River Derwent and Bassenthwaite Lake Special Area of Conservation

Evidence Pack

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Further information

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Contents

1. Site Details

From the River Derwent and Bassenthwaite Lake Special Area of Conservation citation:

The Derwent is a large nutrient poor (oligotrophic) river system with high water quality and a natural channel. There is a natural succession of plant communities from source to mouth reflecting a slight increase in nutrient status downstream. The Derwent flows through two lakes (Derwentwater and Bassenthwaite), as does its major tributary the Cocker (Buttermere and Crummock Water). These lakes have a hydrological buffering effect which helps stabilise the flow regimes.

Bassenthwaite is a large lake with an extensive catchment and consequently is subject to rapid through-flow of water and moderate nutrient status (mesotrophic). 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 long 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*.

Derwent Water is the broadest and shallowest of the major Cumbrian lakes. The aquatic flora is indicative of a relatively low level, nutrient poor (oligotrophic/mesotrophic) lake. Derwent Water and Bassenthwaite Lake have healthy populations of floating water-plantain *Luronium natans* in extensive, species-rich beds of aquatic macrophytes. In Bassenthwaite Lake it also occurs on muddy lake shores.

Between Derwentwater and Bassenthwaite higher plant species are an important component of the aquatic flora with intermediate water-starwort *Callitriche hamulata*, common water-crowfoot *Ranunculus aquatilis* and alternate water-milfoil *Myriophyllum alterniflorum* co-dominating with the lichen genus *Verrucaria* and the moss *Fontinalis antipyretica*. Below the confluence with the Cocker, the Derwent becomes a large mesotrophic river. Algae, liverworts and mosses are abundant, while dominant higher plants include water-crowfoots and alternate water-milfoil.

The River Cocker differs from the main river in being smaller with a more stable flow regime and channel substrates. The stable flows enable a rich and varied flora, including alternate water-milfoil, intermediate water- starwort, shoreweed *Littorella uniflora* and bulbous rush *Juncus bulbosus*, to develop on pebbles and gravel.

The fish fauna includes salmon *Salmo salar* and sea *Petromyzon marinus*, river *Lampetra fluviatilis* and brook lampreys *Lampetra planeri*. Important salmon spawning areas are found below Bassenthwaite Lake and Buttermere, and in the Rivers Greta, Glenderamackin and Marron, as well as St John's, Naddle, Whit and Sandy Becks. There are extensive sea and river lamprey nursery grounds below Bassenthwaite Lake. Juvenile brook lampreys are also found on the lower river. Nursery grounds of river and brook lampreys also occur between Derwentwater and Bassenthwaite and below Buttermere. Vendace *Coregonus albula* are found in Derwentwater and Bassenthwaite Lake, their only localities in the UK. Arctic charr *Salvelinus alpinus*, present in Crummock Water only occur in the Lake District in England. The lakes and rivers represent suitable conditions that support otters *Lutra lutra*.

Braithwaite Moss, on the flood plain area to the south of Bassenthwaite Lake, supports marsh fritillary butterflies *Euphydryas aurinia*. It comprises areas of marshy grassland and rushy pasture intimately mixed with smaller areas of woodland and scrub. Devil's-bit scabious *Succisa pratensis*, the larval food plant, is found throughout the site. The adult butterflies feed on nectar provided by flowers in the species rich grassland. They are weak fliers and benefit from shelter provided by the shrubs and areas of woodland. Structural diversity is also important in the grassland for the provision of suitable larval web sites.

2. Reason for European Site Designation

The River Derwent and Bassenthwaite Lakes Special Area of Conservation (SAC) is designated for the following features:

- H3130 Oligotrophic to mesotrophic standing water with vegetation
- H3260 Water courses of plain to montane levels with *R. fluitantis*
- S1065 Marsh fritillary, *Eurodryas aurinia*
- S1095 Sea lamprey, *Petromyzon marinus*
- S1096 Brook lamprey, *Lampetra planeri*
- S1099 River lamprey, *Lampetra fluviatilis*
- S1106 Atlantic salmon, *Salmo salar*
- S1355 Otter, *Lutra lutra*
- S1831 Floating water-plantain, *Luronium natans*

Links to Conservation Advice:

- Conservation Objectives
- Conservation Objectives Supplementary Advice

3. Nutrient Pressure and Water Quality Evidence

Nutrient pressure(s) for which the following sites are unfavourable:

Bassenthwaite Catchment:

- Nitrogen
- Phosphorus

River Marron Catchment:

- Nitrogen

The Conservation Objectives for the River Derwent and Bassenthwaite Lake SAC states there is a need to **'restore stable nutrient levels appropriate for lake type' and that 'the natural nutrient regime of the river should be protected, with any anthropogenic enrichment above natural/background concentrations should be limited to levels at which adverse effects on characteristic biodiversity are unlikely'**.

