

Ainsdale Sand Dunes NNR biological features

Philip H. Smith, October 2020

Flora

Assemblages of vascular and non-vascular plants in the SSSI/SAC are of special interest, over 200 Sefton duneland vascular taxa and 20 bryophytes being listed as regionally or nationally notable. Amongst these are the Dune Helleborine (*Epipactis dunensis*) and Green-flowered Helleborine (*E. phyllanthos*); both are Nationally Scarce, the former being endemic to Britain. A 2008/09 survey recorded nearly 3000 Dune Helleborines and 400 Green-flowered Helleborines on Ainsdale NNR, representing 42% and 26% of the coastwide totals respectively (Michell & Smith, 2012). Ainsdale NNR supports an internationally important population of Field Gentian (*Gentianella campestris*) (Endangered in England and a Section 41 species). In 2010, Smith & Lockwood (2011a) counted over 140,000 plants, mainly in the 'Dune Restoration Area' where year-round Rabbit (*Oryctolagus cuniculus*) and winter sheep grazing maintain suitable habitat.

Other nationally notable plants in the NNR include Lesser Water-plantain (*Baldellia ranunculoides*) (Vulnerable in England) with seven wetland sites at Ainsdale NNR supporting 28% of the coast's total in 2011 (Smith & Lockwood, 2012). An important species of grazed fixed dunes at Ainsdale is Smooth Cat's-ear (*Hypochaeris glabra*) (Vulnerable in England and Great Britain). In 2007, Smith (2008a) recorded nine sites in the NNR containing about 570 plants (11% of the coast's population). One of the Sefton Coast, most iconic plants, Grass-of-Parnassus (*Parnassia palustris*) (Vulnerable in England) was surveyed by a team of volunteers in 2013. Ainsdale NNR had 8528 plants, 18% of the Sefton Coast total (Smith & Deed, 2014).

Recorded only three times "in the wild", two of the rarest British plants, the hybrid rushes *Juncus balticus* × *J. inflexus* and *J. balticus* × *J. effusus*, have been translocated to Ainsdale NNR for conservation purposes (Smith & Lockwood, 2016). Also Nationally Rare are the two hybrid willows *Salix* × *friesiana* and *S.* × *doniana* that are found in the reserve (Smith, 2014; 2015). Other Nationally Scarce and/or Red-list Vulnerable species found here are Sticky Stork's-bill (*Erodium aethiopicum*), Sea Bindweed (*Calystegia soldanella*), Seaside Centaury (*Centaureum littorale*), Early Marsh-orchid (*Dactylorhiza incarnata* ssp. *coccinea*), Tubular Water-dropwort (*Oenanthe fistulosa*), Round-leaved Wintergreen (*Pyrola rotundifolia* ssp. *maritima*), Lesser Spearwort (*Ranunculus flammula*), Knotted Pearlwort (*Sagina nodosa*), Dune Fescue (*Vulpia fasciculata*) and Heath Dog-violet (*Viola canina* ssp. *canina*). Among many Near Threatened plants on the NNR is Shepherd's-cress (*Teesdalia nudicaulis*), which has one of its last sites in the vice-county on Pinfold Meadow near the railway line. Its survival depends on the presence of disturbed ground and short, open vegetation on an acid soil (Smith & Lockwood, 2011b). One of few notable plants in the conifer plantations is Common Wintergreen (*Pyrola minor*) (Near Threatened in England). A survey in 2017 found 13 colonies in the NNR with over 10,400

plants. They were mostly on the edges of footpaths, firebreaks or Landrover tracks through the forest (Smith & Lockwood, 2018).

In addition to its rarities, the NNR holds a high diversity of vascular plants; at least 446 being recorded.

Ainsdale NNR's bryophyte flora is also extremely rich, recent studies listing 168 taxa (20 regionally or nationally notable). However, 24 were last recorded before 1950 and may now be extinct (Smith, 2018). Of particular interest is the UK Critically Endangered Large Hook-moss (*Pseudocalliergon lycopodioides*) found at several sites in 2019, while the upland liverwort Common Pawwort (*Barbilophozia floerkei*) was recorded in 2017, new to the Sefton Coast, in small acidic slacks in the pinewoods. This habitat also supported three bog-mosses previously thought extinct in the dune system, namely, Acute-leaved Bog-moss (*Sphagnum capillifolium*), Fringed Bog-moss (*S. fimbriatum*) and Lustrous Bog-moss (*S. subnitens*). The Nationally Scarce and Section 41-listed Petalwort (*Petalophyllum ralfsii*), a feature of the SAC, has not been seen at Ainsdale NNR since about 1994. It occurs on the adjacent Ainsdale and Birkdale Sandhills LNR.

