>• Maintenance of natural hydrological regime<br>• Base poor soils</td></tr>
</table>

| | Borrowdale Woodland Complex SAC |
|---|---|
| | • Limited felling or thinning planned to open up dense canopy<br>• Control of grazing<br>• Minimal air pollution – bryophytes and lichens are sensitive<br>• Control of invasive non-native species and any disease outbreaks<br><br>(Habitats Regulations Assessment of the North West Regional Spatial Strategy, September 2008 Consolidated Report Prepared for the Government Office for the North West) |
| **SAC Condition Assessment** | See SSSI condition status |
| **Vulnerabilities (includes existing pressures and trends)** | In recent decades, there has been very little natural regeneration of native woodland tree species to ensure the long-term survival of the woodlands, due to grazing pressures from domestic livestock. However, very low levels of grazing are important to maintain the rich and diverse bryophyte flora. This issue should be addressed through the Environmentally Sensitive Area, Woodland Grant Scheme and agreement of Site Management Statements. The SAC is also part of the UK Restoration of Atlantic Oakwoods LIFE project, under which further positive management is being carried out. |
| **Landowner/ Management Responsibility** | Private Ownership, Highland Birchwoods |
| **HRA/AA Studies undertaken that address this site** | • Habitats Regulations Assessment of the North West Regional Spatial Strategy, September 2008 Consolidated Report Prepared for the Government Office for the North West:<br>• Habitat Regulations Assessment: Cumbria Wind Energy – Supplementary Planning Document (SPD), revised June 2007 see details: http://www.cumbria.gov.uk/elibrary/Content/Internet/538/755/2789/39435142953.pdf<br><br>Concluded that significant effects on European sites are possible according to this document although little explanation is given.<br><br>• Habitat Regulations Assessment: Cumbria Minerals and Waste Development Framework: Submission Draft Core Strategy and Generic Development Control Policies: Details: |

| | Borrowdale Woodland Complex SAC |
|---|---|
| | http://www.cumbria.gov.uk/elibrary/Content/Internet/538/755/1929/39518145940.pdf<br><br>No significant effects of the Cumbria MWD Framework on Borrowdale Woodland Complex are anticipated. |

# Appendix 2: Plans and Programmes Review

## Regional

| Plan | Potential impacts that could cause 'in-combination' effects |
|---|---|
| | |
| **River Basin Management Plan for the North West 2009 (Environment Agency)** | This plan outlines what the Environment Agency under the guidelines of the UK Water Framework Directive aim to achieve, with regards to improving the water environment, over the next 20 years. The report proposes new strategies and actions under the headings of improving rural land management, reducing the impact of transport and built environments, securing sustainable water sources, improving wildlife habitats and addressing point sources of pollution. The key targets of the RBMP are;<br>• By 2015, 17% of surface waters (rivers, lakes, estuaries) in this river basin district are going to improve for at least one biological, chemical or physical element. This includes an improvement of over 1860km of river, in relation to fish, phosphate, specific pollutants and other elements<br>• 34% of surface waters will be at good or better ecological status/potential and 65% of groundwater bodies will be at good status by 2015<br>• At least 38% of assessed surface waters will be at good or better biological status by 2015<br><br>The following challenges are addressed in the plan:<br>• diffuse pollution from agriculture and other rural activities<br>• point source pollution from water industry sewage works<br>• physical modification of water bodies<br>• diffuse pollution from urban sources<br>• |
| **United Utilities Draft Water Resources Management Plan 2008** | The options included in the Water Resources Management Plan could affect biodiversity through effects of:<br>• construction, where the use or transport of materials have indirect impacts on biodiversity,<br>• where the construction sites and processes affect habitats, for example through tunnelling for pipelines, discharges to water, or use of land for equipment and plant.<br>• There could also be effects during operation if the options affect the flows or levels of water and these |

| Plan | Potential impacts that could cause 'in-combination' effects |
|---|---|
| | affect the ecological status of the water bodies.<br>• However site specific impacts were not explicit within the SEA report and no HRA was available. |
| **Shoreline Management Plan (SMP 2) St Bees Head to Earnse Point, 11d** | • Development/ construction/ maintenance of coastal defences; potential for land take, pollution increase, disturbance/ severance of habitats and species. |
| **Cumbria Economic Strategy 2009-2019** | The strategy sets out Cumbria's vision *'to be an energised and healthy environment, and one of the fastest growing economies in the UK'*<br>The strategy identifies two strategic priorities:<br>• The opportunities of Energy and the Low Carbon Economy.<br>• Raising the attractiveness of 'Destination Cumbria' as a place to live, invest, work and visit.<br>Major Projects for the West Cumbria region include:<br>• The Britain's Energy Coast™ programme, a £2 billion package of regeneration projects to advance existing strengths in nuclear industry and promote diversification into other forms of low carbon industries such as renewable energy. The presence of at least one new nuclear station within Cumbria is a key component of the programme. |
| **Cumbria and Lake District Joint Structure Plan** | • Housing and employment focused at Whitehaven; Workington; Cleator Moor; Egremont; generally away from European sites.<br>• Requirement for waste management/ transport disposal from regeneration/ renewal sites has the potential to increase pollution.<br>• Recreation pressures may result from increased tourism related development/ activities and creation of Regional Parks near/ adjacent to European sites.<br>• Atmospheric pollution generated as a result of housing, employment, retail and transport regeneration/ renewal.<br>• Proposed road schemes; potential for air pollution.<br>• Development maintenance of coastal defences; potential for land take, pollution increase, disturbance/ severance of habitats and species.<br>• Provision of wind farms and turbines; tidal/ wave power projects. |

| Plan | Potential impacts that could cause ‘in-combination’ effects |
|---|---|
| | |

## Local

| Plan | Potential impacts that could cause 'in-combination' effects |
|---|---|
| **Cumbria Minerals and Waste Local Plan** | • Current plan has broadly sought to focus any required expansion/ extension on existing sites/ facilities. Potential expansion of sites with associated (ongoing) impacts of air/ water pollution.<br>• Potential for additional waste recovery facilities and/ or land fill sites.<br>• Potential for future oil and gas related development, with associated impacts.<br>• Potential for indirect impacts associated with transport; air pollution. |
| **Cumbria Local Transport Plan (LTP2)** | • Future road schemes have potential indirect effects through increased transport movements; air pollution. |
| **The Derwent, West Cumbria and Duddon Catchment Abstraction Management Strategy 2007 (EA)** | • Catchment Abstraction Management Strategy (CAMS) for the associated catchment areas until 2013. Outlines where water is available and where we need to reduce current rates of abstraction |

# Appendix 3: Likely Significant Effect (LSE) Screening Table

**SIGNIFICANT EFFECTS SCREENING (INCORPORATING IN-COMBINATION ASSESSMENT):**

**European Sites within a 20km radius of the nominated site**

| | Designation | Distance to Nominated site |
|---|---|---|
| Drigg Coast | **SAC** | **5.3km** |
| River Ehen | **SAC** | **7.7km** |
| Wast Water | **SAC** | **12.1km** |
| Lake District High Fells | **SAC** | **11km** |
| River Derwent and Bassenthwaite Lake | **SAC** | **17km** |
| Borrowdale Woodland Complex | **SAC** | **17km** |

The likely significant effects of the development of the nominated site on the above listed European sites located within a 20km radius of the nominated site have been assessed. Some of these European sites have been screened out for the reasons given below. For the remaining European sites, the assessment of the likely significant effects of the construction, operation and decommissioning phases of a new nuclear power station development are presented in tabular form.

**River Derwent and Bassenthwaite Lake SAC**

The River Derwent and Bassenthwaite Lake SAC are situated in North West England. Bassenthwaite Lake in the Lake District is an example of a mesotrophic waterbody. It is a large lake with an extensive catchment area and consequently is subject to rapid through-flow of water. The River Derwent is the largest oligotrophic, or nutrient poor, river in England that still retains high water quality and a natural channel. The site covers an area of 1832.96 ha and is underpinned by 15 SSSIs in England, but only 2 River Derwent and Tributaries and Buttermere lie entirely within the SAC within the 20km search area. The nominated site at Sellafield is over 15km away from the SAC. No impacts arising from changes to water quality are likely to occur within this SAC as it is within a different water catchment area to the nominated site (Bassenthwaite Lake is also a rain water fed lake). There is potential for increased levels of airborne pollutants during the construction, operation and decommissioning phases of the proposed development at the nominated site, which could include planned (argon-41, krypton-85 and tritium) and accidental radioactive emissions. However the Environment Agency assesses that non-radioactive aerial emissions (sulphur dioxide, nitrogen oxides and volatile organic compounds) from nuclear power stations are extremely low compared with other regulated industries and the Agency does not consider them to be an environmental priority. The Environment Agency's most recent available assessment of radioactive aerial emissions indicates that all fall within authorised limits[1]. Therefore given the above and the distance of the nominated site from the SAC, it is not likely that the development proposed on the nominated site will have any significant effects on this SAC.

**Borrowdale Woodland Complex SAC**

The Borrowdale Woodland Complex SAC is an extensive block of western old sessile oak woods in northern England. The site covers an area of 667.83 ha and is underpinned by 10 SSSIs, but with only Scales Wood falling within the 20km search area. The nominated site at Sellafield is over 17km away from the SAC. No impacts arising from changes to water quality are likely to occur within this SAC as it is within a different water catchment area to nominated site. There is potential for increased levels of airborne pollutants during the construction, operation and decommissioning phases of the proposed development at the nominated site, which could include planned (argon-41, krypton-85 and tritium) and accidental radioactive emissions. However the Environment Agency assesses that non-radioactive aerial emissions (sulphur dioxide, nitrogen oxides and volatile organic compounds) from

Measuring Environmental Performance: Sector Report for the Nuclear Industry (Environment Agency, Nov 2005).

nuclear power stations are extremely low compared with other regulated industries and the Agency does not consider them to be an environmental priority. The Environment Agency's most recent available assessment of radioactive aerial emissions indicates that all fall within authorised limits[1]. Therefore given the above and the distance of the nominated site from the SAC, it is not likely that the development proposed will have any significant effects on the SAC.

**Lake District High Fells**

The Lake District High Fells SAC are situated in North West England. The site covers many habitat types including Oligotrophic to mesotrophic standing waters, wet and dry heaths, and blanket bogs. The site covers 26999.36ha and is underpinned by 21 SSSI units but only 5 fall within the SAC within the 20km search area. The nominated site at Sellafield is over 11km away from the SAC. No impacts arising from changes to water quality are likely to occur within this SAC as it is within a different water catchment area to the nominated site and the Oligotrophic to mesotrophic standing waters are fed by rain water. There is potential for increased levels of airborne pollutants during the construction, operation and decommissioning phases of the proposed development at the nominated site, which could include planned (argon-41, krypton-85 and tritium) and accidental radioactive emissions. However the Environment Agency assesses that non-radioactive aerial emissions (sulphur dioxide, nitrogen oxides and volatile organic compounds) from nuclear power stations are extremely low compared with other regulated industries and the Agency does not consider them to be an environmental priority. The Environment Agency's most recent available assessment of radioactive aerial emissions indicates that all fall within authorised limits[1]. Therefore given the above and the distance of nominated Site 6 from the SAC, it is not likely that the development proposed on the nominated site will have any significant effects on this SAC.

Measuring Environmental Performance: Sector Report for the Nuclear Industry (Environment Agency, Nov 2005).
Measuring Environmental Performance: Sector Report for the Nuclear Industry (Environment Agency, Nov 2005).