Water Quality data is reported against the relevant Site of Special Scientific Interest (SSSI) units within the SAC.

The condition of the waterbody and the habitats which support the designated features is in part dependent on the water quality within them. The occurrence of excessive nutrients in the waterbody can impact on the competitive interactions between high plant species and between higher plant species and algae, which can result in a dominance in attached forms of algae, and a loss of characteristic plant species. Changes in plant growth and community composition can have implications for the wider food web, and the species present. Increased nutrients and the occurrence of eutrophication can also impact on the dissolved oxygen levels in the waterbody, also impacting on biota within the river or lake.

Recent water quality measurements show that Bassenthwaite Lake, Derwent Water to be exceeding the targets for Total Phosphorus, and the River Marron is exceeding the target set for Soluble Reactive Phosphate (SRP) concentrations.

Any nutrients entering the catchment upstream of the locations which are exceeding their nutrient targets, will make their way downstream and have the potential to further add to the current exceedance. For the River Derwent and Bassenthwaite SAC, although not all units within the catchment are exceeding the phosphorus targets, the catchments upstream of the Marron and Bassenthwaite Lake (which includes Derwent water) are included in the catchment maps.

Table 1 – Water quality data for the lake units

Unit Name	SSSI Unit	Monitoring Point ID	WQ Target		WQ Monitoring Data[1]		Compliance with target – Pass/Fail and % reduction needed to achieve the WQ Target	
			TP (µg/l)	TN (µg/l)	TP (µg/l)	TN (µg/l)	TP (µg/l)	TN (µg/l)
Bassenthwaite	1	Bassenthwaite – NW – 88010015	10	0.77	14.3 *	0.56 *	FAIL 30% reduction needed	PASS
Buttermere Lake SSSI	1	Buttermere as part of a WQ survey – NW – 88010125	5	0.46	20 **	No data	PASS	Unknown
Derwent Water (River Derwent and Tributaries SSSI)	107	Derwent water – NW – 88010014	8	0.48	8.8 ***	0.33 ***	Fail 9% reduction required	PASS
Crummock Water (River Derwent and Tributaries SSSI)	120	Crummock Water – Lakes Tour – NW - 88022556	5	0.46	4 ****	0.36 ****	PASS	PASS

***Nov 2018 – Oct 2019**
****June – Dec 2004**

[1] Water Quality Monitoring data from EA WIMS database. Nutrient concentrations reported are the annual mean for Total Phosphorus (TP) and Total Nitrogen (TN)

***June – Dec 2021
****July 203 – June 2014

Table 2 – Water quality data for the riverine units

Unit Name	SSSI Unit	Monitoring Point ID	WQ Target	WQ Monitoring Data[2]	Compliance with target – Pass/Fail and % reduction needed to achieve the WQ Target
			Soluble Reactive Phosphorus (µ/gl), annual mean	Orthophosphate reactive as P (µg/l) mean	Orthophosphate
River Glenderamackin	101	River Glenderamackin D/S Blake Beck Farm – NW - 88022117	10	20.2 (April 2014 – May 2017)	FAIL – but uncertain as a number of samples below a LOD which higher than target and slightly older data than sample point below
		River Glenderamackin at guardhouse – ND - 88005554	10	5.6 (April 2019 – 2020)	PASS (1 year of data)
St Johns Beck	102	St Johns Beck at Threlkeld Bridge –	10	2.3 (May 2017 – 2020)	PASS

[2] Water Quality Monitoring data from EA WIMS database. Nutrient concentrations reported are the annual mean for Total Phosphorus (TP) and Total Nitrogen (TN)

