COUNTY: DORSET SITE NAME: RIVER FROME

Status: Site of Special Scientific Interest (SSSI) notified under Section 28 of the Wildlife and Countryside Act 1981. as amended. Section 17 of the Water Resources Act 1991 and Section 4 of the Water Industry Act 1991.

Environment Agency Area: South Wessex

Water Company: Wessex Water plc

Local Planning Authorities: DORSET COUNTY COUNCIL, West Dorset District Council, Purbeck District Council

National Grid Reference: SY 700908 to SY 927871

Length of River SSSI: 49.04 km Area: 153.56 (ha.)

Ordnance Survey Sheets 1:50,000: 194, 195

Date notified (Under 1949 Act): 1977 (part)

Date notified (Under 1981 and 1991 Acts): 1986 (part), 1989 (part), 1998

Other Information:

New river SSSI, incorporating East Stoke Fen SSSI and East Holme Meadows SSSI. East Stoke Fen is managed as a nature reserve by the Dorset Wildlife Trust.

Description and Reasons for Notification:
Key Features and General Character
The River Frome is the most westerly example of a major chalk stream in Great Britain. The SSSI section (Dorchester to Wareham) supports an aquatic and bankside vegetation which shows a downstream transition from a purely chalk stream community type to a lowland, mixed geology community in the lowermost reaches. These plant communities are species-rich compared with like communities on other rivers. The site also supports rare and scarce aquatic invertebrates, a characteristic assemblage of breeding riverside birds and a range of fish species which includes some of particular importance in a European context.

The Frome is mostly fed by tributaries from the chalk of the South Wessex Downs but then drains a geology of sands, gravels and clays below Dorchester. This gives rise to a chalk stream community which differs from the classic type found on the rivers Test and Itchen in Hampshire. The mixed geology also provides the Frome with relatively high base flows together with a tendency to rise and fall substantially more than typical chalk streams. The Frome's lowland community is akin to that of the Hampshire Avon, but differs by rarely having the same combination of plant species.

Being predominantly fed from the chalk, the river water is calcareous and naturally quite rich in nutrients. This results in high biological productivity, and the abundant growth of submerged plants so typical of chalk streams. The vegetation indicates a generally high water

quality, but this can be affected by the varying degrees of artificial nutrient enrichment resulting from human settlements and agricultural activities in the river catchment area.

The river channels have been modified over the centuries to provide water heads for mills as well as a once extensive water-meadow system. This distinctive management system declined from the late 19th century, and subsequent conversion of the meadows to arable agriculture or improved pasture for intensive dairy farming has entailed the river being managed to increase land drainage. To this effect extensive cutting of the river's water plants is carried out in spring and late summer, and there has been some modification and deepening of the channels in places. Despite this history of management, the Frome has many natural physical features and its geomorphological characteristics are more semi-natural than the majority of lowland rivers.

Game fishing is an important use of the river and generally takes precedence over the coarse fishing which is largely confined to the lower reaches. Salmon and sea trout fishing takes place along the middle and lower reaches with trout fishing further upstream. Management of the river for angling is noticeably less intensive than on other game fishing chalk rivers in southern England.

The changes in the agricultural management of the valley have resulted in unimproved grassland being restricted to a few remaining wet pastures, and in semi-natural riparian vegetation such as fen, swamp and wet woodland also being localised. Such habitat now mainly occurs close to the river and tends to be associated with river channel morphological features such as cut-off meanders, side channels and bankside shoals (swales).

A long history of research on the plant, animal and microbial ecology of the River Frome and its tributaries by the Institute of Freshwater Ecology (formerly the Freshwater Biological Association) makes this one of the most intensively studied rivers in Great Britain. This adds to its scientific importance.

