

### *The South Hams coast between Start Point and Bolt Tail*

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The metamorphic coastal rocks between Start Point and Bolt Head, lying within the parishes of Stokenham, Chivelstone, East Portlemouth and Malborough, are unlike any others in Devon. There are two main groups of rocks on land, mica-schists and hornblende-chlorite schists, with transitional types at the junction of the principal rock types formed by the metamorphism of mafic lavas or sills (Mottershead 1971). The dramatic cliffs formed by these rocks reach 90 m at Prawle Point and 130 m at Bolt Tail. Raised beaches formed by changes in sea levels during the Pleistocene are a feature of the coast between Start Point and Salcombe where the cliffs do not always extend down to the modern sea level. Aprons of schist-derived periglacial head deposits form a blanket over the earlier shore platforms below the old cliff-line with a maximum thickness of 33 m at sheltered sites protected from marine erosion. The intertidal area is a wave cut platform composed of the same schists as the cliffs. There is only one small deposit of head between Bolt Head and Bolt Tail, at Soar Mill Cove. Elsewhere soils are derived from *in situ* weathering processes (Mottershead 1971, Durrance & Laming 1982). The fine loamy soils over deeply weathered or fissured rock locally belong to the Trusham series. They are freely draining, slightly acidic, but base rich (Findlay *et al.* 1984). The pH of soil samples derived from the mica-schist was found to be between 4.7 and 5.3, and from the hornblende-chlorite schist



Wave-cut platforms and the former cliff line near Prawle Point looking east towards Start Point.

between 5.3 and 6.1 (Smith & Margetts 2001). Where the slope allows, the more fertile raised beach areas have been converted to arable land.

The imposing coastline is dominated by its dramatic sea cliffs and the old cliff-line. Notable sandy or pebble beaches occur west of Start Point at Great Mattiscombe Sands and Lannacombe, to the west of Prawle Point at Gara Rock and at Soar Mill Cove between Bolt Head and Bolt Tail, where small streams flow out to sea. Smaller spring-fed streams, of more local origin, are to be found here and there and may, like the one at Elander Cove, plunge directly over the cliff edge. The coast is backed by the open rolling South Hams plateau, cut at Lannacombe by a deep coombe and to a lesser extent at Woodcombe, where the vegetation is dominated by wind-cut scrub. A small area of woodland survives near East Prawle. The current field pattern is of medium to large regularly planned fields delineated by stone walls or low dense hedges.

The evolution of the landscape from the very earliest occupation during the Palaeolithic period to the present day has been studied in detail by Waterhouse (2002) in the parish of East Portlemouth. A heritage study covering the parish of Chivelstone was conducted by Exeter Archaeology (2008). The Waterhouse study is the more useful for present purposes and must act as guide to what must have occurred in the somewhat similar areas to the east and west. The first settled farming communities occurred during the Neolithic period between 6,500 and 4,500 years ago but the most obvious indication of early settlement is of extensive Bronze age co-axial field systems laid out on a grand scale between 3,900 and 3,200 years ago. Evidence of the long parallel field boundaries running northwards from the coastline between Portlemouth Down and Decklers Cliff and a similar system near Prawle Point can still be seen today. Much of this area is thought to have been abandoned during the political unrest of post-Roman times, the steeper areas being particularly difficult to farm. The modern pattern began with Anglo-Saxon settlement from around AD 800 and was consolidated following the Norman Conquest. Much of the coastal area was dominated by heathlands at this time, probably used as common land with grazing rights attached to it. Later during this period arable land at Rickham Common was

farmed democratically under the open field system. It is still shown on the 1840 tithe map, and was finally abandoned during the 1940s. During this same period agricultural rationalisation of other open fields in Devon took place and hedgerow establishment followed earlier strip field boundaries. Between about 1700 and 1730 much of the coastal heathland was enclosed with stone walls and banks creating new pasture and some arable fields. This agricultural activity will have 'improved' the soils and, in particular led to an elevation of pH. The valleys above Pig's Nose and Gara Rock were managed as water meadows for a time during the 19<sup>th</sup> century. Nevertheless, the 1840 map indicates that most of the coastal strip remained as either waste or grazing pasture much as we see it today. In addition to raised beach areas, most of the flatter land, inland from the cliffs, is now used to grow cereals, potatoes or cauliflowers. These fields have a notable arable flora, in part due to management policies put in place to promote conditions favouring seed eating birds, especially the Cirl Bunting *Emberiza cirlus*. Changes in agricultural practices had led to the abandonment of grazing on many of the steeper slopes and encroachment by scrub and coarse grasses had resulted in loss of botanical interest. More recently the National Trust has re-introduced grazing and gorse management to some areas, creating conditions for a wider variety of species.

