

TERRESTRIAL PLANT COMMUNITIES OF THE CHESIL BEACH AND THE SHORE OF THE FLEET

Jeanne M FitzPatrick, Preston, Weymouth

As elsewhere, the terrestrial plant communities of the Chesil Beach and the shores around the Fleet coastal lagoon reflect the physical conditions operating in the area. In addition to the geology, soil or substrate and topography, there are strong maritime influences. These include exposure to the S.W. winds, sea spray to all areas, wave action to the seaward side of the Chesil Bank and the tidal waters around the shores of the Fleet. These waters exhibit a gradient of salinity from marine salinities at Ferry Bridge to brackish at Abbotsbury, (Whittaker, Robinson *ibid*).

It is possible to recognise six main habitat types within the study area. Five terrestrial types are the subject of this study. The intertidal mud flats, although supporting an important Zostera community as in Butterstreet cove, are not included here.

1. Shingle This takes the form of a 27.4 km (17 mile) shingle bar, from Portland to West Bay, whose pebbles generally decrease in size from east to west. Stability and vegetation increase from the crest to the back of the beach. Human disturbance is also a factor influencing the amount and diversity of plant cover.
2. Salt Marsh This habitat is distributed all around the shores of the lagoon. The extent of the zone varies considerably with the tidal range and shape of the shore line. It is best developed in inlets and bays and at the two ends of the Fleet. It is only a narrow fringe around promontaries such as Herbury and on the Chesil Beach itself, the salt marsh areas are patchy.
3. Freshwater Marsh The freshwater catchment of the Fleet is about 11 square miles (Sturdy 1972). Only very small streams enter the Fleet and these can dry up in summer. Their influence on the shore is therefore small and local but does produce conditions for freshwater marsh species to grow adjacent to some of the salt marsh areas eg off Pirates Lane. It is best developed at the Swannery which is yet to be studied in any detail.
4. Coastal grass 'cliffs' The land shore of the Fleet varies considerably from very low, gently sloping land to vertical or steep cliffs of 3-5m. Rank vegetation, with or without scrub, covers most of these areas. The geology includes Kimmeridge and Oxford clays, Corallian, Forest Marble, and Fuller's Earth. These last two rock types produce calcareous soils which have a

noticeable influence on the vegetation where they occur eg Herbury to Rodden Hive. As a coastal habitat, the land shore line of the Fleet is not well developed. It is sheltered by the beach and the lagoon to a large extent and the area that remains undisturbed by agricultural development is very narrow in places.

5. Waste Places Where the 'cliff' edge shows erosion and on the inland margins of some areas of shingle eg West Bexington shore path and at Ferry Bridge near the car Park, disturbed and open conditions give opportunity for 'weeds'.

The most important habitat types are, however, the maritime ones, especially the shingle, salt marsh and mud flats.

Areas of the Chesil Beach and Shores of the Fleet visited

The information drawn on for this account has been gradually accumulated from a number of visits to the study area from 1976-79. Twelve different areas were visited and include four areas of the shingle beach and eight shore areas incorporating at least some salt marsh conditions. These areas are listed below.

No attempt has been made to measure the sizes of these areas.

1. Ferry Bridge - Inner face of Chesil Beach. A large area of stable, (Fig. 4D) 'closed' turf surrounded by unstable shingle with more open vegetation and typical shingle species.
2. Ferry Bridge - a band of salt marsh between the shingle and the large (Fig 4D) intertidal sandy shore at the extreme eastern end of the Fleet. Suaeda fruticosa lies between the shingle and the salt marsh and runs more or less continuously the full length of the shingle shore of the Fleet. This area is subject to disturbance and bait digging.
3. Pirates Cove - a deep inlet with salt marsh and freshwater marsh species (Fig 4D)
4. East Fleet - a narrow belt of salt marsh behind the large area of mud flats (Fig 4C) of Butterstreet Cove (Oxford clay and Kimmeridge clay).
5. Herbury Gore - a very narrow fringe of salt marsh in front of steep or (Fig 4B) almost vertical cliffs of the promontary. (Forest Marble and calcareous soil).
6. 'Works' inlet - a small fenced area of salt marsh with freshwater marsh (Fig 6) species. A small stream enters the Fleet at the side of the patch. (Fuller's Earth and calcareous soil).