## Drigg Coast SAC

**Unitary Authority: Cumbria**

## Source: Construction (duration approx 5 years)

| Drigg Coast SAC Construction (duration approx 5 years) | |
|---|---|
| **Water Resources/Quality** | |
| **Potential Impacts: Pathway** | Potential effects on water quality and drainage from earthworks/ excavations and infrastructure provision (sedimentation, pollution incidents through water courses and cycles). |
| **Potential effects on the SAC: Receptor** | Increased/ altered drainage from earthworks and excavation<br><br>Changes in salinity and siltation levels, changes in organic and nutrient loading and enrichment within the SAC could lead to changes in the species diversity and composition of plant communities within the SAC.<br><br>Contamination by synthetic and non-synthetic compounds is potentially an issue for the estuary mudflats, sandflats and the saltmarsh. Toxins can bind to sediments. Mudflat and sandflats are a primary qualifying feature at this site and an increase in nutrient and organic enrichment can result in increased growth of algae and phytoplankton leading to a reduction in species diversity. |
| **Risk of Likely Significant Effect (LSE)?** | English Nature (now Natural England) in 2000 reports the current exposure to siltation within the estuary as low.<br><br>The maintenance of temperature and salinity levels within the natural range is noted as a key environmental condition requirement at this site.<br><br>The current ecological status and chemical quality of the estuaries around the Drigg Coast are not yet assessed (EA, RBMP data, 2008)<br><br>Likely significant effects cannot be ruled out at this stage |
| **Potential Impacts - other Plans and** | **Local Development Frameworks** (Cumbria) – Expansion of mineral and waste sites, future road schemes and planned coastal defences. Water and air quality (pollution), land take and habitat and species disturbance |

| Drigg Coast SAC Construction (duration approx 5 years) | |
|---|---|
| **Water Resources/Quality** | |
| **Programmes** | |
| **Risk from 'In Combination' Effects?** | Uncertain |
| **AA Required?** | Yes |

| Drigg Coast SAC Construction (duration approx 5 years) | |
|---|---|
| **Air Quality** | |
| **Potential Impacts: Pathway** | Potential local impacts from increased development/ traffic growth, and the emissions arising from construction activity. Likely to be restricted to a local level for example. dust/ particulates |
| **Potential effects on the SAC: Receptor** | Local level impacts (reduced air quality, $NO_x$ gases from road/ transport/ generation sources) arising from construction activities.<br><br>A local increase in airborne pollutants can lead to nutrient loading within the SAC |
| **Risk of Likely Significant Effect (LSE)?** | Air quality is not specifically identified as a vulnerability for the SAC (avoidance of pollution is listed that could relate to air quality), although the potential effects of increased nutrient loading (which is an identified vulnerability) from air borne pollutants should be considered in the context of known scale/ known environmental conditions.<br><br>Likely significant effects cannot be ruled out at this stage |
| **Potential Impacts - other Plans and Programmes** | **Local Development Frameworks** (Cumbria) – Expansion of mineral and waste sites, future road schemes and planned coastal defences. Water and air quality (pollution), land take and habitat and species disturbance |
| **Risk from 'In Combination' Effects?** | Uncertain |
| **AA Required?** | Further back-ground environmental condition information required to eliminate aerial emissions as significant at this site. |

| Drigg Coast SAC Construction (duration approx 5 years) | |
|---|---|
| **Habitat Loss and Fragmentation** | |
| **Potential Impacts: Pathway** | Potential local impacts from increased development/ traffic growth, and the emissions arising from construction activity. Likely to be restricted to a local level for example. dust/ particulates |
| **Potential effects on the SAC: Receptor** | Tidal regime and natural erosional forces are critical to maintenance of SAC features. Any coastal defense or marine landing structures which impede sediment flows along the coastline could change erosion / depositional patterns affecting SAC habitat features<br><br>Construction works within foreshore in front of the nominated site would lead to loss of 'buffer' area adjacent to SAC. This could lead to eradication of adjacent seed bank and prevent of recolonisation |
| **Risk of Likely Significant Effect (LSE)?** | **Habitat Loss and Fragmentation**<br><br>Changes to the tidal processes along this stretch of coastline could arise from construction on the coastal fringe. This may indirectly impact on the SAC and has the potential to result in a significant effect.<br><br>Maintenance of the morphological equilibrium of the estuary, including sedimentation patterns is a key environmental condition of the SAC.<br><br>Likely significant effects cannot be ruled out at this stage |
| **Potential Impacts - other Plans and Programmes** | **Local Development Frameworks** (Cumbria) – Expansion of mineral and waste sites, future road schemes and planned coastal defences. Water and air quality (pollution), land take and habitat and species disturbance |
| **Risk from 'In Combination' Effects?** | Uncertain |
| **AA Required?** | Yes |

| Drigg Coast SAC Construction (duration approx 5 years) | |
|---|---|
| **Coastal Squeeze** | |
| **Potential Impacts: Pathway** | |
| **Potential effects on the SAC: Receptor** | Construction of infrastructure and facilities relating to the operation of the nuclear power station may result in an encroachment upon land at the coastal fringes. Changes to sedimentation and erosion regimes along this stretch of coastline could arise from construction on the coastal fringe. This may impact upon the estuarine, mudflat and sand dune features of the SAC |
| **Risk of Likely Significant Effect (LSE)?** | Changes to sedimentation and erosion regimes along this stretch of coastline could arise from construction on the coastal fringe. This may indirectly impact on the SAC and has the potential to result in a significant effect on key features.<br><br>Maintenance of the morphological equilibrium of the estuary, including sedimentation patterns is a key environmental condition of the SAC. |
| **Potential Impacts - other Plans and Programmes** | **Local Development Frameworks** (Cumbria) – Expansion of mineral and waste sites, future road schemes and planned coastal defences. Water and air quality (pollution), land take and habitat and species disturbance. |
| **Risk from 'In Combination' Effects?** | Uncertain |
| **AA Required?** | Yes |

## Source: Operation (duration approx 60 years)

| Drigg Coast SAC Operation (duration approx 60 years) | |
|---|---|
| **Water Resources/ Quality** | |
| **Potential Impacts: Pathway** | Potential impacts on quality from discharges (radioactive and non-radioactive) planned and accidental.<br><br>Abstraction and discharge of water for cooling (heated water up to $10^{o}$c warmer than the receiving environment). |
| **Potential effects on the SAC: Receptor** | Potential for toxic contamination from accidental leakage<br><br>Potential for radioactive discharges (accidental and routine)<br><br>Changes to water temperature from controlled discharge<br><br>Changes to water quality and of water temperature can impact species composition/ encourage excessive algal growth. Heated water release can result in incidental mortality of aquatic species.<br><br>Pollutants potentially mobile may impact other watercourses/ cycles and up and downstream from release point given tidal movements. |
| **Risk of Likely Significant Effect (LSE)?** | Potential for operation effects of changes to water quality and temperature to result in adverse effects on water quality need further investigation to determine whether changes are likely to be significant.<br><br>The maintenance of temperature and salinity levels within the natural range is noted as a key environmental condition requirement at the nominated site.<br><br>Accidental radioactive discharges are unlikely given the level of regulatory control. Risk of significant effects of this is therefore unlikely.<br><br>Likely significant effects cannot be ruled out at this stage |

| Drigg Coast SAC Operation (duration approx 60 years) | |
|---|---|
| **Water Resources/ Quality** | |
| **Potential Impacts - other Plans and Programmes** | **Local Development Frameworks** (Cumbria) – Expansion of mineral and waste sites, future road schemes and planned coastal defences. Water and air quality (pollution), land take and habitat and species disturbance |
| **Risk from 'In Combination' Effects?** | Uncertain |
| **AA Required?** | Yes |

| Drigg Coast SAC Operation (duration approx 60 years) | |
|---|---|
| **Air Quality** | |
| **Potential Impacts: Pathway** | Potential local impacts from increased development/ traffic growth (nitrogen oxides, sulphur dioxide).<br><br>Potential impacts from planned (argon-41, krypton-85 and tritium) and accidental radioactive emissions. |
| **Potential effects on the SAC: Receptor** | Local level impacts (reduced air quality, NOx gases from road/ transport/ generation sources) arising from, operation activities.<br><br>Indirect impacts – through changes to water quality from aerial deposition |
| **Risk of Likely Significant Effect (LSE)?** | Air quality and changes to local and wider air quality conditions is not an identified vulnerability for the SAC (avoidance of pollution is listed that could relate to air quality), although the potential effects of increased nutrient loading (which is an identified vulnerability) from air borne pollutants should be considered in the context of known scale/ known environmental conditions.<br><br>Likely significant effects cannot be ruled out at this stage |
| **Potential Impacts - other Plans and Programmes** | **Local Development Frameworks** (Cumbria) – Expansion of mineral and waste sites, future road schemes and planned coastal defences. Water and air quality (pollution), land take and habitat and species disturbance |
| **Risk from 'In Combination' Effects?** | Uncertain |
| **AA Required?** | Further back-ground environmental condition information required to eliminate aerial emissions as significant at the nominated site. |

| Drigg Coast SAC Operation (duration approx 60 years) | |
|---|---|
| **Habitat Loss and Fragmentation** | |
| **Potential Impacts: Pathway** | Changes to footprint of nominated site through operation, for example to accommodate waste storage, develop infrastructure may lead to the loss of supporting or buffer habitats.<br><br>The construction and maintenance of permanent infrastructure such as roads, compound sites and waste storage facilities may result in fragmentation of habitats and reduce/alter available corridors for the movement of species across habitats and resources. |
| **Potential effects on the SAC: Receptor** | Potential for changes to coastal habitats resulting from long term sea defense structures |
| **Risk of Likely Significant Effect (LSE)?** | Loss and modification of buffer habitats have the potential to result in significant effects and should be considered further. |
| **Potential Impacts - other Plans and Programmes** | **Local Development Frameworks** (Cumbria) – Expansion of mineral and waste sites, future road schemes and planned coastal defences. Water and air quality (pollution), land take and habitat and species disturbance |
| **Risk from 'In Combination' Effects?** | Uncertain |
| **AA Required?** | Yes |

## Source: Decommissioning (duration approx 30 years)

| Drigg Coast SAC Decomissioning (duration approx 30 years) | |
|---|---|
| **Water Resources/ Quality** | |
| **Potential Impacts: Pathway** | Potential effects on water quality and drainage from [de]construction activities, earthworks, infrastructure, waste storage. |
| **Potential effects on the SAC: Receptor** | Increased/ altered drainage from earthworks and excavation<br><br>Changes in salinity and siltation levels, changes in organic and nutrient loading and enrichment within the SAC<br><br>Changes in organic and nutrient loading could change the species diversity and composition of plant communities within the SAC.<br><br>Contamination by synthetic and non-synthetic compounds is potentially an issue for the estuary mudflats, sandflats and the saltmarshes. Toxins can bind to sediments, affecting supporting species. |
| **Risk of Likely Significant Effect (LSE)?** | The maintenance of salinity levels and the avoidance of nutrient enrichment is noted as a key environmental condition requirement at the SAC.<br><br>The current ecological status and chemical quality of the estuaries around the Drigg Coast are not yet assessed (EA, RBMP data, 2008)<br><br>Likely significant effects cannot be ruled out at this stage |
| **Potential Impacts - other Plans and Programmes** | **Local Development Frameworks** (Cumbria) – Expansion of mineral and waste sites, future road schemes and planned coastal defences. Water and air quality (pollution), land take and habitat and species disturbance |
| **Risk from 'In Combination' Effects?** | Uncertain |
| **AA Required?** | Yes |

| Drigg Coast SAC Decomissioning (duration approx 30 years) | |
|---|---|
| **Air Quality** | |
| **Potential Impacts: Pathway** | Potential local impacts from increased development/ traffic growth associated with decommissioning and the emissions arising from [de]construction activity. Likely to be restricted to a local level for example. dust/ particulates. |
| **Potential effects on the SAC: Receptor** | Local level impacts (reduced air quality, NOx gases from road/ transport/ generation sources) arising from decommissioning activities.<br><br>An increase in airborne pollutants can lead to nutrient loading within the SAC |
| **Risk of Likely Significant Effect (LSE)?** | Air quality is not specifically identified as a vulnerability for the SAC (avoidance of pollution is listed that could relate to air quality), although the potential effects of increased nutrient loading (which is an identified vulnerability) from air borne pollutants should be considered in the context of known scale/ known environmental conditions.<br><br>Likely significant effects cannot be ruled out at this stage |
| **Potential Impacts - other Plans and Programmes** | **Local Development Frameworks** (Cumbria) – Expansion of mineral and waste sites, future road schemes and planned coastal defences. Water and air quality (pollution), land take and habitat and species disturbance |
| **Risk from 'In Combination' Effects?** | Uncertain |
| **AA Required?** | Further back-ground environmental condition information required to eliminate aerial emissions as significant at the nominated site. |

