

County: Devon/Cornwall **Site Name:** Plymouth Sound Shores and Cliffs

District: Caradon, Plymouth, South Hams

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

Local Planning Authority: Cornwall County Council
Devon County Council
Caradon District Council
Plymouth City Council
South Hams District Council

National Grid Reference: X 442488 **Area:** 45.0 (ha) (ac)
SX 448513
SX 487512

Ordnance Survey Sheet 1:50,000: 201 **1:10,000:** SX 44 NW,
NE SX 45 SW, SE

Date Notified (Under 1981 Act): 29 September 1997 **Date of Last Revision:** –

Other Information:

This is a new site.

Description and Reasons for Notification:

Plymouth Sound is an open bay into which run several estuaries forming a complex ria system. The coastline of the Sound is steeply sloping and rocky, especially to either side of the mouth. Several major ecological zones have been identified for the Sound and its tributaries. This SSSI encompasses examples from the open coast and sheltered bay parts of the system (sections of the inner zones are represented in other SSSIs), and includes shore communities with a south-western influence.

Open coast (Penlee Point):

Penlee Point is at the western mouth of the Sound. The coastline is subject to strong wave action and the rocky shores hold typical open coast communities. Very steep bedrock shows unusual juxtaposition of habitats. These include exposed limpet and barnacle dominated open faces, deep sheltered gullies with luxuriant red seaweed communities, and sheltered rock-pools, some very deep with kelps, others shallow and dominated by coralline seaweeds. Some of the seaweeds, e.g. *Mesophyllum lichenoides* are south western or western in distribution.

Sheltered Bay:

Hooe Lake Point differs in character and geology from other rocky shores included in this zone of the Sound and that it comprises broken bedrock steeply sloped seaward, backed by boulders and shingle. Numerous midshore shallow rock-pools sheltered by the steep bedrock on the seaward side are notable. These are coralline encrusted with abundant seaweed *Furcellaria lumbricalis* and the south western *Bifurcaria bifurcata* along with the japweed *Sargassum muticum*. The more exposed part of the shore exhibits well developed zonation from barnacle dominated zone with a large quantity of the lichen *Lichena pygmaea*, to a red seaweed dominated zone on flatter bedrock grading into kelps in the sublittoral.

Sheltered Bay (Mount Batten Point):

On the eastern side, there is a 2 km stretch of rocky shore within the sheltered bay zone from Mount Batten Point to Ramscliffe Point. This consists largely of Staddon Grits with an area of more sheltered mid-Devonian slates and limestone in the north; the variation in geology and exposure is reflected in the variety of biological communities. The site supports communities typical of rocky shores with good examples of seaweed zonation and is notable for its rich fauna, particularly that of under-boulders and overhangs.

On the main area of limestone south of Mount Batten Point boring activity by various animals has resulted in a very heterogeneous surface, which provides numerous microhabitats for both plants and other animals. These boring animals include the bivalve *Hiatella arctica* and in places abundant *Polydora* polychaete worms. The upper and midshore is dominated by a limpet *Patella vulgata* and barnacle (mainly *Semibalanus balanoides*) community, whilst the lower shore varies from muddy gravel dominated by ephemeral seaweeds to unbroken bedrock. The latter is extremely diverse with furoid and red seaweeds and a distinct band of the thongweed *Himanthalia elongata*. In crevices and, particularly under overhangs, the biota is dominated by an abundance of the gooseberry sea squirt *Dendrodoa grossularia*. This community is nationally uncommon. A variety of animal species occur under boulders although this community is not as rich or diverse as that south of Jennycliff Bay (see below).

Further south there is intermittent limestone and shale amongst sandstone, including both boulders and bedrock. Here the limestone is also well bored by *Polydora*. There are varying conditions of exposure with a limpet and barnacle dominated midshore with dense patches of mixed seaweeds such as the egg wrack *Ascophyllum nodosum* and bladder wrack *Fucus vesiculosus* grading into a dense zone of saw wrack *Fucus serratus*. The gastropods *Monodonta lineata* and the periwinkle *Littorina littorea* are abundant. The diversity of habitats is increased by indents, rockmills, crevices and overhangs. The latter are dominated by tunicates and sponges, though not as rich as the limestone to the north.

Around Dunstone Point to Rum Bay the shore is characterised by steep rocky ridges. These support typical moderately exposed rocky shore communities although unusual coralline dominated rock pools with numerous anemones *Anemonia viridis* occur in the upper midshore.