		NW – 88005566			
Naddle Beck	103	Naddle Beck U/S R Greta At Naddle Bridge - Nw-88005567	5	Majority of samples above LOD of 10 so unable to assess compliance with target	Unknown
River Greta	104	River Greta At A59 Road Bridge Keswick - Nw-88005570	10	7.8 (May 2014 – Feb 2017)	PASS (Limited data)
Stonethwaite Beck	105	Stonethwaite Beck At Rosthwaite Bridge - Nw-88005544	10	4.5 (June 2014 – March 2017)	PASS (Limited data)
Derwent: Borrowdale	106	River Derwent At Grange In Borrowdale - Nw-88005545	10	3.3 (June 2014 – March 2017)	PASS (limited data)
Derwent: Low Stock Br. (Bass) To Low Portinscale	116	Derwent At A66 Road Bridge - Nw-88005571	13	1.8 (April 2019 – March 2020)	PASS (one year of data)
Derwent: Bassenthwaite To Cockermouth	117	River Derwent At Ouse Bridge - Nw-88005616	16	14.3 (April 2012 – March 2015)	PASS (Older data and some below LOD which greater than target))
		Derwent nr Derwentside Gardens - NW-88022200	16	6.8 (April 2014 – Feb 2017)	PASS (Limited data and some below LOD which greater than target)
Gatesgarthdale Beck	118	No Monitoring Point	5	-	Unknown

Buttermere Dubbs	119	Buttermere (WFD Stillwater Site) - Nw-88021659	5	1.3*	PASS
Whit Beck	121	Whit Beck At Whit Beck Bridge - Nw-88005652	13	5.7 (Nov 2014 – Sept 2015)	PASS (Very limited data)
Sandy Beck	122	No Monitoring Point	-	-	Unknown
River Cocker	123	River Cocker @ Godferhead - Nw-88005630	14	1.7 (April 2019 – March 2020)	PASS (1 year of data)
		River Cocker at Cockermouth - Nw-88005667	14	4.8 (April 2019 – March 2020)	PASS (1 year of data)
River Marron	124	River Marron At Little Clifton - Nw-88005728	40	46.9 (April 2018 – March 2021)	FAIL - 15% reduction needed
Derwent: Cockermouth to Workington	125	River Derwent U/S Brigham Stw - Nw-88005688	22	11 (April 2017 – March 2020)	PASS
		R. Derwent at Great Clifton - NW-RSN0667	22	12.5 (Jan – Dec 2021)	PASS (1 year of data)

***Orthohosphate measured as filtered P rather than reactive P for this sample location**

4. Additional Information

Habitat Type impacted by nutrients:

- Bassenthwaite Lake – Standing Water
- River Marron – Rivers and Streams

The River Derwent and Bassenthwaite SAC is legally underpinned by multiple SSSIs. Bassenthwaite Lake SSSI, and River Derwent and Tributaries SSSI contain the units which are being considered here.

SSSI interest features within Bassenthwaite Lake SSSI include:

- Assemblages of breeding birds - variety of species
- Breeding population of nationally rare fish species - Vendace, *Coregonus albula*
- Floodplain fen (lowland)
- Lowland wetland including basin fen, valley fen, floodplain fen, waterfringe fen, spring/flush fen and raised bog lagg
- Mire grasslands and rush pastures (upland)
- Population of Schedule 8 plant - *Luronium natans*, Floating Water-plantain
- Wet woodland