# River Ehen SAC

**Authority:** Cumbria

## Source: Construction (duration approx 5 years)

| River Ehen SAC Construction (duration approx 5 years) | |
|---|---|
| **Water Resources/ Quality** | |
| **Potential Impacts: Pathway** | Potential effects on water quality and drainage from earthworks/ excavations, infrastructure provision (sedimentation, pollution incidents).<br><br>Potential impacts from increased water abstraction |
| **Potential effects on the SAC: Receptor** | Increased/ altered drainage from earthworks and excavation<br><br>Changes in salinity and siltation levels, changes in organic and nutrient loading and enrichment within the SAC<br><br>Changes in flow levels and sedimentation patterns within the SAC.<br><br>The designated section the River Ehen SAC is located 7.7km to the north of the nominated site and is located within the same catchment area as the nominated site, with part of the river system (undesignated section) adjacent to the site.<br><br>Freshwater Pearl Mussels and Atlantic Salmon (a migratory species) are both a primary qualification feature of the SAC and both are vulnerable to changes in sediment loads and nutrient levels. |
| **Risk of Likely Significant Effect (LSE)?** | The avoidance of water pollution, nutrient enrichment and the requirement for low levels of suspended solids (less than 10mg/l) are noted as a key environmental condition at the SAC<br><br>The River Ehen SAC is located within Water Management Unit (WMRU) 6 and is currently over licensed (EA, CAMS, April 2007).<br><br>Likely significant effects cannot be ruled out at this stage |

| River Ehen SAC Construction (duration approx 5 years) | |
|---|---|
| **Water Resources/ Quality** | |
| **Potential Impacts - other Plans and Programmes** | **Local Development Frameworks** (Cumbria) – Expansion of mineral and waste sites, future road schemes and planned coastal defences. Water and air quality (pollution), land take and habitat and species disturbance |
| **Risk from 'In Combination' Effects?** | Uncertain |
| **AA Required?** | Yes |

| River Ehen SAC Construction (duration approx 5 years) | |
|---|---|
| **Air Quality** | |
| **Potential Impacts: Pathway** | Potential local impacts from increased development/ traffic growth. |
| **Potential effects on the SAC: Receptor** | Local level impacts (reduced air quality, NOx gases from road/ transport/ generation sources) arising from construction activities.<br><br>The SAC is located 7.7km to the north of the site. An increase in airborne pollutants could lead to nutrient loading within the SAC resulting in species changes within habitat communities. |
| **Risk of Likely Significant Effect (LSE)?** | Air quality is not an identified vulnerability for the SAC, although the potential effects of increased nutrient loading from air borne pollutants should be considered in the context of known scale/ known environmental conditions.<br><br>Likely significant effects cannot be ruled out at this stage |
| **Potential Impacts - other Plans and Programmes** | **Local Development Frameworks** Expansion of mineral and waste sites, future road schemes and planned coastal defences. Water and air quality (pollution), land take and habitat and species disturbance |
| **Risk from 'In Combination' Effects?** | Uncertain |
| **AA Required?** | Further back-ground environmental condition information required to eliminate aerial emissions as significant at the nominated site. |

| River Ehen SAC Construction (duration approx 5 years) | |
|---|---|
| **Habitats and Species (Loss and Fragmentation)** | |
| **Potential Impacts: Pathway** | Construction of cooling water culverts, extension of site into 'buffer' habitats, possible development at the coastal fringes (sea walls/ flood defense measures) |
| **Potential effects on the SAC: Receptor** | Movement of migratory fish such as the qualifying interest, Atlantic Salmon, could be restricted as a result of construction of physical barriers (through culverts, drainage systems etc) within the section of the River Ehen which lies adjacent to the nominated site and within estuarine systems also used by this species (sea defences) |
| **Risk of Likely Significant Effect (LSE)?** | Atlantic Salmon a migratory species and primary qualifying feature of the SAC are vulnerable to changes to their habitat and in particular, physical barriers within the water catchments and estuarine system. |
| **Potential Impacts - other Plans and Programmes** | **Local Development Frameworks** (Cumbria) – Expansion of mineral and waste sites, future road schemes and planned coastal defences. Water and air quality (pollution), land take and habitat and species disturbance |
| **Risk from 'In Combination' Effects?** | Uncertain |
| **AA Required?** | Yes, dependant on the scale and extent of habitat loss and fragmentation |

## Source: Operation (duration approx 60 years)

| River Ehen SAC Operation (duration approx 60 years) | |
|---|---|
| **Water Resources/ Quality** | |
| **Potential Impacts: Pathway** | Potential impacts on quality from discharges (radioactive and non-radioactive) and from the abstraction and discharge of water for cooling (heated water up to 10ºc warmer than the receiving environment). |
| **Potential effects on the SAC: Receptor** | Potential for indirect toxic contamination from accidental leakage.<br><br>Potential for indirect radioactive discharges (accidental and routine).<br><br>Alteration of water flow/levels from abstraction.<br><br>Changes to water quality and of water temperature can impact species composition/encourage excessive algal growth. Heated water release can result in incidental mortality of fish and other aquatic species.<br><br>Impingement and entrainment of fish (larvae and eggs) and other aquatic species at water intakes/condenser units. The River Ehen supports migratory Atlantic Salmon that move through the estuary and the sea and the rivers (the mouth of the River Ehen lies south of the nominated site)<br><br>Biocides used to clean cooling infrastructure have potential to impact receiving environment. |
| **Risk of Likely Significant Effect (LSE)?** | The River Ehen SAC is located within the same catchment area as the nominated site, with part of the river system (an undesignated section) adjacent to the site.<br><br>Potential for likely significant effect on the SAC through indirect processes. Atlantic Salmon, a migratory species are a primary qualifying feature of the SAC and are vulnerable to changes in water quality. Any impact on Atlantic salmon also has implications for the Fresh Water Pearl Mussel. The mussel spends its glochidal stage attached to the gills of the salmonid fishes and therefore is dependent on the maintenance of the salmon population.<br><br>The current ecological status of the River Ehen is good (EA, RBMP data, 2008).<br><br>The River Ehen SAC is located within WMRU6 and is currently over licensed (EA, CAMS, April 2007). |

| River Ehen SAC Operation (duration approx 60 years) | |
|---|---|
| **Water Resources/ Quality** | |
| | Likely significant effects cannot be ruled out at this stage |
| **Potential Impacts - other Plans and Programmes** | **Local Development Frameworks** (Cumbria) – Expansion of mineral and waste sites, future road schemes and planned coastal defences. Water and air quality (pollution), land take and habitat and species disturbance |
| **Risk from 'In Combination' Effects?** | Uncertain |
| **AA Required?** | Yes |

| River Ehen SAC Operation (duration approx 60 years) | |
|---|---|
| **Air Quality** | |
| **Potential Impacts: Pathway** | Potential local impacts from increased development/ traffic growth. |
| **Potential effects on the SAC: Receptor** | The SAC is located 7.7km to the north of the site. Local level impacts (reduced air quality, NOx gases from road/ transport/ generation sources) arising from, operation activities.<br><br>Indirect impacts – through changes to water quality from aerial deposition, in particular eutrophication through nitrogen deposition. |
| **Risk of Likely Significant Effect (LSE)?** | Air quality is not an identified vulnerability for the SAC, although the potential effects of increased nutrient loading from air borne pollutants should be considered in the context of known scale/ known environmental conditions.<br><br>Likely significant effects cannot be ruled out at this stage |
| **Potential Impacts - other Plans and Programmes** | **Local Development Frameworks** (Cumbria) – Expansion of mineral and waste sites, future road schemes and planned coastal defences. Water and air quality (pollution), land take and habitat and species disturbance |
| **Risk from 'In Combination' Effects?** | Uncertain |
| **AA Required?** | Further back-ground environmental condition information required to eliminate aerial emissions as significant at this site. |

| River Ehen SAC Operation (duration approx 60 years) | |
|---|---|
| **Habitat Loss and Fragmentation** | |
| **Potential Impacts: Pathway** | Potential for fragmentation of habitat through loss of buffer habitats (land between designated areas) for proposed site.<br><br>Abstraction and discharge of water for cooling (heated water up to $10^{o}$ c warmer than the receiving environment). |
| **Potential effects on the SAC: Receptor** | Movement of migratory fish such as the qualifying interest, Atlantic Salmon, could be restricted as a result of construction of physical barriers (through culverts, drainage systems etc) within the section of the River Ehen which lies adjacent to the nominated site and within estuarine systems also used by this species (sea defences)<br><br>Potential direct loss and fragmentation of migratory fish from physical barriers through the placement and operation of cooling water intake and outfall infrastructure. |
| **Risk of Likely Significant Effect (LSE)?** | Potential for operational effects of changes to water quality and temperature to result in adverse effects on migratory fish populations. Investigation needed to determine whether changes are likely to be significant.<br><br>Associated effects of abstraction may result in increased mortality of fish including Atlantic Salmon a migratory species and primary qualifying feature of the SAC. Any impact on Atlantic salmon also has implications for the Fresh Water Pearl Mussel. The mussel spends its glochidal stage attached to the gills of the salmonid fishes and therefore is dependent on the maintenance of the salmon population.<br>The River Ehen SAC is located within WMRU6 and is currently over licensed (EA, CAMS, April 2007).<br><br>Risk of likely significant effect. |
| **Potential Impacts - other Plans and Programmes** | **Local Development Frameworks** (Cumbria) – Expansion of mineral and waste sites, future road schemes and planned coastal defences. Water and air quality (pollution), land take and habitat and species disturbance |
| **Risk from 'In Combination' Effects?** | Uncertain |
| **AA Required?** | Yes, dependant on the scale and extent of habitat loss and fragmentation |

## Source: Decommissioning (duration approx 30 years)

| River Ehen SAC Decommissioning (duration approx 30 years) | |
|---|---|
| **Water Resources/ Quality** | |
| **Potential Impacts: Pathway** | Potential for effects on quality/ drainage from interim storage general and radioactive (accidental leakage/ pollution incidents). Potential impacts of toxins/ pollution noted above |
| **Potential effects on the SAC: Receptor** | The River Ehen SAC is located within the same catchment area as the nominated site, with part of the river system (undesignated section) adjacent to the site.<br><br>Changes to water quality composition can impact species composition/ encourage excessive algal growth – results in wider impacts on dependant species.<br><br>Fish species are vulnerable to changes in water quality and temperature. |
| **Risk of Likely Significant Effect (LSE)?** | Potential for likely significant effect on SAC through indirect effects on. Atlantic Salmon, a primary qualifying feature, which is vulnerable to changes in water quality. Any impact on Atlantic salmon also has implications for the Fresh Water Pearl Mussel. The mussel spends its glochidal stage attached to the gills of the salmonid fishes and therefore is dependent on the maintenance of the salmon population.<br><br>The River Ehen SAC is located within WMRU6 and is currently over licensed (EA, CAMS, April 2007).<br><br>Likely significant effects cannot be ruled out at this stage |
| **Potential Impacts - other Plans and Programmes** | **Local Development Frameworks** (Cumbria) – Expansion of mineral and waste sites, future road schemes and planned coastal defences. Water and air quality (pollution), land take and habitat and species disturbance |
| **Risk from 'In Combination' Effects?** | Uncertain |
| **AA Required?** | Yes |

| River Ehen SAC Decommissioning (duration approx 30 years) | |
|---|---|
| **Air Quality** | |
| **Potential Impacts: Pathway** | Potential for local level effects in line with increased traffic/ transportation/ development. |
| **Potential effects on the SAC: Receptor** | The SAC is located 7.7km to the north of the site.Local level impacts (reduced air quality, NOx gases from road/ transport/ generation sources) arising from decommissioning activities.<br><br>An increase in airborne pollutants can lead to nutrient loading within the SAC resulting in species changes within habitat communities. |
| **Risk of Likely Significant Effect (LSE)?** | Air quality is not an identified vulnerability for the SAC, although the potential effects of increased nutrient loading from air borne pollutants should be considered in the context of known scale/ known environmental conditions.<br><br>Likely significant effects cannot be ruled out at this stage |
| **Potential Impacts - other Plans and Programmes** | **Local Development Frameworks** (Cumbria) – Expansion of mineral and waste sites, future road schemes and planned coastal defences. Water and air quality (pollution), land take and habitat and species disturbance |
| **Risk from 'In Combination' Effects?** | Unknown |
| **AA Required?** | Further back-ground environmental condition information required to eliminate aerial emissions as significant at this site. |

| River Ehen SAC Decommissioning (duration approx 30 years) | |
|---|---|
| **Habitat Loss and Fragmentation** | |
| **Potential Impacts: Pathway** | Changes to footprint of site through decommissioning activities for example. to accommodate waste storage, develop infrastructure.<br><br>Intake of water for cooling and discharge of (heated) cooling water to tidal reservoir and main estuary. |
| **Potential effects on the SAC: Receptor** | Habitat loss and fragmentation effects on migratory fish from physical barriers (through culverts, drainage systems etc) within the River Ehen adjacent to the nominated site and within estuarine systems (sea defences)<br><br>Cooling water discharge can result in areas of significantly or permanently warmed water, which although small may result in direct changes to species composition.<br><br>Biocides used to clean cooling infrastructure have potential to impacts receiving environment |
| **Risk of Likely Significant Effect (LSE)?** | Habitat loss (aquatic and intertidal) and/ or fragmentation has the potential to impact upon Atlantic Salmon a migratory species and primary qualifying feature of the SAC sensitive to habitat fragmentation through physical barriers within the water catchments and estuarine system. Any impact on Atlantic salmon also has implications for the Fresh Water Pearl Mussel. The mussel spends it's glochidal stage attached to the gills of the salmonid fishes and therefore is dependent on the maintenance of the salmon population.<br><br>Abstraction of water and associated effects may result in mortality of fish and aquatic species.<br><br>The River Ehen SAC is located within WMRU6 and is currently over licensed (EA, CAMS, April 2007).<br><br>Likely significant effects cannot be ruled out at this stage |
| **Potential Impacts - other Plans and Programmes** | **Local Development Frameworks** (Cumbria) – Expansion of mineral and waste sites, future road schemes and planned coastal defences. Water and air quality (pollution), land take and habitat and species disturbance |
| **Risk from 'In Combination' Effects?** | Uncertain |

| River Ehen SAC Decommissioning (duration approx 30 years) | |
|---|---|
| **Habitat Loss and Fragmentation** | |
| **AA Required?** | Yes, dependant on the scale and extent of habitat loss and fragmentation |

