

# SEA KALE HARVESTING BY FORAGER AT DUNGENESS

Supplementary Report

November 2017

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## Introduction

Natural England has argued that harvesting of leaves of Sea Kale damages both the populations of the species and its shingle beach habitat. In January 2016 and July 2017 I submitted evidence on behalf of Forager to support their contention that Sea Kale (*Crambe maritima*) is not threatened by sustainable harvesting at Dungeness. A second submission was written following a site visit on 5 July 2017, again building upon more than 40 years knowledge and experience of shingle beach plants – my own PhD. research at the University of Cambridge, field observations thereafter, the views of experts (notably David Pearman of the Botanical Society of Britain and Ireland, co-author of standard atlases of UK plant distribution), and the published literature on shingle beach flora and vegetation. The 5 July field visit allowed me to assess *in situ* putative threats to Sea Kale and its habitat on the beach at Dungeness from which Forager has harvested leaf material.

A further field visit on 2 November 2017 was an opportunity to examine the site further after the open shingle vegetation had developed more fully over the summer. This further reinforced my view that perceived threats to Sea Kale there have been greatly exaggerated; and that the Steps for sustainable collection proposed by Forager go far beyond what is necessary to maintain and protect the Sea Kale population and the structure and biodiversity of the shingle habitat. Not only was there no evidence that damage had occurred, or will occur in future, but also Forager and Natural England have a mutual interest in conserving species and habitat, and the proposed Steps indicate a framework that could be used to examine issues and to collaborate rather than work in opposition.

## Sea Kale on the beach at Dungeness in autumn

The autumn visit on 2 November confirmed that the readily demarcated bands of Sea Kale plants we had conveniently termed 'rows' extend along the beach parallel to the sea exactly as noted in July. Separated by more or less bare shingle, they follow old strand lines on low ridges.

Row 1 A readily observable change since summer was in the recruitment zone of smaller Sea Kale plants at the top of the shingle slope down to the sea. The occasional individuals of Babington's Orache (*Atriplex glabriuscula*), the only other plant species present, form at this time of year tough prostrate mats. None of the widespread *Atriplex* hybrids or other *Atriplex* taxa are present.

Row 2 Large established Sea Kale plants in pure or almost pure stands, with occasional small individuals of Sea Couch (*Elytrigia atherica*), further emphasizing the colonist nature of Sea Kale and how, as noted too in the literature, it often grows in pure stands.

Row 3 Large established plants of Sea Kale plants in semi-pure stands with some False Oat-grass (*Arrhenatherum elatius*), little different in extent since July, mostly in small patches away from Sea Kale.

Row 4 Larger, established Sea Kale plants in semi-pure stands with patches of False Oat-grass, which had spread slightly on the more stable substrate since July, and also occasional individuals of the non-native Red Valerian (*Centranthus ruber*) and sowthistles.

Row 5 Larger established Sea Kale plants, growing with False Oat-grass and scattered plants of other species, including Curled Dock (*Rumex crispus* subsp. *littoreus* (Hardy) Akeroyd) and Herb Robert (*Geranium robertianum* subsp. *maritimum* (Bab.) H.G. Baker, with an irregular ragged Row 6 of Sea Kale, fewer in number perhaps because the substrate is stabilized and the shingle becomes less an open 'colonist' habitat. When the beach was narrower, before more recent accretion, this area may too have been subject to high human pressure. Landward from Row 5 the vegetation has greater diversity of native (including coastal ecotypic variants) and introduced species, and is rather ruderal in nature.

## Modifying Forager's proposed 'Steps' to alleviate perceived potential damage

Forager has modified the Steps set out in my 14 July Report to take into account objections raised in the recent Statements of Witness by Susan Rees and Jo Dear. The updated version is set out in a separate document. Below are comments on the objections to Forager's proposals:

### **Vegetation development**

In the first four rows of Sea Kale, from where Forager proposes to harvest within Rows 2–3, the plants are specialized colonists in effectively a mono-specific stand with very few other plant species or individuals of other species present. Susan Rees is concerned that we have overlooked the dynamic nature of the vegetation over time and that harvesting may interfere with succession – “rows 2 and 3 would eventually become rows 3 and 4 ...”. This concern does not accord with my own professional knowledge of shingle beaches and their ecology (and commitment to their conservation), and it is also clear that, apart from False Oat-grass, recruitment of other species does not really begin until Row 4. The classic open shingle assemblage of Curled Dock and Yellow Horned Poppy (*Rumex crispus-Glaucium flavum*) is fragmentary, more or less replaced by a mono-specific Sea Kale, a species “characteristic of this vegetation at many sites” (Rodwell 2000, p. 128). Also, at this point in the shingle succession: “the organic content of the substrate is slight and there is never any development of an integrated soil profile, even in more stable stands” (Rodwell *loc. cit.*, p. 130).

