

**CYNGOR CEFN GWLAD CYMRU
COUNTRYSIDE COUNCIL FOR WALES**

SITE OF SPECIAL SCIENTIFIC INTEREST CITATION

**GWYNEDD/DENBIGHSHIRE/
WREXHAM/FLINTSHIRE**

AFON DYFRDWY (RIVER DEE)

Date of Notification: 1995, 2002

National Grid Reference: SH 930351 – SJ 311695

O.S. Maps 1:50,000 Sheet number: Outdoor Leisure map 18
Explorer maps 255, 256, 257 & 266
1:10,000 Sheet number: SH83 NE; SH84 SE; SH93 NW & NE;
SH94 SW; SJ03 NW; SJ04 SW & SE;
SJ13 NE, NW, SE & SW; SJ14 SW & SE;
SJ23 NW & NE; SJ24 SW & SE; SJ26 NE
SJ27 SE; SJ33 NW; SJ34 SW, SE & NE;
SJ35 NE; SJ36 NE & NW; SJ44 NW;
SJ45 SW & NW

Site area: 1,489.5 ha

Description:

Afon Dyfrdwy (River Dee) is of special interest for its fluvial geomorphology, Carboniferous geology, range of river habitat types, saltmarsh transition habitats, populations of floating water plantain *Luronium natans*, slender hare's-ear *Bupleurum tenuissimum*, sea barley *Hordeum marinum*, hard-grass *Parapholis strigosa*, otter *Lutra lutra*, salmon *Salmo salar*, bullhead *Cottus gobio*, brook lamprey *Lampetra planeri*, river lamprey *Lampetra fluviatilis*, sea lamprey *Petromyzon marinus*, club-tailed dragonfly *Gomphus vulgatissimus* and other aquatic invertebrates.

The main channel of the River Dee lies within both Wales and England, and is notified as two separate SSSIs – the Afon Dyfrdwy (River Dee) SSSI in Wales and the River Dee (England) SSSI in England. The features for which the SSSIs are notified, in particular migratory fish, depend upon the whole river ecosystem. Salmon, otter, club-tailed dragonfly, and fluvial geomorphology are of special interest in both Wales and England.

The site extends from the outflow of Llyn Tegid SSSI downstream to where it flows into the Dee Estuary SSSI. In its swifter upper reaches it flows through the broad valley near Corwen, and the spectacular Vale of Llangollen before entering the Cheshire plain at Erbistock and meandering northwards through the Cheshire plain to its tidal limit at Farndon. In its slower, more mature reaches the river is characteristic of a floodplain river with meanders, oxbows and other river-formed landscape features. The River Dee is heavily regulated, with its flow controlled by the reservoirs of Tegid, Celyn and Brenig. The site includes the Ceiriog, Meloch, Tryweryn, and Mynach tributaries.

The source of the River Dee lies within the Snowdonia National Park and its catchment contains a wide spectrum of landscapes from high mountains around Bala, rugged peaks near Llangollen, steep-sided wooded valleys, and the plains of Cheshire and north Shropshire through to the vast mudflats of the estuary. There is a tidal influence as far upstream as Farndon and high tides regularly exceed the Chester weir crest level.

The course and topography of the River Dee and its tributaries were strongly influenced and modified during the last Ice Age. The underlying geology of the Dee ranges from impermeable Cambrian and Ordovician shales in the west, through Silurian to Carboniferous Limestone outcrop at Llangollen to Coal Measures and thick boulder clay overlying the Triassic sandstones of the Lower Dee valley.

GEOLOGY/GEOMORPHOLOGY

Three separate Geological Conservation Review (GCR) Sites are located within the Afon Dyfrdwy (River Dee) SSSI. The River Dee (Rhewl Section) and River Dee (Holt to Worthenbury) GCR sites were selected for their fluvial geomorphological importance and had previously been notified as individual SSSI. The rocks exposed at Dee Bridge are important for their Upper Carboniferous stratigraphy.

Dee Bridge (Upper Carboniferous)

Dee Bridge is important for its Upper Carboniferous stratigraphy. It encompasses the type locality for the Dee Bridge Formation. Adjacent to the river is a sequence of shales, sandstones and mudstones deposited under fluvio-deltaic conditions between the Kinderscoutian and Langsettian stages. Along with a correlative site 20 km to the north (Ruby Brickworks), it comprises the most complete documented sequence of upper Namurian strata in North Wales, illustrating the variation of marginal facies along the northern margin of the Wales-Brabant massif. The site is unique in Wales in showing the progressive, increased influence of more northerly-derived sediments over those derived from the northern margin of the Wales-Brabant massif.

