

The botanical interest of Southport Marine Lake sand-dunes

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Introduction

The dunes to the west and north of Southport Marine Lake are well known as a habitat for the nationally rare Early Sand-grass and nationally scarce Isle of Man Cabbage, this being the only place in the world where the two species can be found growing together (Earl & Buckley-Earl 1997; Smith 2005; Smith in press). Both plants are included in the North Merseyside Biodiversity Action Plan.

A detailed survey by M.K. Brummage in 1997 revealed that this duneland supported other botanical riches, including two other nationally scarce vascular plants, Seaside Centaury and Dune Fescue. Also present were Lesser Centaury, Sea Holly, Sea Spurge and Sea Campion which are now listed as Species of Conservation Importance in North West England (Biodiversity Steering Group 1999). In addition, there were significant populations of other plants that are locally notable, including Early Marsh-orchid and Southern Marsh-orchid. The site was described as "*having considerable nature conservation value*" (Brummage 1997).

Subsequently, the area was designated as a non-statutory Site of Local Biological Interest under the Sefton Unitary Development Plan. This land has been open to the public for many years, being used extensively for informal recreation by pedestrians and dog-walkers.

In February 2007, 4ha of the site was fenced off "for insurance purposes" by a private land-owner and two large patches of Sea Buckthorn were grubbed up (Smith 2007). Some earth movement also took place until halted by planning enforcement. This has led to concerns about the future of the land and it was therefore felt appropriate to conduct further botanical survey work to update Brummage's (1997) study.

Methods

Visits were made in spring and summer 2007, (mostly in August and early September) by members of the Liverpool Botany Group and the author. In addition, the Cleveland Botany Group visited the site on 2nd August. All vascular plants (species, sub-species and hybrids) were listed, in most cases their relative frequency being assessed using the DAFOR scale. "Lower" plants, such as mosses and liverworts, were not included in the survey. Nomenclature was based on the *New Flora of the British Isles* (Stace 1997). The national and regional status of the plants was determined by reference to Cheffings & Farrell (2005) and the Regional Biodiversity Steering Group (1999). Field notes were made on habitat condition.

Results

This duneland is bounded on the west by the linear coastal road carpark, to the north by Fairway, to the east by the Winged Fellowship and the Marine Lake and in the south by Southport Sailing Club. A central Grid Reference is SD338187. Its total area is estimated to be about 6ha.

The main habitats are similar to those described by Brummage (1997). A mobile-dune ridge 2-4m high and 10-20m wide extends along the seaward edge of the site. This is dominated by Marram and Lyme-grass, the latter being more frequent towards the south. Sand Couch is common and there are numerous large plants of Sea Radish. Many sandy informal footpaths cross the ridge. To the north, the back slope supports stands of Sea Holly and Sea Spurge, while Isle of Man Cabbage, interspersed with Sea Radish, occurs sporadically. East of the ridge is a zone of semi-fixed dune, becoming more stabilised towards the edge of the lake. This supports a more varied plant community, characterised especially by Red Fescue and Common Bent, but with many associates, such as Sand Sedge, Ribwort Plantain, Yarrow, Kidney Vetch, Common Ragwort, Common Bird's-foot-trefoil, Biting Stonecrop, Dandelion, Hare's-foot Clover and Cat's-ear. Notable species here include Early Sand-grass, Dune Fescue, Sand Cat's-tail and Sea Campion. Much of this habitat has a relatively short, open sward grazed by Rabbits, an exception being "the bulge" where the dune ridge extends out into the lake, doubling in width. Here, there is an area of more consolidated fixed-dune with ranker vegetation dominated by tall Marram and Red Fescue with occasional Bramble and Common Ragwort.