# Wast Water SAC

## Source: Construction (duration approx 5 years)

| Wast Water SAC Construction (duration approx 5 years) | |
|---|---|
| **Water Resources** | |
| **Potential Impacts: Pathway** | Potential impacts from increased water abstraction |
| **Potential effects on the SAC: Receptor** | Alteration of water flow/levels from abstraction |
| **Risk of Likely Significant Effect (LSE)?** | British Nuclear Fuels Limited abstracts water from the lake, it is not thought that present rates of abstraction affect the SAC. However, further abstraction pressure may alter this situation.<br><br>Wast Water SAC is within WMRU 8, current status is no water available (EA, CAMS, April 2007). |
| **Potential Impacts - other Plans and Programmes** | **Local Development Frameworks** (Cumbria) – Expansion of mineral and waste sites, future road schemes and planned coastal defences. Water and air quality (pollution), land take and habitat and species disturbance. |
| **Risk from 'In Combination' Effects?** | Uncertain |
| **AA Required?** | Yes |

| Wast Water SAC Construction (duration approx 5 years) | |
|---|---|
| **Air Quality** | |
| **Potential Impacts: Pathway** | Potential local impacts from increased development/ traffic growth. |
| **Potential effects on the SAC: Receptor** | Local level impacts (reduced air quality, $NO_x$ gases from road/ transport/ generation sources) arising from construction activities.<br><br>An increase in airborne pollutants could lead to nutrient loading within the SAC. |
| **Risk of Likely Significant Effect (LSE)?** | The absence of atmospheric pollution<br>is identified as a key environmental condition of the SAC. The potential effects of increased nutrient loading from air borne pollutants should be considered in the context of known scale/ known environmental conditions. The SAC is located 12.1km to the east of the site. |
| **Potential Impacts - other Plans and Programmes** | **Local Development Frameworks** (Cumbria) – Expansion of mineral and waste sites, future road schemes and planned coastal defences. Water and air quality (pollution), land take and habitat and species disturbance. |
| **Risk from 'In Combination' Effects?** | Uncertain |
| **AA Required?** | Further back-ground environmental condition information required to eliminate aerial emissions as significant at this site |

## Source: Operation (duration approx 60 years)

| Wast Water SAC Operation(duration approx 60 years) | |
|---|---|
| **Water Resources/Quality** | |
| **Potential Impacts: Pathway** | Potential impacts on quality from discharges (radioactive and non-radioactive) and from the abstraction and discharge of water for cooling (heated water up to 10ºc warmer than the receiving environment. |
| **Potential effects on the SAC: Receptor** | Wast Water SAC is located 12.1km to the east of the nominated site and is located within the same catchment area<br>Abstraction of water directly from the waterbody as well as watercourses that are fed by the waterbody could exacerbate current draw down rates and result in changes to the qualifying aquatic plant communities. |
| **Risk of Likely Significant Effect (LSE)?** | A key environmental condition of the SAC is to maintain current range of fluctuations in lake levels. British Nuclear Fuels Limited abstracts water from the lake, but it is not thought that present rates of abstraction adversely affect the special interest. However, this could alter if water requirements for the proposed development are also to be met from abstraction from this SAC (with the possibility of in-combination effects of both power stations operating concurrently).<br><br>Likely significant effects cannot be ruled out at this stage |
| **Potential Impacts - other Plans and Programmes** | **Local Development Frameworks** (Cumbria) – Expansion of mineral and waste sites, future road schemes and planned coastal defences. Water and air quality (pollution), land take and habitat and species disturbance |
| **Risk from 'In Combination' Effects?** | Uncertain |
| **AA Required?** | Yes |

| Wast Water SAC Operation (duration approx 60 years) | |
|---|---|
| **Air Quality** | |
| **Potential Impacts: Pathway** | Potential local impacts from increased development/ traffic growth. |
| **Potential effects on the SAC: Receptor** | Local level impacts (reduced air quality, NOx gases from road/ transport/ generation sources) arising from, operation activities.<br><br>Indirect impacts – through changes to water quality from aerial deposition. |
| **Risk of Likely Significant Effect (LSE)?** | The absence of atmospheric pollution is identified as a key environmental condition of the SAC. The potential effects of increased nutrient loading from air borne pollutants should be considered in the context of known scale/ known environmental conditions. The SAC is located 12.1km to the east of the site |
| **Potential Impacts - other Plans and Programmes** | **Local Development Frameworks** (Cumbria) – Expansion of mineral and waste sites, future road schemes and planned coastal defences. Water and air quality (pollution), land take and habitat and species disturbance. |
| **Risk from 'In Combination' Effects?** | Uncertain |
| **AA Required?** | Further back-ground environmental condition information required to eliminate aerial emissions as significant at this site. |

## Source: Decommissioning (duration approx 30 years)

| Wast Water SAC Decommissioning (duration approx 30 years) | |
|---|---|
| **Water Resources** | |
| **Potential Impacts: Pathway** | Potential impacts from increased water abstraction. |
| **Potential effects on the SAC: Receptor** | Alteration of water flow/levels from abstraction |
| **Risk of Likely Significant Effect (LSE)?** | British Nuclear Fuels Limited abstracts water from the lake, it is not thought that present rates of abstraction affect the SAC. However, further abstraction pressure may alter this situation.<br><br>Wast Water SAC is within WMRU 8, current status is no water available (EA, CAMS, April 2007). |
| **Potential Impacts - other Plans and Programmes** | **Local Development Frameworks** (Cumbria) – Expansion of mineral and waste sites, future road schemes and planned coastal defences. Water and air quality (pollution), land take and habitat and species disturbance. |
| **Risk from 'In Combination' Effects?** | Uncertain |
| **AA Required?** | Yes |

| Wast Water SAC Decommissioning (duration approx 30 years) | |
|---|---|
| **Water Resources** | |
| **Potential Impacts: Pathway** | Potential impacts from increased water abstraction. |
| **Potential effects on the SAC: Receptor** | Alteration of water flow/levels from abstraction |
| **Risk of Likely Significant Effect (LSE)?** | British Nuclear Fuels Limited abstracts water from the lake, it is not thought that present rates of abstraction affect the SAC. However, further abstraction pressure may alter this situation.<br><br>Wast Water SAC is within WMRU 8, current status is no water available (EA, CAMS, April 2007). |
| **Potential Impacts - other Plans and Programmes** | **Local Development Frameworks** (Cumbria) – Expansion of mineral and waste sites, future road schemes and planned coastal defences. Water and air quality (pollution), land take and habitat and species disturbance. |
| **Risk from 'In Combination' Effects?** | Uncertain |
| **AA Required?** | Yes |

| Wast Water SAC Decommissioning (duration approx 30 years) | |
|---|---|
| **Air Quality** | |
| **Potential Impacts: Pathway** | Potential local impacts from increased development/ traffic growth associated with decommissioning and the emissions arising from [de]construction activity. Likely to be restricted to a local level for example dust/ particulates. |
| **Potential effects on the SAC: Receptor** | Local level impacts (reduced air quality, NOx gases from road/ transport/ generation sources) arising from decommissioning activities.<br><br>An increase in airborne pollutants can lead to nutrient loading within the SAC. |
| **Risk of Likely Significant Effect (LSE)?** | The absence of atmospheric pollution is identified as a key environmental condition of the SAC. The potential effects of increased nutrient loading from air borne pollutants should be considered in the context of known scale/ known environmental conditions. The SAC is located 12.1km to the east of the site. |
| **Potential Impacts - other Plans and Programmes** | **Local Development Frameworks** (Cumbria) – Expansion of mineral and waste sites, future road schemes and planned coastal defences. Water and air quality (pollution), land take and habitat and species disturbance. |
| **Risk from 'In Combination' Effects?** | Uncertain |
| **AA Required?** | Further back-ground environmental condition information required to eliminate aerial emissions as significant at this site. |

# River Derwent and Bassenthwaite SAC

## Source: Construction (duration approx 5 years)

| River Derwent and Bassenthwaite SAC Construction (duration approx 5 years) | |
|---|---|
| **Water Resources/Quality** | |
| **Potential Impacts: Pathway** | Potential impacts from increased water abstraction |
| **Potential effects on the SAC: Receptor** | Alteration of water flow and sedimentation patterns from abstraction |
| **Risk of Likely Significant Effect (LSE)?** | Fish species including Atlantic salmon and Sea, Brook and River Lamprey, primary qualifying features of the SAC are vulnerable to changes in both flow regimes and sedimentation patterns. The River Derwent and Bassenthwaite SAC is located over 15km to the north of the nominated site and is located within the same catchment area.<br><br>The River Derwent and Bassenthwaite SAC falls within WMRU 3 'Upper Derwent' and WMRU 4 'Lower Derwent and River Marron', although the Upper Derwent has a status of water available, the Lower Derwent is classified as 'no water available' as a target status to 2019 (EA, CAMS, April 2007).<br><br>Potential for construction effects of changes to water flow and sedimentation patterns could result in adverse effects within the SAC. |
| **Potential Impacts - other Plans and Programmes** | Fish species including Atlantic salmon and Sea, Brook and River Lamprey, primary qualifying features of the SAC are vulnerable to changes in both flow regimes and sedimentation patterns. The River Derwent and Bassenthwaite SAC is located over 15km to the north of the nominated site and is located within the same catchment area.<br><br>The River Derwent and Bassenthwaite SAC falls within WMRU 3 'Upper Derwent' and WMRU 4 'Lower Derwent and River Marron', although the Upper Derwent has a status of water available, the Lower Derwent is classified as 'no water available' as a target status to 2019 (EA, CAMS, April 2007).<br><br>Potential for construction effects of changes to water flow and sedimentation patterns could result in adverse effects within the SAC. |

| River Derwent and Bassenthwaite SAC Construction (duration approx 5 years) | |
|---|---|
| **Water Resources/Quality** | |
| **Risk from 'In Combination' Effects?** | Uncertain |
| **AA Required?** | Yes |

| River Derwent and Bassenthwaite SAC Construction (duration approx 5 years) | |
|---|---|
| **Air Quality** | |
| **Potential Impacts: Pathway** | Potential local impacts from increased development/ traffic growth |
| **Potential effects on the SAC: Receptor** | Local level impacts (reduced air quality, NOx gases from road/ transport/ generation sources) arising from construction activities.<br><br>An increase in airborne pollutants could lead to nutrient loading within the SAC |
| **Risk of Likely Significant Effect (LSE)?** | The absence of atmospheric pollution is identified as a key environmental condition of the SAC. The potential effects of increased nutrient loading from air borne pollutants should be considered in the context of known scale/ known environmental conditions. The SAC is located over 15km to the north of the site |
| **Potential Impacts - other Plans and Programmes** | **Local Development Frameworks** (Cumbria) – Expansion of mineral and waste sites, future road schemes and planned coastal defences. Water and air quality (pollution), land take and habitat and species disturbance. |
| **Risk from 'In Combination' Effects?** | Uncertain |
| **AA Required?** | Further back-ground environmental condition information required to eliminate aerial emissions as significant at this site |

