

***Petalophyllum ralfsii* (Wils.) Nees & Gottsche (Petalwort) in
the Republic of Ireland**

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Petalophyllum ralfsii (Wils.) Nees & Gottsche (Petalwort) in the Republic of Ireland

Synonyms

Jungermannia ralfsii Wils.
Diplolaena lyellii f. *lamellosa* Nees
Codonia ralfsii (Wils.) Dumort.
Petalophyllum lamellatum Lindb.
Fossombronia corbulaeformis Trabut

(Source: Lockhart *et al.*, 2012)

1. Introduction and status

Petalophyllum ralfsii (Petalwort) is a thalloid liverwort of damp calcareous dune slacks and machair. *P. ralfsii* was formerly classified in the Fossombroniaceae, but is now placed in a newly described family, the Petalophyllaceae (Crandall-Stotler *et al.*, 2002). The species was named after John Ralfs who discovered it in Anglesey in the mid-1800s (Porley & Hodgetts, 2005). It is distinguished from superficially similar species in the Fossombroniaceae by an undissected thallus and the presence of erect, almost parallel, lamellae that radiate from the axis and which are perpendicular to the flattened part of the thallus. Another distinguishing feature is that *P. ralfsii* has colourless rhizoids, whereas the rhizoids are purple in many *Fossombronia* spp. (except *F. caespitifformis* subsp. *multispira*). *P. ralfsii* has a rhizome-like subterranean axis which becomes tuberous at the apex of mature plants and which enables it to withstand long periods of desiccation (Paton, 1999); the above-ground parts can die back during the summer when conditions are drier. The tuberous parts are also thought to contain vesicular-arbuscular mycorrhizae (Smith & Read, 2008; Duckett *et al.*, 2006), which may play a role in nutrition (Holyoak, 2000). Thalli can be solitary, in rosettes or in mats. It is dioicous, i.e. the orange male antheridia and the female archegonia, which are surrounded by erect involucre (bracts), occur on separate thalli. The species is often fertile (Paton, 1999). Sporophytes are produced regularly in spring and early summer. Spores are relatively large (40-56 µm) and may persist in the soil for long periods until environmental conditions become suitable for new plant production (Sim-Sim *et al.*, 2000). It is thought to be a short-lived shuttle species, displaying characteristics of the annual shuttle strategy as it produces frequent sporophytes with large spores (Sim-Sim *et al.*, 2000). No specialised asexual propagules are known, but it can reproduce clonally by means of bifurcation whereby the thallus splits into two. Underground branches from the subterranean axes can also give rise to new thalli, which then become independent as the underground branches decay and presumably the process is continuous (Holyoak, 2000). Its chromosome number is 9 (Paton, 1999) and it is considered to be haploid (Rumsey, 2001). Allozyme analysis carried out on *P. ralfsii* samples taken from 24 colonies in 9 localities in Great Britain found monomorphism within 16 putative loci (Rumsey, 2001). However, allozyme analysis only represents a small fraction of the genome and so the species may not totally lack genetic variation.

Always regarded as a rare plant, partly because of its very specific habitat and partly because the above-ground part of the plant is often absent, it is listed as *Vulnerable* in the *Red Data Book of European Bryophytes* (European Committee for the Conservation of Bryophytes, 1995). *P. ralfsii* appears on Appendix I of *The Convention on the Conservation of European Wildlife and Natural Habitats* (Bern Convention) of 1991, and Annex IIB of *The European Community Directive on the conservation of natural habitats and of wild fauna and flora* (the 'Habitats Directive'), which came into force in 1994. It is now included on lists of specially protected species in all signatory countries

to the Bern Convention and the Habitats Directive. The EU Habitats Directive was transposed into Irish legislation in 1997 (Irish Statute Book, 1997).

As a result of these factors, targeted fieldwork on *P. ralfsii* across Europe increased and it is now clear that *P. ralfsii*, although certainly rare and very habitat-specific, is not as rare in Europe as was once thought. It is, for example, now regarded as *Nationally Scarce* in Britain (Church *et al.*, 2001; Preston, 2006), rather than a Red Listed species. In Ireland, *P. ralfsii* is considered *Least Concern* (Lockhart *et al.*, 2012). Recent fieldwork has shown that the Republic of Ireland may well be a centre of distribution for the plant, with some very large populations on west coast machair systems. Indeed, it seems likely that the Republic of Ireland holds the highest proportion of the world population of *P. ralfsii* of any country in the world, and probably the largest populations (Porley *et al.*, 2008), and therefore has an international responsibility for its conservation.

2. International distribution of *P. ralfsii*

According to Hill *et al.* (1991), *P. ralfsii* is widespread in the Mediterranean region, including North Africa and Turkey, extending northwards along the Atlantic seaboard to Britain (and Ireland), and also occurs in the southern USA. However, Crandall-Stotler *et al.* (2002) consider American *Petalophyllum* to be specifically distinct from European material and have therefore described it as a different species, *P. americanum*. Hill & Preston (1998) include *P. ralfsii* in the Mediterranean-Atlantic element in their classification of floristic elements in Britain and Ireland. Ratcliffe (1968) also included it in his list of Mediterranean-Atlantic bryophytes.

According to Söderström *et al.* (2002), *P. ralfsii* is not very widely distributed in Europe, occurring only in Spain (in the Balearic Islands), Portugal, Greece (including Crete), Italy (including Sicily and Sardinia), Ireland and Britain.

There is now quite a large amount of information available on the distribution of *P. ralfsii* in individual European countries:

- Greece: at least two mainland localities, on the Peloponnese (Preston, 1981; Blockeel, 1991) and Evvia (Blockeel, pers. comm.). Also at least three localities on Crete: Chania, Triada & Komitades (Preston, 1981). There is at least one site on the Greek Island of Gavdopoula (Bergmeier *et al.*, 2011).
- Italy: two mainland sites in Tuscany and two in Calabria (Aleffi & Schumacker, 1995). Also recorded from Lampedusa, Levanzo & Marettimo, small islands off the coast of Sicily, “on volcanic soil” (Jovet-Ast & Bischler, 1971; Dia *et al.*, 1985; Aleffi & Schumacker, 1995). The report of this species from Sardinia by Herzog (1905) was considered doubtful (Bischler & Jovet-Ast, 1972), but the species has subsequently been recorded there (Aleffi, 2005; Aleffi & Cogoni, 2008; Frahm *et al.*, 2008).
- Malta: at least two locations (Jovet-Ast & Bischler, 1972; Dia *et al.*, 1985; Frahm & Lüth, 2008).
- Portugal: two localities in the Algarve, where it “can benefit by grazing and some human activities” (Sim-Sim *et al.*, 2000). A third locality was discovered in 2001 in Serra de Arrábida (Sérgio, 2002). A report from the Azores (Sérgio, 1994) is erroneous (Sérgio *et al.*, 1994; Schumacker, 2001). *P. ralfsii* appears on the Iberian Red List as *Vulnerable* (Sérgio *et al.*, 2006).
- Spain: only known from the Balearic Islands, where it has been recorded from five localities in Mallorca, two in Menorca, two in Ibiza and one in Formentera (Blockeel & Crundwell, 1987;

Casas, 1998; also listed in Cros *et al.*, 2008). Habitats listed are clayey soil in a river mouth, on a steep riverbank, on a roadside, among pine litter in a shaded north-facing gully, on flat clayey surfaces, and a 'rushing stream'. A revision of specimens from mainland Spain showed that they were errors (M. Brugués, pers. comm.).

- United Kingdom: as of 2006, *P. ralfsii* was recorded from 15 10 km² squares in Wales, 11 in England, 1 in Scotland and 1 in Northern Ireland (at Ballymaclary National Nature Reserve (Magilligan Special Area of Conservation)) (Joint Nature Conservation Committee, 2007). Dune systems in Wales and Cornwall are particularly important for this plant, and the Scottish locality is the species most northerly station in the world. It has been refound at nearly all of its historical localities, and some of the populations are large (British Bryological Society Threatened Bryophyte Database).

The EUNIS database (European Nature Information System) gives the following information on *P. ralfsii* in EU countries:

- Ireland: 20 sites
- Italy: 11 sites
- Malta: 2 sites
- Portugal: 1 site
- Spain: 5 sites
- United Kingdom: 14 sites

(<http://eunis.eea.europa.eu/species/4806/sites>)

Presumably these are key sites/Special Areas of Conservation (SACs) for *P. ralfsii* in the Natura 2000 network, rather than a comprehensive site list for each country. However, different countries may have interpreted EUNIS criteria in different ways.

P. ralfsii occurs in Cyprus (Frahm *et al.*, 2009; Blockeel, 2003) and is also found in Turkey (Kürschner & Erdağ, 2005; Kiremit, 2007; Kirmaci & Ağcagil, 2009; Kirmaci & Erdağ, 2010). In North Africa, *P. ralfsii* has also been recorded in Morocco, Algeria and Tunisia (Battandier & Trabut, 1886; Trabut, 1887; Stotler *et al.*, 2002; Ros *et al.*, 2007).

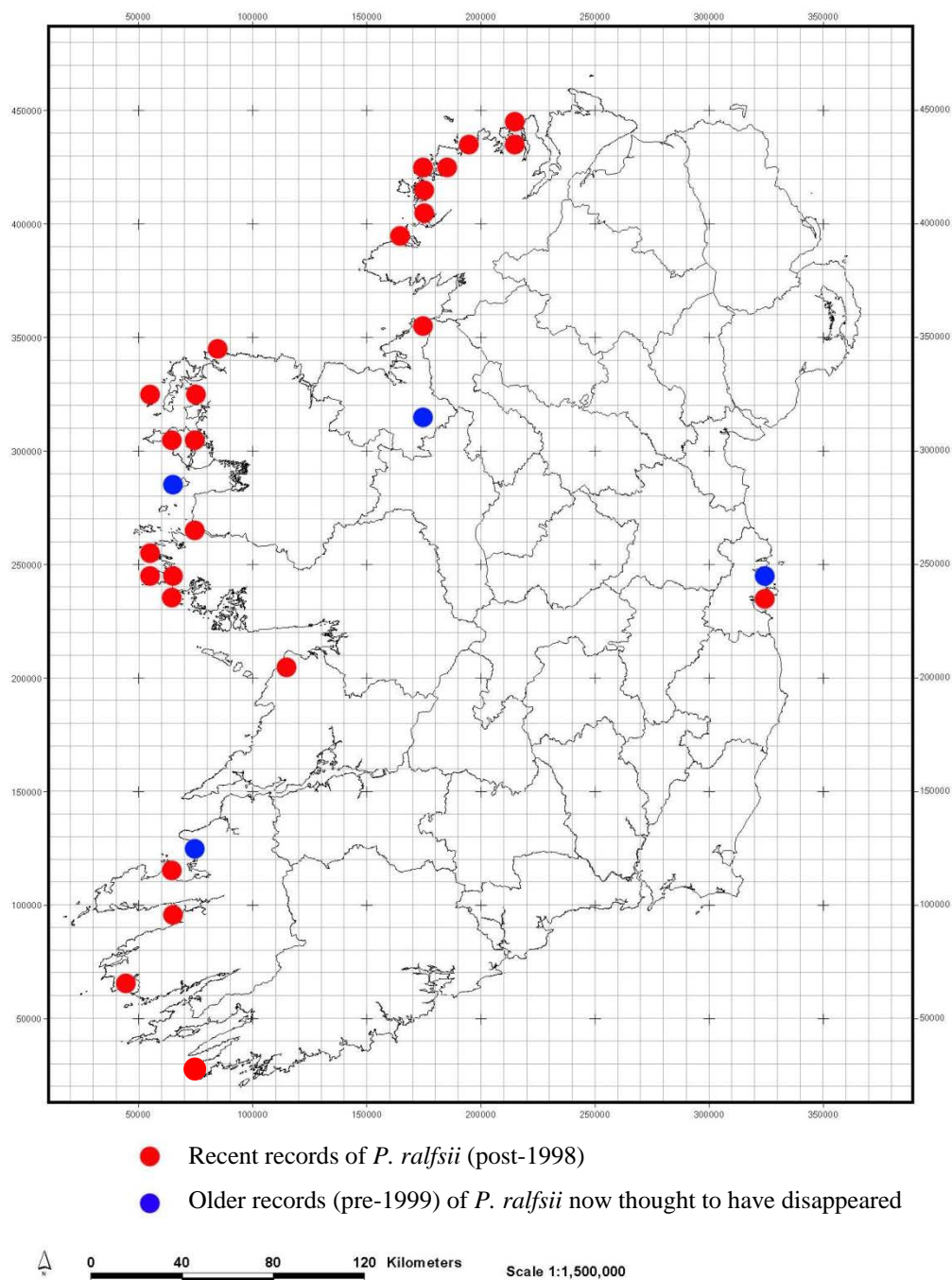
3. Distribution of *Petalophyllum ralfsii* in the Republic of Ireland

P. ralfsii was first recorded in the Republic of Ireland in 1861 near Malahide by B. Carrington (herbarium specimen in DBN). It was subsequently recorded on the North Bull, in north Dublin Bay by D. Moore in 1874 (Moore, 1877), at 'west of Inny Ferry', Waterville, Co. Kerry by R.W. Scully in 1890 (Scully, 1890), on Achill Island by Rev. H.W. Lett in 1903 and on Clare Island, again by Rev. H.W. Lett, in 1920. Most of these records are supported by herbarium specimens. A handful of 'new' populations were discovered in the 1950s and 1960s, but recent fieldwork by N. Lockhart of the National Parks & Wildlife Service (NPWS) from 1998 on, following the inclusion of *P. ralfsii* on the Bern Convention and Habitats Directive, has revealed several hitherto-undiscovered populations, many of them large. *P. ralfsii* is now known in the Republic of Ireland from the counties of Kerry, Cork, Clare, Galway, Dublin, Mayo, Sligo and Donegal. Nearly all the populations are found in coastal dune systems with damp, calcareous slacks or machair. It may have disappeared from some localities, for example, it was found once at Banna, Co. Kerry, by A.P. Fanning in 1954 but has not been refound there, in spite of searching, and it has almost certainly disappeared from Malahide, where its habitat has largely been destroyed. Neither was it refound during recent fieldwork on Clare Island. One anomalous locality was an old limestone quarry near Derry, by Lough Arrow, Co. Sligo,

where *P. ralfsii* was found by Jean Paton in 1970, but this appears to have been a transient population. A pre-2008 specimen from Co. Cork was redetermined as *Fossombronina husnotii* (D. Holyoak, pers. comm.). However, a *P. ralfsii* population was subsequently found at Barley Cove, Co. Cork in October 2012 by N. Lockhart of NPWS.

P. ralfsii has been recorded in recent (post-1998) fieldwork as part of the NPWS programme of rare and threatened bryophyte surveys in the following counties: Kerry (six populations); Clare (one population); Galway (five populations); Dublin (one population); Mayo (seven populations); Sligo (one population); Donegal (eight populations) and Cork (one population) (Sources: NPWS database; Blockeel & Long, 1998; Hodgetts, 2003; Hodgetts, 2006; Holyoak, 1999; Holyoak, 2002; Holyoak, 2003; Holyoak, 2004; N. Lockhart, pers. comm.) The distribution of *P. ralfsii* in the Republic of Ireland, as currently understood, is shown in Figure 1. Only confirmed records are mapped.

Figure 1. Distribution map of *Petalophyllum ralfsii* in the Republic of Ireland.



4. Range of *Petalophyllum ralfsii* in the Republic of Ireland

According to the European Commission (1992), range is taken to be ‘*the outer limits of the overall area in which a habitat or species is found at present. It can be considered as an envelope within which areas actually occupied occur as in many cases not all the range will actually be occupied by the species or habitat*’. This can be a difficult concept for bryophytes, which tend to occur in often very scattered or disjunct populations, the plants occupying small ‘micro-habitats’ within larger, more generally recognised habitats. However, it is relatively easy to determine the range of *P. ralfsii*, because its habitat is well-circumscribed and its extent well-known. The sort of damp calcareous sandy ground where this species grows is highly characteristic of the ‘major habitats’ machair and dune slack.

The range outline largely corresponds to the IUCN definition of ‘extent of occurrence’, taken as the ‘*area contained within the shortest continuous imaginary boundary which can be drawn to encompass all the known, inferred or projected sites of present occurrence of a taxon excluding cases of vagrancy*’ (European Commission, 2006). In the 2007 conservation assessment carried out under Article 17 of the EU Habitats Directive, the Irish 10 km² grid was overlaid with the squares that contained potential habitats for the species. The potential habitats mapped for the range of *P. ralfsii* in the Republic of Ireland were the EU Habitats Directive Annex I habitats Machair (Code 21A0) and Humid Dune Slacks (Code 2190). The true potential range of *P. ralfsii* is considerably less than the 74 grid squares identified in 2007 as containing ‘suitable habitat’, since not all dune slacks are suitable for the species. It is thus considered that the current range of *P. ralfsii* more or less reflects its potential range. This leads to a fragmented range for *P. ralfsii* that nonetheless encompasses a large part of the west coast of Ireland, plus a smaller area on the east coast.

The 2013 conservation assessment range map consists of 32 current range cells, including the 26 current distribution cells and a further 6 cells that could potentially support the species due to geological and edaphic reasons. The range of *P. ralfsii* in the Republic of Ireland can be seen in Figure 2.

4.1 Range Conservation Status

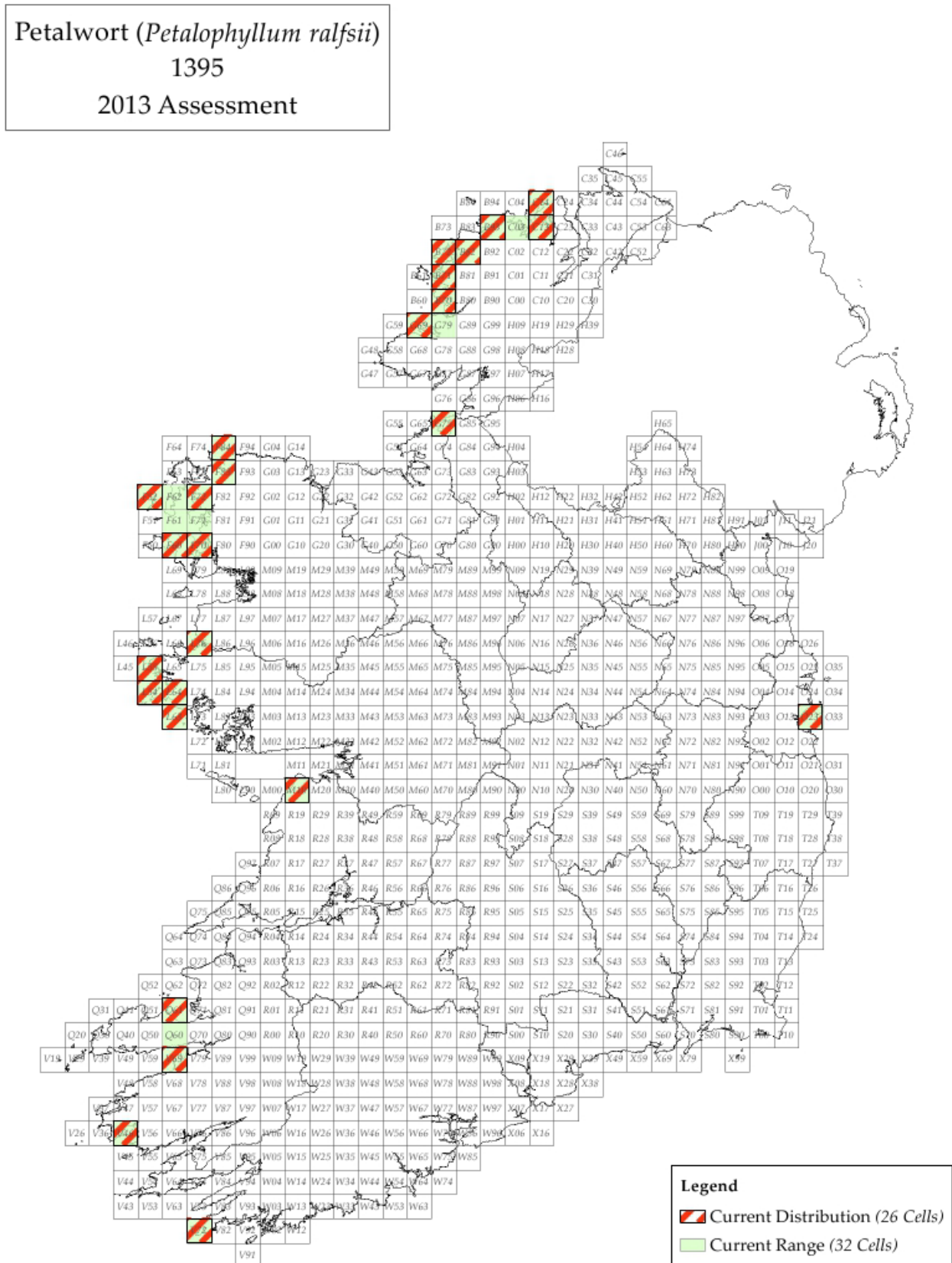
The Favourable Reference Range (FRR) for *P. ralfsii* in the Republic of Ireland is taken to be its present range i.e. a polygon drawn around all the 10 km² squares from which *P. ralfsii* has been recorded recently (1998-2012). This is thought to encompass the ecological range of variation for the species in the Republic of Ireland.

Furthermore, dune systems and machair in the Republic of Ireland have been extensively surveyed in recent years, and most significant populations of *P. ralfsii* are likely to have been found. As a consequence of recent surveys, the current known range of *P. ralfsii* is greater than it has been at any time in the past, simply because many populations of the species were not previously known about. The range of *P. ralfsii* may actually have declined, but there is no evidence for this, again because of the paucity of previous survey work.

As the current range of the species is the same as the FRR, it is allocated a Favourable conservation status in this respect.

- **Species Range Area:** Can be considered as either the area of the grid cells occupied by the habitat which is 3200 km² (32 grid cells x 100 km²) or the area of the polygon which contains all of the grid cells, which is also 3200 km²
- **Favourable Reference Range:** 3200 km² (32 grid cells x 100 km²).

Figure 2. The distribution and range of *Petalophyllum ralfsii* in the Republic of Ireland.



5. Populations of *P. ralfsii* in the Republic of Ireland

5.1 Extant populations of *P. ralfsii* in the Republic of Ireland

There are currently thought to be 30 extant populations of *Petalophyllum ralfsii* in the Republic of Ireland, which occur within 21 SACs (Table 1). Each of the populations are described in some detail below (Section 5.1) and might usefully be read in conjunction with the appended distribution maps (Appendix I). There are four localities (Section 5.2) where confirmed records of *P. ralfsii* have been reported, but where it is now thought to be extinct, or not seen in over 25 years.

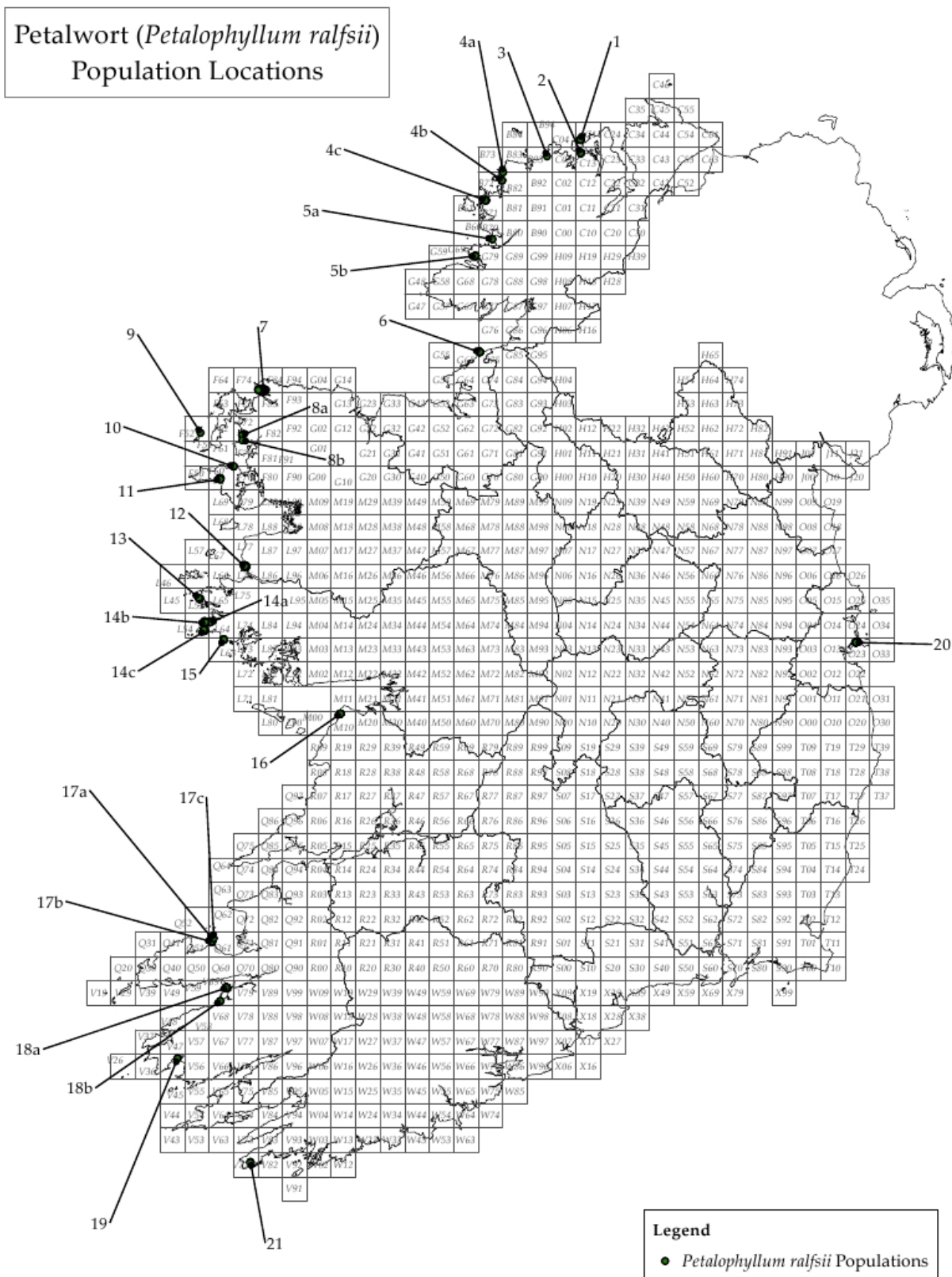
Table 1. Special Areas of Conservation (SACs) with extant populations of *Petalophyllum ralfsii* in the Republic of Ireland.