Immediately north of the Marine Lake is an area of damp, neutral grassland, supporting a closed plant community dominated by Creeping Bent, Red Fescue and Yorkshire-fog, but with much Red Clover. Many other associates include Silverweed, Yellow-rattle, Red Bartsia, Great Willowherb and spreading patches of Michaelmas-daisy. This area previously had a sizeable marsh-orchid population but, although two species and putative hybrids are still present, the numbers are much reduced. Flanking this area were two large Sea Buckthorn clumps, recently removed, and now replaced by ruderal communities, including Perennial Sow-thistle, Fat-hen, Black Medick, Colt's-foot, Common Nettle and, especially, two kinds of Evening-primrose. A similar area of ruderal vegetation resulting from Sea Buckthorn clearance extends along the edge of the Marine Lake east of "the bulge". The plants here are particularly vigorous due to the presence of excess soil nitrogen fixed by the Sea Buckthorn.

To the north-east lies an extensive, relatively flat area of dune grassland, recently mowed and flanked, on the boundary with the Winged Fellowship, by disturbed neutral grassland with various non-native plants. Extending north-west is an equally large area of undulating fixed-dune, which is species-rich and heavily Rabbit-grazed. The dryer areas support Sticky Stork's-bill and Common Stork's-bill with their hybrid, while the lower-lying, damper hollows contain Eyebright and small populations of Common, Seaside and Lesser Centaury and a rare hybrid centaury.

A habitat not described by Brummage (1997) extends as a narrow strip alongside the edge of the lake. Here, wave-action and seepage of brackish water has encouraged maritime plants to invade the heavily grazed Red Fescue sward. Examples include Sea Milkwort, Frog Rush, Sea Purslane, Red Goosefoot and Lesser Sea-spurrey. There is also much Toad Rush and Jointed Rush and a scattering of Lesser Centaury plants.

During 2007, a total of 158 vascular taxa was recorded in the study area, including 91 by Cleveland Botany Group and 146 by Liverpool Botany Group. This compares with 98 recorded by Brummage (1997) in the same area. Overall, 176 taxa have been identified here since 1997, 30 (17.0%) of them being non-native. Fifteen regionally or nationally notable taxa have been listed, one Nationally Rare (NR), five Nationally Scarce (NS), one Vulnerable (VU) and eight Species of Conservation

Importance in North West England (SCI). Of these, only Prickly Saltwort (VU) was not found in 2007 (Table 1). Since 1997, only 14 taxa have been lost (or not refunded) but a remarkable 78 vascular plants have been added to the site's inventory.

Discussion

This area of sand-dunes is of fairly recent origin, dating from 1959/60 when the adjacent section of Marine Drive was constructed (Brummage 1997). This may be one reason why species-richness has increased from 98 to 158 (61%) since 1997 as habitats mature. A contributory factor may well be recent Sea Buckthorn removal and earth moving which has created disturbed ground, subsequently colonised by many ruderal plants. Although the duneland here is a remnant, isolated from the foreshore by the coastal road, sand-blow from the beach across the road maintains the dunes in relatively healthy condition. Plentiful bare ground for colonisation, resulting either from sand-blow, trampling damage or the effects of Rabbits, is important to the well-being of two of the site's most charismatic plants – Early Sand-grass and Isle of Man Cabbage. The former has greatly increased since its discovery in 1996 and was estimated to cover an area of 2158m² in 2004 (Smith 2005). The Isle of Man Cabbage colony was first found in 1989 when 347 plants were counted (Smith & Hall 1991). This increased to 874 in 1997 (Brummage 1997) but then declined to 279 plants in 2004 for reasons which were not clear (Smith 2004).