## Source: Operation (duration approx 60 years)

| River Derwent and Bassenthwaite SAC Operation (duration approx 60 years) | |
|---|---|
| **Water resources/Quality** | |
| **Potential Impacts: Pathway** | Potential impacts on quality from discharges (radioactive and non-radioactive) and from the abstraction and discharge of water for cooling (heated water up to 10ºc warmer than the receiving environment.<br><br>Potential impacts from increased water abstraction |
| **Potential effects on the SAC: Receptor** | Alteration of water flow and sedimentation patterns from abstraction |
| **Risk of Likely Significant Effect (LSE)?** | Fish species including Atlantic salmon and Sea, Brook and River Lamprey, primary qualifying features of the SAC are vulnerable to changes in both flow regimes and sedimentation patterns. The River Derwent and Bassenthwaite SAC is located over 15km to the north of the nominated site and is located within the same catchment area.<br><br>Potential for operation effects of changes to water flow and sedimentation patterns could result in adverse effects within the SAC.<br><br>The River Derwent and Bassenthwaite SAC falls within WMRU 3 'Upper Derwent' and WMRU 4 'Lower Derwent and River Marron', although the Upper Derwent has a status of water available, the Lower Derwent is classified as 'no water available' as a target status to 2019 (EA, CAMS, April 2007).<br><br>Accidental radioactive discharges are unlikely given the level of regulatory control. Risk of significant effect of this is therefore unlikely |
| **Potential Impacts - other Plans and Programmes** | **Local Development Frameworks** (Cumbria) – Expansion of mineral and waste sites, future road schemes and planned coastal defences. Water and air quality (pollution), land take and habitat and species disturbance. |
| **Risk from 'In Combination' Effects?** | Uncertain |
| **AA Required?** | Yes |

| River Derwent and Bassenthwaite SAC Operation (duration approx 60 years) | |
|---|---|
| **Air Quality** | |
| **Potential Impacts: Pathway** | Potential local impacts from increased development/ traffic growth. |
| **Potential effects on the SAC: Receptor** | Local level impacts (reduced air quality, NOx gases from road/ transport/ generation sources) arising from, operation activities.<br><br>Indirect impacts – through changes to water quality from aerial deposition. |
| **Risk of Likely Significant Effect (LSE)?** | The absence of atmospheric pollution is identified as a key environmental condition of the SAC. The potential effects of increased nutrient loading from air borne pollutants should be considered in the context of known scale/ known environmental conditions. The SAC is located 15km to the north of the site. |
| **Potential Impacts - other Plans and Programmes** | **Local Development Frameworks** (Cumbria) – Expansion of mineral and waste sites, future road schemes and planned coastal defences. Water and air quality (pollution), land take and habitat and species disturbance. |
| **Risk from 'In Combination' Effects?** | Uncertain |
| **AA Required?** | Further back-ground environmental condition information required to eliminate aerial emissions as significant at this site |

## Source: Decommissioning (duration approx 30 years)

| River Derwent and Bassenthwaite SAC Decommissioning (duration approx 30 years) | |
|---|---|
| **Water Resources** | |
| **Potential Impacts: Pathway** | Potential impacts from increased water abstraction. |
| **Potential effects on the SAC: Receptor** | Alteration of water flow and sedimentation patterns from abstraction |
| **Risk of Likely Significant Effect (LSE)?** | Fish species including Atlantic salmon and Sea, Brook and River Lamprey, primary qualifying features of the SAC are vulnerable to changes in both flow regimes and sedimentation patterns. The River Derwent and Bassenthwaite SAC is located over 15km to the north of the nominated site and is located within the same catchment area.<br><br>The River Derwent and Bassenthwaite SAC falls within WMRU 3 'Upper Derwent' and WMRU 4 'Lower Derwent and River Marron', although the Upper Derwent has a status of water available, the Lower Derwent is classified as 'no water available' as a target status to 2019 (EA, CAMS, April 2007).<br><br>Potential for decommissioning effects of changes to water flow and sedimentation patterns could result in adverse effects within the SAC. |
| **Potential Impacts - other Plans and Programmes** | **Local Development Frameworks** (Cumbria) – Expansion of mineral and waste sites, future road schemes and planned coastal defences. Water and air quality (pollution), land take and habitat and species disturbance. |
| **Risk from 'In Combination' Effects?** | Uncertain |
| **AA Required?** | Yes |

| River Derwent and Bassenthwaite SAC Decommissioning (duration approx 30 years) | |
|---|---|
| **Air Quality** | |
| **Potential Impacts: Pathway** | Potential local impacts from increased development/ traffic growth associated with decommissioning and the emissions arising from [de]construction activity. Likely to be restricted to a local level for example dust/ particulates. |
| **Potential effects on the SAC: Receptor** | Local level impacts (reduced air quality, NOx gases from road/ transport/ generation sources) arising from decommissioning activities.<br><br>An increase in airborne pollutants can lead to nutrient loading within the SAC. |
| **Risk of Likely Significant Effect (LSE)?** | The absence of atmospheric pollution is identified as a key environmental condition of the SAC. The potential effects of increased nutrient loading from air borne pollutants should be considered in the context of known scale/ known environmental conditions. The SAC is located over 15km to the north of the site. |
| **Potential Impacts - other Plans and Programmes** | **Local Development Frameworks** (Cumbria) – Expansion of mineral and waste sites, future road schemes and planned coastal defences. Water and air quality (pollution), land take and habitat and species disturbance. |
| **Risk from 'In Combination' Effects?** | Uncertain |
| **AA Required?** | Further back-ground environmental condition information required to eliminate aerial emissions as significant at this site |

# Appendix 4: HRA/ Appropriate Assessment Proforma

## Drigg Coast SAC

- **Location: 032547W/ 542102N**
- **Size (ha): 1397.44**
- **Designation: SAC**

| | Drigg Coast SAC |
|---|---|
| **Qualifying Features** | Annex I habitats that are a primary reason for selection of this site<br><br>**1130 Estuaries**<br>**2150 Atlantic decalcified fixed dunes (*Calluno-Ulicetea*)** * Priority feature<br>**2170 Dunes with *Salix repens* ssp. *argentea* (*Salicion arenariae*)**<br><br>Annex I habitats present as a qualifying feature, but not a primary reason for selection of this site<br><br>**1140 Mudflats and sandflats not covered by seawater at low tide**<br>**1310 *Salicornia* and other annuals colonising mud and sand**<br>**1330 Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)**<br>**2110 Embryonic shifting dunes**<br>**2120 Shifting dunes along the shoreline with *Ammophila arenaria* (`white dunes`)**<br>**2130 Fixed dunes with herbaceous vegetation (`grey dunes`)** * Priority feature<br>**2190 Humid dune slacks** |
| **Conservation Objectives** | Subject to natural change, maintain the estuaries in favourable condition 6, in particular:<br>• Intertidal mudflat and sandflat communities |

| | Drigg Coast SAC |
|---|---|
| | • Saltmarsh communities<br>• Boulder and cobble scar communities<br><br>In pursuit of the conservation objective for the estuary complex, the relevant and competent authorities for the Drigg Coast European marine site are advised to manage human activities within their remit such that they do not result in deterioration or disturbance to the habitats or species for which the site has been selected, through any of the following:<br>• Increased radionuclide toxic contamination<br>• Nutrient and/or organic enrichment. |
| **Key Environmental Conditions (factors that maintain site integrity)** | • Maintain morphological equilibrium of the estuary, including sedimentation patterns<br>• Maintain temperature and salinity levels within natural range<br>• Avoidance of pollution<br>• Avoidance of nutrient enrichment<br>• Appropriate grazing of saltmarsh communities<br>• No physical constraints to natural migration of mobile habitats such as dunes<br>• Maintain minimal impact of fishing, bait digging and dredging<br>• High enough water table for dune slacks<br>• Avoidance of damaging levels of erosion from human activities<br>• No increase in organic matter in sediments<br>• No physical constraints to managed realignment if required in response to costal squeeze<br>• Control of bracken/ scrub<br>• Control of invasive and/or non-native species<br><br>(Habitats Regulations Assessment of the North West Regional Spatial Strategy, September 2008 Consolidated Report Prepared for the Government Office for the North West) |
| **Vulnerabilities (includes existing pressures and trends)** | • Physical loss<br>• Physical damage<br>• Toxic contamination |

| | Drigg Coast SAC |
|---|---|
| ***Details at Appendix 1*** | • Non-toxic contamination<br>• Biological disturbance |
| **Predicted Impacts**<br><br>***What are the issues arising from the plan and how might the site be affected?*** | **Water Resources and Quality**<br>• Increased/ altered drainage from earthworks and excavation<br>• Potential for toxic contamination from accidental leakage<br>• Radioactive discharges (accidental and routine)<br>• Changes to water temperature from controlled discharge<br>• Changes in salinity and siltation levels, changes in organic and nutrient loading and enrichment within the SAC<br><br>**Habitat (and Species) Loss and Fragmentation/Coastal Squeeze**<br>• Development along the coastal fringe can impact upon erosion and sediment transport regimes that are required to maintain designated habitats and species present within the SAC<br><br>**Air Quality**<br>• Impacts (reduced air quality, $NO_x$ gases from road/ transport/ generation sources) arising from construction, operation, decommissioning activities. |
| **Potential In-combination effects (screening)**<br>***What other plans and programmes could lead to in-combinations effects?*** | The following plans have the potential to contribute 'in-combination' impacts in relation to the key issues identified. In-combination impacts may be positive where the plans' function is to actively management those identified issues (for example Catchment Abstraction Management Strategies).<br><br>**Water Resources and Quality**<br>• Cumbria and Lake District Joint Structure Plan<br>• Cumbria Minerals and Waste Local Plan<br>• Shoreline Management Plan (SMP 2) St Bees Head to Earnse Point, 11-D<br>• Environment Agency Catchment Abstraction Management Strategies (The Derwent, West Cumbria and Duddon |

| | Drigg Coast SAC |
|---|---|
| | **Habitat (and Species) Loss and Fragmentation/ Coastal Squeeze**<br>• Cumbria Economic Strategy<br>• Cumbria and Lake District Joint Structure Plan<br>• Shoreline Management Plan (SMP 2) St Bees Head to Earnse Point, 11-D<br><br>**Air Quality**<br>• Cumbria and Lake District Joint Structure Plan<br>• Cumbria Minerals and Waste Local Plan<br>• Cumbria Local Transport Plan (LTP2)<br>• Shoreline Management Plan (SMP 2) St Bees Head to Earnse Point, 11-D |
| **Appropriate Assessment**<br><br>**Likelihood of adverse effect on integrity:** | **Water Resources and Quality**<br><br>• Current Environment Agency data[4] indicates that, the ecological and chemical status of the estuarine environments near to Drigg Coast (River Mite, River Irt and River Esk) are not yet assessed. As no assessment has been made to date, no predictions for 2015 status have been made.<br>• The current ecological status assessments for the coastal water quality; at up and downstream locations from Sellafield are assessed as being 'moderate' and the current chemical quality as 'high'. The EA predicts that in 2015 the ecological and chemical status will be 'moderate' and 'good' respectively<br>• The ecological status of the rivers around Sellafield is assessed as ranging from 'moderate' to 'good' ecological quality – the chemical condition of these rivers is assessed as being 'high'. The EA predicts that in 2015 the ecological and chemical status will both be 'good'. |