Flora of the River and adjoining habitats

Along much of the river Frome within the site the aquatic flora is dominated by brook water-crowfoot *Ranunculus penicillatus* var. *pseudofluitans.* Passing downstream an increasing variety of other plant species begin to appear and gradually replace the water-crowfoot and its chalk stream associates. The typical chalk stream plants include blunt-fruited water-starwort *Callitriche obtusangula*, spiked water-milfoil *Myriophyllum spicatum*, blue water-speedwell *Veronica anagallis aquatica*, horned pondweed *Zannichellia palustris* plus other species of lowland river systems, such as river water-crowfoot *Ranunculus fluitans* and the uncommon river water-dropwort *Oenanthe fluviatilis.* The presence of the latter species has a particular nature conservation importance in that its European distribution is centred on Britain's chalk streams. The Frome is unusual for a chalk stream in supporting both brook and river water-crowfoot growing alongside river water-dropwort.

Typical marginal bank species include water-cress *Rorippa nasturtium-aquaticum*, reed sweet-grass *Glyceria maxima*, lesser pond-sedge *Carex acutiformis*, greater pond-sedge *C. riparia* and common reed *Phragmites australis*. Together, the community of aquatic and bankside plants contains all of the most commonly occurring species which are representative, or characterise, the chalk stream community type. The community present is

also species-rich supporting an above average number of species per site compared with other rivers of the same type.

In the lowermost reaches the same chalk species persist, but the presence of plants such as shining pondweed *Potamogeton lucens*, the hybrid *Potamogeton x salicifolius*, fennel pondweed *P. pectinatus*, Canadian pondweed *Elodea canadensis* and yellow water-lily *Nuphar lutea* indicate a change to the lowland, mixed geology community. The composition of the community is again of above average species-richness and includes nearly all of the most commonly occurring species of this river vegetation type.

The site also includes areas of semi-natural wetland habitat adjoining the Frome which are dependent upon the river for their character and are integral to the overall interest. Among these are three areas of fen and wet pasture at East Stoke and East Holme already notified as Sites of Special Scientific Interest. The wetland parts of the site are mostly confined to land close to the river banks, though some are more extensive. They comprise swamp, tall fen and wet woodland vegetation, and very occasional transitional and mosaic habitats including wet heath, and a few areas of grazed wet grassland.

Often the areas of fen and swamp are effectively extensions of the river margin vegetation and show natural successions to wet woodland or scrub. Common reed, reed sweet-grass, lesser pond-sedge and reed canary grass *Phalaris arundinacea* are often the main components of the swamp vegetation, with tall fen associate species occurring widely. Examples of the more species-rich swamp and sedge-fen communities occur notably at East Stoke Fen and on nearby river margins in the Bindon Abbey/Stokeford area. Here the herbaceous fen vegetation includes great willowherb *Epilobium hirsutum*, hemp agrimony *Eupatorium cannabinum*, hemlock water-dropwort *Oenanthe crocata*, meadowsweet *Filipendula ulmaria*, purple loosestrife *Lythrum salicaria*, yellow loosestrife *Lysimachia vulgaris*, common comfrey *Symphytum officinalis*, bittersweet *Solanum dulcamara*, wild angelica *Angelica sylvestris* and less commonly, meadow rue *Thalictrum flavum* and skullcap *Scutellaria galericulata.*

Away from the river bank, swamp and fen vegetation often displays a transition to carr (scrub-invaded fen). The commonest type of carr is grey willow *Salix cinerea* scrub, which may have a nettle *Urtica dioica* dominated understorey or, occasionally, greater tussock sedge *Carex paniculata* with remote sedge *Carex remota*, depending on the local soil water-table and nutrient conditions. Carr-woodland of denser canopy, as at East Stoke Fen, can support an abundance of shade-tolerant plants, ferns, epiphytic mosses and lichens.

The more fully developed riverside wet woodland includes much alder *Alnus glutinosa*, ash *Fraxinus excelsior* and sometimes birch *Betula pubescens* and pedunculate oak *Quercus robur.* The ground flora often retains many fen species alongside the more shade-tolerant plants such as red currant *Ribes rubrum*, hairy brome *Bromus ramosus*, enchanter's nightshade *Circaea lutetiana*, climbing corydalis *Corydalis claviculata*, mosses and ferns. Abundant dead and decaying wood in these unmanaged patches of woodland help make them important for invertebrates. Drier woodland, if considered to be of sufficient interest or contiguous with wet woodland is also included within the site. For example Long Coppice at East Stoke Fen, is dominated by pedunculate oak with a shrub layer composed of hazel *Corylus avellana* and bramble *Rubus fruticosus.* Honeysuckle *Lonicera periclymenum* is abundant here and bluebell *Hyacynthoides non-scriptus* dominates the ground flora.