Nor are the species recruited into the community in Row 4, and more so in Rows 5–6, apparently dependent on the presence of Sea Kale for their establishment. From this point and further inland, effects diminish of unstable shingle, wind and salt spray, even tall waves, and a thin sparse soil develops. False Oat-grass provide more surface stability and begins humus formation; together with other widespread or common species, a sometimes random mix of coastal ecotypic variants, weeds, ruderals and garden escapes, especially Red Valerian. Seer *et al.* (2015, see below) observe that Sea Kale “develops at higher elevated beach ridges at a distance more protected from the sea.” This relatively species-rich community of considerable botanical interest lies outside the harvest zone, and picking Sea Kale should have no impact at all on this part of the shingle, provided that bags of leaves are not dragged across or stacked. Nor will harvesting affect the juvenile plants in the Row 1 strandline community, the key element in Sea Kale plant recruitment and development of the shingle community.

### **Trampling**

Sea Kale is a colonist of the most open and bare shingle, often unstable, its resilience demonstrated by the repeated observation that it “frequently grows in pure stands” (Scott 1976, Pearman & Stirling in Stewart *et al.* 1994, p. 123). David Pearman (pers. comm., and earlier submissions) has argued that it robustly withstands both natural catastrophic damage and trampling by visitors, although persistent trampling may well sometimes be a factor in its local demise (as where a well-worn path from a house at the Dungeness site has carved a way seaward through the rows of plants). The recent study on the effects of trampling on beach plants (Seer *et al.* 2015) demonstrated that Sea Kale showed reduced growth and survival from any level of trampling on the plants. Plants are indeed vulnerable to mechanical damage through direct trampling but there is no evidence of damage that might occur if they are not walked on directly. Note that these experiments were laid out on beaches in the Baltic, where environmental conditions are different from those at Dungeness, with much less severe wind and wave action, and seashores with sand or sandy shingle rather than pure shingle (the experiments were on beaches of high sand content). The plants of Sea Kale in the Dungeness site had certainly survived the press of summer visitors, and probably only suffer from trampling when they are small and not quite established. Forager harvesters, on their proposed infrequent visits, will not be trampling the larger plants and will take good care to avoid all the smaller plants.

In the same trampling study (Seer *et al.*, *loc. cit.*), Halberd-leaved Orache (*Atriplex prostrata*), often low-growing and closely related to the Babington’s Orache that is the principal and usually sole associate of Sea Kale in ‘Row 1’ of the shingle at Dungeness, showed recovery after initial biomass loss, and seed weight was unaffected. Babington’s Orache, like Sea Kale an obligate colonist associated with and presumably well adapted to the conditions of bare and unstable shingle, is likely to be even more resilient to damage than the more ruderal Halberd-leaved Orache, often a plant of saltmarsh strandlines. At Dungeness, Babington’s Orache has well survived the summer trampling despite being in an exposed position near the beach. Despite that Susan Rees and Jo Dear note how in some years Babington’s Orache may cover much of the beach section (no evidence for this in 2017), it is most unlikely that harvesting by Forager personnel will impact in any way on this pioneer mono-specific plant community so close to the beach. Indeed much of its growth, flowering and fruiting takes place after midsummer and into early autumn when harvesting will be over.

Trampling during limited visits by Forager will have a miniscule effect, certainly on any gradual flattening of the shingle ridges, compared with that of the myriad feet of visitors that pass through the shingle plant community each spring and summer. If this is a genuine problem, Natural England perhaps should be considering restricting access to at least some of the site.

### **Seed establishment**

It is suggested that a further effect of trampling is seeds may be pushed down into the shingle during harvesting visits. So too, loss of leaf-cover, either living or as debris, while theoretically a threat, is unlikely to affect the development of shingle vegetation communities. I am unconvinced by the argument that seeds will not be trapped and thus fail to germinate, and that humus will not build up. Any humus

deposition is likely to be at the end of the season as plants die down in autumn (well after harvest, and the Sea Kale plants do not build up plant communities in their leaf litter). The available evidence does suggest that few seeds are trapped, not least as there is little or no evidence on the beach for a seed rain of any kind. After this year's relatively wet summer and autumn, seedlings of Curled Dock (*Rumex crispus* subsp. *littoreus*) for example might have been present, both in the bare shingle and, more especially, around plants and clumps of Sea Kale. On the other hand, this superbly adapted coastal variant of a common species (Cavers & Harper Akeroyd & Briggs 1983) is widespread further inland on the more stable shingle. It often occurs there and elsewhere on barer shingle – but at this site it is rarer near the front of the succession.

### A further way forward

Jo Dear suggests that Forager's steps are more suited to the basis of a study of harvesting over a period of time, perhaps a number of years. Forager agrees with the proposal of a study, as data so gained would be of practical, commercial, scientific and conservation value.