Population	County	SAC Name	SAC Code
1. Rosses Strand	Donegal	Tranarossan and Melmore Lough	000194
2. Rosepenna	Donegal	Sheephaven	001190
3. Tramore/Black Burrow/SW of Dunfanaghy	Donegal	Horn Head and Rinclevan	000147
4a. Damph Beg	Donegal	Gweedore Bay & Islands	001141
4b. Derrybeg	Donegal		
4c. Keadew Point	Donegal		
5a. Dooley Point	Donegal	West of Ardara/Maas Road	000197
5b. Sheskinmore	Donegal		
6. Bunduff Machair	Sligo	Bunduff Lough and Machair/Trawalua/Mullaghmore	000625
7. Garter Hill	Mayo	Glenamoy Bog Complex	000500
8a. Doolough Machair	Mayo	Mullet/Blacksod Bay Complex	000470
8b. Dooyork Machair	Mayo		
9. North Inishkea	Mayo	Inishkea Islands	000507
10. Doogort Machair	Mayo	Doogort Machair/Lough Doo	001497
11. Keel Machair	Mayo	Keel Machair/Menaun Cliffs	001513
12. Dooaghtry	Mayo	Mweelrea/Sheeffry/Erriff Complex	001932
13. Omev Island Machair	Galway	Omev Island Machair	001309
14a. Mannin More	Galway	Slyne Head Peninsula	002074
14b. Truska Machair	Galway		
14c. Doon Hill/West of Aillebrack	Galway		
15. Murvey Machair	Galway	Murvey Machair	002129
16. Fanore	Clare	Black Head-Poulsallagh Complex	000020
17a. SW of Lough Naparka	Kerry	Tralee Bay and Magharees Peninsula, West to Cloghane	002070
17b. Magherabeg	Kerry		
17c. Kilshannig	Kerry		
18a. Inch Spit	Kerry	Castlemaine Harbour	000343
18b. Rossbehy	Kerry		
19. West of Inny Ferry	Kerry	Ballinskelligs Bay and Inny Estuary	000335
20. North Bull	Dublin	North Dublin Bay	000206
21. Barley Cove*	Cork	Barley Cove to Ballyrisode Point	001040

* Recent find of *P. ralfsii*; the species is not yet selected as a qualifying interest for SAC 001040.

The location of the numbered populations in the Republic of Ireland can be seen in Figure 3.

Figure 3. Locations of *Petalophyllum ralfsii* populations in the Republic of Ireland (see Table 1 for key to population number locations).



For the recently-recorded populations in the Republic of Ireland, the following ecological and population details have been collated from NPWS field notes and Campbell (2013).

5.1.1 Tranarossan and Melmore Lough SAC (000194)

Population No. 1: Rosses Strand, Co. Donegal, grid ref. C118428

Field notes from David Holyoak (25 May 2002):

15 thalli at C11864282, near north end of Rosses Strand, on unshaded, partly bare, damp sand exposed in gaps and a small path on south-facing hillside above sandy bay; on slopes of 10-30°, amongst short (< 5 cm) herb-rich grassland. Area closely grazed by sheep.

Field notes from Neil Lockhart (8 May 2006):

Habitat looks as described, but failed to find *P. ralfsii* at place described, perhaps because of dry weather. However, 2 thalli found at C11864280, slightly to the east of D. Holyoak's 2002 record.

Associates:

<i>Agrostis stolonifera</i>	<i>Carex panicea</i>	<i>Plantago coronopus</i>
<i>Aneura pinguis</i>	<i>Festuca rubra</i>	<i>Plantago lanceolata</i>
<i>Bellis perennis</i>	<i>Fissidens dubius</i>	<i>Trichostomum crispulum</i>
<i>Bryum pseudotriquetrum</i>	<i>Holcus lanatus</i>	

Field notes from Christina Campbell, Neil Lockhart & Noeleen Smyth (1 April 2009):

P. ralfsii grows here on damp peaty sand with short vegetation on a south-facing slope above the north end of the strand. Two 25 x 50 cm plots were recorded. Plot 1 was recorded on compact sandy humic soil and had a slope of 23 degrees. Plot 2 was recorded circa 60 m away on a similar flushed slope. Groundwater depth could not be recorded here as rock was hit at 31 cm and 25 cm below groundlevel at plots 1 and 2 respectively. The locality appeared grazed and a potential threat would be a change to this regime; either under-grazing which could lead to shading and competition or over-grazing which could potentially intensify soil erosion on the steeply inclined slope.

Rosses Strand	Plot 1	Plot 2
Distance from sea (m)	86	111
Altitude (metres above sea level)	29	31
Slope (degrees)	23	30
Aspect	South	South
Soil depth (cm)	15	6
Soil pH	7.78	7.86
Depth to bedrock (cm)	31	25
Mean vegetation height (cm)	4.4	3.33
Maximum vegetation height (cm)	7	7
Number of <i>P. ralfsii</i> thalli	17	7
Cover (Domin)		
Total	9	9
Grass	7	6
Sedge	5	4
Forb	4	4
Bryophyte	7	8
Lichen	0	3
Litter	7	5
Bare soil	4	4
Dung	+	0
<i>Agrostis stolonifera</i>	4	2
<i>Amblystegium serpens</i> var. <i>salinum</i>	3	0
<i>Barbula convoluta</i>	1	3
<i>Bellis perennis</i>	+	+
<i>Bryum pseudotriquetrum</i>	4	0
<i>Carex flacca</i>	4	4
<i>Ctenidium molluscum</i>	3	0
<i>Cynosurus cristatus</i>	0	2
<i>Distichium inclinatum</i>	0	2
<i>Ditrichum gracile</i>	4	3
<i>Festuca rubra</i>	6	5
<i>Fissidens dubius</i>	2	0

Rosses Strand (continued)	Plot 1	Plot 2
<i>Galium verum</i>	0	+
<i>Hieracium pilosella</i>	0	2
<i>Hypnum cupressiforme</i>	0	5
<i>Leontodon autumnalis</i>	0	2
<i>Plantago coronopus</i>	1	0
<i>Plantago lanceolata</i>	1	0
<i>Prunella vulgaris</i>	0	2
<i>Thymus praecox</i>	4	4
<i>Syntrichia ruralis</i> var. <i>ruraliformis</i>	2	4
<i>Trifolium dubium</i>	1	1
<i>Trifolium repens</i>	1	0

5.1.2 Sheephaven SAC (000190)

Population No. 2: Rosepenna, Co. Donegal, grid ref. C121372

Field notes from David Holyoak (5 August 1999):

P. ralfsii was located in small quantity on both sides of main R248 road, on edge of golf course and on apparent common land to east. 15 thalli, mostly small, non-fertile, located east of road, 11 west of road (including some larger, one with pseudoperianth). *P. ralfsii* is in sparse low vegetation on pathway used by people and few horses, in area grazed by rabbits. Area is currently rather heavily grazed by rabbits. Plants west of road were on areas from which turf had been cut for use elsewhere on golf course; mowing keeps vegetation short in this area, in addition to rabbit-grazing.

Associates:

<i>Amblyodon dealbatus</i>	<i>Drepanocladus polygamus</i>	<i>Moerckia flotoviana</i>
<i>Aneura pinguis</i>	<i>Entodon concinnus</i>	<i>Pilosella officinarum</i>
<i>Bellis perennis</i>	<i>Euphrasia nemorosa</i>	<i>Plantago lanceolata</i>
<i>Bryum marratii</i>	<i>Festuca rubra</i>	<i>Prunella vulgaris</i>
<i>Bryum pseudotriquetrum</i>	<i>Holcus lanatus</i>	<i>Riccia cavernosa</i>
<i>Campyliadelphus chrysophyllus</i>	<i>Homalothecium lutescens</i>	<i>Salix repens</i>
<i>Carex flacca</i>	<i>Juncus articulatus</i>	<i>Scorpidium cossonii</i>
<i>Cratoneuron filicinum</i>	<i>Juncus bufonius</i>	<i>Selaginella selaginoides</i>
<i>Ctenidium molluscum</i>	<i>Leiocolea badensis</i>	<i>Thuidium abietinum</i> ssp. <i>hystricosum</i>
<i>Distichium inclinatum</i>	<i>Linum catharticum</i>	<i>Trichostomum crispulum</i>
<i>Ditrichum gracile</i>	<i>Lotus corniculatus</i>	<i>Trifolium pratense</i>

Field notes from Christina Campbell, Neil Lockhart & Noleen Smyth (1 April 2009):

One thallus was recorded on a trampled path in an area of damp sandy turf between two roads in early April 2009 where D. Holyoak had recorded 15 thalli in 1999. Similar ground on the other side of the two roads was searched, but no thalli were found. Subsequent visits failed to refind any thalli. The area appears to be used by vehicles practising “donuts” which could create new bare patches of soil as potential habitat, but too much on a continuous basis is damaging as the surface crust is continually broken up and vegetation cannot establish.

Rosepenna	Plot 1
Distance from sea (m)	859
Altitude (metres above sea level)	1.5
Slope (degrees)	0
Aspect	-
Soil depth (cm)	9
Soil pH	7.83
Depth to groundwater (cm)	60
Groundwater pH	7.72
Groundwater conductivity (μ S/cm)	598
Number of <i>P. ralfsii</i> thalli	1
Mean vegetation height (cm)	1.66
Maximum vegetation height (cm)	3.4
Cover (Domin)	
Total	9
Grass	8
Sedge	6
Forb	4
Bryophyte	7

Rosepenna (continued)	Plot 1
Lichen	+
Litter	7
Bare soil	4
Dung	+
<i>Agrostis stolonifera</i>	2
<i>Barbula convoluta</i>	4
<i>Bellis perennis</i>	1
<i>Brachythecium mildeanum</i>	2
<i>Bryum pseudotriquetrum</i>	4
<i>Calliergonella cuspidata</i>	2
<i>Campylium chrysophyllum</i>	+
<i>Carex flacca</i>	6
<i>Ditrichum gracile</i>	4
<i>Festuca rubra</i>	7
<i>Lotus corniculatus</i>	+
<i>Plantago lanceolata</i>	+
<i>Prunella vulgaris</i>	2
<i>Trifolium repens</i>	2

5.1.3 Horn Head & Rinclevan SAC (000147)

Population No. 3: Tramore/Black Burrow/SW of Dunfanaghy, Co. Donegal, grid ref. B982360

Field notes from David Holyoak (2 June 2002):

Three thalli in unshaded carpet of low mosses on thin, damp sandy soil overlying more or less horizontal rock on top of low rocky knoll above sand beach and near dunes. All vegetation very short (< 3 cm), heavily grazed by sheep, cattle and rabbits. Tiny population potentially at risk from accidents such as trampling by stock or burial by loose rock.

Associates:

<i>Bellis perennis</i>	<i>Festuca rubra</i>	<i>Scapania</i> sp.
<i>Distichium inclinatum</i>	<i>Linum catharticum</i>	<i>Trichostomum crispulum</i> (dominant)
<i>Ditrichum gracile</i>	<i>Plantago coronopus</i>	<i>Thymus</i> sp.

5.1.4 Gweedore Bay & Islands SAC (001141)

This SAC contains three populations:

Population No. 4a: Damph Beg (N. of Gweedore Bay/Bunlack Machair), Co. Donegal, grid ref. B802295

Field notes from David Holyoak (4 August 1999):

Small populations of *P. ralfsii* in slack area with a rich flora. Eight small non-fertile thalli counted, but ground rather dry following week with much dry weather. Additional 16 thalli found later, some larger and with antheridia. *P. ralfsii* is at edge of track used to obtain sand from dunes so at risk from increased use or disuse of track. Also potentially at risk from dumping of rubbish.

Field notes from David Holyoak (27 April 2002):

Seven thalli counted with low moss and patchy low phanaerogams on gravelly sand of small low bank above track into small disused sand-quarry, above edge of dune slack. Potentially at risk from damage due to off-road vehicles, or dumping of rubbish near track edge.

Field notes from Neil Lockhart (8 May 2006):

Refound location but did not find *P. ralfsii*. Much litter, broken glass, dumping in vicinity. Also active removal of sand. Prospects for survival reasonable, but small available niche is vulnerable.

Associates:

<i>Amblyodon dealbatus</i>	<i>Didymodon tophaceus</i>	<i>Parnassia palustris</i>
<i>Aneura pinguis</i>	<i>Distichium inclinatum</i>	<i>Plantago lanceolata</i>

<i>Bellis perennis</i>	<i>Ditrichum gracile</i>	<i>Scorpidium cossonii</i>
<i>Bryum</i> cf. <i>algovicum</i> var. <i>rutheanum</i>	<i>Drepanocladus polygamus</i>	<i>Senecio jacobaea</i>
<i>Bryum pallens</i>	<i>Festuca rubra</i>	<i>Trichostomum brachydontium</i>
<i>Carex flacca</i>	<i>Galium verum</i>	<i>Tussilago farfara</i>
<i>Carex arenaria</i>	<i>Luzula campestris</i>	
<i>Didymodon fallax</i>	<i>Moerckia flotoviana</i>	

Population No. 4b: Derrybeg, Co. Donegal, grid ref. B799262

Field notes from David Holyoak (28 April 2002):

Three thalli on low NW-facing part of bank just above edge of dune slack, growing on wet humic sand with very low, patchy moss-rich grassland (2.4 cm high). Whole area is currently grazed by sheep. Off-road driving has caused damage to parts of machair and slacks, but this species is not directly affected.

Field notes from Neil Lockhart (8 May 2006):

P. ralfsii not refound at exact original location. Habitat is as described. 12 plants of *P. ralfsii* found a few metres away (B7986526198).

Associates:

<i>Aneura pinguis</i>	<i>Ditrichum gracile</i>	<i>Prunella vulgaris</i>
<i>Bellis perennis</i>	<i>Festuca rubra</i>	<i>Ranunculus bulbosus</i>
<i>Bryum pallens</i>	<i>Fissidens dubius</i>	<i>Selaginella selaginoides</i>
<i>Carex flacca</i>	<i>Leiocolea badensis</i>	<i>Trichostomum crispulum</i>
<i>Ctenidium molluscum</i>	<i>Leontodon autumnalis</i>	
<i>Distichium inclinatum</i>	<i>Pilosella officinarum</i>	

Population No. 4c: Keadew Point, Co. Donegal, grid. ref. B733182

Field notes from Neil Lockhart (9 February 1998):

More than 20 plants scattered on flat ground on the edges of two ponds, artificially derived from (scraw) cutting. Suitable ground also occurs around the margins, and between the several other ponds. This is possibly the locality of Crundwell's 1962 record. This area has been disturbed for scraw cutting and has created suitable mossy turf for *P. ralfsii*. Some further cutting may be beneficial. No other threats except dumping of domestic junk.

Field notes from David Holyoak (25 April 2002):

16 thalli in one small area, in unshaded low moss carpet (< 2 cm) on damp sand of small hollow at base of low granitic hill at edge of sand dunes. Potentially at risk from reduction of grazing, or from further 'theft' of turf for lawns.

Field notes from Neil Lockhart (9 May 2006):

Three thalli at B7308918141.

Associates:

<i>Agrostis stolonifera</i>	<i>Didymodon ferrugineus</i>	<i>Pilosella officinarum</i>
<i>Anagallis tenella</i>	<i>Distichium inclinatum</i>	<i>Plantago lanceolata</i>
<i>Bellis perennis</i>	<i>Ditrichum gracile</i>	<i>Poa pratensis</i>
<i>Bryum pallens</i>	<i>Drepanocladus polygamus</i>	<i>Preissia quadrata</i>
<i>Bryum pseudotriquetrum</i>	<i>Euphrasia</i> sp.	<i>Prunella vulgaris</i>
<i>Campylium stellatum</i>	<i>Festuca rubra</i>	<i>Pseudoscleropodium purum</i>
<i>Carex arenaria</i>	<i>Fissidens taxifolius</i>	<i>Thymus praecox</i>
<i>Carex flacca</i>	<i>Lophocolea bidentata</i>	<i>Trifolium repens</i>
<i>Ctenidium molluscum</i>	<i>Lotus corniculatus</i>	

Field notes from Christina Campbell, Neil Lockhart, & Noleen Smyth (2 April 2009):

Two plots (25 x 50 cm) were recorded at this population. Only 1 thallus was found in the area described by Lockhart in 1998. Plot 1 was recorded in this area, but no thalli were relocated during subsequent visits in spring 2010 and spring 2011. The area described by Holyoak in 2002 was also examined. However, when the location was revisited, this area was overgrown and unsuitable for *P. ralfsii*. A small population covering *circa* 24.3 m²

was discovered on a layer of humus-rich sand *circa* 1 cm thick overlying pure sand on a rocky outcrop above the shoreline in April 2009 and Plot 2 was recorded here. The area appeared potentially at risk from under-grazing and some dumping was also observed.

Keadew Point	Plot 1	Plot 2
Distance from sea (m)	120	19
Altitude (metres above sea level)	3.1	0.7
Slope (degrees)	0	10
Aspect	-	South-west
Soil depth (cm)	5	1
Soil pH	7.92	7.89
Depth to groundwater (cm)	51	Hit rock at 30cm
Groundwater pH	7.52	NA
Groundwater conductivity ($\mu\text{S}/\text{cm}$)	583	NA
Number of <i>P. ralfsii</i> thalli	1	6
Mean vegetation height (cm)	7.24	2.77
Maximum vegetation height (cm)	11.6	3.8
Cover (Domin)		
Total	10	9
Grass	4	5
Sedge	2	4
Forb	3	4
Bryophyte	9	8
Litter	7	7
Bare soil	+	4
<i>Anagallis tenella</i>	+	0
<i>Aneura pinguis</i>	0	2
<i>Anthyllis vulneraria</i>	0	1
<i>Armeria maritima</i>	2	0
<i>Barbula convoluta</i>	2	0
<i>Bellis perennis</i>	1	1
<i>Brachythecium albicans</i>	0	3
<i>Bryum pallens</i>	2	3
<i>Bryum pseudotriquetrum</i>	4	4
<i>Calliargonella cuspidata</i>	4	2
<i>Campylium stellatum</i>	2	0
<i>Carex arenaria</i>	1	0
<i>Carex flacca</i>	2	4
<i>Cochlearia officinalis</i> agg.	+	0
<i>Daucus carota</i>	1	1
<i>Distichium inclinatum</i>	5	4
<i>Ditrichum gracile</i>	4	4
<i>Festuca rubra</i>	4	4
<i>Fissidens taxifolius</i> var. <i>taxifolius</i>	2	0
<i>Galium verum</i>	+	0
<i>Hieracium pilosella</i>	2	2
<i>Hypnum cupressiforme</i>	3	2
<i>Leontodon autumnalis</i>	+	2
<i>Lotus corniculatus</i>	1	1
<i>Luzula campestris</i>	+	0
<i>Plantago lanceolata</i>	2	0
<i>Prunella vulgaris</i>	0	2
<i>Sagina nodosa</i>	0	2
<i>Scapania gracilis</i>	3	2
<i>Succisa pratensis</i>	0	2
<i>Thymus praecox</i>	2	2
<i>Syntrichia ruralis</i> var. <i>ruraliformis</i>	4	7
<i>Trifolium repens</i>	2	2

5.1.5 West of Ardara/Maas Road SAC (000197)

This SAC contains two populations:

Population No. 5a: Dooley Point, Co. Donegal, grid. ref. B757021

Field notes from David Holyoak (3 August 1999):

A small population of *P. ralfsii* was located near the northern end of the machair, a new record at this locality. Four thalli seen. *P. ralfsii* depends on small bare areas created by disturbance, in wheel ruts, etc.

Field notes from David Holyoak (24 April 2002):

Three small thalli, all close together, on small, mainly bare patch of humic sand exposed on low ridge (bank between old fields) in wide, shallow dune-slack area supporting short grassland that is heavily grazed by cattle.

Associates:

<i>Amblystegium serpens</i> var. <i>salinum</i>	<i>Homalothecium lutescens</i>	<i>Plantago maritima</i>
<i>Aneura pinguis</i>	<i>Hylocomium splendens</i>	<i>Prunella vulgaris</i>
<i>Bellis perennis</i>	<i>Hypochaeris radicata</i>	<i>Salix repens</i>
<i>Carex flacca</i>	<i>Linum catharticum</i>	<i>Selaginella selaginoides</i>
<i>Ctenidium molluscum</i>	<i>Lotus corniculatus</i>	<i>Thuidium abietinum</i> ssp. <i>hystricosum</i>
<i>Danthonia decumbens</i>	<i>Parnassia palustris</i>	<i>Thymus praecox</i>
<i>Ditrichum gracile</i>	<i>Pilosella officinarum</i>	<i>Trifolium repens</i>
<i>Euphrasia nemorosa</i>	<i>Plantago coronopus</i>	
<i>Galium verum</i>	<i>Plantago lanceolata</i>	

Population No. 5b: Sheskinmore, Co. Donegal, grid. ref. G690953

Field notes from Neil Lockhart (11 February 1998):

Two colonies, about 4 m apart, with 20 and 30 plants respectively. On a steeply sloping sandy bank beside a narrow water track, with some outcropping limestone immediately adjacent. This area is surrounded by rabbit burrows further up the slope. No perceived threats at present, maintenance of open turf by rabbit grazing is probably beneficial. Current cattle grazing regime is 8 cattle to 150 acres, October 1 - March 31.

Field notes from Neil Lockhart (9 May 2006):

Very dry, but found just one plant at G6898095454, just above rock outcrop, close to original find.

Associates:

<i>Aneura pinguis</i>	<i>Ditrichum gracile</i>	<i>Ranunculus bulbosus</i>
<i>Bellis perennis</i>	<i>Festuca rubra</i>	<i>Rhytidiadelphus squarrosus</i>
<i>Brachythecium albicans</i>	<i>Lophocolea bidentata</i>	<i>Riccardia multifida</i>
<i>Bryum pseudotriquetrum</i>	<i>Luzula campestris</i>	<i>Thymus praecox</i>
<i>Calliergonella cuspidata</i>	<i>Plantago coronopus</i>	<i>Trichostomum crispulum</i>
<i>Carex</i> cf. <i>flacca</i>	<i>Poa pratensis</i>	<i>Trifolium repens</i>
<i>Cerastium fontanum</i>	<i>Prunella vulgaris</i>	

Field notes from Christina Campbell, Neil Lockhart & Noeleen Smyth (31 March 2009):

A population of *circa* 30 thalli occurred over an extent of *ca.* 13.75 m² along the edge of a sandy bank in short turf with high bryophyte cover above a limestone outcrop. Two 25 x 50 cm plots were recorded. Plot 1 was recorded on sand sitting on a layer of peat *ca.* 40 cm deep overlying limestone. Plot 2 was recorded on a layer of peaty sand 10 cm deep, followed by 17 cm of grey sand overlying iron-stained, fine, gritty silty clay. The groundwater table was reached at 37 cm from the surface. The area appeared to be grazed and cattle and rabbit dung was observed.

Sheskinmore	Plot 1	Plot 2
Distance from sea (m)	515	518
Altitude (metres above sea level)	9.0	8.1
Slope (degrees)	5	15
Aspect	West	South-west
Soil depth (cm)	7	10
Soil pH	8.25	7.96

Sheskinmore (continued)	Plot 1	Plot 2
Depth to groundwater (cm)	47	37
Groundwater pH	NA	7.3
Groundwater conductivity ($\mu\text{S}/\text{cm}$)	NA	484
Number of <i>P. ralfsii</i> thalli	8	1
Mean vegetation height (cm)	5	4
Maximum vegetation height (cm)	8.6	6.5
Cover (Domin)		
Total	9	10
Grass	7	7
Sedge	3	5
Forb	4	4
Bryophyte	7	8
Litter	5	7
Bare	4	3
Dung	4	0
<i>Agrostis stolonifera</i>	0	4
<i>Aneura pinguis</i>	0	4
<i>Anthyllis vulneraria</i>	+	+
<i>Barbula convoluta</i>	2	0
<i>Bellis perennis</i>	+	0
<i>Brachythecium albicans</i>	0	2
<i>Bryum pseudotriquetrum</i>	4	4
<i>Bryum</i> sp.	3	0
<i>Calliergonella cuspidata</i>	3	1
<i>Carex flacca</i>	3	4
<i>Ctenidium molluscum</i>	0	5
<i>Ditrichum gracile</i>	5	4
<i>Festuca rubra</i>	6	5
<i>Galium verum</i>	0	+
<i>Holcus lanatus</i>	4	4
<i>Hypnum cupressiforme</i>	2	0
<i>Leontodon autumnalis</i>	1	+
<i>Lolium perenne</i>	+	+
<i>Lophocolea bidentata</i>	1	0
<i>Mnium hornum</i>	0	+
<i>Plantago coronopus</i>	0	+
<i>Plantago lanceolata</i>	1	2
<i>Prunella vulgaris</i>	3	2
<i>Ranunculus bulbosus</i>	1	3
<i>Rhytidiadelphus squarrosus</i>	1	+
<i>Sagina nodosa</i>	+	0
<i>Scapania gracilis</i>	4	1
<i>Thymus praecox</i>	4	1
<i>Trichostomum brachydontium</i>	1	+
<i>Trifolium repens</i>	2	2

5.1.6 Bunduff Lough & Machair/Trawalua/Mullaghmore SAC (000625)

Population No. 6: Bunduff Machair, Co. Sligo, grid ref. G707563

Field notes from Neil Lockhart (11 March 1998):

Two colonies, one of 18 rosettes, the other of 2 rosettes. Another 2 rosettes seen about 10 m SE along the track. Plants occur on compacted sandy soil on a ridge between wheel ruts on an occasionally used vehicle trackway. No perceived threats.

Field notes from David Holyoak (31 July 1999):

76 thalli counted in about 1 hour, but coverage incomplete and nearby areas of possible habitat (e.g. along track) were dry at time of survey. No immediate threats apparent. Area grazed by cattle and rabbits, so important to maintain level of grazing and water table.

