

COUNTY: EAST SUSSEX SITE NAME: HASTINGS CLIFFS TO PETT BEACH

DISTRICT: ROTHER/HASTINGS

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

Local Planning Authority: ROTHER DISTRICT COUNCIL, Hastings Borough Council

National Grid Reference: TQ 872112 Area: 299.4 (ha.) 739.8 (ac.)

Ordnance Survey Sheet 1:50,000: 119, 189 1:10,000: TQ 80 NW, 81SW, 81SE, 91SW

Date Notified (Under 1949 Act): 1953 Date of Last Revision: 1971

Date Notified (Under 1981 Act): 1990 Date of Last Revision: –

#### Other Information:

Fairlight, Ecclesbourne and Warren Glens are mentioned in 'A Nature Conservation Review' (1977, ed D R Ratcliffe; published by Cambridge University Press). Parts of the site will be included in 'A Geological Conservation Review' (in press). Part of the site is managed by Hastings Borough Council as a Country Park. The site was formerly part of the Hastings Cliffs to Pett Levels SSSI.

#### Reasons for Notification:

This coastal site is of great geological and biological importance. Its palaeobotanical and vertebrate palaeontological fossils are some of the best examples of their type in the world, while two sections of the cliffs show a complex pattern of faults. A number of habitats are represented including woodland (much of it ancient), scrub, maritime grassland and a vegetated shingle beach. These support a number of rare bryophytes (mosses and liverworts), lichens, flowering plants and beetles (Coleoptera).

#### Geological Interest

There are 6 km of eroding seacliffs giving the furthest south easterly exposures of the lower Hastings Beds Group. The section is continuous from the basal Ashdown Sand Formation (possibly equivalent to top Purbeck *sensu* Dorset, which is probably Berriasian) to the lower Wadhurst Clay Formation (probably Valanginian).

A broad facies change may be observed, from meander plain sediments (varicoloured lateritic clays and silts) in the lower Ashdown, to coastal braid-plain sandstones in the upper Ashdown Sand, and lagoonal/lake deposits in the Wadhurst Clay Formation (dark clays with a minor fan-delta sandstone). Sedimentary structures on all scales are superbly displayed, the largest visible for long distances. Examples in the Ashdown are upward-fining, low-angle point bar sequences and various types of channel and cross-bedded sandstone (up to 10 m thick and traceable for up to 0.5 km). In the Wadhurst Formation, pro-fan-delta to top-fan-delta sequences are seen in the lower and upper divisions respectively of the Cliff End Sandstone Member (10 m). This in

places may lie directly on the Ashdown Sand Formation. Detrital petrography reflects the overall facies trend, the lower Ashdown having 'local' compositions (London-Kent massif material predominant), the upper Ashdown containing more exotic debris (mostly from Armorica), and the lower Wadhurst Clay finally reverting to a 'parochial' theme (Kent massif and local ironstone clasts). Diagenetic petrography of the clays and sandstones gives important evidence on the climate, soil conditions and burial-history of the rocks.

Palaeobotanical features include locally abundant drifted plant-fragments (including spores) and upstanding plants in growth positions. Some of the latter were strictly confined to shallow water (*Equisetum* in the lower Ashdown and basal Wadhurst); others were more or less subaerial (*Lycopodites* in a silcrete palaeosol, and unidentified tree-stools in a leached palaeosol at the top of the Cliff End Sandstone; unidentified rootlets in varicoloured interchannel silts and clays; etc). The fossil soils and *in situ* plants support the theory of a warm semi-arid to monsoonal climate. This is strengthened by the anatomy of drifted tree-fragments and by the sedimentological evidence.

Animal fossils, entirely non-marine, include trace fossils, estherids, insects, molluscs, fish, reptile (crocodile, turtles, dinosaurs, pterosaurs) and early mammals. The Cliff End Pebble Bed (Telham Pebble Bed) which is a rich repository of these, lies in the lower Wadhurst Clay above the Cliff End Sandstone Member. Dinosaur footprints (abundant in the Covehurst Sandstone Member at the base of the Ashdown Group), rain prints and sun cracks, occurring at intervals throughout the sequence, testify to periodic exposure of the sediments.

As a classic type-section of the Wealden this site is of national and international importance for reference, and has great potential for research.

Exposures of the Hastings Bed Group at the two Fairlight quarries show the Cliff End Sandstone Member of the lower Wadhurst Clay Formation. At the head of Fairlight Glen the lower (pro-fandelta) and upper (fluviatile top-fandelta) divisions of the member are fully exposed (8 m). Nearer Fairlight church old quarries show upstanding plants in life positions throughout the leached top 4 m of the member. These are important sites for the study of sedimentation and palaeoenvironments in the Wealden generally, and of the Wadhurst Clay sandstones in particular. They are to be compared with examples at Northiam (East Sussex), further north.