River Dee (Holt to Worthenbury) (fluvial geomorphology)

This site comprises a meandering reach of the River Dee between Holt in the north and Worthenbury in the south. It includes land in Wrexham (Wales) and Cheshire (England) and consists of some of the most spectacular and intricately developed river bends or meanders seen anywhere in Britain. The site is important for studies of fluvial geomorphology.

The GCR site was selected for: 1) the present river channel and its intricate pattern of meanders; 2) the main areas of floodplain either side of the river, for the full length of the selected reach; 3) all the visible palaeochannels (abandoned channels) located on the floodplain adjacent to the present channel; 4) the gravel and sand bars located within the modern channel and the other evidence of modern-day river processes contained within the channel; and 5) the most impressive of the remnants of ancient river cliffs located towards the north-east and south-west margins of the site.

The pattern and scale of the meanders are exceptional on a British scale: the range of forms from simple curves to double-headed forms, and the intricacy of the pattern developed over the whole reach is outstanding. The total landform assemblage, including the remnants of ancient river cliffs, the floodplain areas, and the present and abandoned channels, provides the basis for

reconstructing the development of the river since the end of the last glaciation. The abandoned channels and old meander loops (some of which were once oxbow lakes) are exceptional landforms in their own right; their pattern, location and contained sediments provide significant potential for reconstructing some of the geologically recent changes in the course of the River Dee in its long evolution during Holocene times, namely the last 11,500 years. The gravel and sand bars distributed along the course of the modern channel, and the changing form of its banks and bed, bear witness to a range of important modern-day fluvial processes.

Although this part of the course of the River Dee has changed in position markedly during the Holocene, the last few hundred years have been characterised by relative channel stability. It seems likely that the banks and bed of the modern channel are now evolving in response to changing flow and sediment regimes induced by upstream regulation and other human modification to the fluvial system. The significance of the site for studying modern-day river processes is enhanced by the tidally-influenced downstream reach. This renders the site potentially significant for investigating the effects of possible future sea-level rise on the development of the river channel, particularly in view of the long history of tidal influences and stage records (river level) at downstream locations.

This reach of the Dee is a valuable part of the heritage of Great Britain, due to its outstanding combination of landform, sedimentary and process evidence. Most large British rivers have been significantly channelised or straightened in their lower reaches. The Dee is exceptional in maintaining an extremely sinuous platform across the sensitive fluvial-tidal transition zone.

River Dee (Rhewl Section) (fluvial geomorphology)

This reach of the River Dee provides a particularly good example of ingrown incised meanders. Their formation has involved lateral erosion as well as vertical erosion, so that the valley is asymmetrical in cross-profile and indicates that rejuvenation was progressive. In this respect the Dee meanders provide a geomorphological contrast to the entrenched meanders of the River Wye.

FLORA

The River Dee below Llyn Tegid is a predominantly mesotrophic river with a diversity of vegetation types reflecting its geology and geographical location. Near the outflow of Llyn Tegid, the community is typical of a sandstone, mudstone and hard limestone river type intergrading with a mesotrophic river type dominated by gravels, pebbles and cobbles. Species such as hemlock water-dropwort *Oenanthe crocata*, alternate water-milfoil *Myriophyllum alterniflorum*, intermediate water-starwort *Callitriche hamulata*, water mosses *Fontinalis antipyretica* and *F. squamosa*, and reed canary-grass *Phalaris arundinacea* are present. In spite of the large size of the river, the moderate gradient allows pond water-crowfoot *Ranunculus peltatus* to dominate. The nationally and internationally rare floating water-plantain *Luronium natans* also occurs here.

Below Corwen the river increases in gradient such that the community changes to an oligo-mesotrophic river type comprised of numerous bryophytes including *Brachythecium rivulare*, *Conocephalum conicum*, *Eurynchium praelongum*, *Philonotis fontana* and *Rhyncostegium riparioides*, interspersed with patches of *Fontinalis spp.* and sparse milfoil and crowfoot.

Between Llangollen and Bangor-on-Dee, sandstone, mudstone and hard limestone river type

vegetation again predominates, this time with the unusual hybrid crowfoot *Ranunculus x bachii* (*R. fluitans x aquatilis*) occurring in large stands. The Dee is one of only two known UK localities for this hybrid. In this section the river shows signs of nutrient enrichment with the introduced Canadian waterweed *Elodea canadensis* becoming more prevalent.