Only one of the notable plants listed by Brummage (1997) (Prickly Salt-wort) has been lost from the site, but this is frequent elsewhere on the Sefton Coast. Since Brummage's study, the Nationally Scarce coastal sub-species of Early Marsh-orchid *Dactylorhiza incarnata* ssp. *coccinea* has been identified on the Marine Lake dunes. Other notable taxa added since 1997 are Sticky Stork's-bill (NS), Frog Rush (SCI) and Early Forget-me-not (SCI). Although not formally listed as notable, the hybrid centaury *Centaureum x intermedium* has a very restricted British distribution, being confined to coastal dunes in South and West Lancashire, Anglesey and Merioneth. Similarly, the hybrid stork's-bill *Erodium x anaristatum* is only known from dunes in Wales and South Lancashire (Stace 1997). The proportion of nationally and regionally notable plants (8.5% of the total flora) is relatively small compared with the average of 15% for the Sefton Coast (Smith 2006). The likely explanation is that

slack habitat, which supports so many rare plants, is poorly represented at the study site.

Only 30 "alien" plants were found in the study area. The proportion (17.0%) is low compared with the figure of 33% for the dune system as a whole (Smith 2006). This is probably because the Marine Lake dunes lie some distance from gardens which are a major source of non-native plants (Smith 1999).

Two of the main habitats on the site, mobile-dunes and fixed-dunes with herbaceous vegetation, are listed under Annex 1 of the EU Habitats Directive, fixed-dunes being a priority habitat type under this Annex. These habitats are presently being maintained in "favourable condition" by sand-blow, moderate levels of public pressure and Rabbit grazing. However, the recent fencing off of part of the site will reduce trampling effects; this may have adverse long-term consequences for the vegetation.

Despite their small area and "relict" character, the Southport Marine Lake dunes are important for European protected habitats and their associated flora. Although not included in the 2000 revision of the Sefton Coast SSSI, there is no doubt that the site continues to have considerable, and arguably increasing, nature conservation value, justifying its status as a Site of Local Biological Interest under the Sefton Unitary Development Plan.

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Table 1. Vascular plant list for the Southport Marine Lake dunes

LBG = Liverpool Botany Group; CBG = Cleveland Botany Group; MKB = M.K. Brummage.

* = non-native or introduced native taxon.

NR = Nationally Rare; NS = Nationally Scarce; VU = Vulnerable; SCI = Species of Conservation Importance in North West England.

d = dominant; a = abundant; f = frequent; o = occasional; r = rare; v = very; l = locally.

Taxon	English name	LBG 2007	CBG 2007	MKB 1997	Status
<i>Acer pseudoplatanus</i> *	Sycamore	r		+	
<i>Achillea millefolium</i>	Yarrow	o	+	+	
<i>Agrostis stolonifera</i>	Creeping Bent	la	+	+	