7. 'Works' to Langton Hive a narrow fringe of salt marsh in front of
(Fig 4B) low, gently sloping shore line. (Fuller's Earth)
8. Langton Hive to Rodden Hive a narrow fringe of salt marsh in front
(Fig 4B) of steeper 'cliffs'. (Fuller's Earth).
9. Abbotsbury salt marsh area at the extreme western end of the Fleet
(Fig 4A) on the seaward side of a large freshwater marsh. A small stream runs into the end of the Fleet.
10. Abbotsbury a vegetated shingle area. Plant cover increases away from
(Fig 4A) the Car Park and is best opposite the swannery. Most of the vegetation is on the back of the beach although the crest and, less often the seaward side of the beach, can also support some plants if conditions are suitable.
11. Chesil Beach opposite Chickerell Hive - an area of vegetated shingle
(Fig 4C) some distance from the landing point on the more stable back of the beach.
12. West Bexington a less disturbed area west of the car park. Open
(Not mapped, See intro-duction) vegetation on the crest and back of the beach although the seaward side does support some vegetation. The path contains species of disturbed ground. Transects from the crest to the coastal path show an increase in cover and species diversity. (Helyar 1977).

Most visits to the Fleet were carried out in June or July. Because there is a continuous gradient from maritime to non-maritime conditions in all coastal areas, the landward limit of the coastline is difficult to define. The species recorded in this account were those found from above high tide to the 'cliff' edge on the land side of the Fleet. At Ferry Bridge, the species found on the shingle and the grassy area have been recorded. At West Bexington and Abbotsbury, the areas include the crest and back of the beach as far as the foot-path.

This plant survey is still incomplete, both on the total number of species recorded and in the areas visited; although more attention was paid to the coastal species in each area. Because of the need to avoid disturbance to the nesting colonies of Little Tern and other breeding birds, much of the shingle beach has yet to be visited. It is anticipated that more recording will be carried out in future seasons, both on the Chesil and at the Swannery.

III The Floral composition of the study area

The complete list of flowering plant species so far recorded is given in the appendix. It contains 110 species (+ 1 spp of Equisetum). This total is most certainly an under-estimate and some difficult species such as members of the

genera Salicornia, Spergularia and species such as Geranium purpureum need closer study. Limonium binervosum, Eryngium maritimum, Euphorbia paralias and E.portlandica have been reported in the past (Environmental Records Centre, County Museum Dorchester) but were not found by the author. Their present distribution therefore needs checking. These 4 species have nevertheless been included in this total. Absence of a species from these records does not necessarily mean that it is not present, although in most cases this will be so. No attempt has been made to quantitatively assess the different species found in the area visited. Some attempt however, has been made to give for each species some idea of its ecological range. Relevant information has been taken from the list of coastal vascular plant species given in the Nature Conservation Review Vol 1 (1977). In this way, it is possible to make some kind of evaluation of the species found in the study area (Appendix 1). Table 1 has been made from the list of total species recorded in the appendix 1. The symbols which indicate the habitat types appear beside each plant species listed and at the heads of the columns in Table 1. Species that can occur either on shingle or on salt marshes have been separated from those that have a more restricted range. Sandy/dune species have also been separated from the shingle species even though this habitat is not really represented. This exercise is difficult because many species have a wide range of tolerance to physical conditions. Phragmites has been listed in the freshwater marsh species but it can tolerate low salinities as well. Halophytes and other coastal species have also been identified. Table 1 attempts to analyse the flora of each of the 12 areas visited and to show its ecological composition.

Table 1. Number of the main plant species, so far recorded in 12 areas of the Chesil Beach and the shores of the Fleet, found in the different types of habitat.