Field notes from Nick Hodgetts (27 June 2003):

Two very small female thalli seen at edge of dune slack in slightly blown-out area, in shelter of crescent-moon-shaped dune.

Associates:

<i>Agrostis stolonifera</i>	<i>Festuca rubra</i>	<i>Prunella vulgaris</i>
<i>Aneura pinguis</i>	<i>Hylocomium splendens</i>	<i>Riccardia multifida</i>
<i>Bellis perennis</i>	<i>Hypochaeris radicata</i>	<i>Sagina nodosa</i>
<i>Brachythecium mildeanum</i>	<i>Juncus articulatus</i>	<i>Sagina procumbens</i>
<i>Bryum pseudotriquetrum</i>	<i>Leontodon saxatilis</i>	<i>Scorpidium cossonii</i>
<i>Carex flacca</i>	<i>Moerckia flotoviana</i>	<i>Selaginella selaginoides</i>
<i>Cynosurus cristatus</i>	<i>Parnassia palustris</i>	<i>Senecio jacobaea</i>
<i>Didymodon ferrugineus</i>	<i>Pellia endiviifolia</i>	<i>Taraxacum officinalis</i>
<i>Ditrichum gracile</i>	<i>Pohlia wahlenbergii</i>	<i>Thuidium abietinum</i> ssp. <i>hystricosum</i>
<i>Equisetum variegatum</i>	<i>Polygala serpyllifolia</i>	<i>Thymus praecox</i>
<i>Euphrasia</i> sp.	<i>Pseudoscleropodium purum</i>	<i>Trifolium repens</i>

Field notes from Christina Campbell (30 March 2009):

The population here occurs on a track at the eastern edge of a dune slack *circa* 22 m long and 1.5-2 m wide, covering an area of *ca.* 24.3 m². The main area of the slack was very wet with standing water present and a dominance of *Calliergonella cuspidata*. Three plots (25 x 50 cm) were recorded along the track on a sandy loam *ca.* 2-3 cm deep above pure sand. The area appeared grazed by cattle and rabbits and so a potential threat would be any change to this regime.

Bunduff	Plot 1	Plot 2	Plot 3
Distance from sea (m)	503	502	500
Altitude (metres above sea level)	3	2.5	2.26
Slope (degrees)	0	5	3
Aspect	-	South	West
Soil depth (cm)	2	2	3
Soil pH	8.35	8.37	8.12
Depth to groundwater (cm)	33	26	18
Groundwater pH	7.29	7.28	7.29
Groundwater conductivity (µS/cm)	579	620	549
Number of <i>P. ralfsii</i> thalli	5	2	4
Mean vegetation height (cm)	2.8	3.2	2.5
Maximum vegetation height (cm)	6	7	6
Cover (Domin)			
Total	9	9	10
Grass	6	5	6
Sedge	4	4	4
Forb	4	4	4
Fern/ fern allies	2	3	2
Bryophyte	5	7	8
Litter	7	6	6
Bare soil	4	4	3
<i>Ammophila arenaria</i>	0	0	3
<i>Aneura pinguis</i>	3	4	0
<i>Anthoxanthum odoratum</i>	1	0	0
<i>Barbula convoluta</i>	3	0	0
<i>Bellis perennis</i>	1	0	0
<i>Brachythecium mildeanum</i>	1	0	0
<i>Bryum pseudotriquetrum</i>	0	3	3
<i>Calliergonella cuspidata</i>	4	4	5
<i>Carex flacca</i>	4	4	4
<i>Didymodon fallax</i>	3	0	0
<i>Ditrichum gracile</i>	4	2	3
<i>Entodon concinnus</i>	1	2	2
<i>Equisetum variegatum</i>	1	1	2
<i>Festuca rubra</i>	6	5	6
<i>Hieracium pilosella</i>	1	0	2
<i>Leontodon autumnalis</i>	2	1	3
<i>Lotus corniculatus</i>	2	3	1
<i>Plantago coronopus</i>	0	0	+
<i>Prunella vulgaris</i>	0	3	4
<i>Ranunculus bulbosus</i>	2	1	0
<i>Rhytidadelphus squarrosus</i>	0	0	2
<i>Sagina nodosa</i>	1	0	0

Bunduff	Plot 1	Plot 2	Plot 3
<i>Selaginella selaginoides</i>	1	3	1
<i>Thuidium tamariscinum</i>	3	4	2
<i>Thymus praecox</i>	2	2	1
<i>Trifolium repens</i>	3	3	3

5.1.7 Glenamoy Bog Complex SAC (000500)

Population No. 7: Garter Hill, Co. Mayo, grid ref. F80_40_ etc.

Field notes from Neil Lockhart (7 April 1998):

Several hundred plants seen. Plenty of suitable habitat. Plants very frequent at this locality, on banks of water tracks and also on sides of low sandhills in wetter flushed parts of machair. Many thousands of plants seems to be a probable estimate. Currently heavily grazed by sheep, which may favour open turf for *P. ralfsii*. No other perceived threats.

Field notes from David Holyoak (16 April 1999):

Continuously distributed over ca. 1,600 m, in strip of land ca. 100 m wide, so population estimate of 1.6 million thalli, based on approximate density of 10 per square metre. Fewer further east. Also several hundred more slightly to the east. Flushed machair slopes, changing eastward into extensive dune slack. Further east *P. ralfsii* more localised in damp hollows. Present intensive sheep grazing is good for *P. ralfsii*, but causing some sand erosion. Localised damage in west part of area results from vehicle rutting and turf cutting for lawns and graves.

Field notes from David Holyoak (30 September - 1 October 2003):

30 September 2003: F80694065: >1000 thalli scattered over many tens of m²; F81844089: ca. 16 thalli by stream edge; F81884081: hundreds of thalli; F82064069: thousands of thalli in sparsely vegetated hollow; small populations also seen at several intervening locations. Very large population recorded by survey in spring 1999 evidently still persists here. The habitat is still ideal over large areas of wet machair that remains intensively grazed by sheep. No sporophytes seen, but many plants with antheridia and few with perianths. On 1 October 2003 a few thalli were found further east at F82614070.

Field notes from Neil Lockhart (4 July 2006):

Little change since first visit in 1998 - abundant suitable habitat still occurs, still lightly grazed by sheep. Several plants (tens) found at F8106540671 beside stream where 1998 relevé 2 was recorded. Poor time of year for survey.

Associates:

<i>Agrostis stolonifera</i>	<i>Carex flacca</i>	<i>Lophocolea bidentata</i>
<i>Amblyodon dealbatus</i>	<i>Cerastium fontanum</i>	<i>Lotus corniculatus</i>
<i>Amblystegium serpens</i> var. <i>salinum</i>	<i>Cratoneuron filicinum</i>	<i>Pilosella officinarum</i>
<i>Anagallis tenella</i>	<i>Dichodontium</i> cf. <i>pellucidum</i>	<i>Plantago coronopus</i>
<i>Aneura pinguis</i>	<i>Didymodon fallax</i>	<i>Plantago lanceolata</i>
<i>Barbula convoluta</i>	<i>Distichium inclinatum</i>	<i>Pohlia wahlenbergii</i>
<i>Bellis perennis</i>	<i>Ditrichum gracile</i>	<i>Prunella vulgaris</i>
<i>Brachythecium rivulare</i>	<i>Eleocharis</i> sp.	<i>Ranunculus repens</i>
<i>Bryoerythrophyllum recurvirostrum</i>	<i>Equisetum variegatum</i>	<i>Rhytidiadelphus squarrosus</i>
<i>Bryum</i> cf. <i>algovicum</i>	<i>Festuca rubra</i>	<i>Sagina procumbens</i>
<i>Bryum</i> cf. <i>capillare</i>	<i>Fossombronia incurva</i>	<i>Syntrichia ruralis</i>
<i>Bryum pseudotriquetrum</i>	<i>Homalothecium lutescens</i>	<i>Taraxacum officinale</i>
<i>Calliargonella cuspidata</i>	<i>Hypnum cupressiforme</i>	<i>Thuidium abietinum</i> ssp. <i>hystricosum</i>
<i>Campyliadelphus chrysophyllus</i>	<i>Leontodon autumnalis</i>	<i>Trichostomum crispulum</i>
<i>Carex arenaria</i>	<i>Leontodon saxatilis</i>	<i>Trifolium repens</i>

Field notes from Christina Campbell, Karen Gaynor, Neil Lockhart and Noeleen Smyth (12-14 May 2009 (CC, KG & NL only) & 21 April 2010 (CC, NL & NS only)):

The site is an extensive, slightly undulating, machair plain with many streams running down towards the sea and with windblown sand occurring right up onto the hills behind the plain. Seven plots (25 x 50 cm) were recorded, located on the sides of sandy banks and hummocks, on machair plain that extended to the sea shore and in the blowout area of a dune. Evidence of scraw cutting was evident as was dumping in parts of the machair. The area appeared heavily grazed which is beneficial for *P. ralfsii*, but which may lead to erosion. Over-grazing is considered to have led to the degradation of the machair habitat at the site.

Garter Hill	Plot 1	Plot 2	Plot 3	Plot 4	Plot 5	Plot 6	Plot 7
Year	2009	2009	2009	2009	2009	2010	2010
Distance from sea (m)	439	20	192	252	281	203	431
Altitude (metres above sea level)	26.7	3	8.5	4.97	11.63	7.23	14.32
Slope (degrees)	8	20	20	0	10	5	0
Aspect	West	South/south east	South	-	South	South	-
Soil depth (cm)	9	0.5	12	3	9	5	1
Soil pH	8.03	8.19	8.1	8.13	7.83	7.89	8.08
Depth to groundwater (cm)	66	30	51	34	34	34	25
Groundwater pH	6.96	7.23	6.97	6.97	6.97	7.62	7.35
Groundwater conductivity (µS/cm)	806	407	783	718	757	453	781
Number of <i>P. ralfsii</i> thalli	14	12	2	7	4	4	7
Mean vegetation height (cm)	2.58	2.42	3.48	3	2.57	2.54	1.9
Maximum vegetation height (cm)	4.5	3.5	6	4.5	4	3.5	3
Cover (Domin)							
Total	10	10	10	9	10	10	9
Rush	0	0	0	1	0	0	+
Grass	6	9	6	5	6	7	8
Sedge	4	0	3	4	5	5	0
Forb	6	4	6	5	7	7	4
Fern/ fern allies	0	0	0	0	0	2	0
Bryophyte	9	7	9	9	8	10	5
Algae	0	+	0	0	+	0	1
Litter	5	7	4	5	4	6	6
Bare soil	+	4	1	4	2	1	4
Dung	0	1	0	0	2	2	0
<i>Achillea millifolia</i>	0	2	0	0	0	0	0
<i>Agrostis stolonifera</i>	0	6	2	1	1	2	1
<i>Amblyodon dealbatus</i>	0	0	0	2	0	0	0
<i>Amblystegium serpens</i> var. <i>salinum</i>	2	5	3	4	3	0	0
<i>Aneura pinguis</i>	0	2	0	4	3	5	0
<i>Anthoxanthum odoratum</i>	1	0	0	0	0	0	0
<i>Barbula convoluta</i>	4	3	0	3	2	0	0
<i>Bellis perennis</i>	2	3	1	0	4	4	0
<i>Brachythecium albicans</i>	0	0	0	0	3	0	0
<i>Bryum pallens</i>	3	0	0	4	3	0	0
<i>Bryum pseudotriquetrum</i>	0	0	2	2	0	5	4
<i>Bryum</i> sp.	0	2	0	0	1	5	0
<i>Calliergonella cuspidata</i>	0	1	0	0	0	0	1
<i>Carex arenaria</i>	1	0	2	1	0	0	0
<i>Carex flacca</i>	4	0	2	4	5	5	0
<i>Cerastium fontanum</i>	1	0	1	0	0	0	0
<i>Ctenidium molluscum</i>	1	0	0	0	4	0	0
<i>Daucus carota</i>	0	2	4	0	2	0	0
<i>Didymodon fallax</i>	3	3	3	4	3	0	0
<i>Distichium inclinatum</i>	4	0	0	0	0	0	0
<i>Ditrichum gracile</i>	4	2	3	0	4	0	0
<i>Entodon concinnus</i>	0	0	1	0	1	0	0
<i>Erophila verna</i>	1	0	0	0	0	0	0
<i>Euphrasia</i> sp.	0	0	0	0	1	0	0
<i>Festuca rubra</i>	6	8	6	5	6	7	8
<i>Galium verum</i>	0	0	+	0	2	0	0
<i>Homalothecium lutescens</i>	0	3	4	0	0	0	0
<i>Hydrocotyle vulgaris</i>	0	0	+	0	0	0	0
<i>Hypnum cupressiforme</i>	4	2	8	0	2	0	0
<i>Juncus articulatus</i>	0	0	0	1	0	0	+
<i>Leontodon autumnalis</i>	0	0	5	4	1	4	0
<i>Linum catharticum</i>	0	0	0	0	1	0	0
<i>Lophocolea bidentata</i>	0	1	0	0	0	0	0
<i>Lotus corniculatus</i>	0	1	1	0	+	3	0
<i>Luzula campestris</i>	0	0	2	0	1	0	0
<i>Plagiochila asplenioides</i>	1	0	0	0	0	0	0
<i>Plagiomnium</i> sp.	0	0	3	0	0	0	0
<i>Plantago coronopus</i>	2	1	2	4	4	3	2
<i>Plantago lanceolata</i>	0	2	0	0	4	0	0
<i>Poa annua</i>	0	0	0	+	0	0	0

Garter Hill (continued)	Plot 1	Plot 2	Plot 3	Plot 4	Plot 5	Plot 6	Plot 7
<i>Prunella vulgaris</i>	2	0	1	1	+	0	0
<i>Ranunculus bulbosus</i>	0	0	0	0	1	0	0
<i>Rhytiadelphus squarrosus</i>	0	0	+	0	0	0	0
<i>Sagina nodosa</i>	+	0	+	0	0	2	3
<i>Saxifraga tridactylites</i>	2	0	0	0	1	0	0
<i>Scorpidium revolvens</i>	0	0	0	0	0	2	0
<i>Selaginella selaginoides</i>	0	0	0	0	0	2	0
<i>Taraxacum officinale</i>	0	0	0	0	0	+	0
<i>Thymus praecox</i>	5	0	5	0	4	0	0
<i>Syntrichia ruralis</i> var. <i>ruraliformis</i>	+	0	+	2	0	0	0
<i>Trifolium repens</i>	1	0	4	0	1	2	4
<i>Veronica arvensis</i>	3	0	0	0	1	0	0

5.1.8 Mullet/Blacksod Bay Complex SAC (000470)

This SAC contains two populations:

Population No. 8a: Doolough Machair, Co. Mayo, grid ref. F736223

Field notes from Neil Lockhart (8 April 1998):

Circa 20 plants in an area of sandhills at the highest part of the plain, above a flushed calcareous slope to the SE. Sandhill area grazed by cattle. Some fertiliser enrichment at the northern end. No ring feeders seen.

Field notes from David Holyoak (17 April 1999):

77 thalli counted. Lack or scarcity of recent grazing probably limits occurrence of *P. ralfsii*. Most slack habitats now have too tall vegetation cover. However, the site may have been grazed more in past (old cattle dung seen). Still grazed by rabbits.

Field notes from Neil Lockhart (27 April 2006):

3 plants seen on tightly cropped turf on sides of low sandhills. Site appears to be more or less unchanged since 1998, still grazed by cattle, and overall in very good condition, although localised damage around a ring feeder occurs in one area.

Associates:

<i>Agrostis stolonifera</i>	<i>Carex</i> cf. <i>hirta</i>	<i>Lotus corniculatus</i>
<i>Aneura pinguis</i>	<i>Carex flacca</i>	<i>Luzula campestris</i>
<i>Bellis perennis</i>	<i>Ctenidium molluscum</i>	<i>Pilosella officinarum</i>
<i>Brachythecium rivulare</i>	<i>Ditrichum gracile</i>	<i>Plantago coronopus</i>
<i>Bryoerythrophyllum recurvirostrum</i>	<i>Drepanocladus polygamus</i>	<i>Plantago lanceolata</i>
<i>Bryum algovicum</i> var. <i>rutheanum</i>	<i>Eurhynchium praelongum</i>	<i>Prunella vulgaris</i>
<i>Bryum</i> sp.	<i>Festuca rubra</i>	<i>Ranunculus bulbosus</i>
<i>Calliergonella cuspidata</i>	<i>Homalothecium lutescens</i>	<i>Syntrichia ruralis</i>
<i>Campyliadelphus chrysophyllus</i>	<i>Leontodon autumnalis</i>	<i>Trifolium repens</i>
<i>Carex arenaria</i>	<i>Leontodon saxatilis</i>	

Population No. 8b: Dooyork Machair, Co. Mayo, grid ref. F737202

Field notes from Neil Lockhart (9 April 1998):

Six plants seen. Probably more widespread on site, but not frequent or abundant. Plants found on damp flats between low sandhills, which is unusual for *P. ralfsii*. The hills themselves tend to be too heathy in character, with lichens, *Thymus praecox*, *Frullania tamarisci*, etc.

Field notes from David Holyoak (17 April 1999):

None found.

Associates:

<i>Agrostis stolonifera</i>	<i>Ctenidium molluscum</i>	<i>Poa</i> sp.
<i>Bellis perennis</i>	<i>Festuca rubra</i>	<i>Prunella vulgaris</i>
<i>Calliergonella cuspidata</i>	<i>Homalothecium lutescens</i>	<i>Ranunculus bulbosus</i>
<i>Campyliadelphus elodes</i>	<i>Leontodon autumnalis</i>	<i>Selaginella selaginoides</i>

Carex flacca
Carex panicea
Climacium dendroides

Lophocolea bidentata
Lotus corniculatus
Plagiomnium elatum

Trifolium repens

5.1.9 Inishkea Islands SAC (000507)

Population No. 9: North Inishkea, Co. Mayo, grid ref. F567233

Field notes from Neil Lockhart (29 July 1998):

Seven plants scattered at intervals along a well-worn sheep track traversing the lower edge of machair plain, ca. 100 m from the sea. Searched the machair plain and associated water tracks for ca. 2 hours but only found plants along this sheep track. Plenty of other suitable habitat occurs, so *P. ralfsii* is probably more widespread. No threats identified.

Associates:

Bellis perennis

Brachythecium rutabulum

Carex flacca

Cerastium fontanum

Euphrasia sp.

Festuca rubra

Juncus articulatus

Juncus bulbosus

Leontodon autumnalis

Lotus corniculatus

Plantago coronopus

Plantago lanceolata

Poa annua

Prunella vulgaris

Ranunculus bulbosus

5.1.10 Doogort Machair/Lough Doo SAC (001497)

Population No. 10: Doogort Machair ('Achill Island'/Lough Nambrack/Caraun Point), Co. Mayo, grid ref. F702095

Field notes from Neil Lockhart (5 April 1998):

Four rosettes seen. Plenty of suitable sandhills about suggest a more widespread and scattered distribution. Plants occur on the side of a compacted, tightly grazed (sheep) sandhill, relatively dry compared to other sites. At least 1-1.5 m above water table. Fairly heavily grazed by sheep, which may be exacerbating natural wind erosion.

Field notes from David Holyoak (2003):

None found.

Field notes from Neil Lockhart (2 July 2006):

Habitat still present, still an area of eroded rounded dunes present - a lot of sheep and sheep dung. The vegetation appears to be slightly more rank than remembered from previous visit - quite a few spikes of *Cirsium vulgare* give it a more rank appearance - although the herb and bryophyte layer are still grazed tight and suitable niches for *P. ralfsii* exist. Too dry to find *P. ralfsii*.

Field notes from Christina Campbell & Neil Lockhart (15 October 2009):

8 thalli (including one male and one female) were counted on low hummock on machair circa 7 m alt.

Field notes from Christina Campbell & Neil Lockhart (21 October 2010):

43 thalli counted in area of 25 x 50 cm on machair.

Associates:

Achillea millefolium

Bellis perennis

Brachythecium albicans

Bryoerythrophyllum recurvirostrum

Bryum pseudotriquetrum

Carex flacca

Cerastium fontanum

Climacium dendroides

Cratoneuron filicinum

Didymodon vinealis

Ditrichum gracile

Festuca rubra

Fissidens dubius

Galium verum

Hypnum cupressiforme

Hypochaeris radicata

Lophocolea bidentata

Lotus corniculatus

Luzula cf. *campestris*

Pilosella officinarum

Plagiomnium ellipticum

Plantago lanceolata

Poa sp.

Prunella vulgaris

Ranunculus bulbosus

Rhytidiadelphus squarrosus

Sagina procumbens

Syntrichia ruralis

Trifolium repens

5.1.11 Keel Machair/Menaun Cliffs SAC (001513)

Population No. 11: Keel Machair, Co. Mayo, grid ref. F64_04_

Field notes from Neil Lockhart (6 April 1998):

Several hundreds, possibly thousands, of plants occur here. On tightly sheep-grazed turf on the edges of channelised and semi-natural water tracks on the western and more calcareous side of the machair plain. Part of this site is managed as a 9-hole pitch & putt course, low intensity management, with only the greens and tees reseeded, has enabled *P. ralfsii* to survive. Any intensification or expansion should be discouraged.

Field notes from David Holyoak (17-19 April 1999):

Circa 430 thalli counted in total; overall population estimate high hundreds or low thousands. Soil and rubble had recently been tipped in one area. Westward extension of this tipping or its hydrological effects may damage *P. ralfsii*. Area is closely grazed by sheep but suffering damage over wide areas from vehicles driving over machair (resulting in compaction of surfaces), and mowing (or rolling?) for maintenance/creation of lawn-like golf course surfaces. Daily usage of off-road vehicle to exercise dogs on machair was seen.

Field notes from David Holyoak (28 June 2003):

Small, partly bare patches of damp unshaded sand in machair/dune-slacks with very short vegetation (heavily grazed by sheep). Hundreds of thalli at F64380470 and ca. 50 thalli at F64330479. Some sites are very close to an area used as a dump and at risk from being buried by rocks or rubbish placed there. Elsewhere drainage and fertiliser applications are the greatest threats.

Field notes from Neil Lockhart (7 July 2006):

Habitat much as described previously – still lots of available niches, still heavily grazed by sheep etc. Plants seen (> 20) beside old drainage system at F6457504520, but poor time of year for survey. More *P. ralfsii* (20-30 plants) in turf amongst compacted stones behind shingle at F6471804321. All plants extremely small at this time of year.

Associates:

<i>Agrostis stolonifera</i>	<i>Carex arenaria</i>	<i>Linum catharticum</i>
<i>Aneura pinguis</i>	<i>Didymodon fallax</i>	<i>Plagiomnium ellipticum</i>
<i>Barbula convoluta</i>	<i>Didymodon</i> cf. <i>vinealis</i>	<i>Plantago coronopus</i>
<i>Bellis perennis</i>	<i>Distichium inclinatum</i>	<i>Poa annua</i>
<i>Brachythecium</i> cf. <i>rivulare</i>	<i>Drepanocladus polygamus</i>	<i>Potentilla anserina</i>
<i>Bryoerythrophyllum recurvirostrum</i>	<i>Euphrasia tetraquetra</i>	<i>Prunella vulgaris</i>
<i>Bryum pseudotriquetrum</i>	<i>Festuca rubra</i>	<i>Sagina procumbens</i>
<i>Bryum</i> sp.	<i>Fissidens taxifolius</i>	<i>Scorpidium revolvens</i>
<i>Calliergonella cuspidata</i>	<i>Juncus articulatus</i>	<i>Selaginella selaginoides</i>
<i>Campylium stellatum</i>	<i>Leontodon autumnalis</i>	<i>Trifolium repens</i>

5.1.12 Mweelrea/Sheeffry/Erriff Complex SAC (001932)

Population No. 12: Dooaghtry (Lackakeely/Killadoon)), Co. Mayo, grid ref. L750690 etc.

Field notes from Neil Lockhart (25 November 1997):

At least 50 plants seen over 3 locations about 200 m apart. Area not extensively searched, but similar suitable habitat appears to be extensive around the edge of the flat plain. Growing with a turf of mosses. No threats at present.

Field notes from David Holyoak & Neil Lockhart (20 April 1999):

Hundreds of thousands (L750690). Whole area grazed heavily by sheep, and rabbits occur, giving open sward 1-3 cm tall; continued grazing essential for *P. ralfsii*.

Field notes from David Holyoak (11 July 2003):

4 scattered thalli seen at L74426881 on damp unshaded sand among sparse low grasses, sedges and herbs, on base of north-facing machair slope. Heavily grazed by sheep.

Field notes from Neil Lockhart (5 July 2006):

Site essentially in similar condition to when last visited – sheep-grazed machair – very good condition. *P. ralfsii* easily relocated in tractor wheel ruts at L7507068525, and some more at L7536968719, at the side of an old eroded sandhill.

Associates:

<i>Achillea millefolium</i>	<i>Cerastium fontanum</i>	<i>Plantago lanceolata</i>
<i>Agrostis stolonifera</i>	<i>Cratoneuron filicinum</i>	<i>Poa</i> sp.
<i>Amblystegium serpens</i>	<i>Didymodon vinealis</i>	<i>Pohlia</i> sp.
<i>Aneura pinguis</i>	<i>Ditrichum gracile</i>	<i>Prunella vulgaris</i>
<i>Bellis perennis</i>	<i>Euphrasia</i> sp.	<i>Riccardia chamedryfolia</i>
<i>Brachythecium mildeanum</i>	<i>Festuca rubra</i>	<i>Sagina procumbens</i>
<i>Bryum algovicum</i> var. <i>rutheanum</i>	<i>Homalothecium lutescens</i>	<i>Scorpidium revolvens</i>
<i>Bryum pallens</i>	<i>Juncus bulbosus</i>	<i>Syntrichia ruralis</i>
<i>Bryum pseudotriquetrum</i>	<i>Jungermannia atrovirens</i>	<i>Thymus polytrichus</i>
<i>Calliergonella cuspidata</i>	<i>Leontodon autumnalis</i>	<i>Trifolium repens</i>
<i>Carex flacca</i>	<i>Plantago coronopus</i>	

Field notes from Christina Campbell, Karen Gaynor, Neil Lockhart & Noleen Smyth (13 May 2009 & 20 April 2010):

Five plots (25 x 50 cm) were recorded on flat machair plain, on the side of low sandy hummocks and in flushed machair. The area is grazed by sheep and rabbits and maintenance of this regime is essential for the continued presence of *P. ralfsii*.