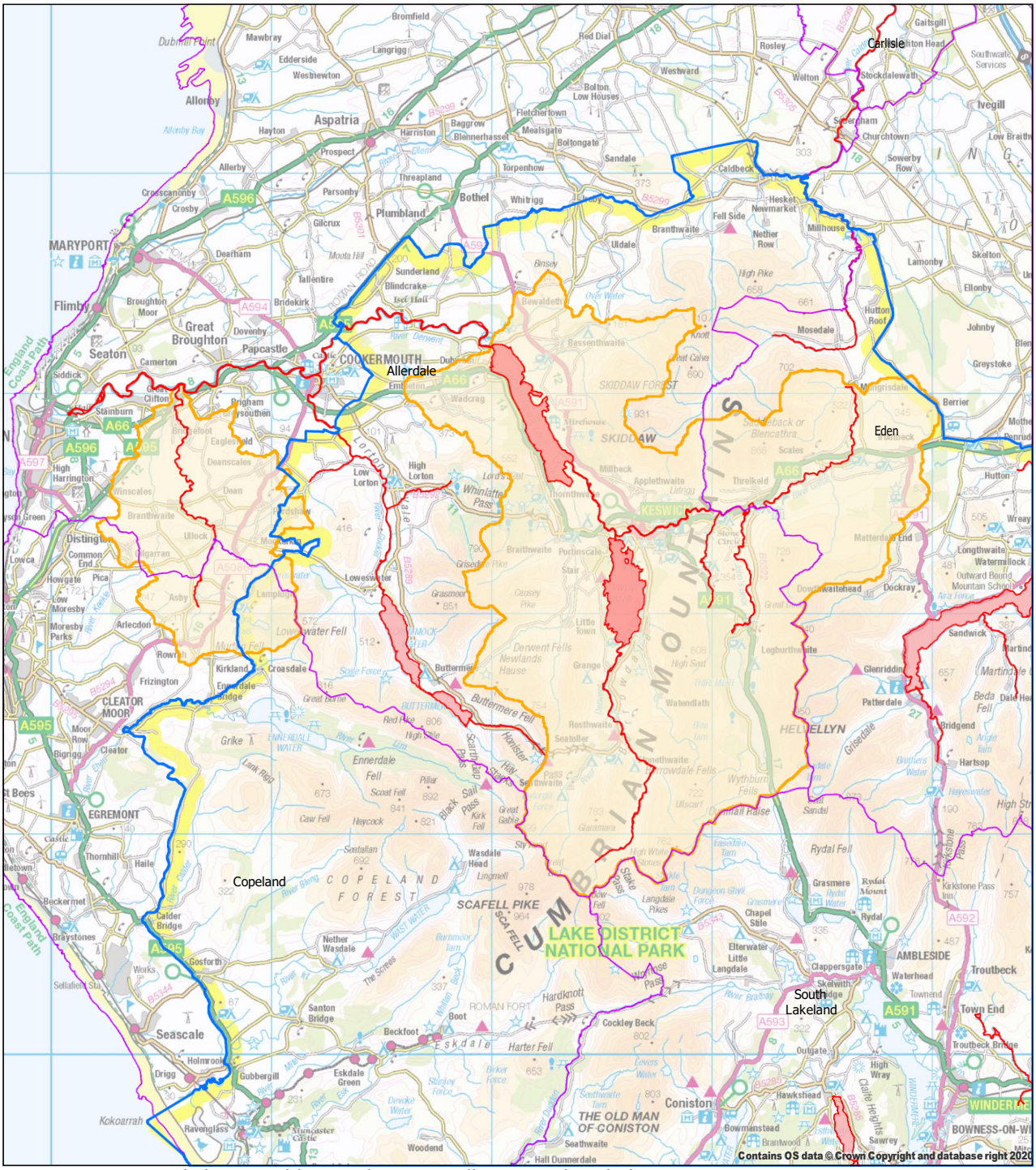
SSSI interest features within River Derwent and Tributaries SSSI include:

- Atlantic salmon, *Salmo salar*
- Breeding population of nationally rare fish species - Vendace, *Coregonus albula*
- Brook lamprey, *Lampetra planeri*
- Ecotypic or genetically distinctive fish populations - Arctic charr, *Salvelinus alpinus*
- Invert. assemblage W211 open water on disturbed sediments
- Invert. assemblage W221 undisturbed fluctuating marsh
- Lowland wetland including basin fen, valley fen, floodplain fen, waterfringe fen, spring/flush fen and raised bog lagg
- Otter, *Lutra lutra*
- Population of Schedule 8 plant - *Luronium natans*, Floating Water-plantain
- River lamprey, *Lampetra fluviatilis*
- River supporting habitat
- Rivers and Streams
- Sea lamprey, *Petromyzon marinus*
- Wet woodland

Appendix

Component SSSIs of River Derwent and Bassenthwaite Lake SAC

Map of component SSSIs of River Derwent and Bassenthwaite Lake SAC



European protected sites requiring nutrient neutrality strategic solutions

Scale: 1:170,000

Component SSSIs of
River Derwent & Bassenthwaite Lake SAC

- Local Authorities
- SSSI subject to nutrient neutrality strategy
- Nutrient neutrality SSSI catchment
- National Parks

List of abbreviations

SAC – Special Area of Conservation

SSSI – Site of Special Scientific Interest

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