<i>Aira caryophyllea</i>	Silver Hair-grass			+	
<i>Aira praecox</i>	Early Hair-grass			+	
<i>Ammophila arenaria</i>	Marram	la	+	+	
<i>Anisantha sterilis</i>	Barren Brome	lf	+		
<i>Anthyllis vulneraria</i>	Kidney-vetch	f	+	+	
<i>Arenaria serpyllifolia</i>	Thyme-leaved Sandwort	o		+	
<i>Arrhenatherum elatius</i>	False Oat-grass	lf	+	+	
<i>Artemisia vulgaris</i>	Mugwort	o	+	+	
<i>Aster novi-belgii</i> *	Confused Michaelmas-daisy			+	
<i>Aster sp. *</i>	Michaelmas-daisy	ld	+		
<i>Atriplex portulacoides</i>	Sea Purslane	r			
<i>Atriplex prostrata</i>	Spear-leaved Orache	la			
<i>Bellis perennis</i>	Daisy	o	+	+	
<i>Beta vulgaris ssp. maritima</i>	Sea Beet	r		+	
<i>Bromus hordeaceus</i>	Soft Brome	o	+	+	
<i>Cakile maritima</i>	Sea Rocket	o	+	+	
<i>Calystegia sepium</i>	Hedge Bindweed			+	
<i>Capsella bursa-pastoris</i>	Shepherd's-purse		+		
<i>Cardamine hirsuta</i>	Hairy Bitter-cress	r			
<i>Carex arenaria</i>	Sand Sedge	la	+	+	
<i>Centaureum erythraea</i>	Common Centaury	o	+	+	
<i>Centaureum littorale</i>	Seaside Centaury	r		+	NS
<i>Centaureum pulchellum</i>	Lesser Centaury	vlo		+	SCI
<i>Centaureum x intermedium</i>	Hybrid Centaury	r			
<i>Cerastium diffusum</i>	Sea Mouse-ear	lo	+	+	
<i>Cerastium fontanum</i>	Common Mouse-ear	o	+	+	
<i>Chamerion angustifolium</i>	Rosebay Willowherb	r		+	
<i>Chenopodium album</i>	Fat-hen	lo	+		
<i>Chenopodium rubrum</i>	Red Goosefoot	r		+	SCI
<i>Cirsium arvense</i>	Creeping Thistle	o	+	+	
<i>Cirsium vulgare</i>	Spear Thistle	o	+	+	
<i>Cochlearia danica</i>	Danish Scurvy-grass	r			
<i>Coincya monensis ssp. monensis</i>	Isle of Man Cabbage	lo	+	+	NS
<i>Conyza canadensis</i> *	Canadian Fleabane	lf		+	
<i>Coronopus didymus</i> *	Lesser Swine-cress	r			
<i>Crepis capillaris</i>	Smooth Hawk's-beard	o	+	+	
<i>Cynosurus cristatus</i>	Crested Dog's-tail			+	
<i>Dactylis glomerata</i>	Cock's-foot	lo	+	+	
<i>Dactylorhiza incarnata ssp. coccinea</i>	Early Marsh-orchid		+	+	NS
<i>Dactylorhiza incarnata ssp. incarnata</i>	Early Marsh-orchid		+		
<i>Dactylorhiza incarnata x fuchsii</i>	Hybrid Marsh-orchid		+	+	
<i>Dactylorhiza praetermissa</i>	Southern Marsh-orchid		+	+	
<i>Diplotaxis muralis</i>	Annual Wall-rocket	r	+	+	
<i>Elytrigia juncea</i>	Sand Couch	lf		+	

<i>Elytrigia repens</i>	Common Couch	la	+	+	
<i>Epilobium hirsutum</i>	Great Willowherb	vla			
<i>Epilobium montanum</i>	Broad-leaved Willowherb		+		
<i>Equisetum arvense</i>	Field Horsetail	o		+	
<i>Erodium cicutarium</i>	Common Stork's-bill	lo	+	+	
<i>Erodium lebelii</i>	Sticky Stork's-bill	lo	+		NS
<i>Erodium x anaristatum</i>	Hybrid Stork's-bill	r			
<i>Erophila verna</i>	Spring Whitlow-grass	lf			
<i>Eryngium maritimum</i>	Sea Holly	lf	+	+	SCI
<i>Euphorbia paralias</i>	Sea Spurge	o	+	+	SCI
<i>Euphrasia</i> agg.	Eyebright	lf	+	+	
<i>Euphrasia tetraquetra</i>	Eyebright	lf			
<i>Euphrasia tetraquetra</i> x <i>E. nemorosa</i>	Hybrid Eyebright	?	+		
<i>Fallopia convolvulus</i>	Black Bindweed	r			
<i>Festuca arundinacea</i>	Tall Fescue			+	
<i>Festuca rubra</i>	Red Fescue	f	+	+	
<i>Filipendula ulmaria</i>	Meadowsweet	r			
<i>Galium aparine</i>	Cleavers	la	+		
<i>Geranium molle</i>	Dove's-foot Crane's-bill	r			
<i>Geranium robertianum</i>	Herb-Robert	r			
<i>Glaux maritima</i>	Sea Milkwort	vla			
<i>Heracleum mantegazzianum</i> *	Giant Hogweed			+	
<i>Hieracium umbellatum</i>	Umbellate Hawkweed	r			
<i>Hippophae rhamnoides</i> *	Sea Buckthorn	o	+	+	
<i>Holcus lanatus</i>	Yorkshire-fog	f	+	+	
<i>Honckenya peploides</i>	Sea Sandwort	r	+	+	
<i>Hordeum distichon</i> *	Two-rowed Barley		+		
<i>Hypochaeris radicata</i>	Cat's-ear	o	+		
<i>Ilex aquifolium</i>	Holly	r			
<i>Iris pseudacorus</i>	Yellow Iris			+	
<i>Juncus ambiguus</i>	Frog Rush	vlf			SCI
<i>Juncus articulatus</i>	Jointed Rush	lf	+	+	
<i>Juncus bufonius</i>	Toad Rush	lf	+	+	
<i>Lamium album</i>	White Dead-nettle	r			
<i>Lathyrus latifolius</i> *	Broad-leaved Everlasting-pea			+	
<i>Lathyrus pratensis</i>	Meadow Vetchling	r			
<i>Leontodon saxatilis</i>	Lesser Hawkbit	o	+		
<i>Leymus arenarius</i>	Lyme-grass	o	+	+	
<i>Ligustrum ovalifolium</i> *	Garden Privet			+	
<i>Linaria vulgaris</i>	Common Toadflax	r			
<i>Lobularia maritima</i> *	Sweet Alison	r			
<i>Lolium perenne</i>	Perennial Rye-grass	la	+		
<i>Lotus corniculatus</i>	Common Bird's-foot-trefoil	f	+	+	
<i>Lycopus europaeus</i>	Gypsywort	r			
<i>Malus domestica</i> *	Apple	r	+		