[4] Environment Agency River Basin Management Plans: South West River Basin District, 2008.
UKTG – Water Framework Directive Website: http://www.wfduk.org/
Environmental Agency – http://maps.environment-agency.gov.uk/wiyby/wiybyController?ep=maptopics&lang=_e

| | Drigg Coast SAC |
|---|---|
| | • Groundwater chemical quality around Sellafield is assessed by the EA as being 'good'. The EA predicts that in 2015 the chemical quality will also be 'good'.<br>• Radioactive discharges are subject to targets monitored by the EA and of the non-radioactive discharges, nitrate contributions are considered to be the most significant (research cited by the EA in the nuclear sector report). In particular it is noted that there can be measurable localised impacts on sea nutrient levels in the vicinity of discharges.<br>• Environmental condition data for Drigg Coast SAC (Appendix 1, Site Characterisations) relating to water quality highlights that the temperature and salinity levels should be maintained within the natural range and nutrient enrichment, and pollution should be avoided. Therefore, whilst current water quality indicators show ecological and chemical levels around Sellafield to be 'moderate' or higher, it is not possible (without further information on discharge levels and quality) to conclude that discharges both radioactive and non-radioactive will not have an adverse effect on the SAC.<br>• The water resource management unit WMRU around Sellafield is managed through the EA CAMS process. This CAMS area is largely rural, but there are significant industrial water abstractors along the coast. Throughout the area small-scale water abstraction is important for a range of uses including agriculture, hydropower, campsites and private water supply. The largest water abstractions within this CAMS area are from lakes and reservoirs. Water from Wast Water SAC is used at the Sellafield site. Public water supply for the area is mainly from Crummock Water and Ennerdale, along with a number of smaller reservoirs. Thirlmere is used to supply water locally and elsewhere in the North-West. Given that water abstraction requirements and locations for Sellafield are currently unknown, it is not possible to conclude that water supply to the development will avoid levels of abstraction that lead to adverse effects on the SAC.<br><br>**Habitat (and Species) Loss and Fragmentation/Coastal Squeeze**<br>• The Cumbria Shoreline Management Plan (SMP), states wave conditions at the Braystones Site occur predominantly from the south-west, which results in a net northerly drift of sediment. However, |

| | Drigg Coast SAC |
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| | with prevailing tidal conditions to the south-east, the balance of littoral drift is considered sensitive to combinations of storm and tide[5].<br>• The Sellafield Site falls within Unit No.4 of the shoreline management plan 'Pow Beck to Whitriggs Scar'[6]. Long term predictions observe the coast around the Sellafield Site is expected to remain relatively stable. However, over time (0-50 years) rising sea levels may impact, resulting in observable coastal changes. Thus further extensions of coastal defences along the coastal fringe may be required.<br><br>**Air Quality**<br><br>• The EA state that emissions to air form major industrial sites in the North West have reduced substantially (but traffic is causing air quality problems in major cities) and that air quality in the North West is improving<br>• Information provided by the UK Air Pollution Information System[1] indicates that air quality within the area (centred on the SAC and including Sellafield, up to a resolution of 5km) is generally good with pollution levels for all key pollutants (sulphur dioxide and nitrogen dioxide) typically low. However, sensitivities and critical loads have been identified for the interest features within the SAC and have revealed that for nitrogen dioxide current deposition levels are within and past exceedence level ranges. For both shifting and fixed dune systems current deposition levels for Nitrogen when compared to critical loads for these habitats is in exceedence by a range of 10 to 20 kg/N//ha/yr. The effects of this eutrophication for fixed dunes systems can be an increase in tall grasses, decrease in prostrate plants and an increased Nitrogen leaching. For shifting dune systems effects can be a biomass increase and increase in Nitrogen leaching |

[5]North West England and North Wales Shoreline Management Plan, Appendix C: Baseline Process Understanding, Report C2 – General overview of current understanding, Revision 05/12/2008
http://mycoastline.org/index.php?option=com_content&task=view&id=156&Itemid=140
[6] St Bees Head to Earnse Point Shoreline Management Plan Sub-cell 11d: CPU 4; Management Unit No.4 : Pow Beck to Whitriggs Scar
http://www.mycoastline.org/images/pdf/subcell11d/11datlasmu4.pdf

| | Drigg Coast SAC |
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| | • The Environment Agency assesses that, non-radioactive aerial emissions (sulphur dioxide, nitrogen oxides and volatile organic compounds) from nuclear power stations are extremely low compared with other regulated industries and the Agency does not consider them to be an environmental priority.<br>• The Agency's most recent available assessment of radioactive aerial emissions indicates that all fall within authorised limits.[7]<br>• Air quality issues around Sellafield are considered to potentially be most significant during construction and decommissioning phases (transport etc). The potential for cumulative effects from other plans and programmes is minimised by sustainable transport measures set out in the Local Transport Plan for Cumbria, and the main focus of new housing development being located away from Sellafield to the north of the nearest main town of Workington and Whiteheaven. However, cumulative effects from other plans in the local and north west area and the known air quality conditions it is not possible to conclude that that there will not be adverse effects on the SAC. |
| **Possible Avoidance and Mitigation Measures – *includes recommendations for policy/proposals*** | **Water Resource and Quality**<br>• Avoiding adverse effects on surface, ground and estuarine waters is primarily the responsibility of the Water Companies (resource planning) and the Environment Agency (abstraction licensing and discharge regulation). However, the Nuclear NPS can direct requirements for efficiency of water use and require that issues relating to supply and discharge (including potential effects on N2K sites) are in place prior to the implementation of the nominated site proposals.<br><br>**Habitat (and Species) Loss and Fragmentation/Coastal Squeeze**<br>• Where proposals for design and build remain under development, the Nuclear NPS should seek to prioritise the prevention of any direct adverse impacts upon sensitive habitats and species which could lead to their loss or fragmentation. Preventative measures implemented should allow for the avoidance of key habitats and/or species during construction works, and ensure that adequate measures are implemented within construction environmental management plans to minimise direct |

[7] Measuring Environmental Performance: Sector Report for the Nuclear Industry (Environment Agency, Nov 2005).

| | Drigg Coast SAC |
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| | and indirect impacts upon habitats and species of factors such as disturbance, pollution etc. The interest features on the designated sites should guide the identification of potential mitigation and compensation measures.<br>• Habitat creation to replace habitats removed as a result of the development and to maintain connectivity of wildlife corridors around the development site should be undertaken as early as possible prior to the development works.<br>• Any direct impacts that may not be mitigated for successfully should be addressed through appropriate compensation measures agreed with Statutory Bodies and implemented prior to the commencement of development proposals.<br>• Further studies are necessary to determine risks of the development upon the ecological integrity of the cSAC. In particular, further understanding is required for those species and habitats within the cSAC that are noted to be in decline before mitigation and an assessment of likely effects can be undertaken.<br><br>**Air Quality**<br><br>• The Nuclear NPS should take account of potential air quality impacts through requirements, particularly at a local level for sustainable transport plans including for example: the use of non-road transport where possible, phasing of development and robust monitoring at sites to track changes. In particular, the monitoring should account for the potential for cumulative impacts where the phasing between existing power stations and the new build overlaps. |
| **Conclude no adverse effect on integrity?** | It is not possible at this stage of the development of the Nuclear NPS to say that proposals at Sellafield will not have significant adverse effects on the Drigg Coast SAC as a result of impacts to water quality, habitat (and species) loss and fragmentation, coastal squeeze water, changes to water quality and resource and indirect effects associated with air quality. |

## River Ehen SAC

- **Location: 032951W/ 543055N**
- **Size (ha): 24.39**
- **Designation: SAC**

| | River Ehen SAC |
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| **Qualifying Features** | Annex II species that are a primary reason for selection of this site:<br>**1029 Freshwater pearl mussel *Margaritifera margaritifera***<br><br>Annex II species present as a qualifying feature, but not a primary reason for site selection:<br>**1106 Atlantic salmon *Salmo salar*** |
| **Conservation Objectives** | At the time of preparing this HRA Report, the conservation objectives for this site had not been published. |
| **Key Environmental Conditions (factors that maintain site integrity)** | • Avoidance of water pollution (for example sheep dip)<br>• Maintenance of natural course of river<br>• Maintenance of sufficient flow<br>• Avoidance of nutrient enrichment<br>• Control of invasive and/or non-native species<br>• No physical barriers to fish migration<br>• Control of angling/netting; no pearl mussel fishing<br>• Controlled introductions of fish<br>• Clean gravel/hard rock substrate in some areas, silt and sand in others<br>• Low suspended solids (less than 10mg/l)<br>• Cool, soft water, well oxygenated<br>• Minimum disturbance to mussels by walking in river<br><br>(Habitats Regulations Assessment of the North West Regional Spatial Strategy, September 2008 |

| | River Ehen SAC |
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| | Consolidated Report Prepared for the Government Office for the North West) |
| **Vulnerabilities (includes existing pressures and trends)**<br>***Details at Appendix 1*** | • Eutrophication of the river from sewage works and agricultural run-off<br>• Pearl fishing<br>• River flow<br>• Changes in the physical and chemical conditions of their habitat<br>• Poor water quality<br>• Nutrient enrichment<br>• Sedimentation caused by catchment overgrazing, forestry activities and other land management practices<br>• Acidification, exacerbated by conifer afforestation<br>• Habitat removal and alteration through drainage schemes<br>• Flow regulation and fisheries management |
| **Predicted Impacts**<br><br>***What are the issues arising from the plan and how might the site be affected?*** | **Water Resources and Quality**<br>• Increased/ altered drainage from earthworks and excavation<br>• Potential for toxic contamination from accidental leakage<br>• Radioactive discharges (accidental and routine)<br>• Alteration of water flow/levels from abstraction<br>• Changes to water temperature from controlled discharge<br>• Changes in salinity and siltation levels, changes in organic and nutrient loading and enrichment within the SAC<br><br>**Habitat (and Species) Loss and Fragmentation**<br>• Habitat loss and fragmentation of migratory fish from physical barriers (through culverts, drainage systems etc) within the River Ehen adjacent to Sellafield and within estuarine estuarine/marine systems (potential sea defences and cooling water intake/outfall infrastructure)<br><br>**Air Quality**<br>• Impacts (reduced air quality, NOx gases from road/ transport/ generation sources) arising from |

| | River Ehen SAC |
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| | construction, operation, decommissioning activities. |
| **Potential In-combination effects (screening)** ***What other plans and programmes could lead to in-combinations effects?*** | The following plans have the potential to contribute 'in-combination' impacts in relation to the key issues identified. In-combination impacts may be positive where the plans' function is to actively management those identified issues (for example Catchment Abstraction Management Strategies).<br><br>**Water Resources and Quality**<br>• Cumbria and Lake District Joint Structure Plan<br>• Cumbria Minerals and Waste Local Plan<br>• Shoreline Management Plan (SMP 2) St Bees Head to Earnse Point, 11-D<br>• Environment Agency Catchment Abstraction Management Strategies (The Derwent, West Cumbria and Duddon<br><br>**Habitat (and species) Loss and Fragmentation**<br>• Cumbria and Lake District Joint Structure Plan<br>• Shoreline Management Plan (SMP 2) St Bees Head to Earnse Point, 11-D<br><br>**Air Quality**<br>• Cumbria and Lake District Joint Structure Plan<br>• Cumbria Minerals and Waste Local Plan<br>• Cumbria Local Transport Plan (LTP2)<br>• Shoreline Management Plan (SMP 2) St Bees Head to Earnse Point, 11d |
| **Appropriate Assessment**<br><br>**Likelihood of adverse effect on integrity:** | **Water Resources and Quality**<br>• Current Environment Agency data[8] indicates that, the ecological and chemical status of the estuarine environments near to the Drigg Coast (River Mite, River Irt and River Esk) are have not yet assessed. As no assessment has been made to date no predictions for 2015 status have not been made. |

[8] Environment Agency River Basin Management Plans: South West River Basin District, 2008.

| | River Ehen SAC |
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| | • The current ecological status assessments for the coastal water quality; up and downstream from Sellafield are assessed as being 'moderate' and the current chemical quality as 'high'. ,The EA predicts that in 2015 the ecological and chemical status will be 'moderate' and 'good' respectively<br>• The ecological status of the rivers around Sellafield is assessed as ranging from 'moderate' to 'good' ecological quality – the chemical condition of these rivers is assessed as being 'high'. The EA predicts that in 2015 the ecological and chemical status will both be 'good'.<br>• Groundwater chemical quality around Sellafield is assessed by the EA as being 'good'. The EA predicts that in 2015 the chemical quality will also be 'good'.<br>• Radioactive discharges are subject to targets monitored by the EA and of the non-radioactive discharges, nitrate contributions are considered to be the most significant (research cited by the EA in the nuclear sector report). In particular it is noted that there can be measurable localised impacts on sea nutrient levels in the vicinity of discharges.<br>• Environmental condition data for River Ehen SAC (Appendix 1, Site Characterisations) relating to water quality highlights the avoidance of nutrient enrichment, and water pollution, the maintenance of sufficient flow and the requirement for low suspended solids (lass than 10mg/l). Therefore, whilst current water quality indicators show ecological and chemical levels around Sellafield to be 'moderate' or higher, it is not possible (without further information on discharge levels and quality) to conclude that discharges both radioactive and non-radioactive will not have an adverse effect on the SAC.<br>• The water resource management unit WMRU around Sellafield is managed through the EA CAMS process. This CAMS area is largely rural, but there are significant industrial water abstractors along the coast. Throughout the area small-scale water abstraction is important for a range of uses including agriculture, hydropower, campsites and private water supply. The largest water abstractions within this CAMS area are from lakes and reservoirs. Water from Wast Water SAC is used at the Sellafield site. Public water supply for the area is mainly from Crummock Water and Ennerdale, along with a number of smaller reservoirs. Thirlmere is used to supply water locally and elsewhere in the North- |