Plants in these exposed situations on freely draining soils are more than usually subject to variability in weather patterns. While extreme cold is rarely experienced, drought may have a significant effect on shallow rooted and annual species. Weather records for the 40-year period from 1960 at Slapton Ley Field Studies Centre have been analysed by Burt and Horton (2001). Whilst Slapton is situated in a sheltered site about a kilometre inland, the weather station is reasonably exposed in all directions except to the southwest. The weather patterns recorded there give some indication of conditions prevailing on the cliffs to the south. Slapton experiences an Oceanic climate with a mean annual temperature of 10.7° C, almost as high as anywhere on mainland Britain. July and August are the warmest months with a mean maximum temperature of 20.2° C and February the coldest with a mean minimum of 3.3° C. Nevertheless, the mean air temperature during this period was 5.9° C indicating that, on average, grass can continue to grow throughout the year.



Weather-worn hornblende-chlorite schist cliff (bottom left) behind slabs of mica-schist used to make field boundaries on the cliff slopes at Prawle Point.



The popular beach at Soar Mill Cove. Much of the sand seen here in 2012 was lost during the winter storms of 2013–2014.

Extreme temperatures are rare events. During this period, daytime temperature remained below zero only 47 times confined to ten individual years. At the other end of the scale, daytime temperature exceeded 25°C on only 87 days, and on only one occasion, in June 1976, did it exceed 30°C. Average rainfall for the period was 1059.1 mm, slightly more than most coastal locations and perhaps reflecting the proximity of Dartmoor. Monthly rainfall of about 124 mm between November and January falls to just over 60 mm between April and July. During drought years of 1975 and 1976 a mere 3.3 mm and 5.5 mm was recorded during June of those years.

While most of the plants mentioned here can also be found in other places along the South Devon coastline, no one other area can boast such a rich and diverse flora as the schistose cliffs and fields between Start Point and Bolt Tail.

At the lowest level Sea Spleenwort *Asplenium marinum* is locally frequent in the spray zone, usually in deeply shaded crevices and sea caves and Golden-samphire *Inula crithmoides*, Rock Samphire *Crithmum maritimum* and Saltmarsh Rush *Juncus gerrardii* can be found on rocks and rock platforms just above the sea. At Gammon Head there is a substantial colony of Sea-purslane *Atriplex portulacoides* high and dry on the sheltered cliff above Maceley Cove. Rock Sea-lavenders *Limonium binervosum* subsp. *mutatum* and *L. britannicum* subsp. *coombense* are both endemic here, on sheltered crumbling head deposits, just above the sea and Yellow-vetch *Vicia lutea* is sometimes locally abundant on freshly exposed head at Great Mattiscombe Sands.

Heavy recreational use must have a deleterious effect on beach communities including strandline plants such as Orache *Atriplex* spp. and Sea Rocket *Cakile maritima*. Summer pressure and beach management may also

affect populations of Shore Dock *Rumex rupestris*, listed as Endangered on the British Red List. *R. rupestris* occurs occasionally along the South Hams coast from Start Point westwards towards Plymouth where fresh water flows out below the head at the foot of the cliffs, usually at the back of beaches. The most important population, at Soar Mill Cove, was flourishing in 2011 but has declined since, following a series of winter storms which led to cliff falls and loss of sand from the beach.

Water Mint *Mentha aquatica*, Hemp-agrimony *Eupatorium cannabinum*, Marsh Thistle *Cirsium palustre* and Water-cress *Nasturtium officinale* grow in tall herb communities where streams flow down from the cliff tops and stands of Common Reed *Phragmites australis* can be found where these streams flow out onto beaches or where seepage water trickles out onto rock platforms above the sea. Long-bracted Sedge *Carex extensa*, Distant Sedge *C. distans*, Slender Club-rush *Isolepis cernua* and Brookweed *Samolus valerandi* are often found in similar situations.