The shore in Jennycliff Bay and to the south is composed of extensive broken bedrock which becomes steeper and eventually vertical towards Ramscliff Point. Small to medium sized boulders are common and very large boulders occur in the mid and upper shore of the southern section. The shore has a diversity of habitats supporting a rich biota. Complete biological zonation typical of moderately exposed shores occurs including a lichen zone; limpet/barnacle dominated midshore zone; below this is a zone with saw wrack with various red seaweeds, such as *Laurencia pinnatifida*, *Palmaria palmata*, *Mastocarpus stellatus* and *Caliblepharis ciliata*, which become dominant in some areas; and at the bottom of the shore is a dense zone of thongweed *Himanthalia elongata*. Particular habitats of note include overhangs, shaded ridges and rock pools.

Overhangs are dominated by the gooseberry sea squirt as in the northern part of the section with a variety of other animals including other tunicates, sponges and bryozoan seamats. There is a rich underboulder community including a variety of crabs and other crustaceans such as the chameleon prawn *Hippolyte*, squat lobster *Galathea squamifera*, and corrugated crab *Xantho incisus* (a south-western species). Sponges, colonial sea squirts, e.g. *Botryllus schlosseri*, anemones, gastropods, several fish, e.g. butterfish *Pholis gunnellus*, five bearded rockling *Ciliata mustela* and rock goby *Gobius paganellus*, also occur, as do echinoderms such as the cushion star *Asterina gibbosa* and common brittlestar *Ophiothrix fragilis*.

On some ridges shaded north-facing vertical surfaces are not dominated by the gooseberry sea squirt but instead include other good examples of overhang biota including shade-tolerant seaweeds such as *Phyllophora pseudoceranooides*, the Devonshire cup coral *Caryophyllia smithii* and cowrie molluscs *Trivia arctica*.

There are numerous rock pools but most are filled with sediment and seaweed debris and do not support a rich biota. Exceptions are those which include an underboulder community with several species of sea squirt, e.g. *Ascidia mentula*, and abundant worm pipefish *Nerophis lumbriciformis*. The diversity of habitats is increased by freshwater input near Jennycliff Beach where there is a sand filled channel with *Arenicola marina* and *Enteromorpha* sp.

Geology:

Coastal cliff and foreshore outcrops provide a classic section through Lower Devonian to early Middle Devonian stratigraphic units, including part of the Dartmouth Group, the Meadfoot Group, the Staddon Grits, the Jennycliff Slates and part of the Plymouth Limestone.

The sequence is fossiliferous at certain levels and has yielded a variety of groups including plant remains, corals (*Metriophyllum*, *Pleurodictyum*, *Thamnopora* etc.), brachiopods, bryozoa, gastropods, rare orthonitic nautiloids, ostracods, trilobites (including phacopids), crinoids (one partially articulated) and fragmentary ostracoderm (mainly pteraspid) and acanthodian fish remains.

In Jennycliff Bay this sequence is usually steeply inclined and flexured into open recumbent folds, sometimes with chevron form. Cleavage associated with these folds is strongly developed in the slates but becomes more widely spaced in siltstones and sandstones. The cleavage dips at moderate low angles to the south. In places the strata become overturned, dipping steeply to the south. Sedimentary structures such as graded bedding and cross-bedding can be used to establish the original "way-up" of the strata. The disposition of the beds, the folds and the cleavage demonstrate that this section lies on the northern, steep or overturned limb of the Dartmouth Antiform, part of a major geological structure which can be traced from Newquay to the west to Dartmouth in the east.

In Bovisand Bay many further structural features can be observed, including folds of three generations with associated cleavages. In this section first generation folds are generally asymmetric with steep or overturned northern limbs and gently dipping southern limbs. The associated cleavage dips consistently south at about 40°. The disposition of these folds indicates that the trace of the Dartmouth Antiform, a major first-generation structure, passes through this section. At the southern end of the bay, a major fault separates the Dartmouth beds from the Meadfoot Group. This fault is an important regional structure associated with the Dartmouth Antiform.

Batten Bay to Andurn Point provides an unrivalled section through the lower part of the Devonian succession of the Plymouth District. A clear geological succession with palaeontological-age controls and sedimentological orientation information aids the interpretation of the Variscan structures in the area, notably the regionally important Dartmouth Antiform and associated major faults.