In 1998, the uncommon Lesser Bearded Stonewort (*Chara curta*) and Opposite Stonewort (*Chara contraria*) were recorded on Ainsdale NNR in 4 and 10 sites respectively.). It is likely that they are still present.

Fungi

As before

Fauna

Reptiles and amphibians

The populations of Sand Lizard (*Lacerta agilis*), Natterjack Toad (*Epidalea calamita*) and Great Crested Newt (*Triturus cristatus*) are of special interest, the latter having been introduced to the Ainsdale dunes in the 1970s.

Sefton has the most northerly naturally occurring Sand Lizards in Britain, these being thought to be a genetically distinct race. Small populations occur sporadically between Hightown dunes and Hesketh Golf Course. This European-protected, Section 41 species declined substantially during the 20th century, probably because of development, vegetation overgrowth, loss of bare sand and the introduction of trees and shrubs, though wet summers were also thought to have been deleterious. The most recent coastwide estimate put the total population at 1000-1500 adults (Hardaker, 2010), though numbers have since declined at some fixed-dune sites. Precise numbers on the NNRs are not known but are probably small, with Sand Lizards recently recorded only on frontal dune ridges at Ainsdale. Conservation of these relict populations requires control of tree

and scrub encroachment, creating bare sand patches for basking/egg-laying, preventing heavy trampling of suitable habitat, litter and fire control. Discarded bottles have been described as “death-traps” for Sand Lizards (Hardaker, 2010). Domestic cats are thought to be significant predators of lizards near to housing (Larsen & Henshaw, 2001), while Pheasants (*Phasianus colchicus*) that are released annually on nearby land-holdings, are also known to predate lizards.

The Sefton Coast sand-dunes have long been the premier British locality for the Natterjack Toad, which is European-protected and a Section 41 species. Coastwide monitoring of populations and breeding success began in 1987, the results of 31 years of study being summarised by Smith & Skelcher (2019). On Ainsdale NNR, numbers increased from 1987 to 1999 (about 400 females), coinciding with tree-removal, the introduction of livestock and restoration of old scrapes (Simpson, 2002). However, apart from high spawn-counts in 2005 and 2006, the population has since declined significantly, despite the fact that large parts of the reserve are managed in a way that should benefit this species, including the provision of scrapes, scrub control and winter-grazing by livestock (Smith & Skelcher, 2019).

The Great Crested Newt (section 41-listed) thrives in the slacks and scrapes of Ainsdale NNR, the largest count of adults in a single pool being 121 in April 1998 (White *et al.*, 2017). Also Section 41-listed, the Common Toad occurs widely in the NNR, breeding in the older scrapes.

Mammals

Section 41-listed mammals associated with the reserve include Hedgehog (*Erinaceus europaeus*), Brown Hare (*Lepus europaeus*), Noctule Bat (*Nyctalus noctula*), Brown Long-eared Bat (*Pleotus auritus*) and Red Squirrel (*Sciurus vulgaris*). Red Squirrels of the continental Europe subspecies *S. v. vulgaris* occur in the conifer plantations on Ainsdale NNR, with population density estimates in 1996 of 2/ha in the rear woodlands and 1/ha in the frontal woodlands. They have greatly declined in most parts of Northwest England in recent decades, being largely replaced by the American Grey Squirrel (*Sciurus carolinensis*). The Sefton Coast woodlands were designated a National Red Squirrel Refuge in 2005, with a 5 km-wide inland buffer zone, within which Grey Squirrels are controlled. A major outbreak of parapox virus, carried by Grey Squirrels, reduced the numbers of Sefton Red Squirrels in 2008 by about 80%. Monitoring, using visual transects, hair-tubes and trail cameras, showed that the Ainsdale NNR population had returned to about 90% of the pre-crash population by 2019.

Atkinson & Houston (1993) state that the Sefton dunes provide important feeding habitat for bats but there are few roosting opportunities. Bat surveys on Ainsdale NNR found up to 20 Brown Long-eared Bats at three sites in May 2019 while 11 were found at a probable maternity roost in a bat-box in May 2018. Two Noctule Bats at each of two sites were located in March 2018, while two were found hibernating in a bat-box in February 2018 (S. Irwin, pers. comm.).