Maritime grassland communities with Red Fescue *Festuca rubra*, Thrift *Armeria maritima*, Portland Spurge *Euphorbia portlandica*, Bluebell *Hyacinthoides non-scripta* and Wild Carrot *Daucus carota* mix with patches of wind-cut Blackthorn *Prunus spinosa* and Wild Privet *Ligustrum vulgare* on the sea-cliff slopes. The coastal subspecies of Common Broomrape *Orobanche minor* subsp. *maritima* may also be found here, parasitic on *D. carota*.

Ungrazed cliff tops and slopes are dominated by Bracken *Pteridium aquilinum* and Gorse *Ulex* spp., the latter sometimes covered with sheets of Dodder *Cuscuta epithymum*. Burnet Rose *Rosa pimpinellifolia* can be locally common amongst the Gorse and Bloody Crane's-bill *Geranium sanguineum*, restricted in Devon to this part of the coast, is locally abundant in more sheltered areas. Lanceolate Spleenwort *Asplenium obovatum* is frequent in cliff-top rock crevices.

Heathland communities with Western Gorse *Ulex gallii*, Bell Heather *Erica cinerea* and Heather *Calluna vulgaris* grade into dwarf maritime communities, summer parched grassland and bare rock near the cliff edge with Spring Squill *Scilla verna*, Autumn Squill *S. autumnalis*, Sea Stork's-bill *Erodium maritimum* and Upright Chickweed *Moenchia erecta*. Blue Fescue *Festuca longifolia* is widespread on very thin soils over rocks where the competition from more vigorous species is reduced (Smith & Margetts 2001). Long-headed Clover *Trifolium incarnatum* subsp. *molinerii* was discovered near Bolt Tail in 2005 by Peter Reay and Wendy Reece (Smith 2006) growing in thin cliff edge soils in short, relatively open vegetation where other small annual leguminous species including Hare's-foot Clover *Trifolium arvense*, Rough Clover *T. scabrum*, Knotted Clover *T. striatum*, Slender Bird's-foot-trefoil *Lotus angustissimus* and Hairy Bird's-foot-trefoil *L. subbiflorus* may grow. Bird's-foot Clover *Trifolium ornithopodioides* and Suffocated Clover *T. suffocatum* are local, where Red Fescue *Festuca rubra* grassland is kept short by grazing or trampling.

On slopes above Soar Mill Cove there are small areas of Purple Moor-grass *Molinia caerulea* dominated mire with many of the associated species one would expect to find further inland. These include Bog Asphodel *Narthecium ossifragum*, Common Cottongrass *Eriophorum angustifolium*, Star Sedge *Carex echinata*, Pill Sedge *C. pilulifera*, Bog Pimpernel *Anagallis tenella*, Round-leaved Sundew *Drosera rotundifolia*, Lesser Skullcap *Scutellaria minor* and Pale Butterwort *Pinguicula lusitanica*. Allseed *Radiola linoides*, first seen here in 1938, was rediscovered in 2007, in drier areas on the edge of one of the mires, and Dotted Sedge *Carex punctata* was found at its second extant Devon location in 2012 during a Devonshire Association Botany Section meeting.

The fields immediately behind the semi-natural coastal strip have a rich arable flora reflecting a long agricultural history and, in some cases, recent management policy. Corn Spurrey *Spergula arvensis*, Musk Stork's-bill *Erodium moschatum*, Sharp-leaved Fluellen *Kickxia elatine*, Small-flowered Buttercup *Ranunculus parviflorus* and Field Woundwort *Stachys annua* are all common. Round-leaved Fluellen *Kickxia spuria*, Narrow-fruited Cornsalad *Valerianella dentata*, Small-flowered Catchfly *Silene gallica*, Dwarf Spurge *Euphorbia exigua*, Henbit Dead-nettle *Lamium amplexicaule* and Cut-leaved Dead-nettle *L. hybridum* can also be found, but much less commonly.



Common Cottongrass *Eriophorum angustifolium* in one of a series of small mires on the slopes near Soar Mill Cove.

The coastal strips from Start Point to Prawle Point and Bolt Head to Bolt Tail are both Sites of Special Scientific Interest designated for their geology, lichens, flowering plants, invertebrates and birds. The National Trust owns and manages a small area around Stinking Cove, the coastal strip from Prawle Point west to Rickham Common and the coastal strip between Bolt Head and Bolt Tail, including some of the adjoining farmland.

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