AREAS OF THE CHESIL BEACH AND SHORE OF FLEET	MARITIME HABITATS				NON MARITIME HABITATS				TOTAL NO OF SPECIES HALOPHYTES	OTHER COASTAL SPECIES	TOTAL NO OF COASTAL SPECIES	
	SHINGLE (Sh)	SHINGLE & SALT MARSH (Sh Sm)	SALT MARSH (Sm)	SAND/DUNE (S)	FRESH WATER MARSH (F)	CALCAREOUS GRASSLAND (C)	OTHER GRASSLAND (G)	WASTE AREAS (W)				
1. Ferry Bridge Shingle	11	9		3		6	10	10	49	15	8	23
2. Ferry Bridge salt marsh	1	5	5						11	10	1	11
3. Off Pirates Cove	2	10	5		6	3	3	4	33	13	6	19
4. East Fleet	1	8	3		1			1	14	10	2	12
5. Herbury Gore	1	4	2			6	3	1	17	6	2	8
6. 'Works'	1	10	9		2			1	23	14	6	20
7. 'Works' to Langton Hive	1	6	8		1	2	1	2	21	11	4	15
8. Langton Hive to Rodden Hive	1	6	2		3	10	6	3	31	5	5	10
9. Abbotsbury salt marsh	1	13	9	1	1				25	19	5	24
10. Abbotsbury shingle	13	6					1	6	26	14	6	20
11. Chesil opp Chickerell	3	9		2			3	4	21	9	4	13
12. West Bexington	8	8				1	6	14	37	11	7	21
TOTALS	16	19	15	5	6	15	15	20	111	41	14	55

Comments

1. Of the 55 coastal species so far recorded for the whole study area, 41 are halophytes and occur on shingle, salt marsh or both habitats. Halophytes are unique in their ability to tolerate some degree of salinity in the soil water around their roots and/or the effects of spray on their shoots. They are the largest group of species found in this study area.

2. About 50% of the total list of species recorded occur more typically in habitats removed from maritime influence eg Lotus corniculatus, Iris pseudacorus. Some species which are included in the coastal list also occur elsewhere eg Anthyllis vulneraria, Rumex crispus, Daucus carota, Ononis repens.
3. In any one area, there may be more than one type of plant community, especially where a transition from one set of conditions to another occurs. Around the western end of the Fleet, there are shingle, salt marsh and freshwater marsh communities adjacent to one another, together with species that are characteristic of disturbed ground. The shingle areas of Ferry Bridge (area 1) and West Bexington (area 12) have 10 and 14 species of waste ground plants respectively. Where small streams or ditches drain into the Fleet, freshwater marsh species grow alongside those of the salt marsh, eg Oenanthe crocata, Iris pseudacorus, and Phragmites grow with Scirpus maritimus, Aster tripolium and Triglochin maritimus in areas such as the 'works' (area 6) and Abbotsbury (area 9) and Pirates Cove (area 3).
4. Where the soil of the land shore line is influenced by calcareous rocks such as Forest Marble and Fuller's Earth, calcicoles such as Blackstonia perfoliata, Brachypodium pinnatum, Primula veris and Poterium sanguisorba are found between Herbury (area 3) and Rodden Hive (areas 7 and 8).
5. At Ferry Bridge (areas 1 and 2) and Abbotsbury (areas 9 and 10), both of which are comparatively large areas, there are a large number of species present - about 60 species and 50 species respectively. Where the shore is narrow as at Herbury (area 5) and Langton Hive (area 8) there is only a fringing salt marsh but where there are inlets, a wider and a more diverse flora occurs as at Pirates Cove (area 3), the 'Works' (area 6) and Abbotsbury (area 9). See also table 2.
6. A comparison of the areas included in this study can most readily be made by examining only the coastal species (Table 3).

Table 2 Comparison of the numbers of Coastal species recorded in the different areas of the Chesil Beach and the shores of the Fleet.

AREA	NO OF SPECIES	COMMENTS
1. Ferry Bridge	26	good - shingle/grass
2. " "	11	poor - disturbed salt marsh
3. off Pirates Cove	19	good - with freshwater marsh spp.
4. E. Fleet	12	poor - salt marsh & cliff but large mud flats.
5. Herbury	8	poor - narrow fringe of salt marsh
6. 'Works'	20	good - salt marsh with freshwater marsh.
7. Langton to 'Works'	15	poor - narrow salt marsh fringe
8. Langton to Rodden Hive	10	" " " " "
9. Abbotsbury	20	good salt marsh.
10. "	24	good - shingle.
11. Chesil opp. Chickerell	10	poor - shingle
12. West Bexington	20	good - shingle

Evaluation of the Chesil Beach and shores of the Fleet.