The proposed steps under paragraph 6 had provided for a picking area extending half a mile north and south of the boardwalk.

I understand that Forager would be content for a smaller experimental area to be used in 2018, but otherwise subject to the protections provided by the proposed steps.

A control area is needed for the study, so it is proposed we establish in the first instance, in Rows 2–3, a sample Sea Kale leaf-collecting plot 250 m in length, with an adjacent 250 m control plot where the leaves of the plants remain uncollected. This area will be established 200 m north of the boardwalk. This is only a preliminary experiment, without rigorous experimental design and replication, but should give some indication of possible damage. At present we have no data at all on the effects of collecting leaves and so data on the plants and the shingle habitat will be of value to both Forager and Natural England.

Another way forward is to augment limited leaf harvest in the experimental area with harvest of Sea Kale leaves from disturbed and landscaped shingle habitats of sea defences adjacent to a public right of way flanking the power station.

The site which has been used in the past for the harvesting of Sea Kale leaves is not among the fully developed unique habitats for which Dungeness is especially noted, with wetlands and rare plant communities of dwarf broom and other species. Instead it can be argued that this is a damaged (nevertheless important) community separated by ribbon housing development from the main vegetation zones on the foreland, with natural succession from foreshore to lichen heath and other communities effectively broken. It is difficult to see this area, as Natural England does, as semi-pristine native habitat. It remains a rich, if disturbed habitat, in which succession does continue, with new shingle added to seaward, and there is no evidence that succession processes are in any way being damaged. The position of the sea end of the boardwalk some distance from the sea suggests there has been a good deal of accretion even in the relatively recent period since this was constructed.

Both Susan Rees and Jo Dear have succinctly and persuasively summarized the varied and dynamic complex of shingle, saltmarsh, intertidal habitats and grazing marsh in the Dungeness, Romney Marsh and Rye Bay SSSI, in which Dungeness is a National Nature Reserve. Both scientists rightly emphasize the importance and need for protection of this special habitat, which is a UK speciality but local even in S.E. England and rare at a European and global level. Ironically, permitted shingle extraction elsewhere on Dungeness may have done more damage than any sustainable harvest could achieve. Small-scale sustainable foraging is not the same as large-scale mainstream commercial over-exploitation, which needs to be controlled like vehicular access. Continuation of such small-scale activity should be seen as a positive use of the native natural resources that conservation designation seeks to protect.

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### Experience and qualifications

I am a freelance botanist, conservationist and writer, and previously held academic posts in Plant Taxonomy at the Botany Departments of Trinity College, Dublin, and the University of Reading. I graduated from the University of St Andrews in 1975 (BSc, 1<sup>st</sup> class Honours). My PhD (1975–79) from the University of Cambridge on 'Genecological studies of *Rumex crispus*' involved study of the ecology of the shingle beaches from where I sampled *R. crispus* subsp. *littoreus* (Akeroyd & Briggs 1983) and other 'native' weeds. I am familiar with the ecology and distribution of *Crambe maritima* in S and E England, and in Ireland, and of the other shingle beach plants in this case that are of concern to Natural England (e.g. Akeroyd et al. 1978). I have extensive knowledge of the floras of British, Europe and the Near East, with a particular interest in families Chenopodiaceae (Amaranthaceae) and Polygonaceae (e.g. Akeroyd 1986, Edmondson & Akeroyd 2016), and in weeds, ruderals and coastal plants. In 1983–89, I was Research Officer for the revision of *Flora Europaea* vol. 1 and joint family editor of Cruciferae (Brassicaceae), and assisted Prof. P.W. Ball to prepare an updated account of *Crambe* (Ball 1993, see also Akeroyd 1995).

I am the author of *Docks and Knotweeds of Britain and Ireland* (2014), and Botanical Society of the British Isles (BSBI) referee for, among other plant genera, *Rumex* (docks and sorrels) and *Atriplex* (oraches, especially maritime species and hybrids), leading field and laboratory workshops for the BSBI on both genera. I have published a review, with a comprehensive annotated catalogue, of coastal ecotypic variation in European plant species (Akeroyd 1997, see also Akeroyd 1996), such as *Geranium robertianum* subsp. *maritimum* and *Solanum dulcemara* var. *marinum*. I have also researched unsustainable and illegal collection of plants from the wild in Britain (Akeroyd 1999).

I co-founded and edited the international conservation magazine *Plant Talk* (1994–2006), editing and writing articles and reviews, many of which addressed the sustainable use of wild plant resources. Since 2000, I have worked with an Anglo-Romanian project in Transylvania on farming, biodiversity and links between landscape and livelihood, including sustainable collection of wild plants. I am the author or editor of 15 books and author or co-author of numerous scientific papers (including on coastal plants), handbooks, reports and Flora accounts, and popular articles on botany, horticulture and conservation.

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