Dooaghtry	Plot 1	Plot 2	Plot 3	Plot 4	Plot 5
Year	2009	2009	2009	2009	2010
Distance from sea (m)	413	234	323	374	659
Altitude (metres above sea level)	21	23	17	18	17.5
Slope (degrees)	15	4	0	0	5
Aspect	South-west	North	-	-	South
Soil depth (cm)	3	6	2	2	4.5
Soil pH	8.12	8.19	8.09	8.19	8
Depth to groundwater (cm)	15 to bedrock	70	64	59	49.5
Groundwater pH	NA	7.2	7.21	7.19	7.37
Groundwater conductivity (µS/cm)	NA	699	688	619	575
Number of <i>P. ralfsii</i> thalli	11	3	8	16	4
Mean vegetation height (cm)	2.2	2.6	3.0	2.3	2.0
Maximum vegetation height (cm)	3	5	5	4	3
Cover (Domin)					
Total	9	9	10	9	10
Shrub	0	0	0	0	0
Rush	+	4	0	0	1
Grass	5	4	6	7	4
Sedge	5	3	4	2	5
Forb	6	5	4	4	5
Fern/ fern allies	0	0	0	0	2
Bryophyte	8	8	9	8	9
Litter	3	4	4	5	4
Bare soil	3	5	2	4	0
Dung	2	1	+	3	1
<i>Agrostis stolonifera</i>	1	3	1	0	0
<i>Amblystegium serpens</i> var. <i>salinum</i>	1	0	1	0	0
<i>Anagallis tenella</i>	0	0	0	0	1
<i>Aneura pinguis</i>	4	0	0	0	4
<i>Barbula convoluta</i>	1	4	3	0	0
<i>Bellis perennis</i>	4	4	2	1	3
<i>Brachythecium albicans</i>	4	4	5	0	0
<i>Brachythecium mildeanum</i>	0	0	0	0	2
<i>Bryum algovicum</i>	4	0	4	1	0
<i>Bryum pseudotriquetrum</i>	3	4	0	4	0
<i>Bryum</i> sp.	0	0	0	0	3
<i>Calliergonella cuspidata</i>	0	3	0	0	0
<i>Carex arenaria</i>	0	0	3	2	0
<i>Carex flacca</i>	5	2	3	0	5
<i>Centaurium erythraea</i>	0	0	0	+	0

Dooaghtry (continued)	Plot 1	Plot 2	Plot 3	Plot 4	Plot 5
<i>Cerastium fontanum</i>	2	0	0	1	0
<i>Ctenidium molluscum</i>	0	0	3	1	0
<i>Didymodon fallax</i>	4	5	4	3	0
<i>Distichium inclinatum</i>	0	0	1	4	0
<i>Ditrichum gracile</i>	0	0	5	4	4
<i>Entodon concinnus</i>	3	0	0	0	0
<i>Equisetum variegatum</i>	0	0	0	0	1
<i>Erophila verna</i>	0	0	1	1	0
<i>Euphrasia</i> sp.	+	1	1	1	0
<i>Festuca rubra</i>	5	2	6	7	4
<i>Holcus lanatus</i>	0	0	1	0	0
<i>Hydrocotyle vulgaris</i>	0	0	0	0	2
<i>Juncus acutiflorus</i>	0	4	0	0	0
<i>Juncus articulatus</i>	+	4	0	0	1
<i>Jungermannia atrovirens</i>	0	0	0	0	8
<i>Leontodon saxatilis</i>	4	0	+	+	2
<i>Linum catharticum</i>	0	0	0	3	0
<i>Lophocolea bidentata</i>	2	0	4	0	0
<i>Lotus corniculatus</i>	0	0	2	0	0
<i>Luzula campestris</i>	0	0	+	1	0
<i>Pellia endiviifolia</i>	4	0	0	0	0
<i>Plagiochila asplenoides</i>	0	0	2	0	0
<i>Plantago coronopus</i>	5	4	2	4	3
<i>Plantago lanceolata</i>	0	0	1	0	0
<i>Pleurochaete squarrosa</i>	2	2	0	0	0
<i>Pohlia wahlenbergii</i>	1	0	0	0	4
<i>Rhytidiadelphus squarrosus</i>	0	4	0	0	0
<i>Sagina procumbens</i>	+	3	1	1	2
<i>Saxifraga tridactylites</i>	1	0	4	2	0
<i>Scorpidium revolvens</i>	0	0	0	0	4
<i>Selaginella selaginoides</i>	0	0	0	0	1
<i>Trichostomum brachydontium</i>	0	0	1	2	0
<i>Trifolium dubium</i>	0	0	1	0	0
<i>Trifolium repens</i>	3	1	0	0	+

5.1.13 Omev Island Machair SAC (001309)

Population No. 13: Omev Island Machair, Co. Galway, grid ref. L56_55_

Field notes from Neil Lockhart (8 October 1998):

Two populations close to each other, one (R1) of 4 plants in 2 colonies, the other (R2) of *ca.* 300 along a compacted trackway for a distance of *ca.* 10 m. Plants (R1) occur in a flat, wet basin which seasonally floods with peaty calcareous sand. Area has been disturbed in the past by vehicle wheel tracks and some poaching by cattle which has exposed bare sandy peat. No threats - occasional disturbance may benefit *P. ralfsii*. Currently grazed by cattle and rabbits. R2: several rosettes growing in the wheel ruts of a trackway across the machair. Ground very compressed with patches of Pottiaceae-dominated open ground. Only threat is from lack of vehicle usage. Maintain usage to compact soil and retain open ground.

Field notes from Neil Lockhart (3 November 2006):

Refound NL's R2 after a few minutes searching. Track is a bit scuffed up by cattle hooves in places, but *P. ralfsii* seen at L5637355524, in same place as in 1998. Just 5 plants counted, but suitable compacted ground occurs in the vicinity. Overall, the site is much as it was in 1998. Refound R1 after 1 minute search. Habitat exactly as described in 1998. *P. ralfsii* found where vehicle tracks cross wet plain at L5592755983, just 1 plant.

Associates:

<i>Agrostis stolonifera</i>	<i>Didymodon ferrugineus</i>	<i>Plantago lanceolata</i>
<i>Anagallis tenella</i>	<i>Ditrichum gracile</i>	<i>Poa</i> sp.
<i>Aneura pinguis</i>	<i>Festuca rubra</i>	<i>Polygala</i> cf. <i>serpyllifolia</i>
<i>Barbula convoluta</i>	<i>Fissidens celticus</i>	<i>Potentilla anserina</i>
<i>Bellis perennis</i>	<i>Fissidens dubius</i>	<i>Prunella vulgaris</i>
<i>Brachythecium rutabulum</i>	<i>Galium verum</i>	<i>Pseudocrossidium hornschurchianum</i>
<i>Bryum pseudotriquetrum</i>	<i>Gentianella campestris</i>	<i>Ranunculus bulbosus</i>
<i>Calliergonella cuspidata</i>	<i>Juncus acutiflorus</i>	<i>Rhytidiadelphus squarrosus</i>

<i>Campylium stellatum</i>	<i>Juncus cf. bufonius</i>	<i>Riccardia chamedryfolia</i>
<i>Carex flacca</i>	<i>Leontodon autumnalis</i>	<i>Sedum acre</i>
<i>Carex arenaria</i>	<i>Lotus corniculatus</i>	<i>Selaginella selaginoides</i>
<i>Ctenidium molluscum</i>	<i>Moerckia flotoviana</i>	<i>Trifolium repens</i>
<i>Cynosurus cristatus</i>	<i>Pellia endiviifolia</i>	
<i>Didymodon fallax</i>	<i>Plantago coronopus</i>	

5.1.14 Slyne Head Peninsula SAC (002074)

This SAC contains three populations:

Population No. 14a: Mannin More, Co. Galway, grid ref. L607460

Field notes from David Holyoak (16 May 2004):

Thirteen thalli seen, but habitat extensive and likely to be hundreds, if not thousands. On unshaded, damp calcareous sand with sparse low (< 5 cm) vegetation on machair slope; area closely grazed, mainly by sheep.

Field notes from Neil Lockhart (29 October 2006):

P. ralfsii seen at L6070846080: 24 plants per square metre over a suitable area of *ca.* 100 x 20 m = 48,000 plants. More plants seen a few hundred metres further west, walking along the coast, *ca.* 100 m in from the sea. In damp depressions at L6062746274, alt. 11 m - 12 plants in area 4 x 3 m - undoubtedly more, but only searched for 2 minutes. More plants at L6062646313 in a semi-circular depression just 30-40 m further west, *ca.* 40 m from sea: *ca.* 32,000 plants. Plants also seen on trackway immediately west of depression at L6061346373. Yet more plants amongst machair grassland further west at L6048646412 - 3 plants. Overall the site condition here is very good for *P. ralfsii*, grazed by sheep, rabbits and hares. Also a good time of year to survey - two very large populations seen: the first a confirmation of David Holyoak's record, the second a new one. Further survey would probably reveal yet more!

Associates:

<i>Aneura pinguis</i>	<i>Distichium inclinatum</i>	<i>Leiocolea badensis</i>
<i>Calliergonella cuspidata</i>	<i>Festuca rubra</i>	<i>Lotus corniculatus</i>
<i>Carex panicea</i>	<i>Galium verum</i>	<i>Prunella vulgaris</i>
<i>Didymodon tophaceus</i>	<i>Leontodon saxatilis</i>	<i>Trichostomum brachydontium</i>

Population No 14b: Truska Machair, Co. Galway, grid ref. L585458

Field notes from Neil Lockhart (6-7 October 1998 [with Noel Kirby, Ger O'Donnell & Marie-Louise Heffernan]):

Flat, extensive machair plain sloping gently to NE. Seasonally flooded, but water table currently below surface and ground is damp. Heavily grazed by a mixture of cattle and sheep. Found a small population, *ca.* 50 plants, on wheel ruts beside road on entering the machair plain. Another, more extensive and natural population was seen on damp, seasonally flooded ground at the edge of sedge/reed swamp on the Truska/Mannin Beg townland boundary. Several hundred plants were seen here. The main Truska machair plain supported the largest single population yet seen in Ireland. The number must range from 750,000 to 2.4 million. Not currently threatened, although sand extraction occurs locally. Current grazing regime appears beneficial for *P. ralfsii*.

Field notes from David Holyoak & Neil Lockhart (21-22 April 1999):

Population 6 (L583459) very large, covering area paced as 425 x 50-80 m, density 200 and 303 thalli in two 1 m squares: overall population *ca.* 5.5 million or more. All other populations much smaller: 4 (L584453), 5 (L587461), 7, 8, 9 all 1-3 thalli. Current heavy grazing by sheep evidently good for *P. ralfsii*. Some rutting caused by off-road vehicles, but no serious problems apparent.

Field notes from David Holyoak (11 May 2004):

Partly bare damp sand of extensive slack in machair, receiving blown sand from low bank to north; many thousands of square metres of habitat for *P. ralfsii* in vicinity. Many thousands of thalli. Potentially at risk from erosion if stocking levels increase, or from shading and vegetation succession if grazing declines.

Field notes from Neil Lockhart (2 November 2006):

20 plants per m². Further plants seen along the length of the flat depression, but at much lower densities (< 10 per m²). Far less extensive patches than in 1998 and 1999. There appears to be less open ground, less *Moerckia*, and more *Festuca rubra*. This may be a natural succession, or there may be less sheep grazing. *P. ralfsii* is still relatively common, though not abundant. Lots of *P. ralfsii* in flat-bottomed depression at L5811945620, alt. 12 m, with *M. hibernica*, in open compacted wet turf. This is much more as Truska machair was in 1998/99. Estimate of 150 plants per square metre in patches over an area of ca. 20 x 60 m (150 x 1200 = 180,000 plants, or probably somewhat less because of the patchiness, but maybe 100,000). A further population seen in wet ground, below main population, where water channel enters the sea at L5801545692 - ca. 15,000 plants.

Associates:

<i>Agrostis stolonifera</i>	<i>Cardamine pratensis</i>	<i>Juncus acutiflorus</i>
<i>Amblyodon dealbatus</i>	<i>Carex arenaria</i>	<i>Linum catharticum</i>
<i>Amblystegium serpens</i>	<i>Carex flacca</i>	<i>Moerckia flotoviana</i>
<i>Anagallis tenella</i>	<i>Cerastium</i> sp.	<i>Plantago coronopus</i>
<i>Aneura pinguis</i>	<i>Cratoneuron filicinum</i>	<i>Plantago lanceolata</i>
<i>Barbula convoluta</i>	<i>Didymodon fallax</i>	<i>Poa annua</i>
<i>Bellis perennis</i>	<i>Didymodon ferrugineus</i>	<i>Pohlia</i> sp.
<i>Brachythecium rutabulum</i>	<i>Didymodon tophaceus</i>	<i>Ranunculus</i> cf. <i>bulbosus</i>
<i>Bryum</i> cf. <i>algovicum</i>	<i>Distichium inclinatum</i>	<i>Riccardia chamedryfolia</i>
<i>Bryum pseudotriquetrum</i>	<i>Festuca rubra</i>	<i>Sagina procumbens</i>
<i>Calliergonella cuspidata</i>	<i>Homalothecium lutescens</i>	<i>Thuidium recognitum</i>
<i>Campylium stellatum</i>	<i>Iris pseudocorus</i>	<i>Trifolium repens</i>

Field notes from Christina Campbell, Neil Lockhart, Deirdre Lynn & Noleen Smyth (17-19 February 2009, 24 March 2010 & 10 March 2011):

The largest sub-population (Truska sub-population 1) occurs on the main Truska machair plain that is bordered to the north and north-west by a sand ridge. This area appears to be seasonally flooded in parts, receives in-blown sand from the ridge and is grazed by cattle and sheep. Nine plots (25 x 50 cm) containing *P. ralfsii* were recorded along two transects extending from the sea along the area of occurrence. The second largest sub-population (sub-population 2) occurs in a damp and seasonally flooded area to the south-west of the main area of occurrence. Seven plots (25 x 50 cm) were recorded here. A single thallus was found in area further north of the main sub-population in 2011 and a plot was recorded here. The area is under commonage and maintenance of the grazing regime is essential for *P. ralfsii* here. Some rutting by off-road vehicles was visible.

Truska Machair	Sub-population 1									Sub-population 2						Sub-population 3
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Year	'09	'09	'09	'09	'09	'10	'10	'10	'10	'10	'10	'10	'10	'10	'10	'11
Distance from sea (m)	217	107	181	413	156	146	208	276	438	281	224	196	166	136	116	463
Altitude (metres above sea level)	6.42	2.14	6.09	6.92	6.34	2.81	4.24	10.21	9.36	8.38	7.29	8.3	5.32	4.99	7.52	0.14
Slope (degrees)	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Aspect	-	-	-	-	-	-	-	-	-	West	-	-	-	-	-	0
Soil depth (cm)	1.0	0.5	1.5	4.0	0.5	2.5	3.0	4.0	2.0	3.0	4.0	4.0	4.0	2.0	3.0	3
Soil pH	8.05	7.96	7.95	7.61	7.97	8.00	7.88	7.85	7.85	7.91	8.14	8.02	7.86	7.90	7.95	7.84
Depth to groundwater (cm)	36	20	27	12	36	24	27	20	12	11	14	16	17	25	24	20
Groundwater pH	7.34	7.11	7.22	7.26	7.21	7.27	7.26	7.25	7.13	7.24	6.89	6.96	6.88	7.39	7.66	7.18
Groundwater conductivity (µS/cm)	671	802	778	701	650	612	604	582	806	588	698	602	715	600	459	582
Number of thalli	23	59	24	2	33	43	25	5	3	5	1	5	2	18	17	1
Mean vegetation height (cm)	4.0	6.5	6.0	3.5	3.0	3.0	2.5	2.4	1.8	2.4	1.6	3.2	2.5	3.0	3.2	1.83
Maximum vegetation height (cm)	5.8	7.0	7.0	7.0	7.0	12	5.5	4.0	7.0	4.5	3.5	6.0	3.5	12.0	5.5	3.5
Cover (Domin)																
Total	9	9	9	9	9	10	10	10	10	10	10	10	10	10	10	8
Rush	0	4	+	1	0	2	1	1	1	0	+	+	0	0	0	3
Grass	6	1	4	7	3	5	6	4	4	6	6	6	5	4	2	5
Sedge	1	5	2	5	2	+	2	1	4	1	0	5	5	6	7	7
Forb	5	8	6	4	6	5	3	4	5	4	5	4	2	4	4	5
Bryophyte	8	5	5	8	7	8	9	9	9	8	8	9	8	8	7	7
Algae	0	2	0	0	2	+	+	+	0	0	+	0	0	0	+	0
Litter	8	4	4	4	4	4	5	5	3	7	5	6	7	6	4	7
Bare soil	4	4	5	1	6	4	+	1	+	4	4	+	2	+	4	5
Dung	1	+	+	0	0	2	1	0	1	0	0	0	0	+	+	0
<i>Agrostis stolonifera</i>	1	2	2	4	2	5	1	1	0	4	1	4	2	3	+	2
<i>Amblystegium serpens</i> var. <i>salinum</i>	1	0	0	0	0	1	3	6	0	0	1	0	0	2	4	3
<i>Aneura pinguis</i>	0	0	1	6	0	4	0	0	1	3	1	2	3	1	4	4
<i>Barbula convoluta</i>	1	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Bellis perennis</i>	5	5	5	3	4	2	1	2	4	0	+	+	+	+	2	4
<i>Brachythecium mildeanum</i>	+	1	1	0	1	1	5	4	4	0	4	0	0	0	1	4
<i>Bryum pseudotriquetrum</i>	0	0	0	1	0	3	0	0	6	4	2	3	+	0	2	4
<i>Bryum</i> sp.	0	1	0	0	0	0	2	3	0	0	0	0	0	0	0	0
<i>Calliergonella cuspidata</i>	0	0	0	5	0	0	0	1	2	5	4	3	+	0	2	4
<i>Carex arenaria</i>	+	5	2	0	2	+	2	1	1	1	0	+	0	4	1	0
<i>Carex flacca</i>	0	0	0	5	0	0	0	0	4	0	0	5	5	5	7	7
<i>Cerastium fontanum</i>	1	0	1	0	2	+	+	+	0	0	0	0	+	0	0	0
<i>Didymodon fallax</i>	4	0	4	1	6	5	5	4	0	5	5	4	3	5	5	0
<i>Ditrichum gracile</i>	0	0	0	0	0	0	0	0	0	3	0	2	0	0	0	0

Truska Machair (continued)	Sub-population 1									Sub-population 2						Sub-population 3
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
<i>Festuca rubra</i>	6	1	4	7	1	1	6	4	4	6	6	6	5	3	2	5
<i>Homalothecium lutescens</i>	2	0	0	0	0	0	0	0	0	0	0	2	+	0	0	2
<i>Hypnum cupressiforme</i>	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0
<i>Juncus acutiflorus</i>	0	0	0	0	0	2	1	1	1	0	+	+	0	0	0	0
<i>Juncus articulatus</i>	0	4	+	1	0	0	0	0	4	0	0	0	0	0	0	3
<i>Leontodon autumnalis</i>	0	0	0	2	0	0	0	0	0	0	1	0	0	0	0	1
<i>Lophocolea bidentata</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0
<i>Lotus corniculatus</i>	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0
<i>Luzula multiflora</i>	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Moerckia flotoviana</i>	0	1	0	0	0	2	0	0	0	0	0	0	0	0	0	0
<i>Nostoc</i> sp.	0	2	0	0	2	+	+	+	0	0	+	0	0	0	+	0
<i>Plantago coronopus</i>	1	8	5	0	4	4	+	2	1	+	0	2	+	4	4	1
<i>Plantago lanceolata</i>	0	2	+	0	+	+	1	1	0	0	1	+	+	1	+	0
<i>Prunella vulgaris</i>	0	0	0	0	0	+	0	+	0	0	1	0	0	0	0	4
<i>Ranunculus bulbosus</i>	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0
<i>Ranunculus repens</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
<i>Rhytiadelphus squarrosus</i>	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0
<i>Riccardia multifida</i>	0	0	0	0	0	0	2	0	0	0	0	0	0	0	1	0
<i>Sagina procumbens</i>	1	4	2	0	1	2	+	+	+	0	2	1	0	0	1	0
<i>Thymus praecox</i>	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0
<i>Syntrichia ruralis</i> var. <i>ruraliformis</i>	+	0	0	0	1	0	1	0	2	0	0	2	+	1	0	0
<i>Trifolium repens</i>	4	2	1	2	1	1	2	+	1	3	3	+	1	1	+	4

Population No. 14c: Doon Hill/ W. of Aillebrack, Co. Galway, grid ref. L58_42_

Field notes from Neil Lockhart (10 November 1997):

Found several (*ca.* 30) plants on the side of old wheel ruts on damp calcareous sand, with open moss-dominated vegetation.

Field notes from Neil Lockhart (6 October 1998 [with Noel Kirby, Ger O'Donnell & Marie-Louise Heffernan]):

Still many (probably >100) plants on wheel ruts. Found two further populations on wheel ruts to the north-west, also on Aillebrack machair. Probably at least >100 plants in each.

Field notes from David Holyoak & Neil Lockhart (21-22 April 1999):

Extensive damage due to vehicles over large areas. This site is also under-grazed, mainly by cattle. Sheep-grazing could improve the habitat for *P. ralfsii*. Population 2 (L580428): 1-3 thalli; population 3 (L581429): 11 thalli; population 1 (L583425) not seen.

Field notes from David Holyoak (10 May 2004):

On partly bare, damp calcareous sand in small hollows in machair. Mainly occurs where machair surface disturbed, e.g. in old wheel ruts. Machair heavily grazed, mostly by sheep. Four colonies of 4, 6, 1 & 7 thalli respectively. Doubtless occurs elsewhere. Repeated disturbance of machair surface provides niches for *P. ralfsii*, but too much erosion or vehicle traffic may be deleterious. Reduction in present heavy grazing may be deleterious to it.

Field notes from Neil Lockhart (30 October 2006):

Habitat still in good condition. Found *P. ralfsii* at L58082/42944, alt. 11 m, in very compacted turf of wheel ruts. This corresponds to population 3 on the 1:50,000 map. Not very common, only 2 plants seen after quick search.

Associates:

Aneura pinguis

Carex panicea

Plantago coronopus

Bellis perennis

Cratoneuron filicinum

Plantago lanceolata

Bryum pseudotriquetrum

Leontodon saxatilis

Calliergonella cuspidata

Pellia endiviifolia

5.1.15 Murvey Machair SAC (002129)

Population No. 15: Murvey Machair, Co. Galway, grid ref. L661391

Field notes from Neil Lockhart (5 October 1998):

One population of *P. ralfsii* on flushed sloping bank of rocky outcrop found during a preliminary visit in June 1998. Estimated 20-30 plants. Revisited site on 5 October 1998 to record a relevé, but could only relocate one plant at this original site. Found a second population a few hundred metres to the north and recorded a relevé, but only 3-4 plants seen here. No threats at present. Site is currently grazed by sheep. Some erosion, but not a threat.

Field notes from David Holyoak (22 April 1999):

Three thalli at L661391, 35 thalli at L661392, the counts surprisingly low in view of the large extent of apparently suitable habitat. Site has considerable extent of good, closely sheep-grazed machair with damp hollows. Tufa is being deposited in flushes and on slopes. The moss *Hymenostylium recurvirostrum* forms large patches on some slopes. No threats apparently; intense sheep-grazing here probably favours *P. ralfsii*; wheel-rutting from vehicles.

Field notes from David Holyoak (9 May 2004):

One thallus at L6613/3912 and about 100 thalli at L6620/3911 in partly bare patches of very short (*ca.* 4 cm) moss-rich grassland on unshaded calcareous sand of machair slope. Extensive areas currently appear ideal for *P. ralfsii*, yet it is scarce and local. Whole area currently overgrazed by sheep.

Field notes from Neil Lockhart (1 November 2006):

Overall the machair is in excellent condition for *P. ralfsii*, tightly grazed by sheep and very wet flushes interspersed with granite outcrops and sandy/grassy slopes. Found a population of *P. ralfsii* at L66194/38891,

alt. 24 m, approximately where the October 1998 relevé was recorded. Six plants seen. Only one plant seen on the steep flushed slopes where the original June 1998 find occurred.

Associates:

<i>Agrostis stolonifera</i>	<i>Cephalozia bicuspidata</i>	<i>Lotus corniculatus</i>
<i>Amblyodon dealbatus</i>	<i>Cerastium fontanum</i>	<i>Luzula multiflora</i>
<i>Amblystegium serpens</i> var. <i>salinum</i>	<i>Cratoneuron filicinum</i>	<i>Moerckia flotoviana</i>
<i>Anagallis tenella</i>	<i>Didymodon ferrugineus</i>	<i>Pellia endiviifolia</i>
<i>Bellis perennis</i>	<i>Didymodon rigidulus</i>	<i>Plantago coronopus</i>
<i>Brachythecium mildeanum</i>	<i>Distichium inclinatum</i>	<i>Plantago lanceolata</i>
<i>Bryum pseudotriquetrum</i>	<i>Ditrichum gracile</i>	<i>Prunella vulgaris</i>
<i>Calliergonella cuspidata</i>	<i>Festuca rubra</i>	<i>Sagina procumbens</i>
<i>Campylium elodes</i>	<i>Galium verum</i>	<i>Thymus praecox</i>
<i>Carex flacca</i>	<i>Leontodon autumnalis</i>	

5.1.16 Black Head-Poulsallagh Complex SAC (000020)

Population No. 16: Fanore, Co. Clare, grid ref. M138086

Field notes from Neil Lockhart (24 February 1998):

Twelve plants near a limestone boulder. *ca.* 9 rosettes amongst tight turf near a limestone boulder; another colony of just 3 plants about 2 m away. Plants occur in a low-lying eroded plain, amongst a damp mossy turf strewn with large limestone boulders. Rare moss *Pleurochaete squarrosa* occurs here. Tight turf currently maintained by rabbit-grazing - no perceived threats at present, except nearby amenity use in caravan park.