Although the diversity of species and of habitats make the study area of great ecological/botanical importance, it is the coastal species and the halophytes in particular that make the whole area of special value. It is in fact, listed by N.C.C. as a Grade 1 Internationally important site. The shingle beach is one of the 5 largest, and the Fleet waters itself the largest regularly tidal lagoon, in Britain. In 1939, Tansley stated that the Chesil Beach "is not so rich in flowering plants" as Blakeney, possibly owing partly to "the poverty of drift on the inner margin bordering the Fleet". More surveys are needed to see just how this area in Dorset compares with this north Norfolk site and Dungeness. A comparison of the number of coastal species listed for the South West of England from "A Nature Conservation Review" and those recorded for this Dorset site, is included. The number of coastal species and halophytes of S.W. England however, include species from all marine habitats, whilst the totals for the study area are mainly from shingle and salt marsh (ie sandy/dune typical grass or rocky cliff habitats are not represented on the Fleet).

Table 3. A comparison of the number of Vascular Plant species for the S.W. England and the Chesil/Fleet area.

	CHESIL/FLEET	S.W. ENGLAND	% NO OF S.W. ENGLAND SPP ON CHESIL/FLEET
Shingle	35	50	70%
Salt Marsh	34	65	52.3%
Total no. of coastal spp.	55	182 (all the marine habitats)	30.2%
No. Halophytes	41	85 "	48.2%

*NB These % could well be higher with more survey work.

Conclusions

However well this Dorset site compares with similar sites elsewhere, the shingle flora of the Chesil Beach remains a very rich and important one. This account has dealt only with the Flowering Plants but the shingle is also rich in lichens and to some extent mosses (see Tansley's reference to Watson 1922). The moving pebbles produce a fragile habitat, easily destroyed by storms, trampling feet and fishing activities. The salt marsh areas are not extensive compared to those of Poole and Christchurch Harbours, but nevertheless 34 salt marsh species have been recorded for the shores of the Fleet. There are no very rare species on this list produced here, but there are large and important populations of Lathyrus japonica, Glaucium flavum, Crambe maritima, Suaeda fruticosa and Trifolium scabrum on the Chesil Beach. The Fleet is also the only Dorset site for Althaea officinalis. In conclusion it must be stated that the total environment that this area represents, is of very high scientific value.

FLOWERING PLANT LIST OF THE CHESIL BEACH AND SHORES OF THE FLEET
12 AREAS VISITED FROM 1976-79

AREAS OF THE BEACH AND FLEET

		1	2	3	4	5	6	7	8	9	10	11	12
C	<u>Agrimonia eupatoria.</u> Agrimony								X				
Sh Sm	<u>Agropyron pungens.</u> Sea Couch.	X		X	X	X	X	X	X	X			X
Sh Sm	<u>Agrostis stolonifera.</u> Creeping Bent						X						
W	<u>Aira caryophylla.</u> Silvery Hair Grass	X											
W	<u>A. praecox.</u> Early Hair Grass.	X											
Sm	<u>Althaea officinalis.</u> Marsh Mallow						X	X	X	X			
Sh	<u>Anagallis arvensis.</u> Scarlet Pimpernel	X											X
W	<u>Arenaria serpyllifolia.</u> Thyme- leaved Sandwort	X											
C	<u>Anthyllis vulneraria.</u> Kidney Vetch	X											
Sh Sm	<u>Armeria maritima.</u> Thrift	X	X							X			
W	<u>Arhenatherum elatius.</u> False Oat Grass										X		X
Sh Sm	<u>Artemisia maritima.</u> Sea Wormwood										X		X
Sm	<u>Aster tripolium</u> Sea Aster		X		X		X	X		X			
Sh Sm	<u>Atriplex gabiusscula</u> Babington's Orache											X	
Sh Sm	<u>A. hastata.</u> Hastate Orache		X	X	X		X		X	X			X
Sm	<u>A. littoralis.</u> Grass-leaved Orache				X					X			
Sh Sm	<u>Beta vulgaris.</u> Sea Beet	X	X	X	X	X	X	X	X	X	X	X	X
C	<u>Blackstonia perfoliata</u> Yellow-wort								X				
C	<u>Brachypodium pinnatum.</u> Tor Grass					X			X				
W	<u>Brassica nigra.</u> Black Mustard												X
W	<u>Bromus mollis.</u> Brome grass	X											X
C	<u>Briza media.</u> Quaking Grass								X				
W	<u>Calystegia sepium.</u> Bindweed			X							X		X
Sh	<u>C. Soldanella.</u> Sea Bindweed	X									X		X
Sh	<u>Carex arenaria.</u> Sand Sedge	X									X		
Sm	<u>C. distans.</u> Distant Sedge									X			
Sm	<u>C. divisa.</u> Salt Marsh Sedge							X					
C	<u>C. flacca.</u> Carnation Sedge								X				
Sm	<u>C. obtusae.</u> False Fox Sedge			X									
Sh	<u>Catapodium marinum.</u> Darnel Grass	X									X		
G	<u>Centaurea nigra.</u> Hardhead								X				
C	<u>Centaureum</u> spp. Centaury	X							X				