<i>Matricaria discoidea</i> *	Pineapple-weed	r			
<i>Medicago lupulina</i>	Black Medick	vla	+	+	
<i>Medicago sativa</i> *	Lucerne	vlf		+	
<i>Mibora minima</i>	Early Sand-grass	la		+	NR
<i>Myosotis arvensis</i>	Field Forget-me-not		+		
<i>Myosotis ramosissima</i>	Early Forget-me-not	o			SCI
<i>Odontites vernus</i>	Red Bartsia	lf	+	+	
<i>Oenothera glazioviana</i> *	Large-flowered Evening-primrose	lf	+	+	
<i>Oenothera x fallax</i> *	Intermediate Evening-primrose	la			
<i>Ononis repens</i>	Common Restharrow	o	+	+	
<i>Papaver dubium</i>	Long-headed Poppy	lo	+	+	
<i>Papaver pseudoorientale</i> *	Oriental Poppy		+		
<i>Papaver rhoeas</i>	Common Poppy	r	+		
<i>Pastinaca sativa</i>	Wild Parsnip	r			
<i>Persicaria maculosa</i>	Redshank	r			
<i>Phleum arenarium</i>	Sand Cat's-tail	o	+	+	SCI
<i>Plantago coronopus</i>	Buck's-horn Plantain	la	+	+	
<i>Plantago lanceolata</i>	Ribwort Plantain	lf	+	+	
<i>Plantago major</i>	Greater Plantain	o	+	+	
<i>Plantago maritima</i>	Sea Plantain			+	
<i>Poa annua</i>	Annual Meadow-grass	lf	+		
<i>Poa trivialis</i>	Rough Meadow-grass		+		
<i>Polygala vulgaris</i>	Common Milkwort	r			
<i>Polygonum arviculare</i>	Knotgrass	lf	+		
<i>Populus alba</i> *	White Poplar	r	+	+	
<i>Populus nigra</i> *	Black Poplar		+		
<i>Populus x canescens</i> *	Grey Poplar		+		
<i>Populus x jackii</i> *	Balm-of-Gilead	r			
<i>Potentilla anserina</i>	Silverweed	lf		+	
<i>Potentilla reptans</i>	Creeping Cinquefoil	r			
<i>Prunus sp.*</i>	Cherry	r			
<i>Pulicaria dysenterica</i>	Common Fleabane			+	
<i>Ranunculus acris</i>	Meadow Buttercup	o	+	+	
<i>Ranunculus repens</i>	Creeping Buttercup	o			
<i>Raphanus raphanistrum</i> ssp. <i>maritimus</i>	Sea Radish	o	+	+	
<i>Rhinanthus minor</i>	Yellow-rattle	lf	+	+	
<i>Rosa canina</i> agg.	Dog-rose	r			
<i>Rosa rugosa</i> *	Japanese Rose	la	+	+	
<i>Rubus caesius</i>	Dewberry	r		+	
<i>Rubus fruticosus</i> agg.	Bramble	r	+	+	
<i>Rumex acetosa</i>	Common Sorrel	r	+		
<i>Rumex crispus</i> ssp. <i>littoreus</i>	Curled Duck	o	+	+	
<i>Sagina maritima</i>	Sea Pearlwort	r			
<i>Sagina nodosa</i>	Knotted Pearlwort	r		+	
<i>Salix caprea</i>	Goat Willow	r			
<i>Salix cinerea</i>	Grey Willow	r			
<i>Salix repens</i>	Creeping Willow	r			