Field notes from Neil Lockhart (31 October 2006):

Small population found at M13824 08799, 4 m alt, about 8 m east of original population (where it appears to have gone). Habitat very much the same as in 1998 - tight turf over limestone strewn with boulders. Counted 10 plants in a grassy turf (not the open moss turf) on the slightly sloping sides of the lowest part of a kind of track from the dunes to the sea. Plants are very scarce here and hard to find. Habitat appears to be in good condition.

Associates:

<i>Aneura pinguis</i>	<i>Didymodon vinealis</i>	<i>Plantago coronopus</i>
<i>Bellis perennis</i>	<i>Ditrichum gracile</i>	<i>Plantago lanceolata</i>
<i>Brachythecium mildeanum</i>	<i>Festuca rubra</i>	<i>Pleurochaete squarrosa</i>
<i>Bryum</i> sp.	<i>Hypnum cupressiforme</i>	<i>Syntrichia ruraliformis</i>
<i>Carex flacca</i>	<i>Leontodon autumnalis</i>	<i>Thymus praecox</i>
<i>Cerastium fontanum</i>	<i>Lotus corniculatus</i>	<i>Trichostomum crispulum</i>

Field notes from Christina Campbell (17 April 2009):

In April 2009 a population *circa* 25 m long and 1-1.5 m wide was found along a trampled path in a damp flat depression strewn with large limestone boulders between sand dunes. Three plots (25 x 50 cm) were recorded along the path on tight turf on sandy loam *circa* 7-9 cm overlying sand *ca.* 16 cm deep overlying limestone. Rabbit-grazing was evident and droppings were observed.

Fanore	Plot 1	Plot 2	Plot 3
Distance from sea (m)	168	157	144
Altitude (metres above sea level)	3	3	3
Slope (degrees)	0	5	0
Aspect	-	East	-
Soil depth (cm)	7	7	9
Soil pH	8.1	8.15	8.12
Soil conductivity (μ S/cm)	105	104.5	102
Depth to bedrock (cm)	23	26	23
Number of <i>P. ralfsii</i> thalli	1	5	3
Mean vegetation height (cm)	1.72	2.14	1.77
Maximum vegetation height (cm)	3	3.5	3
Cover (Domin)			
Total	9	10	10
Grass	6	5	8
Sedge	4	6	6
Forb	5	6	6
Bryophyte	4	8	8

Fanore (continued)	Plot 1	Plot 2	Plot 3
Algae	+	0	0
Litter	5	5	6
Bare soil	4	4	4
Dung	0	2	0
<i>Agrostis stolonifera</i>	2	0	0
<i>Aneura pinguis</i>	2	0	0
<i>Barbula convoluta</i>	2	3	2
<i>Bellis perennis</i>	3	1	0
<i>Brachythecium mildeanum</i>	1	3	4
<i>Bryum algovicum</i>	1	0	4
<i>Bryum pseudotriquetrum</i>	3	4	2
<i>Bryum</i> sp.	0	2	0
<i>Carex flacca</i>	4	6	6
<i>Ctenidium molluscum</i>	0	4	0
<i>Didymodon fallax</i>	0	0	3
<i>Distichium inclinatum</i>	2	4	4
<i>Festuca rubra</i>	6	5	8
<i>Leontodon autumnalis</i>	2	4	2
<i>Lophocolea bidentata</i>	0	0	2
<i>Lotus corniculatus</i>	2	2	0
<i>Orthotrichum diaphanum</i>	0	1	0
<i>Plantago coronopus</i>	2	0	1
<i>Plantago lanceolata</i>	2	4	4
<i>Pleurochaete squarrosa</i>	0	2	0
<i>Ranunculus repens</i>	1	0	2
<i>Thymus praecox</i>	+	4	4
<i>Trifolium repens</i>	2	0	0

5.1.17 Tralee Bay and Magharees Peninsula, West to Cloghane SAC (002070)

This SAC contains three populations:

Population No. 17a: SW of Lough Naparka, Co. Kerry, grid ref. Q616168

Field notes from Neil Lockhart (30 January 1998):

Five rosettes at this location. Plants occur on sloping side of low (*ca.* 50 cm) sandy ridge, above *Salix repens* zone, *ca.* 1 m from open water, *ca.* 35 cm above current water table, in a tightly grazed mossy turf with an open sunny aspect. Several of the larger wet slacks east of the road are heavily used as winterage for cattle. Overstocking has made many of these potential sites unsuitable for *P. ralfsii*. Reduction in stock numbers recommended.

Field notes from Nick Hodgetts (20 May 2003):

Small heavily poached slack surrounded by dunes, with limited bryological interest. *P. ralfsii* not refound. Some possibly suitable habitat remaining, but becoming encroached upon by vascular plant vegetation.

Field notes from Neil Lockhart (21 November 2006):

Re-visit to search for NL's 1998 record of *P. ralfsii*. Almost no open water in the slack, despite recent heavy rains – so the area where *P. ralfsii* occurred is too dry and no longer suitable. The lower areas of the slack are too enriched, with *Calliergonella cuspidata*, so don't look suitable either.

Associates:

<i>Amblystegium serpens</i> var. <i>salinum</i>	<i>Homalothecium lutescens</i>	<i>Prunella vulgaris</i>
<i>Bellis perennis</i>	<i>Lotus corniculatus</i>	<i>Prunella vulgaris</i>
<i>Brachythecium rutabulum</i>	<i>Luzula campestris</i>	<i>Pseudoscleropodium purum</i>
<i>Bryoerythrophyllum recurvirostrum</i>	<i>Nostoc</i> sp.	<i>Ranunculus bulbosus</i>
<i>Bryum pseudotriquetrum</i>	<i>Pilosella officinarum</i>	<i>Senecio jacobaea</i>
<i>Calliergonella cuspidata</i>	<i>Plagiomnium affine</i>	<i>Trifolium repens</i>
<i>Carex flacca</i>	<i>Plantago lanceolata</i>	
<i>Festuca rubra</i>	<i>Poa pratensis</i>	

Population No. 17b: Magherabeg, Co. Kerry, grid ref. Q612158

Field notes from Neil Lockhart (28 January 1998):

P. ralfsii appears to be confined to the north-eastern margin of the largest flat depression, at the base of the highest dune ridge. *Scorpidium revolvens* and *Campylium* spp. in the wettest parts here indicate calcareous ground water. Sparsely present (3-4 rosettes) on each of four sandy hillocks examined. Probably also occurs on the many other low hillocks extending south-east from here along the shoreline of the winter-flooded trench. Scattered rosettes occur on low (ca. 1 m) compacted sandy hillocks around the NE edge of flat, flooded depression. Plants occur halfway up amongst low, tightly grazed turf. Principal threat is from agricultural eutrophication. Cattle are overwintered on the commonage, and the flooded depressions further south appeared more enriched and less suitable for calcareous bryophytes.

Field notes from Nick Hodgetts (20 May 2003):

36 thalli seen in roughly the same place as in 1998, on small hummocks in large dune slack with sand/humus soil, scattered over ca. 50 m length. Also several small groups of thalli along a ca. 20 m length at the base of dunes at the northern end of the slack. There is a discontinuous strip of bare ground with scattered *P. ralfsii* above the slack but below the dry dunes, just above the *Salix repens* zone.

Field notes from Neil Lockhart (21 November 2006):

Not refound in 2006, when site was very dry.

Associates:

<i>Amblystegium serpens</i> var. <i>salinum</i>	<i>Didymodon fallax</i>	<i>Plantago lanceolata</i>
<i>Aneura pinguis</i>	<i>Eucladium verticillatum</i>	<i>Polygala vulgaris</i>
<i>Barbula convoluta</i>	<i>Euphrasia</i> sp.	<i>Prunella vulgaris</i>
<i>Bellis perennis</i>	<i>Festuca rubra</i>	<i>Pseudoscleropodium purum</i>
<i>Brachythecium glareosum</i>	<i>Fissidens taxifolius</i>	<i>Ranunculus bulbosus</i>
<i>Bryoerythrophyllum recurvirostrum</i>	<i>Galium verum</i>	<i>Riccardia multifida</i>
<i>Bryum pallens</i>	<i>Hieracium</i> sp.	<i>Sagina procumbens</i>
<i>Campylium stellatum</i>	<i>Homalothecium lutescens</i>	<i>Salix repens</i>
<i>Carex arenaria</i>	<i>Hypnum lacunosum</i>	<i>Scorpidium revolvens</i>
<i>Carex flacca</i>	<i>Leontodon autumnalis</i>	<i>Thymus praecox</i>
<i>Cephalozia</i> sp.	<i>Lophocolea bidentata</i>	<i>Tortella flavovirens</i>
<i>Cratoneuron filicinum</i>	<i>Lotus corniculatus</i>	<i>Trichostomum brachydontium</i>

Field notes from Christina Campbell, Neil Lockhart & Noeleen Smyth (2 & 4 March 2009):

Colonies occurred on disturbed hillocks and eroded sand mounds in a dune slack with a dune ridge to the north-east. There was open standing water in some parts of the site. Five plots (25 x 50 cm) were recorded on such hummocks with *Salix repens*. Plot 4 contained many fen species. The site is grazed by cattle and a winter-feeder was seen nearby. The ground between the hummocks was severely torn-up with vehicle tracks from possibly quad-bike scrambling which were extensive at the site when visited in March 2009. *Hippophae rhamnoides* was also prevalent in parts of the nearby dune. Encroachment of this invasive shrub is a possible threat, as is the expansion of a neighbouring golf course.

Magherabeg	Plot 1	Plot 2	Plot 3	Plot 4	Plot 5
Distance from sea (m)	297	287	351	347	288
Altitude (metres above sea level)	3.29	2.18	5.89	2.8	2.12
Slope (degrees)	10	15	5	10	5
Aspect	East	East	West	West	South
Soil depth (cm)	1.5	3	20	2	3
Soil pH	7.74	7.82	7.88	7.79	7.83
Depth to groundwater (cm)	30	32	20	24	18.5
Groundwater pH	7.22	6.97	7.12	7.22	7.27
Groundwater conductivity (μ S/cm)	650	846	678	593	596
Number of thalli	8	1	2	1	2
Mean vegetation height (cm)	2.0	4.2	2.8	2.3	2.1
Maximum vegetation height (cm)	4	12	4	4	5
Cover (Domin)					
Total	9	9	9	9	9
Shrub	2	4	1	1	0
Rush	0	+	0	0	0
Grass	5	6	8	8	8

Magherabeg (continued)	Plot 1	Plot 2	Plot 3	Plot 4	Plot 5
Sedge	5	4	4	1	2
Forb	5	5	4	5	5
Bryophyte	8	6	6	5	7
Algae	0	0	0	2	+
Litter	5	5	5	7	5
Bare soil	4	4	4	4	4
Dung	0	3	+	1	3
<i>Agrostis stolonifera</i>	1	0	+	2	2
<i>Amblystegium serpens</i> var. <i>salinum</i>	2	2	0	3	0
<i>Barbula convoluta</i>	+	4	2	0	1
<i>Bellis perennis</i>	2	2	3	4	4
<i>Brachythecium mildeanum</i>	1	2	1	1	4
<i>Bryum pseudotriquetrum</i>	0	0	0	1	0
<i>Bryum</i> sp.	4	1	0	0	0
<i>Calliergonella cuspidata</i>	0	0	1	0	0
<i>Carex arenaria</i>	0	0	0	0	1
<i>Carex flacca</i>	4	4	4	2	2
<i>Cerastium fontanum</i>	0	3	0	+	2
<i>Didymodon fallax</i>	2	1	2	0	0
<i>Festuca rubra</i>	5	5	8	7	7
<i>Fissidens adianthoides</i>	0	0	0	2	0
<i>Galium aparine</i>	0	0	+	0	0
<i>Juncus articulatus</i>	0	+	0	0	0
<i>Leiocolea turbinata</i>	5	0	0	0	0
<i>Leontodon autumnalis</i>	4	1	+	0	2
<i>Lophocolea bidentata</i>	1	1	2	1	1
<i>Lotus corniculatus</i>	0	3	2	0	2
<i>Luzula multiflora</i>	2	3	+	5	4
<i>Nostoc</i> sp.	0	0	0	2	+
<i>Plantago coronopus</i>	0	0	1	0	0
<i>Plantago lanceolata</i>	2	0	+	4	1
<i>Prunella vulgaris</i>	4	1	+	4	+
<i>Pseudoscleropodium purum</i>	5	4	2	5	2
<i>Ranunculus repens</i>	0	0	+	1	+
<i>Sagina nodosa</i>	+	0	0	0	3
<i>Salix repens</i>	0	4	1	1	0
<i>Senecio jacobaea</i>	0	0	+	2	0
<i>Thuidium tamariscinum</i>	0	0	+	0	0
<i>Thymus praecox</i>	3	3	0	4	2
<i>Syntrichia ruralis</i> var. <i>ruraliformis</i>	0	0	0	0	2
<i>Trifolium repens</i>	0	1	0	+	2

Population 17c: Kilshannig, Co. Kerry, grid ref. Q620172

Field notes from Nick Hodgetts (21 May 2003):

Three thalli found at edge of slack in sand/humus soil, just above cattle track and zone of creeping willow.

Associates:

Aneura pinguis

Bellis perennis

Bryum pseudotriquetrum

Carex flacca

Cratoneuron filicinum

Festuca rubra

Hieracium sp.

Hypnum lacunosum

Lotus corniculatus

Moerckia flotoviana

Prunella vulgaris

Trifolium spp.

5.1.18 Castlemaine Harbour SAC (000343)

This SAC contains two populations:

Population No. 18a: Inch Spit, Co. Kerry, grid ref. V67_97_

P. ralfsii was recorded as 'common' at the south tip of the spit in 1983 by N. Lockhart, but no further information was available.

Field notes from Christina Campbell, Neil Lockhart & Noeleen Smyth (4 March 2009 & 5 May 2010):

P. ralfsii was found in three slacks in March 2009. The extent of occupancy was mapped at the first two (nearest to the tip of the spit), but only one thallus was found in the third slack at 2009 and subsequent searches in 2010 & 2011 were unsuccessful. Three plots (25 x 50 cm) were recorded in the first slack and one plot (25 x 50 cm) was recorded in the second. Open surface water pools were present in lower parts of the slacks. The site is grazed by cattle and sheep. There is an on-going proposal to build a golf-course on the spit which could potentially impinge directly upon the populations at Inch or indirectly through change in the hydrology of the site. There was evidence of quad-biking on some dunes, although not in the slacks surveyed.

Inch	Plot 1	Plot 2	Plot 3	Plot 4
Year	2009	2009	2009	2010
Distance from sea (m)	446	444	410	437
Altitude (metres above sea level)	0.19	0.69	0.30	0.20
Slope (degrees)	0	0	0	0
Aspect	-	-	-	-
Soil depth (cm)	12	0	3	44
Soil pH	7.67	7.84	7.42	8.13
Depth to groundwater (cm)	19	20	19	56.5
Groundwater pH	7.04	7.29	6.81	7.17
Groundwater conductivity ($\mu\text{S}/\text{cm}$)	529	418	635	707
Number of <i>P. ralfsii</i> thalli	8	8	7	9
Mean vegetation height (cm)	6.0	4.4	3.3	2.2
Maximum vegetation height (cm)	8	5	7	7.5
Cover (Domin)				
Total	10	7	9	9
Shrub	4	4	1	4
Grass	5	4	6	4
Sedge	3	3	4	4
Forb	5	1	4	4
Bryophyte	8	4	8	9
Algae	+	1	1	0
Litter	4	4	4	5
Bare soil	3	8	4	3
Dung	0	0	0	1
<i>Agrostis stolonifera</i>	5	2	5	0
<i>Aneura pinguis</i>	2	1	2	0
<i>Bellis perennis</i>	0	0	0	1
<i>Brachythecium mildeanum</i>	0	1	1	0
<i>Bryum pseudotriquetrum</i>	0	1	0	7
<i>Bryum</i> sp.	5	1	2	6
<i>Calliergonella cuspidata</i>	0	0	4	0
<i>Carex arenaria</i>	1	0	0	0
<i>Carex flacca</i>	2	3	4	4
<i>Carex nigra</i>	0	0	2	1
<i>Didymodon fallax</i>	4	2	4	7
<i>Festuca rubra</i>	3	4	1	4
<i>Leontodon autumnalis</i>	4	0	4	4
<i>Lotus corniculatus</i>	0	0	2	0
<i>Nostoc</i> sp.	+	1	1	0
<i>Plantago lanceolata</i>	0	0	0	2
<i>Pohlia wahlenbergii</i>	6	4	4	0
<i>Prunella vulgaris</i>	5	0	2	3
<i>Rhytidiadelphus triquetrus</i>	1	0	0	0
<i>Sagina procumbens</i>	0	+	2	0
<i>Salix repens</i>	0	0	0	4
<i>Syntrichia ruralis</i> var. <i>ruraliformis</i>	0	0	0	4

Population No. 18b: Rossbehy, grid ref. V64759163

Field notes from Neil Lockhart (29 July 1998):

Little suitable habitat, as the spit is relatively narrow and mostly comprises *Ammophila* dunes. Some flooded depressions do occur on the eastern side, about $\frac{2}{3}$ the way up the spit. Some suitable low sandy knolls were found but are possibly not calcareous enough - no calcicole indicators were seen. The pools themselves had *Calliergonella cuspidata* and *Homalothecium lutescens*.

Field notes from David Holyoak (22 May 2006):

20 small thalli of *P. ralfsii* were seen on damp, partly bare, compressed humic sand of dune slack/track edge; ca. 5 m alt. at the grid reference given above.

Field notes from Neil Lockhart (12 October 2012):

Still at 64760 91614 alt. 3 m, 3 thalli. Another 4 at 64753 91612 (in a 1 m²). Area of suitable niche is 40 m x 1 m.

5.1.19 Ballinskelligs Bay and Inny Estuary SAC (000335)

Population 19: West of Inny Ferry, Co. Kerry, grid ref. V474682

Field notes from Neil Lockhart (25 January 1998):

This is very likely Scully's 1890 station for *P. ralfsii*, "about 1 mile west of the ferry on the north side". Two populations were found on a sandy bank/ridge bordering the south-east side of the eastern reedbed. These appear to be the only plants on the western side of the Inny, as the sand flats further to the west are semi-improved and heavily used by cattle and did not appear suitable. One population consisted of a single rosette, the other of ca. 30-50 rosettes over an area of ca. 1 x 2 m. Plants growing in tightly-grazed turf, firm but moist sandy soil, on sandy ridge (ca. 1 m tall), half way up, surrounding flooded depression. This site is heavily grazed and poached by cattle and is most threatened by agricultural improvement/reclamation. The sand ridge is being eroded and is vulnerable to re-grading should the reedbed behind be drained.

Field notes from Neil Lockhart (1 March 2007):

Re-visit by NL to search for 1998 record of *P. ralfsii*. Not found after about 1 hour search. The habitat appears to be much the same as described in 1998, still grazed by cattle and much poached - vegetation quite rank and there's not much suitable compact mossy turf available. The plant was scarce even in 1998, so it may well still be present but not seen on this visit. The threat of agricultural intensification or reclamation remains. In the localities where seen before there appear to be some blow outs or scrapes of bare sand, which in time might be worth looking at.

Associates:

<i>Agrostis stolonifera</i>	<i>Cerastium fontanum</i>	<i>Plantago lanceolata</i>
<i>Aneura pinguis</i>	<i>Festuca rubra</i>	<i>Prunella vulgaris</i>
<i>Bellis perennis</i>	<i>Leontodon</i> cf. <i>autumnalis</i>	<i>Pseudoscleropodium purum</i>
<i>Brachythecium albicans</i>	<i>Lophocolea bidentata</i>	<i>Rhytidadelphus squarrosus</i>
<i>Brachythecium rutabulum</i>	<i>Lotus corniculatus</i>	<i>Riccardia multifida</i>
<i>Bryum pseudotriquetrum</i>	<i>Luzula campestris</i>	<i>Sagina procumbens</i>
<i>Carex arenaria</i>	<i>Pedicularis</i> cf. <i>palustris</i>	<i>Trifolium repens</i>
<i>Carex flacca</i>	<i>Plagiomnium undulatum</i>	

Field notes from Christina Campbell & Noleen Smyth (June 2009, May 2010, November 2010 and February 2011):

This location was visited in June 2009, May 2010, November 2010 and February 2011 but no thalli were recorded in this, or any surrounding area, despite extensive searches. The site appeared to be under-grazed, although some evidence of cattle-grazing was present. The sward appeared even less open in February 2011 than it did in June 2009.

5.1.20 North Dublin Bay SAC (000206)

Population No. 20: North Bull, Co. Dublin, grid ref. O247378 etc.

Field notes from Neil Lockhart (16 June 1999):

More than 100 thalli along the track for *ca.* 80 m. The only known east coast locality in Ireland. Probably the same site as recorded by Pitkin and Synnott in 1975.

Field notes from David Holyoak (17 November 2004):

Five thalli on trampled path through damp hollow in dunes.

Associates:

<i>Aneura pinguis</i>	<i>Didymodon tophaceus</i>	<i>Plantago lanceolata</i>
<i>Anthoxanthum odoratum</i>	<i>Festuca rubra</i>	<i>Poa annua</i>
<i>Barbula cf. convoluta</i>	<i>Glaux maritima</i>	<i>Polygala serpyllifolia</i>
<i>Brachythecium sp.</i>	<i>Holcus lanatus</i>	<i>Prunella vulgaris</i>
<i>Carex flacca</i>	<i>Juncus articulatus</i>	<i>Ranunculus bulbosus</i>
<i>Cirsium palustre</i>	<i>Leontodon autumnalis</i>	<i>Trifolium pratense</i>
<i>Cratoneuron filicinum</i>	<i>Plantago coronopus</i>	<i>Trifolium repens</i>

Field notes from Christina Campbell, Neil Lockhart & Noeleen Smyth (11 & 13 February 2009):

The population occurs on a track *circa* 1 m wide (to 2 m in places) along the seaward side of the Alder Marsh, a dune slack on the north end of the island, in the fixed dune. The population here is maintained by trampling and rabbit-grazing which keep the soil compact and the vegetation low. Five plots were recorded here at various points along the track. Open standing water was observed at the site in March 2009.

North Bull	Plot 1	Plot 2	Plot 3	Plot 4	Plot 5
Distance from sea (m)	119	117	153	167	169
Altitude (metres above sea level)	3	3	3.5	5	5
Slope (degrees)	0	0	0	0	0
Aspect	-	-	-	-	-
Soil depth (cm)	9	9	11	9	9
Soil pH	7.54	7.49	7.70	7.86	7.65
Depth to groundwater (cm)	19	18	19	15.5	15.5
Groundwater pH	7.14	7.18	6.91	7.04	6.98
Groundwater conductivity (μ S/cm)	718	606	976	715	944
Number of thalli	1	2	3	2	1
Mean vegetation height (cm)	5	5	3	5	3
Maximum vegetation height (cm)	6	7.5	4	6	4
Cover (Domin)					
Total	9	9	9	9	9
Grass	4	6	4	5	5
Sedge	8	5	6	8	8
Forb	4	4	2	3	3
Bryophyte	7	7	1	6	4
Litter	5	5	5	5	5
Bare soil	6	4	6	4	5
<i>Agrostis stolonifera</i>	4	1	1	4	4
<i>Amblystegium serpens</i> var. <i>salinum</i>	1	1	0	5	5
<i>Aneura pinguis</i>	5	4	1	4	4
<i>Anthoxanthum odoratum</i>	3	1	1	1	1
<i>Brachythecium mildeanum</i>	0	1	0	0	0
<i>Carex arenaria</i>	1	0	0	0	0
<i>Carex flacca</i>	8	5	7	8	8
<i>Ctenidium molluscum</i>	2	4	0	5	5
<i>Equisetum variegatum</i>	0	0	0	+	0
<i>Festuca rubra</i>	4	5	3	5	4
<i>Leontodon autumnalis</i>	2	2	0	1	1
<i>Prunella vulgaris</i>	2	2	1	4	1
<i>Ranunculus repens</i>	0	0	0	+	0
<i>Trifolium repens</i>	1	1	0	2	2

5.1.21 Barley Cove to Ballyrisode Point SAC (001040)

Population No. 21: Barley Cove, Co. Cork, grid ref. 77060 25950 etc.

Field notes from Neil Lockhart (13 October 2012):

Two *P. ralfsii* thalli at 77060 25950 alt. 4 m in compact tightly grazed (sheep) turf on ridge of trackway - area of suitable niche 75 m x 1 m all along track. 3 thalli at 76991 25984, alt. 4 m. Also in and around a dune slack at 76903 25832, alt. 6 m – about 8 thalli/m² – area of suitable niche ca. 1 m wide in a zone around parts of slack ca. 40 m. Also at 76905 25834.

Associates:

Bellis perennis

Carex flacca

Didymodon sp.

Nostoc sp.

Plantago coronopus

5.2 Extinct populations of *P. ralfsii* in the Republic of Ireland

P. ralfsii has also been recorded from the following localities in the past, but has now apparently disappeared from them (NPWS files):

Near Derry, Lough Arrow, Co. Sligo, grid ref. G7__1__

P. ralfsii was recorded here in 1970 by Jean Paton, from an old quarry near Lough Arrow. This is the only non-coastal site from which this species has been recorded in Ireland.

Field notes from Neil Lockhart (11 March 1998):

Visited an old gravel pit/quarry in Ballindoon Townland, almost certainly the site of Jean Paton's 1970 record. The quarry has become a bit overgrown and is now disused, whereas the GSI aerial photograph (1977) shows it as more open. It is now heavily poached by cattle, and although several typical associates of *P. ralfsii* were seen (*Aneura pinguis*, *Riccardia multifida*, etc.), no *P. ralfsii* was found. The plant is unlikely to still occur here and its prospects for survival here must be considered slim as the area becomes more vegetated.