Areas of grazed wet grassland which have been subject to little agricultural improvement are few and localized. An upstream section of the site includes a small surviving area of species rich rush-pasture alongside shallow, spring-fed drains on a former water meadow. The sward is characterised by a frequent occurrence of sharp-flowered, soft and hard rush *Juncus acutifloris*, *J. effusus* and *J. inflexus*, and grasses such as creeping bent *Agrostis stolonifera* and Yorkshire fog *Holcus lanatus.* Intermixed with the rushes and grasses there is an assemblage of wetland plants which has been almost lost from the Frome flood-plain. Among the more notable species are ragged-robin *Lychnis flos-cuculi*, marsh valerian *Valeriana dioica* and Carnation sedge *Carex panicea*. This type of rush-pasture formerly occurred with unimproved flood pasture but fields of the latter grassland type are now only found at East Holme, adjoining the downstream end of the river.

The East Holme meadows consist of two areas alongside the Frome that have escaped agricultural improvement and are important remnants of the valley's former grassland communities. They demonstrate a complete gradation of semi-natural vegetation ranging from elements of mire and heath flora on the valley margin, through acid grassland, to mesotrophic grassland on the alluvial floodplain. The majority of the unimproved pasture here comprises the Yorkshire fog and tufted hairgrass *Deschampsia caespitosa* coarse grassland community, and the Yorkshire fog and soft rush *Juncus effusus* community. These grasslands, particularly where wettest, are considered to be exceptionally species-rich for their type, containing carpets of small sedges such as carnation sedge *Carex panicea*, oval sedge *C. ovalis*, common sedge *C. nigra* and hairy sedge *C. hirta*, together with local abundances of otherwise scarce plants in Dorset including marsh cinquefoil *Potentilla palustris* and a local moss species *Calliergon giganteum*. Seasonally waterlogged areas within the rush pasture are dominated by a swampy vegetation of floating sweet-grass *Glyceria fluitans*, various small sedges, while locally frequent species include common spike-rush *Eleocharis palustris*, common cottongrass *Eriophorum angustifolium* and tubular water-dropwort *Oenanthe fistulosa.* The main block of rush pasture/coarse grassland is traversed by a series of species-rich ditches where the grazing regime combined with regular ditch clearance prevents domination by tall monocotyledons and encourages diversity. Within the open ditches there are several species of very restricted distribution within the county, including red pondweed *Potamogeton alpinus*, lesser water-plantain *Baldellia ranunculoides* and flowering rush *Butomus umbellatus.* Of particular interest on the sloping and poached ditch margins is the frequency of bottle sedge *Carex rostrata* and bladder sedge *C. vesicaria*, and a large stand of their hybrid *C. x involuta*, all of these being uncommon in Dorset.

Invertebrates

The River Frome and its adjacent wetland habitats are of high entomological interest. The chalk stream environment is very productive and high densities of macro-invertebrates are associated with the abundant weed beds and a variety of substrate habitats. The larvae of *Chironimidae* (midges) and *Simuliidae* (blackflies) are the most commonly encountered groups, with lesser amounts of *Ephemeroptera* (mayflies) and *Trichoptera* (caddis flies). Among the mayflies recorded, five are considered to be localised in Britain. The very scarce mayfly *Caenis pusilla* for which there are only three known localities in Britain has also been reported.

Aquatic molluscs are abundant in well vegetated stretches, including two species of localised distribution: *Valvata cristata* and *V. piscinalis.* Two nationally rare invertebrates occur in the lower Frome: firstly, the medicinal leech, *Hirudo medicinalis*, a species which is specially

protected under Schedule 5 of the Wildlife and Countryside Act 1981 and is rarely found in streams or rivers; secondly, the water beetle, *Macronychus quadrituberculatus*, a species which lives on stones in streams and rivers and is now very scarce and localised in the British Isles. The dragonflies and damselflies of the site include two species of local distribution in Britain: the ruddy darter *Sympetrum sanguineum* and the banded demoiselle *Calopteryx splendens*, together with a nationally rare (RDB3) species, the scarce chaser *Libellula fulva*, which breeds in slow flowing sections of the river.