The eroding cliffs consist of Cretaceous sediments (Fairlight Clays, Ashdown Sands and Wadhurst Clay). The Wadhurst Clay (Lower Cretaceous) has produced many specimens of dinosaurs, pterosaurs, turtles, crocodiles and plesiosaurs. These include species of the dinosaur genera *Iguanodon*, *Megalosaurus* and *Cetiosaurus*. A classic collecting area, this is probably the best area for future finds of Lower Cretaceous reptiles outside the Isle of Wight. The Fairlight Cliffs also have a unique Lower Cretaceous mammal fauna. Rare specimens of both therian and prototherian mammals occur. The site is remarkable for yielding teeth of *Aegialodon dawsoni*, a form close to the ancestry of modern therian mammals. It is one of a handful of localities in the world to have yielded early Cretaceous mammal remains.

The cliffs between Covehurst Wood and Lee Ness Ledge is the best known and most productive site for the Fairlight Clay flora. This flora is the most important of those found in the British Wealden deposits, containing a wide variety of algae, mosses, pteridophytes and gymnosperms. The fossils are exceptionally well preserved, and include more or less whole cycad and bennettitite fronds. Cuticles are also often present. Their flora is comparable with the famous Wealden floras found in Belgium (the 'Bernissart Flora') and north west Germany. In Britain it is unique for its abundance and diversity, and is without doubt our most important Cretaceous fossil plant site. Preserved in the Wealden strata below Fairlight Cliffs there are *in situ* tree stumps, the only recorded examples of such stumps in British strata of this age. They probably belong to the now extinct family of tree-ferns, the Tempskyaceae. If this is proven they are the only known examples of *in situ* stumps belonging to this family. This is a site of considerable importance for interpreting the biology of this unusual group of ferns and the palaeoecology of the British Wealden.

At Fairlight two coastal sections expose representatives of the complex pattern of faults which cut the Lower Cretaceous rocks cropping out in East Sussex. Here the rocks are involved in a gentle crusted upfold, the Weald Anticline, which dominates the geological structure of south eastern England. At these localities two reverse faults cut the strata, the Haddocks and Fairlight Cove faults. Both are orientated WNW to ESE and are inclined steeply to the SSW. The displacements on these faults are substantial, being in the order of 50 metres downthrow to the NNE in each case. These faults are considered to be the surface expression of deep seated faults over which the Weald Anticline developed as a result of crustal compression during the Tertiary at the time of the Alpine mountain building episode (orogeny).

#### Biological Interest

The streams of the three glens cut steep sided valleys which are covered in parts by mature woodland dominated by pedunculate oak *Quercus robur*, with beech *Fagus sylvatica*, ash *Fraxinus excelsior* and hazel *Corylus avellana*, and occasional specimens of yew *Taxus baccata*, holly *Ilex aquifolium* and field maple *Acer campestre*. The ground flora varies from communities dominated by bracken *Pteridium aquilinum* on the sands to those dominated by dogs mercury *Mercurialis perennis* and pendulous sedge *Carex pendula* on the clays where the local violet helleborine *Epipactis purpurata* is found. Alder *Alnus glutinosa* is common along the streams and on wet flushes along with tussock sedge *Carex paniculata*, opposite-leaved golden saxifrage *Chrysosplenium oppositifolium* and ramsons *Allium ursinum*. These wooded streams are sheltered from frosts and support 'Atlantic' bryophytes such as the moss *Fissidens rivularis*, and the liverwort *Dumortiera hirsuta* at its only locality east of Devon, and a number of lichens which are associated with ancient woodland such as *Dimerella lutea*. The woodlands support a range of uncommon and rare beetles, while the Fairlight Glen stream has yielded the only modern records of the rare beetle *Hydraena pygmaea* in south east England.

Near the coast the trees become progressively more affected by salt spray from the sea and at Covehurst Wood there are extremely stunted trees growing on acidic sandstone boulders. Here there is an important bryophyte flora including the liverwort *Lophocolea fragans* at its only locality in south east England.

The woodlands grade into a coastal scrub along the cliff edges, consisting of wind-pruned thickets of privet *Ligustrum vulgare* and blackthorn *Prunus spinosa*. Within the scrubby areas there are patches of grassland dominated by yellow oat-grass *Trisetum flavescens* and red fescue *Festuca rubra*, common centaury *Centaureum erythraea* and scarlet pimpernel *Anagallis arvensis*. Thrift *Armeria maritima* is common along the cliff edge with the scarce loose silky-bent *Aspera spica-venti*.

At Firehills there is an area of coastal heathland which is now invaded by bracken *Pteridium aquilinum* and gorse *Ulex europaeus*, but which still has areas of ling *Calluna vulgaris* with bell heather *Erica cinerea*, and local rarities such as pale dog violet *Viola lactea*, fenugreek *Trifolium ornithopodioides* and bog pimpernel *Anagallis tenella*.

The shingle beach supports a range of coastal plants such as sea kale *Crambe maritima*, bittersweet *Solanum dulcamara* and sea beet *Beta vulgaris*, with nationally rare plants such as the sea pea *Lathyrus japonicus* and yellow vetch *Vicia lutea*. The rocky intertidal areas with their characteristic fauna and flora have a long history of marine biological study. They are particularly interesting because of their isolated position on a predominantly shingle and soft sediment coast.