Below Bangor-on-Dee the River Dee flows into the Cheshire plains and displays typical characteristics of lowland river types with shallow gradients flowing over nutrient rich soils, with pondweeds such as curled pondweed *Potamogeton crispus*, perfoliate pondweed *Potamogeton perfoliatus* and small pondweed *Potamogeton berchtoldii* occurring frequently. Tripartite bur-marigold *Bidens tripartita* and lesser pondweed *Potamogeton pusillus*, both rare along Welsh rivers, are found in this section. This section is a lowland, clay-dominated river type but due to overgrazing of the margins and eutrophication this vegetation component is threatened and frequently species-poor. Fennel pondweed *Potamogeton pectinatus* also occurs here and in the more eutrophic sections may be the only submerged species.

There is good tree cover along the banks of the River Dee and the tributaries, with the Ceiriog being tree lined on both banks along much of its length. The dominant species are alder *Alnus glutinosa* and willow *Salix spp.*, with occasional ash *Fraxinus excelsior* and oak *Quercus spp.*. Where sections of the riverbank have been fenced off the vegetation tends to be dominated by bramble *Rubus fruticosus*, nettles *Urtica dioica* and other tall ruderals. Indian (also known as Himalayan) balsam *Impatiens glandulifera* and Japanese knotweed *Fallopia japonica* are increasing throughout the site.

Downstream of Chester along the canalised section of the river towards the estuary saltmarsh transition habitats have developed. These comprise upper and middle saltmarsh, annual high marsh and wet neutral grassland. These habitats support such rarities as the following species of special interest: slender hare's-ear, sea barley and hard-grass.

MAMMALS

The otter is of special interest and is found throughout the site, especially where appropriate bank side cover exists to provide secure holts and lying up areas. Water vole *Arvicola terrestris* have been recorded on the middle and lower reaches of the River Dee.

FISH

The River Dee is of special interest for Atlantic salmon for which it is one of the Environment Agency's index rivers. The Mynach, Meloch and Ceiriog tributaries are the most important salmon spawning tributaries in the Dee catchment and are included within this SSSI. Other migratory fish utilising the system include river lamprey, sea lamprey, sea trout *Salmo trutta trutta*, and eel *Anguilla anguilla*. Smelt *Osmerus eperlanus* and Twaite shad *Alosa fallax* have been recorded in the section between Chester and the estuary, but are not thought to have breeding populations.

The Dee also supports populations of non-migratory fish including bullhead and brook lamprey which are species of special interest, as well as brown trout *Salmo trutta*. The river is noted for its grayling *Thymallus thymallus*. The middle and lower reaches of the Dee support a diverse coarse fish population including, roach *Rutilus rutilus*, dace *Leuciscus leuciscus*, bream *Abramis brama* and perch *Perca fluviatilis*, although low water temperatures and poor riparian habitat

limit spawning success. Several coarse fish species including Barbel *Barbus barbus*, ruffe *Gymnocephalus cernua*, chub *Leuciscus cephalus*, and silver bream *Blicca bjoerkna* have been introduced to the system.

INVERTEBRATES

The lower reaches of the River Dee support Britain's only known population of the stonefly *Isogenus nubecula*. Club-tailed dragonfly *Gomphus vulgatissimus* is nationally scarce and present along the lower Dee, particularly where the river is slow flowing and there is adjacent woodland habitat or bankside tree cover available for adults. The nationally scarce weevil *Baris lepidii* has been recorded at its only Welsh site on sandy riverbanks along the lower Dee. All three species are of special interest.

Other aquatic invertebrates present include the nationally scarce freshwater pearl mussel *Margaritifera margaritifera* which is recorded from only nine Welsh rivers, and the water beetle *Bidessus minutissimus*, which inhabits reaches of the middle Dee, where it prefers fine gravel substrates in shallow, slow flowing side-waters.

Remarks:

The section of the Dee that flows through England is notified as a separate SSSI under the name of River Dee (England), ensuring that the whole of the river is safeguarded.

Part of the SSSI lies within the Snowdonia National Park.

The Afon Dyfrdwy (River Dee) SSSI supports the following habitats and species listed in the EC Habitats Directive (Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora):

- Rivers with floating vegetation often dominated by water crowfoot - Annex I
- Otter – Annex II & IV
- Sea lamprey – Annex II
- River lamprey – Annex II & V
- Brook lamprey – Annex II
- Atlantic salmon – Annex II & V
- Bullhead – Annex II
- Freshwater pearl mussel – Annex II & V
- Grayling – Annex V

The otter and the freshwater pearl mussel are listed under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended).

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