COUNTY: HEREFORD AND WORCESTER/POWYS SITE NAME: RIVER LUGG/AFON LLUGWY

SITE REF: 15 PGL

Status: Site of Special Scientific Interest (SSSI) notified under Section 28 of the Wildlife and Countryside Act 1981 as amended

Local Planning Authorities: HEREFORD AND WORCESTER COUNTY COUNCIL, Leominster District Council, Hereford City Council, South Herefordshire District Council, Powys County Council, Radnorshire District Council

National Grid References: SO 173751–SO 565372

Length (approximate)		Area (approximate)	
English Length:	74.17 (km.)	English Area:	210.05 (ha.)
Welsh Length:	26.90 (km.)	Welsh Area:	26.90 (ha.)
Total Length:	101.07 (km.)	Total Area:	236.95 (ha.)

Ordnance Survey Sheets:
1:50,000: 148, 149
1:10,000: SO 17 NE, SE, SO 26 NE, NW, SO 27 SW, SO 36 NW, NE, SE, SW, SO 46 NW, SW, SE, SO 45 NE, SO 53 NE, SO 54 NW, SE, SW, SO 55 NW, SW

Date Notified (Under 1981 Act): 2 February 1995

Other Information:
This is a new site.
The site interest includes the following species covered by Council Directive 92/43/EEC on the conservation of natural habitats and of wild flora and fauna:

- Atlantic Stream Crayfish *Austropotamobius pallipes* – Annex II
- Common Otter *Lutra lutra* – Annex II and IV
- Atlantic Salmon *Salmo salar* – Annex IV
- Bullhead *Cottus gobio* – Annex IV
- Twaite Shad *Alosa fallax* – Annex II

Atlantic Stream Crayfish and Common Otter are also listed in Schedule 5 of the Wildlife and Countryside Act 1981 as amended.
The site overlaps with the River Lugg Meanders SSSI selected under the Geological Conservation Review.

Flora
The headwaters on Pool Hill are characterised by a range of aquatic and semi-aquatic bryophytes including the golden-brown moss *Cratoneuron commutatum* in stony flushes and *Cinclidotus fontinaloides* on streamside rocks.

There are a few higher plants present, especially in the peaty pools near to the river's source where intermediate water-starwort *Callitriche hamulata*, water-purslane *Lythrum portula* and round-leaved crowfoot *Ranunculus omiophyllus* can be found. The large pool at the source supports the nationally scarce pillwort *Pilularia globulifera.*

The river banks and surrounds in the headwaters support a range of semi-natural vegetation including heather moorland, dry calcareous grassland, base-rich flushes typically with small sedges and brown mosses and damp pasture. The latter is characterised by purple moor-grass *Molinia caerulea*, quaking grass *Briza media*, sharp-flowered rush *Juncus acutiflorus*, devil's-bit scabious *Succisa pratensis*, Marsh valerian *Valeriana dioica* and rusty willow *Salix cinerea* subsp *oleifolia* scrub with a rich ground flora that includes water avens *Geum rivale.*

In the upper Lugg there is little vegetation where the flow is greatest and the bed is unstable. Characteristic plants include encrusting and filamentous algae, the liverworts *Pellia epiphylla* and *Solenostoma triste* and the moss *Rhynchostegium riparioides*. The species diversity for such small, shaded, sandstone streams is typically poor with lower plants constituting over one-third of plant species present. The only truly aquatic higher plants of this community are branched bur-reed *Sparganium erectum*, which grows in silt at the channel edge, and brook water-crowfoot *Ranunculus penicillatus* subsp *pseudofluitans* on riffles.

Most of the middle and lower reaches have species-rich, calcareous, lowland river communities due to the downstream influence of the drainage from the Silurian mudstones, siltstones and limestones. In the middle reaches from Leominster to the Vern Railway bridge the transitional nature of the river is shown by the lowland species, typical of a clay bedded channel, growing alongside water crowfoots and a variety of bryophytes requiring coarser substrates. Below the confluence with the Arrow, the dominant higher plant of the upper river – brook water-crowfoot – gradually gives way to extensive beds of river water-crowfoot *Ranunculus fluitans*, a species largely confined to rivers with a large flow volume. There is an increasingly eutrophic influence downstream with spiked water-milfoil *Myriophyllum spicatum*, horned pondweed *Zannichellia palustris* and the green algae *Cladophora glomerata* and *Enteromorpha* frequent. Marginal vegetation is sparse with only branched bur-reed and reed canary-grass *Phalaris arundinacea* commonly present.

In the lower reaches of the Lugg the vegetation assemblages are increasingly characteristic of southern clay rivers but retain the influence of coarse substrates. Upstream of weirs and where the flow is sluggish, several species occur which are typical of slow moving, soft bottomed rivers, for example yellow water-lily *Nuphar lutea*, unbranched bur-reed *Sparganium emersum* and common club-rush *Scirpus lacustris* The nutrient-rich nature of the lowermost reaches is shown by the appearance of fennel pondweed *Potamogeton pectinatus*, perfoliate pondweed *P. perfoliatus* and arrowhead *Sagittaria sagittifolia*. Along the river's edge, great yellow-cress *Rorippa amphibia* and flowering rush *Butomus umbellatus* occur, at or near to their western limit of distribution.

Parts of the site within Wales at Pool Hill and within England at Presteigne are managed by the Radnorshire Wildlife Trust as the Beacon Hill and Withybeds nature reserves, respectively.