		1	2	3	4	5	6	7	8	9	10	11	12
	<u>Cirsium arvense.</u> Creeping Thistle	X										X	X
W	<u>C.vulgare.</u> Spear Thistle.	X											X
C	<u>Carlina vulgaris.</u> Carline Thistle					X							
W	<u>Cerastium vulgatum.</u> Common Mouse-ear	X										X	X
Sh Sm	<u>Cochlearia danica</u> Stalked Scurvy Grass	X								X	X	X	X
Sm	<u>C.officinalis.</u> Common Scurvy Grass				X	X	X						
Sh	<u>Crambe maritima.</u> Sea Kale										X		X
Sh	<u>Crithmum maritimum.</u> Samphire	X	X								X		
G	<u>Dactylus glomerata.</u> Cocksfoot	X				X			X		X	X	X
C	<u>Daucus carota.</u> Carrot	X	X		X				X				X
Sh Sm	<u>Festuca rubra.</u> Red Fescue	X	X		X						X	X	X
F	<u>Epilobium hirsutum</u> Hairy Willowherb			X					X				
F	<u>Equisetum</u> spp. Horsetail			X									
	<u>Erodium cicutarium</u> Common Storkbill	X											
Sh S	<u>Eryngium maritimum.</u> Sea Holly	?											
S	<u>Euphorbia paralias.</u> Sea Spurge	?											
S	<u>E.portlandica</u> Portland Spurge	?											
C	<u>Galium verum.</u> Lady's bedstraw	X							X				
C	<u>Genista tinctoria.</u> Dyer's Greenweed							X	X				
Sh	<u>Geranium purpureum.</u> Lesser Herb Robert?	X									X	X	X
Sh	<u>Glaucium flavum.</u> Yellow Horned Poppy	X									X		X
Sh Sm	<u>Glaux maritima.</u> Sea Milkwort			X	X	X		X	X	X			
Sh Sm	<u>Halimione portulacoides.</u> Sea Purslane.		X	X			X			X		X	
W	<u>Heracleum sphondylium.</u> Hogweed			X									X
G	<u>Hypochoeris radicata.</u> Cats ear	X											X
	<u>Iris pseudacorus.</u> Flag Iris			X									
G	<u>I. foetidissima.</u> Stinking Iris					X							
Sm	<u>Juncus gerardii</u> Saltmarsh Rush		X	X	X	X	X	X	X	X			
Sm	<u>J. maritimus.</u> Sea Rush						X	X		X			
Sh	<u>Lathyrus japonicus.</u> Sea Pea										X		
G	<u>L.pratensis.</u> Meadow Vetchling			X									
Sh Sm	<u>Limonium binervosum.</u> Rock Sea Lavender												
G	<u>Lotus corniculatus</u> Bird's Foot Trefoil	X	X					X	X			X	X
Sh	<u>Lavatera arborea.</u> Tree Mallow												X
W	<u>Malva sylvestris.</u> Common Mallow	X		X							X		X
F	<u>Oenanthe crocata.</u> Water Dropwort			X			X	X	X				
W	<u>Onobrychis vicifolia.</u> Sanfoin			X									
	<u>Ononis repens.</u> Restharrow	X	X		X				X				
Sh Sm	<u>Parapholis stigosa.</u> Sea Hard Grass	X					X		X	X			