Areas of riparian habitat in the valley have been found to support diverse invertebrate faunas which include nationally rare species of fly and beetle recorded in wet woodland, fens and ditches. Other typical wetland species present include the local scarlet tiger *Callimorpha dominula*, a moth whose larvae feed on comfrey and *Chrysolina menthastri*, a bright green leaf beetle which lives on water mint.

Birds

The Frome and its adjoining vegetation provide valuable breeding habitat for riverine and wetland birds. Kingfisher *Alcedo atthis* and grey wagtail *Motacilla cinerea* occur throughout the length of the river, while the fringing swamp, fen and wet woodland habitats support a number of riparian passerines including reed bunting *Emberiza schoeniclus*, reed warbler *Acrocephalus scirpaceus* and sedge warbler *Acrocephalus shoenobaenus*. The rare Cetti's warbler *Cettia cettia* has become widely established in similar habitat along the lower river, whilst grasshopper warbler *Locustella naevia* is now reduced to the status of an irregular breeder. Of the waterfowl, moorhen *Gallinula chloropus*, mute swan *Cygnus olor* and mallard *Anas platyrhynchos* are ubiquitous, but less obvious is the water rail *Rallus aquaticus* which breeds in dense fen vegetation.

The wet grassland breeding birds of the Lower Frome valley have all undergone substantial declines in their numbers over recent years. Redshank *Tringa totanus*, snipe *Gallinago gallinago* and lapwing *Vanellus vanellus*, all once common as breeding birds are now only present as winter visitors. Some parts of the wider Frome valley (mostly outside the site boundary) are still of considerable importance for wintering waterfowl and waders, notably teal *Anas crecca*, wigeon *Anas penelope*, Bewick's swan *Cygnus columbianus bewickii* and black tailed godwit *Limosa limosa.* The river's margins and riparian vegetation are regularly used by a number of species on passage such as common sandpiper *Actitis hypoleucos* and green sandpiper *Tringa ochropus.* Osprey *Pandion haliaetus* is a regular spring and autumn visitor, sometimes using the river and adjacent standing waters to fish.

Fish

The main and most widespread elements of the Frome's natural fish fauna are eel *Anguilla anguilla*, minnow *Phoxinus phoxinus*, stone loach *Noemachilus barbatulus*, three-spined stickleback *Gasterosteus arculeatus*, brown trout *Salmo trutta* (including sea trout), Atlantic salmon *Salmo salar**, bullhead *Cottus gobio**, and brook lamprey *Lampetra planeri**. The last four species all spawn on river gravels where water flows keep them aerated and free of sediment, conditions naturally found in the chalk stream environment. Salmonoid spawning within the SSSI section of river is predominantly by salmon and sea-trout and this is an important part of the Frome for them. Records of other anadromous fish (marine species which spawn in rivers) within the lower Frome include sea lamprey *Petromyzon marinus**, and the nationally uncommon smelt *Osmerus esperlanus*. Several of these fish species (as

indicated*) have been identified as requiring special conservation measures owing to their vulnerable status in a European context.

The Frome does not have a particularly diverse coarse fish fauna, with species such as perch *Perca fluviatilis* and carp *Cyprinus carpio* considered escapes from ponds and lakes. Pike *Esox esox* is common and as a predator numbers are removed to benefit the fisheries. Grayling *Thymallus thymallus*, an introduced species in this river, is widespread and can comprise a significant proportion of the coarse fish population.

Mammals
All three species of native aquatic mammal have been recorded on the River Frome: water shrew *Neomys fodiens*, otter *Lutra lutra* and water vole *Arvicola terrestris*. The presence of the last mentioned species is notable owing to a recent and very severe decline in its population throughout lowland Britain.

*Species listed on Annex II of the EC 'Habitats and Species' Directive.