Malahide Estuary SAC (= Malahide), Co. Dublin, grid ref. O2__4__

P. ralfsii was recorded from this site between 1861 and 1904, but has not been seen since. A brief visit by Nick Hodgetts in 2006 revealed no potential habitat for the plant. Habitat has either been destroyed by coastal developments, or else it has been subsumed by golf courses, where the slacks are too dry.

Clare Island, Co. Mayo, grid ref. L6__8__

P. ralfsii was recorded on Clare Island in 1920 by H.W. Lett, but has not been seen since. A survey by David Holyoak in 2003 failed to re-find it.

Akeragh, Banna & Barrow Harbour SAC, Co. Kerry, grid ref. Q7__2__

P. ralfsii was recorded here in 1954 by A.P. Fanning, but recent visits have failed to re-find it.

Field notes from Neil Lockhart (27 January 1998):

Several likely-looking areas were found and examined in detail but the absence of *P. ralfsii* is mostly probably attributable to eutrophication of groundwater from intensive agricultural activity. Several of the slack areas were used as 'stock yards' for cattle, with ring feeders and silage brought in during winter. Nearly all of the dunes are heavily used by cattle, and some horses, and the entire area of low-lying land to the east is intensively farmed for cattle. The smell of slurry spreading was evident. Several slacks or wet depressions occur, but these support mostly coarse bryophytes, or have been destroyed by cattle. It is probably significant that no truly calcicole bryophytes were seen at all.

5.3 Population estimation

There are a number of problems in estimating bryophyte populations, notably the difficulty in deciding what constitutes ‘an individual’. In the case of *P. ralfsii*, a single thallus could be taken to be an individual, although this takes no account of the fact that thalli might be connected by underground structures, or that some populations might consist of clonal swarms (Hallingbäck *et al.*, 1996).

For the 2001-2006 reporting period for Article 17 of the EU Habitats Directive, the measure of population estimation for *P. ralfsii* was ‘number of localities’ (Evans & Arvela, 2011). A locality is defined as a discrete location where a *P. ralfsii* population has been recorded. At that time there were 29 known localities, in 20 SACs, in the Republic of Ireland. Since then, an additional locality, also in an SAC, has been reported, so there are now 30 localities, in 21 SACs. For the 2007-2012 reporting period, and to facilitate comparison between EU Member States, the recommended unit for estimating population of *P. ralfsii* is now the ‘area covered by the population in m²’ (Evans & Arvela, 2011). To measure this, Campbell (2013) delimited the extent of occupancy of 13 of the largest and most representative populations by recording the GPS positions at the extent to where *P. ralfsii* occurred at these localities. As not all niches within the extents of occupancy were suitable for *P. ralfsii*; some being too wet, too dry or too overgrown with coarse vegetation. Therefore the area covered by the population (m²) was estimated from field observation by reducing the area of extent of occupancy to the percentage of suitable niche. The area covered by *P. ralfsii* in the 17 remaining populations, all of which were small in extent, was calculated from estimates made in the field from NPWS surveys. The area covered by the population (m²) per population was summed to give a national population estimate of 399,604.3 m² i.e. ca. 399,600 m².

Campbell (2013) also quantified the number of individuals at each of the 13 studied populations by counting numbers of thalli in sample 1 x 1 m plots, with repeat counts in a selection of plots over the years 2009, 2010 and 2011. The mean number of thalli per m² per year was calculated for each of the 13 populations. The area covered by the population (m²) was multiplied by the mean number of thalli/m² of the lowest year to derive a minimum population estimate, and by the mean number of thalli/m² of the highest year to derive a maximum population estimate for each of the 13 populations. Minimum and maximum thalli counts for the 17 remaining populations were calculated from estimates made in the field from NPWS surveys.

The minimum counts per year were summed to determine a minimum national population estimate of 3,609,457 i.e. ca. 3,609,450 thalli and a maximum national population estimate of 15,097,303 i.e. ca. 15,097,300 thalli.

Location and population estimates (in terms of number of thalli and area covered by population (m²)) for *Petalophyllum ralfsii* at its 30 localities in the Republic of Ireland for the 2007 Conservation Assessment (Hodgetts, 2007) and for the 2013 Conservation Assessment, are listed in Table 2.

Table 2. Locations and population estimates in terms of number of thalli and area covered by the population for *Petalophyllum ralfsii* populations (localities) in the Republic of Ireland.

Population (SAC)	County	Grid reference	First seen	Last seen	Population size (no. of thalli) for 2007 Assessment	Population size (no. of thalli) for 2013 Assessment	Population size (area covered by the population) for 2013 Assessment
1. Rosses Strand (Tranarossan and Melmore Lough)	Donegal	C119428	Holyoak 2002	Campbell <i>et al.</i> 2011	15 (2002) - Holyoak; 2 (2006) - Lockhart	34 in 1m ² x 2 (2009) - Campbell <i>et al.</i> ; 36 in 1m ² x 2 (2010) - Campbell <i>et al.</i> ; 11 in 1m ² x 2 (2011) - Campbell <i>et al.</i>	20 m ²
						Min. = 5.5 thalli/m² x 20 = 110 thalli; Max. = 18 thalli/m² x 20 = 360 thalli	
2. Rosepenna (Sheephaven)	Donegal	C121372	Holyoak 1999	Campbell <i>et al.</i> 2011	26 (1999) - Holyoak	1 in 1m ² (2009) - Campbell <i>et al.</i> ; 0 in 1m ² (2010) - Campbell <i>et al.</i> ; 0 in 1m ² (2011) - Campbell <i>et al.</i>	1,123 m ²
						Min. = 0 thalli/m² x 1123 = 0 thalli; Max. = 1 thallius/m² x 1123 = 1123 thalli	
3. Tramore (Horn Head & Rinclevan)	Donegal	B982360	Holyoak 2002	Holyoak 2002	3 (2002) - Holyoak	3 (2002) - Holyoak	0.06 m ²
4a. Damp Beg (Gweedore Bay & Islands)	Donegal	B802295	Holyoak 1999	Lockhart 2006	24 (1999) - Holyoak; 7 (2002) - Holyoak; 0 (2006) - Lockhart	24 (1999) - Holyoak; 7 (2002) - Holyoak; 0 (2006) - Lockhart	0.5 m ²
4b. Derrybeg (Gweedore Bay & Islands)	Donegal	B799262	Holyoak 2002	Lockhart 2006	3 (2002) - Holyoak; 12 (2006) - Lockhart	3 (2002) - Holyoak; 12 (2006) - Lockhart	0.5 m ²
4c. Keadew Point (Gweedore Bay & Islands)	Donegal	B733182	Crundwell 1962	Campbell <i>et al.</i> 2011	20 (1998) - Lockhart; 16 (2002) - Holyoak; 3 (2006) - Lockhart	11 in 1m ² x 2 (2009) - Campbell <i>et al.</i> ; 4 in 1m ² x 2 (2010) - Campbell <i>et al.</i> ; 10 in 1m ² x 2 (2011) - Campbell <i>et al.</i>	21 m ²
						Min. = 2 thalli/m² x 21 = 42 thalli; Max. = 5.5 thalli/m² x 21 = 115 thalli	
5a. Dooley Point (West of Ardara/Maas Road)	Donegal	B757021	Holyoak 1999	Holyoak 2002	4 (1999) - Holyoak; 3 (2002) - Holyoak	4 (1999) - Holyoak; 3 (2002) - Holyoak	0.5 m ²
5b. Sheskinmore (West of Ardara/Maas Road)	Donegal	G690953	Lockhart 1998	Lockhart 2006	50 (1998) - Lockhart; 1 (2006) - Lockhart	22 in 1m ² x 2 (2009) - Campbell <i>et al.</i> ; 4 in 1m ² x 2 (2010) - Campbell <i>et al.</i> ; 19 in 1m ² x 2 (2011) - Campbell <i>et al.</i>	14 m ²
						Min. = 2 thalli/m² x 14 = 28 thalli; Max. = 11 thalli/m² x 14 = 154 thalli	
6. Bunduff (Bunduff Lough & Machair/ Trawalua/ Mullaghmore)	Sligo	G707563	Lockhart & Wyse Jackson 1998	Campbell <i>et al.</i> 2011	22 (1998) - Lockhart & Wyse Jackson; 76 (1999) - Holyoak; 2 (2003) - Hodgetts	11 in 1m ² x 3 (2009) - Campbell; 4 in 1m ² x 3 (2010) - Campbell <i>et al.</i> ; 27 in 1m ² x 3 (2011) - Campbell <i>et al.</i>	44 m ²
						Min. = 1.33 thalli/m² x 45 = 60 thalli; Max. = 9 thalli/m² x 45 = 405 thalli	

Population (SAC)	County	Grid reference	First seen	Last seen	Population size (no. of thalli) for 2007 Assessment	Population size (no. of thalli) for 2013 Assessment	Population size (area covered by the population) for 2013 Assessment
7. Garter Hill (Glenamoy Bog Complex)	Mayo	F807407	Lockhart 1998	Campbell <i>et al.</i> 2011	> 1000 (1998) - Lockhart; 1,600,000 (1999) - Holyoak; 1000s (2003) - Holyoak; > 10 (2006) - Lockhart	68 in 1m ² x 5 (2009) - Campbell <i>et al.</i> ; 283 in 1m ² x 6 (2010) - Campbell <i>et al.</i> ; 53 in 1m ² x 5 (2011) - Campbell <i>et al.</i> Min. = 9.9 thalli/m² x 148123 = 1466418 thalli Max. = 53.1 thalli/m² x 148123 = 7865331 thalli	148,123 m ²
8a. Doolough (Mullet/Blacksod Bay Complex)	Mayo	F736223	Lockhart 1998	Lockhart 2006	20 (1998) - Lockhart; 77 (1999) - Holyoak; 3 (2006) - Lockhart	20 (1998) - Lockhart; 77 (1999) - Holyoak; 3 (2006) - Lockhart	0.5 m ²
8b. Dooyork (Mullet/Blacksod Bay Complex)	Mayo	F737202	Lockhart 1998	Lockhart 1998	6 (1998) - Lockhart; 0 (1999) - Holyoak	6 (1998) - Lockhart; 0 (1999) - Holyoak	4 m ²
9. North Inishkea (Inishkea Islands)	Mayo	F567233	Lockhart 1998	Lockhart 1998	7 (1998) - Lockhart	7 (1998) - Lockhart	0.25 m ²
10. Doogort Machair (Doogort Machair/Lough Doo)	Mayo	F702095	Lett 1903	Campbell <i>et al.</i> 2010	4 (1998) - Lockhart; 0 (2003) - Holyoak; 0 (2006) - Lockhart	43 in 25 x 50 cm (2010) – Campbell & Lockhart = 258 thalli in 0.75 m ²	0.75 m ²
11. Keel Machair (Keel Machair/Menaun Cliffs)	Mayo	F646046	Warburg 1962	Lockhart 2006	'hundreds' (1998) - Lockhart; 430 (1999) - Holyoak; 'hundreds' (2003) - Holyoak; > 50 (2006) - Lockhart	800 - 2000 - Lockhart (1998), Holyoak (1999 & 2003)	10,267m ²
12. Dooaghtry (Mweelrea/Sheeffry/Erriff Complex)	Mayo	L753686	Perry 1968	Campbell <i>et al.</i> 2011	> 50 (1997) - Lockhart; 150,000 (1999) - Holyoak; 'hundreds' (2003) - Holyoak; > 23 (2006) - Lockhart	91 in 1m ² x 5 (2009) - Campbell <i>et al.</i> ; 54 in 1m ² x 4 (2010) - Campbell <i>et al.</i> ; 68 in 1m ² x 4 (2011) - Campbell <i>et al.</i> Min. = 12.5 thalli/m² x 95790 = 1197375 thalli Max. = 21 thalli/m² x 95790 = 2011590 thalli	95,790 m ²
13. Omev Island Machair (Omev Island Machair)	Galway	L558560	Lockhart 1998	Lockhart 2006	304 (1998) - Lockhart; 6 (2006) - Lockhart	304 (1998) - Lockhart; 6 (2006) - Lockhart	1,020 m ²
14a. Mannin More (Slyne Head Peninsula)	Galway	L607460	Holyoak 2004	Lockhart 2006	> 13 (2004) - Holyoak; <i>ca.</i> 80,000 (2006) - Lockhart	<i>ca.</i> 80,000 (2006) - Lockhart	19,970 m ²
14b. Truska Machair (Slyne Head Peninsula)	Galway	L587462	Lockhart 1998	Campbell <i>et al.</i> 2011	2,400,000 (1998) - Lockhart; 5,500,000 (1999) - Holyoak; 'thousands' (2004) - Holyoak; > 150,000 (2006) - Lockhart	577 in 1m ² x 6 (2009) - Campbell <i>et al.</i> ; 389 in 1m ² x 10 (2010) - Campbell <i>et al.</i> ; 90 in 1m ² x 3 (2011) - Campbell <i>et al.</i> Min: 14.2 thalli/m² x 53942 = 765948 thalli Max. = 91.2 thalli/m² x 53942 = 4919328 thalli	53,942 m ²

Population (SAC)	County	Grid reference	First seen	Last seen	Population size (no. of thalli) for 2007 Assessment	Population size (no. of thalli) for 2013 Assessment	Population size (area covered by the population) for 2013 Assessment
14c. Doon Hill/W. of Aillebrack (Slyne Head Peninsula)	Galway	L58_42_	Long 1988	Lockhart 2006	30 (1997) - Lockhart; > 300 (1998) - Lockhart; 14 (1999) - Holyoak; 18 (2004) - Holyoak; 2 (2006) - Lockhart	> 300 (1998) - Lockhart; 14 (1999) - Holyoak; 18 (2004) - Holyoak; 2 (2006) - Lockhart	8 m ²
15. Murvey Machair (Murvey Machair)	Galway	L662389	Lockhart 1998	Lockhart 2006	30 (1998) - Lockhart; 38 (1999) - Holyoak; 101 (2004) - Holyoak; 7 (2006) - Lockhart	30 (1998) - Lockhart; 38 (1999) - Holyoak; 101 (2004) - Holyoak; 7 (2006) - Lockhart	1.75 m ²
16. Fanore (Black Head-Poulsallagh Complex)	Clare	M138086	Long 1994	Lockhart 2006	12 (1998) - Lockhart; 10 (2006) - Lockhart;	10 in 1m ² x 3 (2009) - Campbell 22 in 1m ² x 3 (2010) - Campbell <i>et al.</i> 70 in 1m ² x 3 (2011) - Campbell <i>et al.</i>	35 m ²
						Min. = 3.3 thalli/m² x 35 = 116 thalli; Max. = 23.3 thalli/m² x 35 = 816 thalli	
17a. SW of Lough Naparka, (Tralee Bay and Magharees Peninsula, West to Cloghane)	Kerry	Q616168	Lockhart 1998	Lockhart 1998	5 (1998) - Lockhart; 0 (2003) - Hodgetts; 0 (2006) - Lockhart	5 (1998) - Lockhart; 0 (2003) - Hodgetts; 0 (2006) - Lockhart	0.25 m ²
17b. Magherabeg (Tralee Bay and Magharees Peninsula, West to Cloghane)	Kerry	Q612158	Lockhart 1998	Hodgetts 2003	16 (1998) - Lockhart; 36 (2003) - Hodgetts; 0 (2006) - Lockhart	28 in 1m ² x 5 (2009) - Campbell <i>et al.</i> ; 39 in 1m ² x 5 (2010) - Campbell <i>et al.</i> ; 15 in 1m ² x 5 (2011) - Campbell <i>et al.</i>	1870.5 m ²
						Min. = 3 thalli/m² x 1870.5 = 5612 thalli; Max. = 7.8 thalli/m² x 1870.5 = 14590 thalli	
17c. Kilshannig (Tralee Bay and Magharees Peninsula, West to Cloghane)	Kerry	Q620172	Hodgetts 2003	Hodgetts 2003	3 (2003) - Hodgetts	3 (2003) - Hodgetts	0.25 m ²
18a. Inch Spit (Castlemaine Harbour)	Kerry	V6__9__	Lockhart 1983	Lockhart 1983	'common' (1983) - Lockhart;	43 in 1m ² x 3 (2009) - Campbell <i>et al.</i> ; 57 in 1m ² x 4 (2010) - Campbell <i>et al.</i> ; 93 in 1m ² x 3 (2011) - Campbell <i>et al.</i>	7,160 m ²
						Min. = 12.9 thalli/m² x 7160 = 92364 thalli; Max. = 27.9 thalli/m² x 7160 = 199764 thalli	
18b. Rossbehy (Castlemaine Harbour)	Kerry	V648916	Holyoak 2006	Lockhart 2012	20 (2006) - Holyoak	20 (2006) - Holyoak; 7 (2012) - Lockhart	43 m ²

Population (SAC)	County	Grid reference	First seen	Last seen	Population size (no. of thalli) for 2007 Assessment	Population size (no. of thalli) for 2013 Assessment	Population size (area covered by the population) for 2013 Assessment
19. West of Inny Ferry (Ballinskelligs Bay & Inny Estuary)	Kerry	V474682	Scully 1890	Lockhart 1998	ca. 50 (1998) - Lockhart	ca. 50 (1998) - Lockhart; 0 (2009) - Campbell; 0 (2010) - Campbell & Smyth; 0 (2011) - Campbell	0.5 m ²
20. North Bull (North Dublin Bay)	Dublin	O247378	Pitkin & Synnott 1975	Lockhart & Holyoak 2004	> 100 (1999) - Lockhart; 5 (2004) - Lockhart & Holyoak;	24 in 1m ² x 3 (2009) - Campbell <i>et al.</i> ; 2 in 1m ² x 3 (2010) - Campbell <i>et al.</i> ; 8 in 1m ² x 3 (2011) - Campbell <i>et al.</i>	37 m ²
						Min. = 0.67 x 37 = 25 thalli; Max. = 8 x 37 = 296 thalli	
21. Barley Cove (Barley Cove to Ballyrisode Point)	Cork	V769259	Lockhart 2012	Lockhart 2012	NA	257 (2012) - Lockhart	109.4 m ²
TOTAL					7,331,682 thalli (max.) 150,252 thalli (min.)	15,097,303 thalli (max.) 3,609,457 thalli (min.)	339,604 m²

5.4 Population trends

Because of the lack of historical population estimates, the considerable annual and seasonal (apparent) fluctuations in populations, and different count methodology used, it is almost impossible to assess population trends in individual colonies of *P. ralfsii* at this stage. The fact that there is a huge discrepancy between the estimated minimum and maximum totals is not surprising, considering the wide fluctuations that this species apparently undergoes, at least in terms of visible thalli.

Differences between counts may be largely attributable to the amount of search effort involved and the prevailing weather conditions around the time of search (N. Lockhart, pers. comm.). *P. ralfsii* is apparently much less frequent when the ground is dry and more frequent when it is damp. This may reflect temporary conditions, or a general reduction in the water table, possibly due to abstraction, or it may be an indication of the deleterious effects of climate change. In Cornwall, *P. ralfsii* has apparently increased in recent years (D. Holyoak, pers. comm.), and this may be as a result of climate change favouring the species.

Trends in the area covered by population (m²) are also dependent on the presence of the species in order for it to be delimited. The number of localities however, should remain stable.

5.5 Population Conservation Status

The Favourable Reference Population (FRP) is '*the population in a given biogeographical region considered the minimum necessary to ensure the long-term viability of the species*' (Evans & Arvela, 2011). The area covered by population (m²) calculated in the 2013 Conservation Assessment report to the EU is 339,600 m². Calculating the area covered by the population is dependent on the presence of *P. ralfsii*, which can undergo natural fluctuation depending on the prevailing conditions at the time of population visits. At present there are at least 30 *P. ralfsii* localities (populations) in the Republic of Ireland. This number of localities is considered adequate to ensure a favourable population conservation status in the future and is considered to represent the population baseline. As there is no evidence of any significant decline in population number since the Directive came into force, the current area covered by population and the number of localities is set as the Favourable Reference Population.

Following the General Evaluation Matrix for assessing the Conservation Status of Annex II Species (Evans & Arvela, 2011), because the Estimated Present Population is the same as the Favourable Reference Population, the Population Conservation Status of *P. ralfsii* in the Republic of Ireland is Favourable.

- **Species population:** 30 populations of *P. ralfsii* (covering 339,600 m²)
- **Favourable Reference Population:** 30 populations of *P. ralfsii* (covering 339,600 m²)

6. Habitat

The ecology of *P. ralfsii* in Britain and Ireland has been described in two main sources:

Church *et al.* (2001):

“This plant is usually found on damp, calcareous sand in dune slacks, where it is wet or even subject to inundation in the winter. *P. ralfsii* seems to favour the sides of paths where the soil receives some disturbance, leading to gaps in the vegetation. It does not grow in slacks that are water-filled for long periods or heavily shaded. It has also been recorded growing over metalliferous mine-spoil and old masonry. Until recently it was thought to grow on thin soil over limestone on clifftops near Torquay, but it is now known that these records are mistakes for *Fossombronia husnotii* (D. Holyoak, pers. comm.). It usually disappears from view when the substrate dries out in the summer, surviving as tubers. It can vary in apparent abundance from year to year, depending on weather conditions. Sporophytes are produced mainly between March and May.”

Hill *et al.* (1991):

“A coastal species of calcareous sand-dunes where it may be locally frequent in and along the margins of slacks. Most conspicuous in winter and spring, it disappears almost completely during periods of drought. Frequent associates include *Aneura pinguis*, *Leiocolea badensis*, *Preissia quadrata*, *Riccardia chamedryfolia*, *R. incurvata*, *Barbula* spp., *Bryum* spp., *Dicranella varia* and *Trichostomum* spp. Lowland. Dioicous; sporophytes frequent from December to June. Perennation through periods of drought is by means of tubers packed with lipid.”

6.1 Habitat Conservation Status

The current area of habitat niche occupied by *P. ralfsii* is believed to be stable. Furthermore, the sites supporting *P. ralfsii*, several of which are large, are considered to be in good condition and are not considered under threat.

The habitat occupied by *P. ralfsii* has been mapped and visited by NPWS staff and other workers frequently in recent years. The extent of occupancy of 13 of the 30 populations studied by Campbell (2013) was measured by recording GPS co-ordinates along the perimeter of a polygon of the area containing *P. ralfsii*. The area covered by the population of *P. ralfsii* within the polygon was estimated, as not all microhabitats within the polygon were suitable for *P. ralfsii*. Estimates based on expert judgement were derived for the remaining populations. The area covered by the populations, i.e. Habitat for the species, was calculated at 339,600 m² or 0.34 hectares (see Table 2).

Observations suggest that the dune slack and machair habitat that supports *P. ralfsii* is still extensive and in good condition to support the species.

Therefore it is inferred that the Conservation Status of Habitat for the Species is Favourable.

7. Future Prospects

7.1 Negative impacts and threats

Because of the fragility of its habitat and its specialised ecology, *P. ralfsii* is potentially threatened by a large number of factors, including holiday developments, recreational activities, removal of turf, under-grazing, desiccation due to water abstraction or afforestation and the spread of conifers. Having said that, many sites are good quality intact dune systems and are recorded as having no perceived current threats. The main threats can be summarised as follows:

- **Grazing imbalance**

It is important to achieve the right balance of grazing in order to conserve *P. ralfsii*. A reduction in grazing by livestock and rabbits may threaten the plant at some localities, as it needs a short, open sward in order to compete. Any spread of coarser vegetation, because of a reduction in grazing, could constitute a threat to its survival. On the other hand, too high a level of grazing may have a deleterious impact on *P. ralfsii* through physical damage, soil erosion and an excessive input of nutrients.

- **Physical disturbance**

Although it is likely that a small amount of disturbance, in the form of soil compaction, may be favourable to this plant, more extreme forms of disturbance, which break the bryophyte crust on the surface, are likely to be detrimental. Thus, a certain level of off-roading by vehicles may actually be beneficial, through providing wheel-ruts as habitat, but too much may destroy the integrity of the surface and threaten the plant. Some of the smaller populations are particularly at risk from disturbance events.

- **Pollution**

Pollution of the groundwater, chiefly through eutrophication from agricultural activities such as slurry-spreading and application of fertilisers, is a threat to *P. ralfsii*. This appears to have eliminated it from Akeragh, Banna & Barrow Harbour, for example. Eutrophication may occur directly from over-stocking on the site, or it may be due to run-off from adjacent agricultural land. Dog faeces can be another source of local eutrophication. Pollution in the form of dumping may also be a threat. Many of the sites for this plant are prime sites for illegal dumping.

- **Turf-cutting and sand removal**

Turf-cutting is an increasingly serious threat to some of the sites for *P. ralfsii*, as the tight grassy sward may appeal to some gardeners as a cost-free alternative to buying commercial turf to place in lawns or even on graves. Sand removal could easily destroy *P. ralfsii* habitat, as well as potentially disrupting the hydrology.

- **Desiccation & increase in salinity**

General desiccation, as a consequence of climate change, drainage schemes or a lowering of the water table, is a very serious threat to *P. ralfsii*. This plant requires at least seasonal wetness, and if the number of days per year when the turf is wet reduces, then it is very noticeable that *P. ralfsii* is much reduced. Whether it disappears completely or retreats to its underground storage-organ is not known. Clearly *P. ralfsii* is well adapted to survive periods of desiccation as a dormant underground structure, but it is not yet known how much desiccation can be withstood before it disappears completely. An increase in salinity would also have an adverse effect on *P.*

ralfsii – it may be somewhat salt-tolerant, as a predominantly coastal species, but flooding by sea water would probably eliminate it.

- **Land use**

Large-scale changes in land use constitute perhaps the most significant threats to *P. ralfsii*. Dune systems are under constant pressure from proposed developments such as golf courses, caravan parks, hotel building and other leisure developments, all of which are capable of obliterating suitable habitat for this plant. It is likely that the Malahide locality has been destroyed in this way. Dune systems are occasionally regarded as good sites for conifer plantations, and these obviously destroy the fragile dune-slack habitat.

7.2 Positive Impacts

A number of these threats are being addressed through national legislation. Some of the rarest plants in the Republic of Ireland, including *P. ralfsii*, are protected under the Flora (Protection) Order, 1999. It is an offence to cut, uproot or damage plants included in this list. The Habitats Directive (which specifically protects *P. ralfsii* in Annex IIB) is transposed into Irish law in the European Communities (Natural Habitats) Regulations (Statutory Instrument 94 of 1997). The Habitats Directive provides protection for the habitats of listed plants, as well as the plants themselves.