UKTG – Water Framework Directive Website: http://www.wfduk.org/
Environmental Agency – http://maps.environment-agency.gov.uk/wiyby/wiybyController?ep=maptopicsandlang=_e

| | River Ehen SAC |
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| | West. Given that water abstraction requirements and locations for Sellafield are currently unknown, it is not possible to conclude that water supply to the development will avoid levels of abstraction that lead to adverse effects on the SAC.<br><br>**Habitat (and Species) Loss and Fragmentation**<br>• The extent of the loss and/or fragmentation of marine, intertidal and terrestrial habitats from the construction of nuclear reactors, construction areas and other infrastructure and facilities relating to the operation of the nuclear power station is currently unknown given that the exact scope of the development and the requirements for coastal or sea defence infrastructure remain undetermined at this stage. At this strategic stage where detailed development plans are unknown, it is therefore not possible to conclude that no adverse impacts upon the SAC will arise from the proposed development with regards to loss and fragmentation of habitats and species.<br><br>**Air Quality**<br>• The EA state that emissions to air form major industrial sites in the North West have reduced substantially (but traffic is causing air quality problems in major cities) and that air quality in the North West is improving<br>• Information provided by the UK Air Pollution Information System[1] indicates that air quality within the area (centred on the SAC and including Site, up to a resolution of 5km) have not been detailed. Decision on critical loads for eutrophication is to be taken at a site specific level since habitat sensitivity depends on N or P limitation For acidification there is a potential for a negative impact on qualifying species. The sensitivity of Freshwater Pearl Mussels and the sensitivity of salmon host populations to acidification combine to indicate that the species is at considerable risk from the effects of acidification, if mainly via indirect effects. It is recommended that an ANC of 30 µeql-1 be used in the setting of site-specific critical loads for Freshwater Pearl Mussels. (Freshwater Screening and Assessment Based on Freshwater Critical Loads, Environment Agency R and D Project Ref 12094, 1999). In waters acidified by atmospheric pollution (for example rather than naturally organic acid waters) aluminium toxicity is the principal problem. Salmon are most vulnerable at their early life stages in the nursery areas. The effect of exceedence is reduced recruitment leading to small populations of |

| | River Ehen SAC |
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| | irregular age structure or elimination. A critical ANC of 30 ?eql-1 is recommended. (Freshwater Screening and Assessment Based on Freshwater Critical Loads, Environment Agency R and D Project Ref 12094, 1999)<br>• The Environment Agency assesses that, non-radioactive aerial emissions (sulphur dioxide, nitrogen oxides and volatile organic compounds) from nuclear power stations are extremely low compared with other regulated industries and the Agency does not consider them to be an environmental priority.<br>• The Agency's most recent available assessment of radioactive aerial emissions indicates that all fall within authorised limits.[9]<br>• Air quality issues around Sellafield are considered to potentially most significant during construction and decommissioning phases (transport etc). The potential for cumulative effects in the area is minimised by sustainable transport measures set out in the Local Transport Plan for Cumbria, and the main focus of new housing development being located away from Sellafield to the north of the nearest main town of Workington and Whiteheaven. Therefore, in the context of: known air quality conditions; existing plans and (local level) management activities to regulate impacts; the N2K site characterisation data which indicates that the qualifying features are not considered vulnerable or at risk for issues of air quality; it is assessed that there is unlikely to be a significant effects on the SAC from air quality impacts. |
| **Possible Avoidance and Mitigation Measures – *includes recommendations for policy/proposals*** | **Water Resource and Quality**<br>• Avoiding adverse effects on surface, ground and estuarine waters is primarily the responsibility of the Water Companies (resource planning) and the Environment Agency (abstraction licensing and discharge regulation). However, the Nuclear NPS can direct requirements for efficiency of water use and require that issues relating to supply and discharge (including potential effects on N2K sites) are in place prior to the implementation of the nominated site proposals.<br><br>**Habitat (and Species) Loss and Fragmentation**<br>• Where proposals for design and build remain under development, the Nuclear NPS should seek to |

[9] Measuring Environmental Performance: Sector Report for the Nuclear Industry (Environment Agency, Nov 2005).

| | River Ehen SAC |
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| | prioritise the avoidance of direct habitat impacts, for example through habitat fragmentation that could impact on the integrity of the River Ehen SAC. Careful design of any features such as culverts, which could cause fragmentation to migratory fish, should be undertaken. Any direct impacts that cannot be avoided or mitigated should be addressed by compensation measures agreed with the Statutory Bodies and implemented prior to implementation of development proposals.<br><br>**Air Quality**<br>• The Nuclear NPS should take account of potential air quality impacts through requirements, particularly at a local level for sustainable transport plans including for example: the use of non-road transport where possible, phasing of development and robust monitoring at sites to track changes. In particular, the monitoring should account for the potential for cumulative impacts where the phasing between existing power stations and the new build overlaps.<br>. |
| **Conclude no adverse effect on integrity?** | It is not possible at this stage of the development of the Nuclear NPS to say that proposals at Sellafield will not have significant adverse effects on the River Ehen SAC as a result of impacts from potential water abstraction and changes to water quality and habitat (and species) loss and fragmentation and resource.<br><br>It is, however, considered that air quality impacts are unlikely to be significant given current environmental trends, known site vulnerabilities and available mitigation measures to address site level impacts. |

## Wast Water SAC

- **Location: 031721W/ 542638N**
- **Size (ha): 286.21**
- **Designation: SAC**

| | Wast Water SAC |
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| **Qualifying Features** | Annex II species that are a primary reason for selection of this site<br><br>3130 **Oligotrophic to mesotrophic standing waters with vegetation of the *Littorelletea uniflorae* and/or of the *Isoëto-Nanojuncetea*** |
| **Conservation Objectives** | At the time of preparing this HRA Report, the conservation objectives for this site had not been published. |
| **Key Environmental Conditions (factors that maintain site integrity)** | • Absence of water pollution<br>• Absence of atmospheric pollution<br>• Maintain poor to moderate nutrient levels<br>• Maintain current range of fluctuations in lake levels (in particular avoiding excessive drawdown in summer months)<br><br>(Habitats Regulations Assessment of the North West Regional Spatial Strategy, September 2008 Consolidated Report Prepared for the Government Office for the North West) |
| **Vulnerabilities (includes existing pressures and trends)**<br>***Details at Appendix 1*** | There are no known threats, human pressures or otherwise, which will adversely affect the water quality of Wast Water. British Nuclear Fuels Limited abstracts water from the lake, but it is not thought that present rates of abstraction adversely affect the special interest. |
| **Predicted Impacts** | **Water Resources and Quality** |

| | Wast Water SAC |
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| ***What are the issues arising from the plan and how might the site be affected?*** | • Alteration of water flow/levels from abstraction<br><br>**Air Quality**<br>• Impacts (reduced air quality, $NO_x$ gases from road/ transport/ generation sources) arising from construction, operation, decommissioning activities. |
| **Potential In-combination effects (screening)**<br>***What other plans and programmes could lead to in-combinations effects?*** | The following plans have the potential to contribute 'in-combination' impacts in relation to the key issues identified. In-combination impacts may be positive where the plans' function is to actively management those identified issues (for example Catchment Abstraction Management Strategies).<br><br>**Water Resources and Quality**<br>• Cumbria and Lake District Joint Structure Plan<br>• Cumbria Minerals and Waste Local Plan<br>• Shoreline Management Plan (SMP 2) St Bees Head to Earnse Point, 11-D<br>• Environment Agency Catchment Abstraction Management Strategies (The Derwent, West Cumbria and Duddon<br><br>**Air Quality**<br>• Cumbria and Lake District Joint Structure Plan<br>• Cumbria Minerals and Waste Local Plan<br>• Cumbria Local Transport Plan (LTP2)<br>• Shoreline Management Plan (SMP 2) St Bees Head to Earnse Point, 11-D |
| **Appropriate Assessment**<br><br>**Likelihood of adverse effect on integrity:** | **Water Resources and Quality**<br>• Current Environment Agency data[10] indicates that, the ecological and chemical status of the estuarine environments near to Sellafield are not yet assessed. As no assessment has been made to date no predictions for 2015 status have not been made. |

[10] Environment Agency River Basin Management Plans: South West River Basin District, 2008.

| | Wast Water SAC |
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| | • The current ecological status assessments for the coastal water quality; at up and downstream from Sellafield are assessed as being 'moderate' and the current chemical quality as 'high'. ,The EA predicts that in 2015 the ecological and chemical status will be 'moderate' and 'good' respectively<br>• The ecological status of the rivers around Sellafield is assessed as ranging from 'moderate' to 'good' ecological quality – the chemical condition of these rivers is assessed as being 'high'. The EA predicts that in 2015 the ecological and chemical status will both be 'good'.<br>• Groundwater chemical quality around Sellafield is assessed by the EA as being 'good'. The EA predicts that in 2015 the chemical quality will also be 'good'.<br>• The ecological status of Wast Water SAC is assessed as being 'good' but the chemical quality has not yet been assessed. The EA predicts that in 2015 the ecological status will also be 'good' but no prediction on the chemical quality can be made.<br>• Radioactive discharges are subject to targets monitored by the EA and of the non-radioactive discharges, nitrate contributions are considered to be the most significant (research cited by the EA in the nuclear sector report). In particular it is noted that there can be measurable localised impacts on sea nutrient levels in the vicinity of discharges.<br>• Environmental condition data for Wast Water SAC (Appendix 1, Site Characterisations and above) relating to water quality highlights the requirement for absence of water pollution, and the requirement to maintain poor to moderate nutrient levels and the current range in lake levels. Therefore, whilst current water quality indicators show ecological and chemical levels around Sellafield to be 'moderate' or higher, it is not possible (without further information on discharge levels and quality) to conclude that discharges both radioactive and non-radioactive will not have an adverse effect on the SAC.<br>• The water resource management unit WMRU around Sellafield is managed through the EA CAMS process. This CAMS area is largely rural, but there are significant industrial water abstractors along the coast. Throughout the area small-scale water abstraction is important for a range of uses including agriculture, hydropower, campsites and private water supply. The largest water abstractions within |

UKTG – Water Framework Directive Website: http://www.wfduk.org/
Environmental Agency – http://maps.environment-agency.gov.uk/wiyby/wiybyController?ep=maptopicsandlang=_e

| | Wast Water SAC |
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| | this CAMS area are from lakes and reservoirs. Water from Wast Water SAC is used at the current Sellafield site. Public water supply for the area is mainly from Crummock Water and Ennerdale, along with a number of smaller reservoirs. Thirlmere is used to supply water locally and elsewhere in the North-West. Given that water abstraction requirements and locations for Sellafield are currently unknown, it is not possible to conclude that water supply to the development will avoid levels of abstraction that lead to adverse effects on the SAC.<br><br>**Air Quality**<br>• Information provided by the UK Air Pollution Information System indicates that air quality within the area (centered on the SAC and including Site, up to a resolution of 5km) is generally good with pollution levels for all key pollutants (sulphur dioxide and nitrogen dioxide) typically low and not falling within or in excess of critical loads (currently set at 17.1 kg/ha/yr or nitrogen and 12.3 kg/ha/yr for sulphur)<br>• The EA state that emissions to air form major industrial sites in the North West have reduced substantially (but traffic is causing air quality problems in major cities) and that air quality in the North West is improving<br>• The Environment Agency assesses that, non-radioactive aerial emissions (sulphur dioxide, nitrogen oxides and volatile organic compounds) from nuclear power stations are extremely low compared with other regulated industries and the Agency does not consider them to be an environmental priority.<br>• The Agency's most recent available assessment of radioactive aerial emissions indicates that all fall within authorised limits[11]<br>Air quality issues around Sellafield are considered to potentially most significant during construction and decommissioning phases (transport etc). The potential for cumulative effects from other plans and programmes is minimised by typically low levels of key pollutants in the area, sustainable transport measures set out in the Local Transport Plan for Cumbria, and the main focus of new housing development being located away from Sellafield to the north of the nearest main town of Workington and Whiteheaven. Therefore, in the context of: known air quality conditions; existing plans and (local |