		1	2	3	4	5	6	7	8	9	10	11	12
F Sm	<u>Phragmites communis.</u> Common Reed			X	X				X	X			
Sh	<u>Phleum arenarium.</u> Sand Cat's Tail	X									X		
C/W	<u>Picris echioides.</u> Prickly Ox-tongue	X						X	X		X	X	X
Sh S Sm	<u>Plantago coronopus.</u> Buckshorn Plantain.	X				X	X			X			X
Sh G	<u>P.lanceolata.</u> Ribwort Plantain	X											
Sh Sm	<u>P.maritima.</u> Sea Plantain		X	X			X	X		X			
W	<u>Potentilla anserina.</u> Silverweed			X		X	X	X	X				
C	<u>Poterium sanguisorba.</u> Salad Burnet			X		X			X				
C	<u>Primula veris</u> Cowslip					X							
G	<u>Prunus spinosa.</u> Blackthorn					X							X
Sm	<u>Puccinellia maritima.</u> Sea Poa		X							X			
G	<u>Rhinanthus minor.</u> Yellow Rattle	X											
Sh Sm	<u>Rumex crispus.</u> Curled Dock	X		X			X	X			X	X	X
S	<u>Sagina nodosa</u> Knotted Pearlwort	X								X		X	
Sm	<u>Salicornia perenne.</u> Perennial Glasswort		X										
Sm	<u>Salicornia spp</u> Glasswort		X				X			X			
Sm	<u>Scirpus maritimus.</u> Sea Club-rush			X	X		X	X		X			
F	<u>Ranunculus sceleratus.</u> Celery-leaved Buttercup			X			X						
Sh	<u>Sedum acre.</u> Wall Pepper	X									X		
G	<u>Senecio jacobea.</u> Ragwort								X				X
W	<u>S.vulgare.</u> Groundsel												X
Sh	<u>Silene maritima.</u> Sea Champion	X									X	X	X
Sh	<u>Smyrniium olusatrum</u> Alexanders										X		X
Sh Sm	<u>Solanum dulcamera.</u> Woody Nightshade	X					X		X		X	X	X
W	<u>Sonchus arvensis.</u> Corn Southistle								X				X
W	<u>.S.oleraceus.</u> Corn Southistle										X	X	X
Sm	<u>Spergularia spp</u> Spurrey		X	X	X		X	X		X			
Sh Sm	<u>Suaeda fruticosa.</u> Shrubby Sea Blight	X		X						X		X	
Sh Sm	<u>S.maritima.</u> Annual Sea Blight		X	X	X		X	X		X		X	
Sh	<u>Tamari gallica.</u> Tamarisk										X		
W	<u>Taraxacum officinale.</u> Dandelion	X											X
C	<u>Thume drucei.</u> Thume	X											
G	<u>Trifolium arvense.</u> Hare'sfoot Clover	X											
G	<u>T.campestre.</u> Hop Trefoil	X											
G	<u>T.dubium</u> Lesser Trefoil.	X							X				
S	<u>T.scabrum.</u> Rough Clover	X										X	
Sm	<u>Triglochin maritima.</u> Sea Arrowgrass			X	X		X	X		X			
Sh Sm	<u>Tripleurospermum maritimum.</u> Scentless Maywood	X		X				X	X	X	X	X	X

	1	2	3	4	5	6	7	8	9	10	11	12
<u>Torilis nodosa</u> . Knotted Hedge Parsley			X					X				
<u>Vulpia</u> spp. Rat-tail Fescue.	X											

Ecological Range of the species recorded

	<u>Symbol</u>
Shingle	Sh
Salt Marsh	Sm
Shingle/Salt Marsh	Sh Sm
Sand/dune	S
Freshwater Marsh	F
Grassland - calcareous	C
- other types	G
Waste land	W
[]	Not found by author but past records indicate presence
No of Halophytes	41
No of other Coastal spp.	14
No of typically non-maritime spp	56
Total no. of species so far recorded	111