Under Annex IIB, each member state must designate Special Areas of Conservation for *P. ralfsii*. The Republic of Ireland to date has 20 SACs in which *P. ralfsii* is one of the key features (see Table 1). An additional population at Barley Cove, Co. Cork, discovered in 2012, is within an SAC (Barley Cove to Ballyrisode Point), but the species is not yet listed as a qualifying interest. On present knowledge, it appears that the entire national population of *P. ralfsii*, bar a few thalli at Rosepenna, is protected within Special Areas of Conservation in Ireland.

The Irish Government is a signatory to The Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention), 1982.

An ongoing monitoring programme of rare and threatened bryophytes, including *P. ralfsii*, has been established by the NPWS.

7.3 Future Prospects Conservation Status

No pressures (or impacting activities) were recorded at 12 of 13 populations during the period 2009-2011 (Campbell, 2013), nor at the remaining populations at the time of survey (NPWS submissions). Undergrazing was noted as an impacting factor at the population at West of Inny Ferry, Co. Kerry during 2009-2011, resulting in increased cover of grass and lack of bare ground impacting on the quality of the habitat for *P. ralfsii* at that particular locality. However, this is a localised issue and does not represent the situation across the wider landscape.

Considering the positive impacts for the species protection, the fact that there are no high impacting pressures currently acting on the populations, apart from a localised issue at West of Inny Ferry, and that there is no reason to believe that any threats will present themselves in the future, the Future Prospects are assessed as Favourable.

8. Overall Conservation Status

The range of *P. ralfsii* is not considered to have declined historically, or at least there is no evidence of a decline. It still occurs at the great majority of the localities from which it has been recorded. Range therefore has a Favourable Conservation Status.

The population of *P. ralfsii* in the Republic of Ireland is substantial, and appears to be fairly stable. However, long-term trends are at present difficult to distinguish from short-term fluctuations, and it may be that this species has declined, although there is no evidence for this, due to the paucity of fieldwork in the past. Population therefore has a Favourable Conservation Status.

The habitat of *P. ralfsii* – dune slacks and machair – is still extensive and largely in good condition for *P. ralfsii* and the identified suitable areas still support *P. ralfsii*. Habitat for the Species therefore has a Favourable Conservation Status.

Considering the impacts, pressures and threats to *P. ralfsii* in the Republic of Ireland today and the measures in place that will assist its protection, it is expected that this species will survive. Therefore the overall Conservation Status for Future Prospects of *P. ralfsii* is Favourable.

Range of <i>Petalophyllum ralfsii</i>:	Favourable
Population of <i>Petalophyllum ralfsii</i>:	Favourable
Habitat for <i>Petalophyllum ralfsii</i>:	Favourable
Future Prospects for <i>Petalophyllum ralfsii</i>:	Favourable
Overall Assessment:	Favourable Conservation Status

9. Monitoring

9.1 Introduction

Under Article 17 of the EU Habitats Directive, each member state must report to the European Commission on the measures taken under the Directive and on the conservation status of the listed species and habitats every 6 years (Evans & Arvela, 2011; European Commission, 1992). The conservation status of a species is defined as the sum of influences acting on the target species that may affect the long-term distribution and abundance of its populations. There are four criteria - range, population, area of suitable habitat and future prospects - that must be met in a favourable way, i.e. given a classification of 'Good' for the conservation status to be given an overall classification of 'Good'. The criterion 'range' is the outer limits of the overall area in which a species is found at present and can be considered as an envelope within which areas actually occupied occur, as in many cases not all the range will actually be occupied by the species (Evans & Arvela, 2011; European Commission, 1992).

The criteria are considered favourable when:

- the natural range of the target species is neither declining nor is likely to decline in the foreseeable future;
- population dynamics data suggest that the target species populations are maintaining themselves on a long-term basis as a viable component of its natural habitat;
- there is and will continue to be a sufficiently large habitat for the populations to maintain themselves into the long-term future and
- future prospects for their overall survival must also be deemed favourable.

If any of these criteria are not in favourable condition then an unfavourable status must be given. There are two categories of unfavourable status: 'Unfavourable - Inadequate' and 'Unfavourable - Bad'.

9.2 Monitoring

Article 11 of the EU Habitats Directive requires each Member State to undertake 'surveillance' of the conservation status of listed habitats and species. According to Jones *et al.* (2006), "The overall purpose of surveillance and reporting is to identify, and draw attention to, weaknesses in the state of the environment which will need to be addressed if the vision and strategic goals are to be achieved". This document goes on to say that surveillance, which is considered an essential companion to monitoring, is "systematic sampling designed to produce a series of measurements in time and the term is used here to encompass monitoring when the need is to know whether a particular state or standard is being achieved".

According to the Joint Nature Conservation Committee's *Common Standards Monitoring for Designated Sites: First Six Year Report* (Joint Nature Conservation Committee, 2006), monitoring performs the following functions:

- it indicates the degree to which current conservation measures are proving effective in achieving the objectives of the designation at site level, and identifies any need for further measures;
- it indicates the effectiveness of current conservation action and investment at country level, and identifies priorities for future action;

- it enables Government to undertake its national and international reporting commitments in relation to designated sites, and more widely, and helps identify any areas of shortfall in implementation.

9.2.1. Broad-scale monitoring

The Joint Nature Conservation Committee (JNCC) consider monitoring to be a ‘quick and dirty’ exercise that can be done frequently, by non-specialists, to provide an early warning of designated features at localities slipping into an unfavorable conservation status. It does not require specialist knowledge of taxa, so tends to use a series of ‘indirect attributes’. For example, a quick visit to a woodland to monitor the state of bryophytes might have to ascertain (a) that the trees have not been felled, (b) that the canopy structure is still more or less intact, and (c) that there is still a dominance of bryophytes on wet ground, rocks, banks and trees.

For *Petalophyllum ralfsii*, Table 3 (adapted by N. Hodgetts) might be a guide to broad-scale monitoring:

Table 3. Proposed guide to broad-scale monitoring of *Petalophyllum ralfsii* populations in the Republic of Ireland (Hodgetts, 2007).

Attribute	Measure	Target	Comments
Hydrology	Visual assessment	Very wet or inundated in winter; damp in summer	
Quantity*	Visual assessment	Estimate numbers (range e.g. 1-10; 10-50 etc.) and general extent of area	No need to attempt precise count. It requires monitoring over a number of years to obtain an accurate picture of its abundance on a site.
Sward height	Visual assessment	< 1cm with much bare ground	Associates: <i>Agrostis stolonifera</i> , <i>Festuca rubra</i> , <i>Plantago coronopus</i> , <i>Bellis perennis</i> , <i>Didymodon</i> spp. and <i>Barbula</i> spp.
Shade	Visual assessment	Shrubs and trees absent from slacks where <i>P. ralfsii</i> is known	Does not tolerate shading
Vegetation	Visual assessment	<i>Salix repens</i> and other coarse vegetation absent, present at low levels, or kept low by grazing	Does not tolerate competing vegetation such as <i>Salix repens</i>

* If able to identify *Petalophyllum ralfsii* confidently

If one attribute fails, the locality is not in favourable condition. Broad-scale monitoring of this sort should be done annually at each *P. ralfsii* locality if possible, either by NPWS staff, other conservation professionals or volunteers.

9.2.2 Fine-scale monitoring

In tandem with broad-scale monitoring, there should be a supporting programme of fine-scale monitoring. Fine-scale monitoring is considered to be an activity that is done mainly by specialists, and less frequently than broad-scale monitoring.

For *P. ralfsii*, fine-scale monitoring should consist of a visit to its populations by a bryologist, at least once every six years, to check (a) that *P. ralfsii* is still present, and (b) the health and extent of its population, habitat and associates. Naturally, the fine-scale monitoring visit should double as a broad-scale monitoring visit. Recording sheets provided (see Appendix II) should be filled out and digital photographs should be taken, so that future monitoring can be compared with the baseline.

Following a study on *Petalophyllum ralfsii* as part of a Ph.D. research project carried out by Campbell (2013) the above broad-scale monitoring guidelines were investigated and amended to provide more specific fine-scale monitoring guidelines. It should be noted that some small differences exist in the attributes monitored in machair habitat populations (Garter Hill, Doolough Machair, Dooyork Machair, North Inishkea, Doogort Machair, Keel Machair, Dooaghtry, Omev Island Machair, Mannin More, Truska Machair, Doon Hill/W. of Aillebrack and Murvey Machair) and dune slack habitat populations (Rosses Strand, Rosepenna, Tramore/Black Burrow/SW of Dunfanaghy, Damp Beg, Derrybeg, Keadew Point, Dooy Point, Sheskinmore, Bunduff, Fanore, SW of Lough Naparka, Magherabeg, Kilshannig, Inch Spit, Rossbehy, West of Inny Ferry, North Bull and Barley Cove).

9.2.3 Preparation for fine-scale monitoring visit

Prior to the fine-scale monitoring being carried out, the surveyor should ensure that they have the necessary skills to identify *P. ralfsii*, including its reproductive structures and information on species it may be confused with, e.g. *Fossombronia* spp. and *Moerckia flotoviana*. Identification of associate species should also be included in preparation, particularly of associated bryophyte species such as *Aneura pinguis*, *Bryum pseudotriquetrum* and *Didymodon fallax*.

A thorough familiarisation with previous surveys of and monitoring visits to the population under investigation is also required as this will highlight any changes in status or threats from the previous visits.

Field survey equipment should include:

- An adequate number of population relevé and assessment sheets (see Appendix II)
- Maps showing location of populations (see Appendix I)
- A handheld GPS receiver capable of differential corrections accurate to 50 cm or less with post processing (e.g. Trimble GeoExplorer range)
- Photographs of population and locations of target species
- Pointed sticks (white, or another clearly visible colour)
- 1 x 1 m quadrat
- Trowel
- Ruler & measuring tape
- Clinometer
- Digital camera
- Sealable plastic tubes (50 ml or above)
- Plastic syringe
- Ziploc® bags (small to medium)
- Cocktail sticks
- Plant identification guides

9.2.4 Area of extent of occupancy, area covered by population & recording of relevé data

‘Area covered by the population (m²)’ is an accepted method of assessing populations of bryophytes (Evans & Arvela, 2011) as it can be difficult to determine what constitutes an individual because of the clonal nature of many species (Hallingbäck *et al.*, 1998). It is also used to assess the attribute of area of ‘habitat for the species’ in the EU Conservation Assessment report.

Thus both area covered by the population and thalli counts are to be assessed. The methodology for mapping the extent of occupancy at both machair and dune slacks populations is similar. The details of how to assess thalli numbers is outlined below. The overall aim of these approaches is to generate a set of standardised and comparable data that can be used to determine trends in the cover and number of thalli of the species.

The first thing to be carried out during a population fine-scale monitoring visit is to determine the area of extent of occupancy of *P. ralfsii* within the site. The extent of occupancy of *P. ralfsii* should be marked by white plastic sticks for easy visualisation. Once the extent of occupancy is delimited the points should be recorded on a handheld GPS. A polygon can subsequently be drawn around these points and the area measured using GIS software such as ArcGIS. An on-site estimation should be made of the percentage of the area covered by the population within the extent of occupancy and noted on the recording sheet (see Table 5).

9.2.5 Number of 1 x 1 m relevé plots

It is suggested that within the smaller dune slack populations two to three 1 m² plots should be randomly located within the area of extent of occupancy, and four to five 1 m² plots within larger dune slack and machair populations. The presence of *P. ralfsii* within the plot should be ensured. If *P. ralfsii* is not present another random point should be chosen until *P. ralfsii* is found within the plot. The microhabitats in the extensive machair localities are highly variable and include very wet areas unsuitable for *P. ralfsii*. Therefore plots within the area of extent of occupancy of *P. ralfsii* nearest a selected random GPS point could be monitored, then the next and so on until the desired number of plots have been recorded. At some populations, e.g. Magherabeg, the species may occur only on the sides of low sandy hummocks, so the nearest hummock to a randomly chosen point should be searched for its presence, then the next randomly located hummock, etc.

9.2.6 Parameters to be recorded in relevé plots

- The GPS co-ordinates and altitude of each plot should be recorded on the hand-held GPS device and also noted on the field sheet.
- The slope of the plot should be measured with a clinometer and the aspect with a compass.
- Soil depth (cm) should be taken by digging three small holes, using a trowel, around the outside of the plot and averaging the depth, measured with a ruler, of the mineral soil (usually overlying sand) and then:
- One of the holes can be further dug with the trowel until the groundwater level is reached. Groundwater should be allowed to accumulate in the hole until the level becomes stable. The distance from the groundwater level to the soil surface (cm) should then be measured with a ruler/measuring tape. If bedrock is hit before reaching the groundwater level then the depth (cm) to the bedrock from the surface of the soil should be measured with a ruler/measuring tape and noted. Before the hole is refilled:
- A groundwater sample should be collected by inserting a labelled sealable plastic tube into the hole. If a groundwater sample proves difficult by this method the sample can be sucked up using a plastic syringe and should be emptied into the plastic tube.

- The mean vegetation height (cm) should be calculated by averaging the length of 5 stems in the plot measured with a ruler/measuring tape.
- The stem with the maximum vegetation height (chosen by eye) should also be measured and noted.
- Cover of trees, shrubs, grasses, rushes, sedges, forbs, bryophytes, lichens, algae and litter should be recorded to the nearest 5% as should cover of surface water, rock and dung within each 1 x 1 m plot. The cover of bare ground within the 1 m² plot should be estimated to the nearest 1%.
- The presence of any plant species in the plot should also be listed and its cover recorded to the nearest 5%.
- Photographs should be taken of each plot from above, and from facing north, south, east and west.
- Each individual *P. ralfsii* thallus should be marked with a cocktail stick. The search for thalli in each plot should be at least 30 minutes in duration. Once all are marked they should be counted by their reproductive status (male, female, indeterminate, with mature or immature sporophytes). This is in order to amass information on the viability of the populations.
- Soil samples of *circa* 2 cm³ should be taken from the middle and four corners of each 1 x 1 m plot and amalgamated in a labelled Ziploc® bag.

9.2.7 Laboratory work

Soil and groundwater samples should be analysed for pH as soon as possible using the appropriate methods in a suitable laboratory. The results table on the recording sheet should be filled out for each population (see Appendix II). Table 4 shows an example surface water analysis results table filled out for Bunduff, Co. Sligo.

Table 4. Results of analysis of surface water sample from Bunduff, Co. Sligo.

Bunduff Plot Number:	1	2	3	4	5
Soil pH	8.35	8.37	8.12	-	-
Groundwater pH	7.29	7.28	7.29	-	-

9.2.8 Timing of Assessment

The timing of visits should occur in spring as thalli are most likely to be visible above ground at that time of year. Groundwater levels are more likely to be higher then also. If presence of thalli cannot be established during a population visit, the population must be re-visited a minimum of three times before the national survey is completed before it can be assessed.

9.2.9 Field Assessment

All questions on the field survey sheets should be filled in on-site to the best ability of the surveyor. The aim is to record the extent and status of the liverwort and any pressures or threats on an individual location basis. It is recommended that the sheet containing the previous monitoring results be compared in the field with the latest monitoring results. This will enable the surveyor to ascertain if any changes have taken place between surveys.

9.3 Population Assessment

No specific target value for area or number of thalli should be set as this number is variable from year to year. Information collected over a number of years of monitoring will build up a picture of the species abundance at a locality (Hodgetts, 2000) and trends should be assessed over the monitored years to determine any patterns of decline and also in relation to other attributes recorded. The area of the polygon around the plotted GPS of the extent of occupancy within the locality should be entered. An estimate of the percentage of the area of extent of occupancy covered by *P. ralfsii* should also be entered. The target for the population assessment is that thalli are present at the locality.

The Population Assessment table on the recording sheet should be filled in for each locality visited (see Appendix II). Table 5 shows an example of Population Assessment table filled out for Bunduff (a dune slack population).

Table 5. Example *Petalophyllum ralfsii* Population Assessment table filled out for Bunduff, Co. Sligo.

Method of assessment	Area in m ²	% occupied	Target	Result	Pass/Fail
Area of polygon around GPS points	55.03	80	Thalli present	Present	Pass

9.4 Habitat Assessment

Floristic work on the habitats of *P. ralfsii* by Campbell (2013) suggested positive and negative indicators to monitor. The indicators used to assess habitat quality are hydrology, shrub cover, cover of bare ground and mean vegetation height. These should be assessed within the two-five 1 x 1 m plots. GPS positions and photographs of all plots and any other features of interest (e.g. illegal dumping) should be taken.

The indicators and how to assess them are outlined below.

Hydrology

The timing of surveillance visits is suggested as spring. Pools of surface water visible in lower lying parts of the locality should be noted. The groundwater level should be assessed at the two-five random plot locations. This is done by digging a hole with a trowel just outside the plot until the groundwater level is reached. The groundwater level should be allowed to settle for at least ½ hour while the thalli count is being assessed. Once the level is stable, the depth from the top of the hole to the level should be measured with a ruler or a measuring tape (see Section 9.2.6).

It is suggested here that the mean groundwater level should not reach below 80 cm from the ground surface. At populations where the groundwater table cannot be measured due to underlying rock, indeed, at all populations, the surface of the soil should be wet or at least damp to the touch when a hand is pressed into the soil.

Shrub (*Salix repens*) cover

Shrub cover should be monitored as *P. ralfsii* does not tolerate excessive shading. Shrub cover, in particular *Salix repens*, within each 1 x 1 m plot should be estimated to the **nearest 5%**. Mean shrub cover should not exceed 25%.

Grass cover

Increased nutrients and/or undergrazing can change the vegetation composition; tall-herbs and grasses can begin to dominate. Grass cover should be estimated to the **nearest 5%** within each plot and mean grass cover should not exceed 60%.

Cover of bare ground

Some bare ground should be present as too closed a sward could out-shade and out-compete *P. ralfsii*. Cover of bare ground should be estimated to the **nearest 1%** in each plot. Mean cover of bare ground should exceed 5% in all populations.

Mean vegetation height

The height of 5 stems in each 1 x 1 m plot should be measured with a ruler/ measuring tape and averaged per plot. The mean vegetation height averaged over the monitoring plots in the machair populations, should not exceed 6 cm, and in the dune slack populations, should not exceed 9 cm.

The Habitat Assessment table on the recording sheet (see Appendix II) should be filled out for each population. Table 6 shows an example of a completed Habitat Assessment table for Bunduff, a dune slack population, in Co. Sligo.

Table 6. Habitat Assessment indicators, measures of assessment and targets for Bunduff, Co. Sligo.

Indicator	Method of assessment	Target	Result	Pass/Fail
Hydrology <input type="checkbox"/> tick box if surface water present on site	Measuring depth to groundwater level in hole	≤ 80 cm depth from ground surface	25.7 cm from ground surface	Pass
	If bedrock below: Hand should be pressed onto soil surface	Soil surface should be wet/damp	Soil surface damp	Pass
Shrub cover	Estimation of shrub cover to nearest 5% in each of 2-5 plots	Mean percent shrub cover should not exceed 25%	0%	Pass
Grass cover	Estimation of grass cover to nearest 5% in each of 2-5 plots	Mean percent grass cover should not exceed 60%	35%	Pass
Cover of bare ground	Estimation of cover of bare ground to nearest 1% in each of 2-5 plots	Mean percent cover of bare soil should exceed 5%	7.6%	Pass
Mean vegetation height	Mean height (cm) of 5 stems per plot averaged in 2-5 plots	Machair: Mean vegetation height should not exceed 6 cm	NA	NA
		Dune slack: Mean vegetation height should not exceed 9 cm	3.8 cm	Pass

9.5 Assessment of Future Prospects

The assessment sheet contains sections to record pressures and threats to the species at each population. Continued and standardised assessment of the local threat status will be important in monitoring trends over time, and will ultimately help inform management decisions. The future prospects of *P. ralfsii* are believed to be stable in the short/medium term. Potentially threatening activities and their location, influence, intensity and area affected should be recorded (see Table 7).

Table 7. Potential impacting activities (with their EU code) with location, influence, intensity and area affected for *P. ralfsii* populations Future Prospects Assessment.

Activity (EU code)	Location (Inside/outside extent of occupancy)	Influence (Positive/ Negative/ Neutral)	Intensity (High/ Medium/ Low)	Area affected (0-10m ² ; 11-50m ² ; 51-100m ² ; >100m ²)
Intensive grazing (A04.01)				
Excessive poaching (Trampling, overuse, G05.01)				
Abandonment of pastoral systems, lack of grazing (A04.03)				
Stock feeding (A05.02)				
Restructuring agricultural land holdings (A10)				
Fertilisation (A08)				
Pollution to groundwater (H02)				
Water abstractions from groundwater (J02.07)				
Sand & gravel extraction (C01.01)				
Motorised vehicle damage (G01.03)				
Other outdoor sports & leisure activities (G01.08)				
Sport & leisure structures (G02)				
Dumping (Discharges E03)				
Invasive non-native species (I01)				
Natural erosion (K01.01)				
Biocenotic evolution, succession (incl. enlargement of scrub vegetation area) (K02)				
Species composition change (succession) (K02.01)				
Other:				

9.6 Assessing Overall Conservation Status

To derive an overall assessment, the Population, Habitat and Future Prospect Assessments are combined. Following the completion of the all sections an overall score of Green (Favourable), Amber (Unfavourable - Inadequate) or Red (Unfavourable - Bad) is assigned using the criteria below.

Population assessment

Due to the natural variability of the occurrence and density of *P. ralfsii*, targets involving thalli number cannot be set. Therefore the confirmation of the presence of the species at the locality is the sole target to achieve a Favourable population assessment (Green). If the species cannot be found after three repeated locality visits then it is to receive an Unfavourable - Inadequate status (Amber).

- 1 pass = Favourable (Green),
- 0 passes = Unfavourable - Inadequate (Amber)

Habitat assessment

For the overall habitat assessment to indicate favourable conditions the following criteria should be used:

- 4-5 passes = Favourable (Green),
- 2-3 passes = Unfavourable - Inadequate (Amber), and
- 0-1 passes = Unfavourable - Bad (Red).

Future prospects

The assessment of Future Prospects is more subjective. If there is no significant impact of the activities the Future Prospects should be assessed as Favourable (Green), moderated impact should be assessed as Unfavourable - Inadequate (Amber) and severe impact as Unfavourable - Bad (Red).

Overall Assessment

The overall assessment of the population is carried out by combining the results from all the other assessments and is assessed using the following criteria.

- All Green = Favourable (Green)
- 1-3 Amber = Unfavourable - Inadequate (Amber)
- 1 Red = Unfavourable - Bad (Red).

Targets for Population, Habitat for the species and Future prospects should be assessed at a locality-by-locality level. The raw data for each locality assessment can then be used to derive a national assessment.

Table 8 shows an example of a completed Overall Assessment for Bunduff.

Table 8. Example of an Overall Assessment for Bunduff.

Attribute	Assessment
Population	Favourable (Green)
Habitat for the species	Favourable (Green)
Future Prospects	Favourable (Green)
Overall	Favourable (Green)

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Appendix I. Maps and aerial photograph maps of *Petalophyllum ralfsii* sites

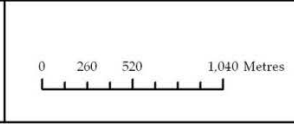
Overview of the GPS points mapped during previous surveys for the *Petalophyllum ralfsii* populations overlaid on Discovery maps and on aerial photographs.