Birds

The Sefton Coast is of special interest for its nationally and internationally important wintering numbers of waterfowl, forming part of the Ribble and Alt Estuary SPA and Ramsar site. However, the relatively narrow foreshore of Ainsdale NNR makes a relatively small contribution to this interest.

The duneland is of lower ornithological interest but Section 41 breeding birds include Skylark (*Alauda arvensis*), Linnet (*Carduelis cannabina*), Lesser Redpoll (*Carduelis cabaret*) (rare), Reed Bunting (*Emberiza schoeniclus*), Grasshopper Warbler (*Locustella naevia*), Dunnock (*Prunella modularis*) and Song Thrush (*Turdus philomelos*). Formerly regular breeders, Cuckoo (*Cuculus canorus*), Grey Partridge (*Perdix perdix*) and Lapwing (*Vanellus vanellus*) are now virtually extinct. The Amber-listed Black-headed Gull (*Chroicocephalus ridibundus*) is an increasing breeder in the NNR, about 50 pairs nesting at slack 65.

Invertebrates

The Sefton Coast dunes are one of the invertebrate “hot-spots” of England (Atkinson & Houston, 1993; Smith, 2009) with well over 3300 species recorded. A great number of section 41 insects occurs on Ainsdale NNR. For example, breeding butterflies include the Small Heath (*Coenonympha pamphilus*), Grayling (*Hipparchia semele*), Wall (*Parage megera*) and White-letter Hairstreak (*Strymonidia c-album*). Also significant is a large population of the nationally declining Dark Green Fritillary (*Argynnis aglaja*) (Marsh & White, 2019). The dune system is renowned for its diversity of moths with over 450 species thought to be breeding on Ainsdale NNR (R. Walker, pers. comm.). This includes as many as 46 Section 41-listed species, examples being the Forester (*Adscita statices*) on acid grassland and Goat Moth (*Cossus cossus*) whose caterpillars feed inside the stems of poplars (*Populus*) and willows (*Salix*), especially in wet places. Other notable moths of the NNR include the Nationally Scarce and declining Portland (*Actebia praecox*) and Grass Eggar (*Lasiocampa trifolii*).

Important beetles include the nationally rare section 41-listed Northern Dune Tiger Beetle (*Cicindela hybrida*), for which the Sefton Coast is one of only two British localities (Smith, 2011). This predatory species is highly dependent on bare sand, so Ainsdale NNRs is not amongst its major haunts. In 2019, the nationally Endangered Miry Sloth Weevil (*Bagous lutosus*) was re-found on Ainsdale NNR by G. Hedges after 25 years’ absence. It is associated with the uncommon aquatic plant Various-leaved Pondweed (*Potamogeton gramineus*). The Critically Endangered Ainsdale Dung Beetle (*Ammoecius brevis*) is restricted to the Sefton Coast. The last sighting was in 1996 until a small number was found associated with Rabbit dung in Ainsdale & Birkdale LNR in 2017. Then, in 2020, 82 adult beetles were recorded in an Ainsdale NNR grazing enclosure by G. Hedges. The Red Dune Crawler (*Rhizothorax rufa*) is Endangered in Britain, with two sites in Wales, in addition to the Sefton Coast. It was last seen on Ainsdale NNR in 2001 but the discovery of a single dead specimen at Formby Point in May

2020 gives hope that it might still survive at Ainsdale. This species is heavily dependent on bare sand.

Amongst the many ants, bees and wasps (Hymenoptera) of the dunes, significant species include the Early Colletes (or Vernal Mining Bee) (*Colletes cunicularius*) which nests in great numbers of south-facing sandy banks (Taylor, 2004). The Nationally Rare Kirby's Sand Wasp (*Podalonia affinis*) was re-discovered at Ainsdale NNR in 2019 (Hargreaves, 2019).

Flies (Diptera) are one of the largest insect groups, Ainsdale NNR supporting an enormous diversity of species. For example, 61 hoverfly species (Syrphidae) were recorded by one observer in 2018-19 (P. Kinsella, pers. comm.), with a further 11 species by others. Most notable was the Nationally Scarce Mugwort Hoverfly (*Triglyphus primus*). Also of interest is the increasing status of our largest hoverfly, the Hornet Hoverfly (*Volucella zonaria*). Having spread from southern England, it was first recorded in the region in 2015 and is now regularly seen at Ainsdale. In June 2019, a Slender-footed Robberfly (*Leptarthrus brevirostris*) was photographed in Ainsdale NNR, this being the first vice-county record.