[11] Measuring Environmental Performance: Sector Report for the Nuclear Industry (Environment Agency, Nov 2005).

| | Wast Water SAC |
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| | level) management activities to regulate impacts; the N2K site characterisation data which indicates that the qualifying features are not considered vulnerable or at risk for issues of air quality; it is assessed that there is unlikely to be a significant effects on the SAC from air quality impacts. |
| **Possible Avoidance and Mitigation Measures – *includes recommendations for policy/proposals*** | **Water Resource and Quality**<br>• Avoiding adverse effects on surface, ground and estuarine waters is primarily the responsibility of the Water Companies (resource planning) and the Environment Agency (abstraction licensing and discharge regulation). However, the Nuclear NPS can direct requirements for efficiency of water use and require that issues relating to supply and discharge (including potential effects on N2K sites) are in place prior to the implementation of the nominated site proposals.<br><br>**Air Quality**<br>• While air quality impacts are not assessed as being significant at this N2K site, it is appropriate that Nuclear NPS takes account of potential air quality impacts through requirements, particularly at a local level for sustainable transport plans including for example: the use of non-road transport where possible, phasing of development and robust monitoring at sites to track changes. In particular, the monitoring should account for the potential for cumulative impacts where the phasing between the existing power station and the new build overlaps. |
| **Conclude no adverse effect on integrity?** | It is not possible at this stage of the development of the Nuclear NPS to say that proposals at Sellafield will not have significant adverse effects on Wast Water SAC as a result of impacts to water from alteration of water flow/levels from abstraction. It is, however, considered that air quality impacts are unlikely to be significant given current environmental trends, known site vulnerabilities and available mitigation measures to address site level impacts. |

## River Derwent and Bassenthwaite SAC

- **Location: 030832W/ 543435N**
- **Size (ha): 1832.96**
- **Designation: SAC**

| | River Derwent and Bassenthwaite SAC |
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| **Qualifying Features** | Annex I habitats that are a primary reason for selection of this site<br>**3130 Oligotrophic to mesotrophic standing waters with vegetation of the *Littorelletea uniflorae* and/or of the *Isoëto-Nanojuncetea***<br><br>Annex I habitats present as a qualifying feature, but not a primary reason for selection of this site<br>**3260 Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation**<br><br>Annex II species present as a qualifying feature, but not a primary reason for site selection<br>**1065 Marsh fritillary butterfly *Euphydryas* (*Eurodryas*, *Hypodryas*) *aurinia***<br>**1095 Sea lamprey *Petromyzon marinus***<br>**1096 Brook lamprey *Lampetra planeri***<br>**1099 River lamprey *Lampetra fluviatilis***<br>**1106 Atlantic salmon *Salmo salar***<br>**1355 Otter *Lutra lutra***<br>**1831 Floating water-plantain *Luronium natans*** |
| **Conservation Objectives** | At the time of preparing this HRA Report, the conservation objectives for this site had not been published. |
| **Key Environmental Conditions (factors that maintain site integrity)** | • Avoidence of water pollution (for example sheep dip)<br>• Maintenance of sufficient flow<br>• Maintenance of natural course of river<br>• Avoidence of nutrient enrichment |

| | River Derwent and Bassenthwaite SAC |
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| | • Devils bit scabious- the larval food plant of Marsh Fritillary<br>• Marsh Fritillary requires low intensity grazing (preferably ponies or cattle as sheep damage the host plant)<br>• Avoidance of mowing and burning in areas of butterflying colonies<br>• Maintenance of all populations of Marsh Fritilary – linked populations are critical for this species<br>• Good weather conditions in flight period of butterfly<br>• Control of invasive and/or non-native species<br>• No physical barriers to fish migration or Otter movement<br>• Control of angling/netting<br>• Clean gravel/hard rock substrate in some areas, silt and sand in others<br>• Low suspended solids (less than 10 mg/l)<br>• Sufficient bankside breeding, foraging and resting habitat for Otters (for example cover, sites for holts)<br>• Avoidence of disturbance to Otter<br>• Maintenance of summer lake levels<br>• Some areas of overhanging vegetation, cover and still water used by fish<br><br>(Habitats Regulations Assessment of the North West Regional Spatial Strategy, September 2008 Consolidated Report Prepared for the Government Office for the North West) |
| **Vulnerabilities (includes existing pressures and trends)**<br>***Details at Appendix 1*** | The wildlife of the River Derwent system is dependent upon the maintenance of high water quality, particularly its naturally low level of nutrients. There are problems with sewage, acidification (from rainfall) and pollution with synthetic pyrethroid sheep dips (leading to losses of insect life, the food of the Annex II fish species). Flow regimes and sedimentation patterns in the rivers are important, not least in providing suitable spawning grounds for fish. These are affected by flood defence works and abstraction for water supplies. The management of the land in the catchment is also important. Much of the land is heavily drained for agriculture or forestry, which results in increased run-off. As many of the surrounding hills are ecologically overgrazed, soil erosion can cause high sediment loads in the streams and river entering the lakes. Sediment and nutrients from such sources, as well as possibly point sources, have affected plant communities in the lakes. Phosphorous stripping is being undertaken on part of the site, |

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| | although it is expected that full recovery may take a decade or more. The above issues are all recognised in the joint English Nature/Environment Agency Conservation Strategy for the river system, and all licensed activities which may be contributing to such problems will be addressed through the review process under the Habitats Regulations. |
| **Predicted Impacts**<br><br>***What are the issues arising from the plan and how might the site be affected?*** | **Water Resources and Quality**<br>• Alteration of water flow/levels from abstraction<br><br>**Air Quality**<br>• Impacts (reduced air quality, $NO_x$ gases from road/ transport/ generation sources) arising from construction, operation, decommissioning activities. |
| **Potential In-combination effects (screening)**<br>***What other plans and programmes could lead to in-combinations effects?*** | The following plans have the potential to contribute 'in-combination' impacts in relation to the key issues identified. In-combination impacts may be positive where the plans' function is to actively management those identified issues (for example Catchment Abstraction Management Strategies).<br><br>**Water Resources and Quality**<br>• Cumbria Economic Strategy<br>• Cumbria and Lake District Joint Structure Plan<br>• Cumbria Minerals and Waste Local Plan<br>• Shoreline Management Plan (SMP 2) St Bees Head to Earnse Point, 11d<br>• Environment Agency Catchment Abstraction Management Strategies (The Derwent, West Cumbria and Duddon<br><br>**Air Quality**<br>• Cumbria Economic Strategy<br>• Cumbria and Lake District Joint Structure Plan<br>• Cumbria Minerals and Waste Local Plan<br>• Cumbria Local Transport Plan (LTP2) |

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| | • Shoreline Management Plan (SMP 2) St Bees Head to Earnse Point, Sub cell 11d |
| **Appropriate Assessment**<br><br>**Likelihood of adverse effect on integrity:** | **Water Resources and Quality**<br>• Current Environment Agency data[12] indicates that, the ecological and chemical status of the estuarine environments near to Sellafield are not yet assessed. As no assessment has been made to date, predictions for 2015 status have not been made.<br>• The current ecological status assessments for the coastal water quality; at up and downstream from Sellafield are assessed as being 'moderate' and the current chemical quality as 'high'. ,The EA predicts that in 2015 the ecological and chemical status will be 'moderate' and 'good' respectively<br>• The ecological status of the rivers around Sellafield is assessed as ranging from 'bad' to 'good' ecological quality – the chemical condition of these rivers is assessed as being of 'pass' quality or 'not yet assessed'.<br>• The ecological quality of the River Derwent is assessed as 'bad' – the chemical condition of the river is considered of 'pass' status. The EA predicts that in 2015 the ecological and chemical status will remain the same.<br>• Groundwater chemical quality around Sellafield is assessed by the EA as being 'good'. The EA predicts that in 2015 the chemical quality will also be 'good'.<br>• Radioactive discharges are subject to targets monitored by the EA and of the non-radioactive discharges, nitrate contributions are considered to be the most significant (research cited by the EA in the nuclear sector report). In particular it is noted that there can be measurable localised impacts on sea nutrient levels in the vicinity of discharges.<br>• The water resource management unit WMRU around Sellafield is managed through the EA CAMS process. This CAMS area is largely rural, but there are significant industrial water abstractors along the coast. Throughout the area small-scale water abstraction is important for a range of uses including agriculture, hydropower, campsites and private water supply. The largest water abstractions within this CAMS area are from lakes and reservoirs. Water from Wast Water SAC is used at the Sellafield |

[12] Environmental Agency – http://maps.environment-agency.gov.uk/wiyby/wiybyController?ep=maptopicsandlang=_e

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| | site. Public water supply for the area is mainly from Crummock Water and Ennerdale, along with a number of smaller reservoirs.<br>• The River Derwent and Bassenthwaite SAC is hydrologically linked to the Upper and Lower WMRU. The Upper Derwent WMRU Unit 3 is considered licensable with 'Water Available' to a target status of 2019. However, for the Lower Derwent WMRU Unit 4 there is a status of 'No Water Available' up to 2019. Any potential future licenses will be issued with constraints and the Habitats Directive river flow objective will be used to protect the SAC River.<br>Environmental condition data for the River Derwent and Bassenthwaite SAC (Appendix 1, Site Characterisations) relating to water resources highlights flow regimes and sedimentation patterns in the rivers are important. Therefore, until further information is obtained on the needs and source of water abstraction for the nominated Braystones site, it's not certain it will not have an adverse effect on the SAC.<br><br>**Air Quality**<br>• The EA state that emissions to air form major industrial sites in the North West have reduced substantially (but traffic is causing air quality problems in major cities) and that air quality in the North West is improving<br>• Information provided by the UK Air Pollution Information System indicates that air quality within the area (centered on the SAC and including Site, up to a resolution of 5km) is above or within critical levels for all key pollutants(where noted).<br>• The Environment Agency assesses that, non-radioactive aerial emissions (sulphur dioxide, nitrogen oxides and volatile organic compounds) from nuclear power stations are extremely low compared with other regulated industries and the Agency does not consider them to be an environmental priority.<br>• The Agency's most recent available assessment of radioactive aerial emissions indicates that all fall within authorised limits.[13]<br>• Air quality issues around Sellafield are considered to potentially most significant during construction |

[13] Measuring Environmental Performance: Sector Report for the Nuclear Industry (Environment Agency, Nov 2005).

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| | and decommissioning phases (transport etc). The potential for cumulative effects from other plans and programmes is minimised by sustainable transport measures set out in the Local Transport Plan for Cumbria, and the main focus of new housing development being located away from Sellafield to the north of the nearest main town of Workington and Whiteheaven. However, cumulative effects from other plans in the local and North West region, known air quality conditions and the N2K site characterisation data which indicates that the qualifying features are considered vulnerable or at risk for issues of air quality; it is not possible to conclude that that there will not be adverse on the SAC. |
| **Possible Avoidance and Mitigation Measures – *includes recommendations for policy/proposals*** | **Water Resource and Quality**<br>Avoiding adverse effects on surface, ground and estuarine waters is primarily the responsibility of the Water Companies (resource planning) and the Environment Agency (abstraction licensing and discharge regulation). However, the Nuclear NPS can direct requirements for efficiency of water use and require that issues relating to supply and discharge (including potential effects on N2K sites) are in place prior to the implementation of the nominated site proposals.<br><br>**Air Quality**<br>While air quality impacts are not assessed as being significant at this N2K site, it is appropriate that Nuclear NPS takes account of potential air quality impacts through requirements, particularly at a local level for sustainable transport plans including for example: the use of non-road transport where possible, phasing of development and robust monitoring at sites to track changes. In particular, the monitoring should account for the potential for cumulative impacts where the phasing between the existing power station and the new build overlaps. |
| **Conclude no adverse effect on integrity?** | It is not possible at this stage of the development of the Nuclear NPS to say that proposals at Braystones will not have significant adverse effects on the River Derwent and Bassenthwaite SAC as a result of impacts to water from alteration of water flow/levels from abstraction. It is, however, considered that air quality impacts are unlikely to be significant given current environmental trends, known site vulnerabilities and available mitigation measures to address site level impacts. |

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