<i>Salsola kali</i>	Prickly Saltwort			+	VU
<i>Sambucus niger</i>	Elder	lo		+	
<i>Saponaria officinalis</i> *	Soapwort	r		+	
<i>Sedum acre</i>	Biting Stonecrop	f	+	+	
<i>Sedum album</i> *	White Stonecrop	r		+	
<i>Senecio jacobaea</i>	Common Ragwort	f	+	+	
<i>Senecio squalidus</i> *	Oxford Ragwort	o	+	+	
<i>Senecio vulgaris</i>	Groundsel			+	
<i>Silene uniflora</i>	Sea Campion	r		+	SCI
<i>Silene vulgaris</i>	Bladder Campion		+		
<i>Sisymbrium officinale</i>	Hedge Mustard	r	+		
<i>Sisymbrium orientale</i> *	Eastern Rocket		+		
<i>Solanum dulcamara</i>	Bittersweet	r			
<i>Solanum nigrum</i>	Black Nightshade	r			
<i>Sonchus arvensis</i>	Perennial Sow-thistle	lf			
<i>Sonchus asper</i>	Prickly Sow-thistle	o	+	+	
<i>Spergularia marina</i>	Lesser Sea-spurrey	r			
<i>Stachys sylvatica</i>	Hedge Woundwort	r			
<i>Stellaria media</i>	Common Chickweed	r			
<i>Symphytum x uplandicum</i> *	Russian Comfrey	r			
<i>Tanacetum vulgare</i>	Tansy	r	+	+	
<i>Taraxacum officinale</i> agg.	Dandelion	lf		+	
<i>Tragopogon pratensis</i>	Goat's-beard		+	+	
<i>Trifolium arvense</i>	Hare's-foot Clover	o	+	+	
<i>Trifolium campestre</i>	Hop Trefoil	r			
<i>Trifolium dubium</i>	Lesser Trefoil	o	+		
<i>Trifolium pratense</i>	Red Clover	la	+	+	
<i>Trifolium repens</i>	White Clover	lf	+	+	
<i>Tripleurospermum maritimum</i>	Sea Mayweed	o		+	
<i>Triticum aestivum</i> *	Bread Wheat	r	+		
<i>Tussilago farfara</i>	Colt's-foot	lf	+	+	
<i>Urtica dioica</i>	Common Nettle	lf		+	
<i>Veronica persica</i> *	Common Field-speedwell	r			
<i>Vicia hirsuta</i>	Hairy Tare	r			
<i>Vicia sativa</i>	Common Vetch	r			
<i>Vulpia bromoides</i>	Squirreltail Fescue	lo	+		
<i>Vulpia fasciculata</i>	Dune Fescue	o	+	+	NS
176 taxa; 30 alien (17.0%)		146	91	98	