Dragonflies and damselflies (Odonata) have been particularly well studied on the Sefton Coast (Smith, 2008b; White & Smith, 2015). The ponds and deeper scrapes at Ainsdale NNR are used for breeding by about 11 species, the most notable being Ruddy Darter (*Sympetrum sanguineum*), a southern insect first recorded at Ainsdale NNR in 1989. Four Vagrant Emperors (*Anax ephippiger*), including a pair, were seen at the NNR in June 2019.

Communities

p. 16, para. 1: no change.

Para. 2: Embryonic shifting dunes, consisting of NVC community SD4: *Elymus farctus* (now *Elymus junceiformis*) foredune, are poorly represented at Ainsdale NNR because of coastal erosion.

p. 17 para 1: Shifting dunes with Marram (*Ammophila arenaria*) (mobile dunes) consist mainly of a tall narrow ridge supporting largely SD6: *Ammophila arenaria* mobile dune, with some SD5: *Leymus arenarius* mobile dune.

Para. 2: Fixed dunes with herbaceous vegetation (fixed dune grassland) comprise complex mosaics of slacks, ridges and bare sand patches. The key grassland communities of this zone are SD7: *Ammophila arenaria*-*Festuca rubra* semi-fixed dune, SD8: *Festuca rubra*-*Galium verum* fixed dune grassland, SD9: *Ammophila arenaria*-*Arrhenatherum elatius* dune grassland, SD10: *Carex arenaria* dune grassland, SD11: *Carex arenaria*-*Cornicularia aculeata* dune and SD12: *Carex arenaria*-*Festuca ovina*-*Agrostis capillaris* dune grassland. The sequence of habitats from foredunes to dune grassland and dune slack is extensive within the Ainsdale NNR, and

substantial areas of open dune vegetation remain. There are large areas of semi-fixed and fixed dunes with herbaceous vegetation exhibiting considerable variation from calcareous to acidic. In the calcareous areas, Common Restharrow (*Ononis repens*) is prominent. Large-scale scrub and tree removal in the 1990s and the introduction of stock grazing in SSSI units 15 and 17 resulted in an increase of desired dune species and communities.

Para. 3: The older fixed dunes also include small areas of Atlantic decalcified fixed dune (dune heath), comprising H1: *Calluna vulgaris*-*Festuca ovina* heath, H9: *Calluna vulgaris* - *Deschampsia flexuosa* heath, H11: *Calluna vulgaris* - *Carex arenaria* heath, U1: *Festuca ovina* - *Agrostis capillaris* - *Rumex acetosella* grassland, U2: *Deschampsia flexuosa* grassland, U4: *Festuca ovina* - *Agrostis capillaris* - *Galium saxatile* grassland and U5: *Nardus stricta* – *Galium saxatile* grassland.

Para. 4. Dunes with Creeping Willow (*Salix repens* var. *argentea*) occur extensively within Ainsdale NNR. The site is particularly important for dune slacks dominated by Creeping Willow, in the form of the NVC communities SD13: *Sagina nodosa*-*Bryum pseudotriquetrum* dune slack, SD14: *Salix repens*-*Campyllum stellatum* dune slack, SD15: *Salix repens*-*Calliergon cuspidatum* dune slack and SD16: *Salix repens*-*Holcus lanatus* dune slack. Creeping Willow also dominates areas of free-draining dune grassland to a much greater extent than at most other UK sites.

Para. 5: Ainsdale NNR also includes extensive areas representative of SD17: *Potentilla anserina*-*Carex nigra* dune slack. The site contributes to the range and variation of humid dune slack vegetation, being a large and representative base-rich system towards the northern limit for some humid dune slack communities along the west coast of Britain. These habitats are amongst the most botanically diverse areas on the NNR. About 33% of the total English resource of dune slacks occurs on the Sefton Coast (Edmondson, 2010).

Para. 6: Other habitats include the intertidal sand flats, which provide feeding and roosting areas for shorebirds. The extensive woodlands (c. 130ha) consist mostly of single species, even-aged blocks of predominately Corsican Pine (*Pinus nigra* subsp. *laricio*) with a sparse or non-existent ground flora, within which are relict slacks that have become acidic due to the influence of pine litter. Hunt *et al.* (2019) showed that, with appropriate management by grazing and scrub-clearance, two major firebreaks through the rearward plantations could provide valuable dune habitats. There is also the permanent open water of past excavations, these supporting amphibians (including Great Crested Newt), aquatic invertebrates (notably several species of dragonfly) and an aquatic flora including several species of stonewort, Various-leaved Pondweed and Lesser Water-plantain.

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