The Welsh section of the river lies within the Radnor Environmentally Sensitive Area (ESA).

Description and Reasons for Notification:
From its upland source in Powys in mid-Wales to its confluence with the Wye below Hereford in England, the River Lugg is considered to be one of the best British mainland examples of both a clay river and a river displaying a transition from nutrient-poor to naturally nutrient-rich water chemistry. Despite being canalised in some small sections of its 101 km length and running through an intensively farmed catchment in its middle and lower reaches, it is a largely unpolluted natural river and supports river plant communities and otter populations of special interest.

The Lugg rises at 500 m on Pool Hill in Powys and descends rapidly to flow through a more gentle landscape and eventually onto a broad alluvial floodplain joining the River Wye. It runs for most of its length through pasture with some areas of arable. Only around its source and at the Lugg Meadow SSSI does adjoining semi-natural vegetation constitute significant land cover. The river is tree lined for most of its length, alder *Alnus glutinosa* and willows *Salix* spp. being the main species. The SSSI boundary incorporates short stretches of adjacent wet woodland and includes all fringing tree lines. The channel itself is quite active, especially in the upper and middle reaches, with migrating meanders which deposit shingle banks and cut vertical bank faces up to 3 m high. Through its long history

of use the river also has several mill leats and flood flow channels, the most notable of the latter being the Kenwater through Leominster. These stretches complement the biological interest found in the main channel and have been included in the site, even though they have extensive bank protection or canalised sections.

Geology and Topography

Near to its source the infant river drains an upland area based on Silurian mudstones and siltstones, where the bedrock geology is the dominant influence on channel form. Numerous peaty flushes and small springs on the valley sides feed the headwaters and combine to cut a steep-sided and rock-bottomed section, descending over 200 m in the first 3 km. The Lugg's upper catchment is underlain by these same Silurian rocks and the river adopts a typically high-energy erosive character.

From the border with England, the underlying rocks are predominantly non-calcareous and are principally Old Red Sandstone of Devonian age on the valley sides, with some limestone outcropping at the Aymestry Gorge. Changes in bedrock and river gradient are reflected in the channel substrate. Along the stretch from the border to Leominster the average flow is quite fast, with a well developed pool and riffle system and a river bed predominantly of cobbles, pebbles and gravels. From Kingsland and particularly below the confluence with the River Arrow, the river meanders across an alluvial plain. These lower reaches are characterised by deeper water and slower flows and the river is clay bedded with silt deposits.

Such variations in geology , flow and substrate have given rise to an interesting downstream variation in river plant communities, ranging from naturally species-poor communities of upland channels prone to spate, to those representative of mature lowland rivers. These types combine in the Lugg's lower reaches to produce a plant assemblage of unusual occurrence in England.

The high naturalness and diversity of the aquatic communities is demonstrated by the occurrence of the pollution intolerant red algae, *Lemanea fluviatilis* and *Hildenbrandia rivularis* along the entire course of the Lugg and the presence of a total of 121 river plant species.

Mammals

Field signs of common otter *Lutra lutra* are numerous and widespread along the length of the river and indicate a healthy population. It is one of the few rivers in central England that retained a strong population during the widespread decline of the 1980s. The Lugg, therefore, is considered a core refuge area for otters and has played a key role in the species recolonisation of the River Wye catchment.

Invertebrates

Extensive populations of the native atlantic stream crayfish *Austropotomobius pallipes* are present, a species which is in decline across Europe. Limited sampling to date has identified a variety of rare and scarce invertebrates from the lower Lugg, including the nationally rare pea mussel *Pisidium tenuilineatum,* a species requiring unpolluted conditions. The nationally scarce species present include two aquatic beetles *Riolus cupreus* and *R. subviolaceus* which live on stones in flowing water, and the alderfly *Sialis nigripes*, a species with an aquatic larva living in silts in large river systems. A range of mayflies *Ephemeroptera* including species with localised distributions are also recorded. The common hawker *Aeshna juncea* is common along the headwaters of the river.

The change in river bed substrate and flow rate can be mapped by the distribution of two damselflies, the banded demoiselle *Calopteryx splendens* and the beautiful demoiselle *C. virgo*. The latter is present above and around Leominster but is replaced by the banded demoiselle down to the confluence with the Wye.

Fisheries

Though not of special interest, the fish community has many natural characteristics and contributes to the nature conservation value of the river. The Lugg upstream of Leominster is predominantly a brown trout *Salmo trutta* fishery with some grayling *Thymallus thymallus* present. Few coarse fish are found above Aymestry which marks the upper limit of atlantic salmon *Salmo salar* migration. Coarse fish including chub *Leuciscus cephalus*, roach *Rutilus rutilus*, pike *Esox lucius*, twaite shad *Alosa fallax*, eels *Anguilla anguilla* and barbel *Barbus barbus* become more plentiful downstream of Leominster. Stoneloach *Noemacheilus barbatulus*, minnows *Phoxinus phoxinus* and bullheads *Cottus gobio* are present throughout the river.

Breeding Birds

The River Lugg provides good habitat for a range of typical river birds. Dipper *Cinclus cinclus* is found on the upper reaches, with kingfisher *Alcedo atthis* occurring more on the middle and lower stretches. Grey wagtail *Motacilla cinerea* occur throughout. Several pairs of mute swan *Cygnus olor* and common sandpiper *Actitis hypoleucos* also breed on the river, as do mallards *Anas platyrhynchos* which are plentiful. Some active cutting faces of the meanders hold colonies of sand martins *Riparia riparia*.