**Population 1: Rosses Strand, Co. Donegal
(Tranarossan and Melmore Lough SAC 000194)**



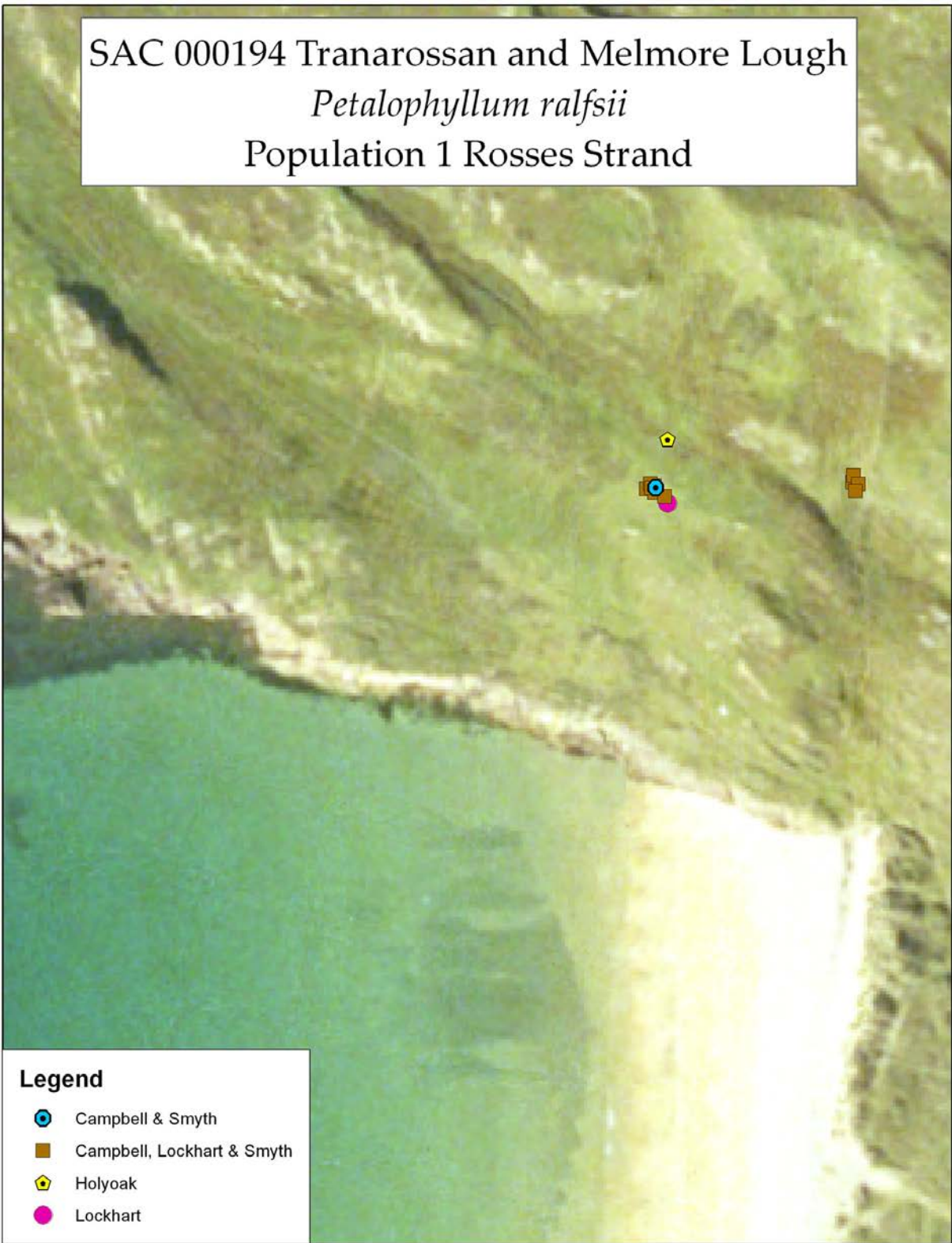
Produced by: Paul Duffy and Teresa Tuttle
Conservation Planning
National Parks and Wildlife Service
Date: 13th February 2013

Conservation Objectives
Petalophyllum ralfsii (Natura code: 1395)



N
↑
Map Version 1.0

SAC 000194 Tranarossan and Melmore Lough
Petalophyllum ralfsii
Population 1 Rosses Strand



Legend

-  Campbell & Smyth
-  Campbell, Lockhart & Smyth
-  Holyoak
-  Lockhart

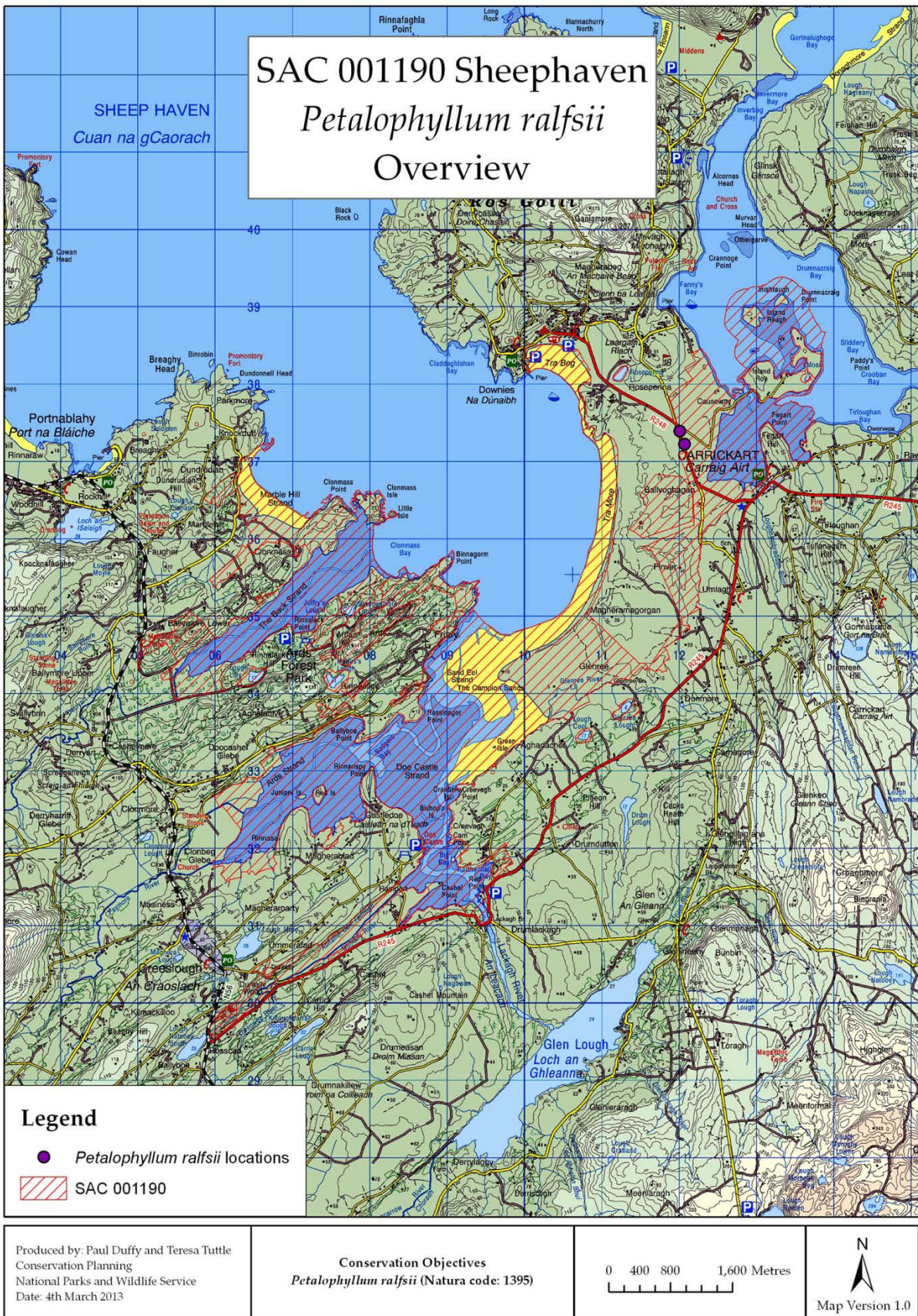
Produced by: Paul Duffy and Teresa Tuttle
Conservation Planning
National Parks and Wildlife Service
Date: 13th February 2013

Conservation Objectives
Petalophyllum ralfsii (Natura code: 1395)

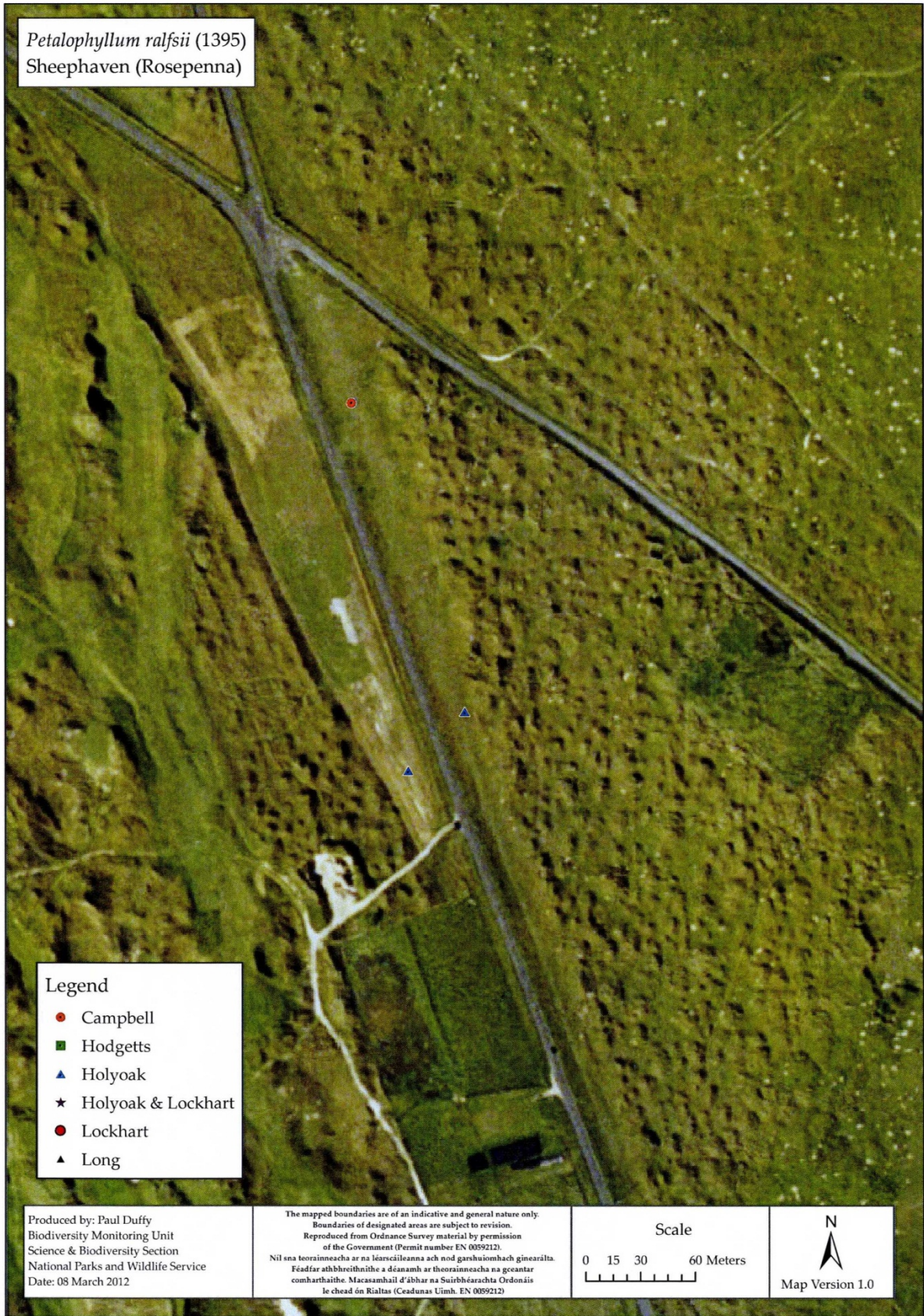
0 10 20 40 Metres



Population 2: Rosepenna, Co. Donegal (Sheephaven SAC 001190)



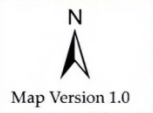
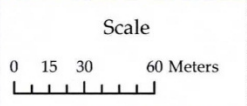
Petalophyllum ralfsii (1395)
Sheephaven (Rosepenna)



- Legend**
- Campbell
 - Hodgetts
 - ▲ Holyoak
 - ★ Holyoak & Lockhart
 - Lockhart
 - ▲ Long

Produced by: Paul Duffy
Biodiversity Monitoring Unit
Science & Biodiversity Section
National Parks and Wildlife Service
Date: 08 March 2012

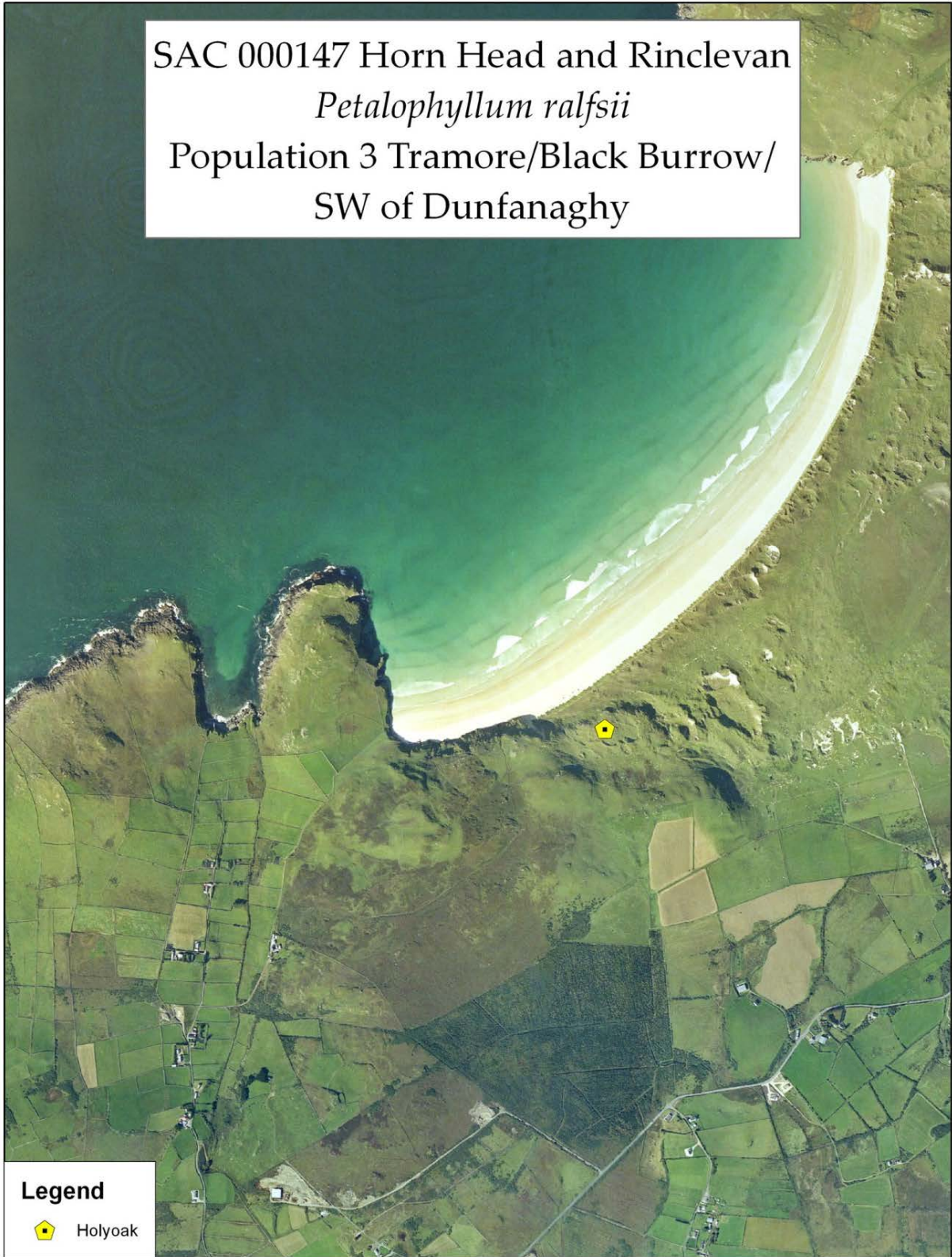
The mapped boundaries are of an indicative and general nature only.
Boundaries of designated areas are subject to revision.
Reproduced from Ordnance Survey material by permission
of the Government (Permit number: EN 0059212).
Níl sna teorainneacha ar na léarscáileanna ach nod garshuíomhach ginearálta.
Féadfar athbhreithniú a déanamh ar theorainneacha na gceantar
comharthaíthe. Macasamhail d'ábhar na Suirbhéaracha Ordonáis
le chead ón Rialtas (Ceadúnas Uimh. EN 0059212)



**Population 3: Tramore/Black Burrow/SW of Dunfanaghy, Co. Donegal
(Horn Head and Rinclevan SAC 000147)**



SAC 000147 Horn Head and Rinclevan
Petalophyllum ralfsii
Population 3 Tramore/Black Burrow/
SW of Dunfanaghy

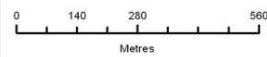


Legend

 Holyoak

Produced by: Paul Duffy and Teresa Tuttle
Conservation Planning
National Parks and Wildlife Service
Date: 13th February 2013

Conservation Objectives
Petalophyllum ralfsii (Natura code: 1395)

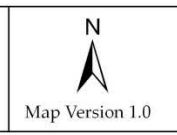
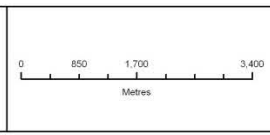


Population 4a: Damph Beg, Population 4b: Derrybeg and Population 4c: Keadew Point, Co. Donegal (Gweedore Bay and Islands SAC 001141)



Produced by: Paul Duffy and Teresa Tuttle
Conservation Planning
National Parks and Wildlife Service
Date: 29th January 2013

Conservation Objectives
Petalophyllum ralfsii (Natura code: 1395)



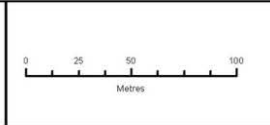
SAC 001141 Gweedore Bay and Islands
Petalophyllum ralfsii
Population 4a Damph Beg



Legend
♦ Holyoak

Produced by: Paul Duffy and Teresa Tuttle
Conservation Planning
National Parks and Wildlife Service
Date: 29th January 2013


Conservation Objectives
Petalophyllum ralfsii (Natura code: 1395)



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Map Version 1.0

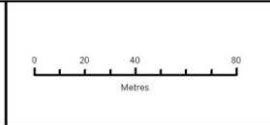
SAC 001141 Gweedore Bay and Islands
Petalophyllum ralfsii
Population 4b Derrybeg



- Legend
-  Holyoak
 -  Lockhart

Produced by: Paul Duffy and Teresa Tuttle
Conservation Planning
National Parks and Wildlife Service
Date: 29th January 2013

Conservation Objectives
Petalophyllum ralfsii (Natura code: 1395)



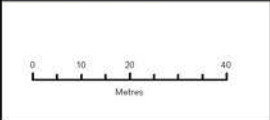
SAC 001141 Gweedore Bay and Islands
Petalophyllum ralfsii
Population 4c Keadew Point



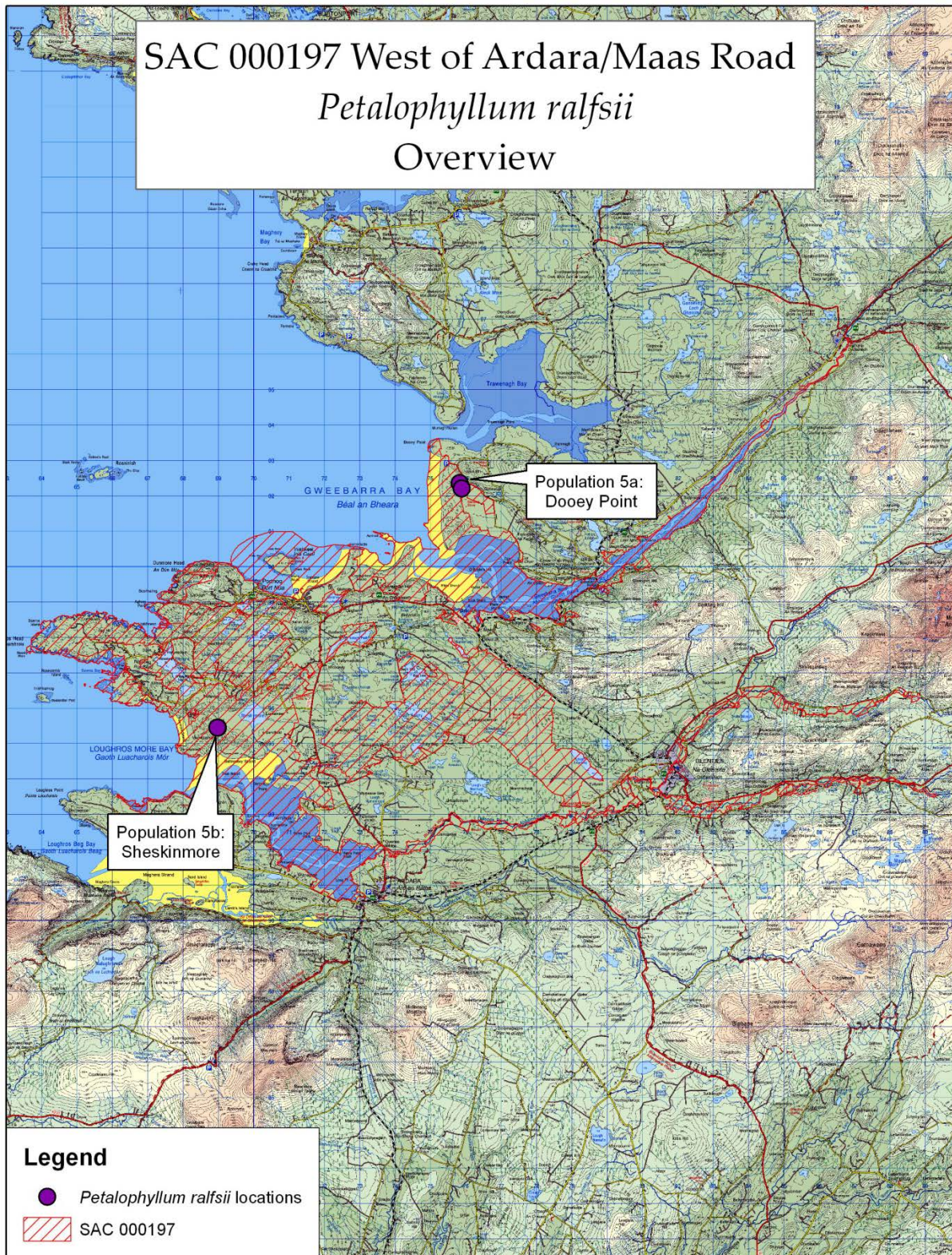
- Legend
- Campbell & Smyth
 - ★ Campbell, Lockhart & Smyth
 - ★ Holyoak
 - Lockhart

Produced by: Paul Duffy and Teresa Tuttle
Conservation Planning
National Parks and Wildlife Service
Date: 29th January 2013

Conservation Objectives
Petalophyllum ralfsii (Natura code: 1395)

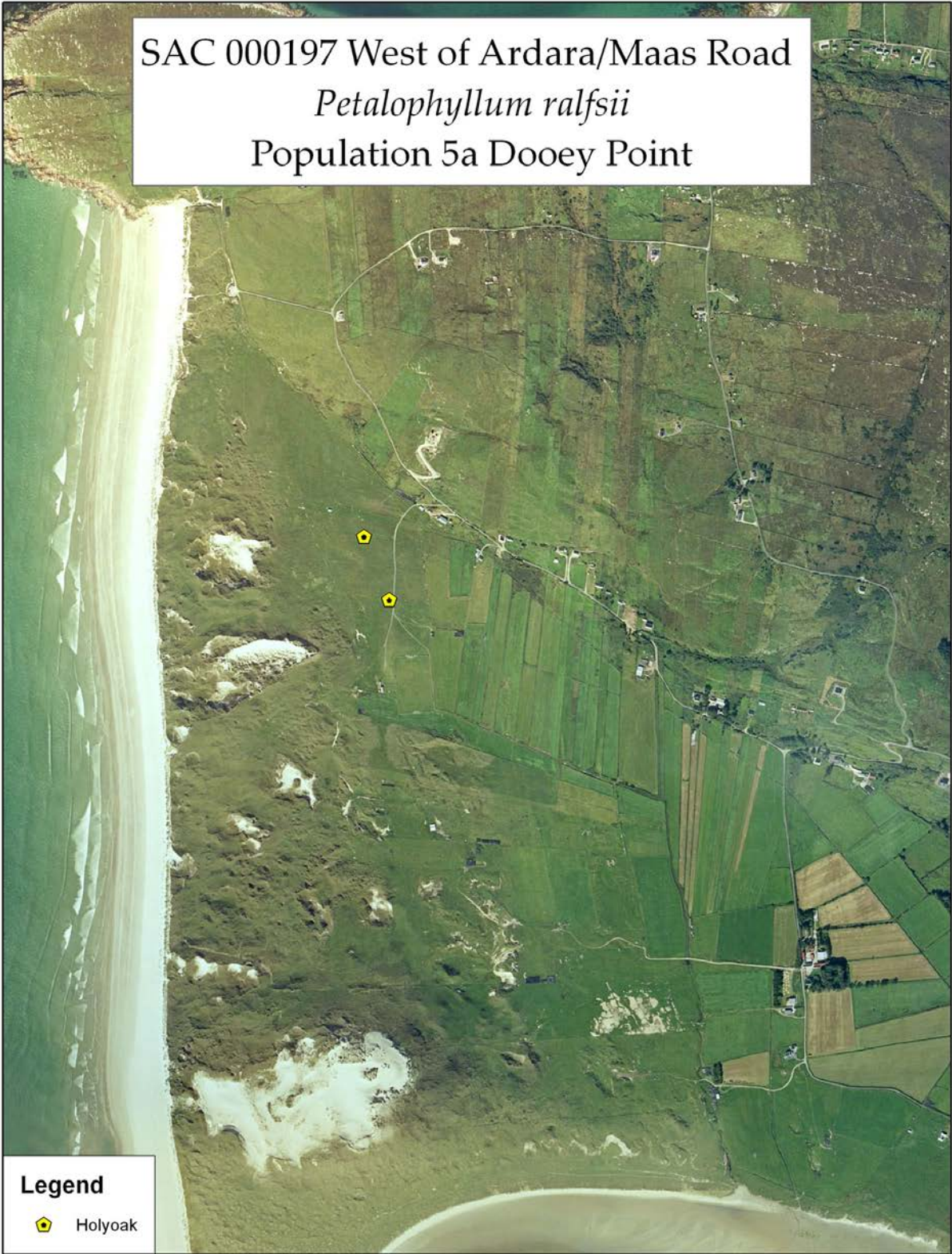


**Population 5a: Dooley Point and Population 5b: Sheskinmore, Co. Donegal
(West of Ardara/Maas Road SAC 000197)**



<p>Produced by: Paul Duffy and Teresa Tuttle Conservation Planning National Parks and Wildlife Service Date: 14th February 2013</p>	<p><i>Petalophyllum ralfsii</i> Draft Area of Suitable Habitat</p>		<p>Map Version 1.0</p>
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SAC 000197 West of Ardara/Maas Road
Petalophyllum ralfsii
Population 5a Dooney Point



Legend

 Holyoak

Produced by: Paul Duffy and Teresa Tuttle
Conservation Planning
National Parks and Wildlife Service
Date: 14th February 2013

Petalophyllum ralfsii
Draft Area of Suitable Habitat




Map Version 1.0

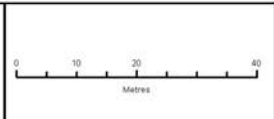
SAC 000197 West of Ardara/Maas Road
Petalophyllum ralfsii
Population 5b Sheskinmore

Legend

-  Campbell & Smyth
-  Campbell, Lockhart & Smyth
-  Lockhart

Produced by: Paul Duffy and Teresa Tuttle
Conservation Planning
National Parks and Wildlife Service
Date: 14th February 2013

Petalophyllum ralfsii
Draft Area of Suitable Habitat



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Map Version 1.0

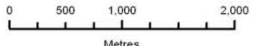

Population 6: Bunduff Machair, Co. Sligo
(Bunduff Lough and Machair/Trawalua/Mullaghmore SAC 000625)

SAC 000625 Bunduff Lough and Machair
 /Trawalua/Mullaghmore
Petalophyllum ralfsii
 Overview

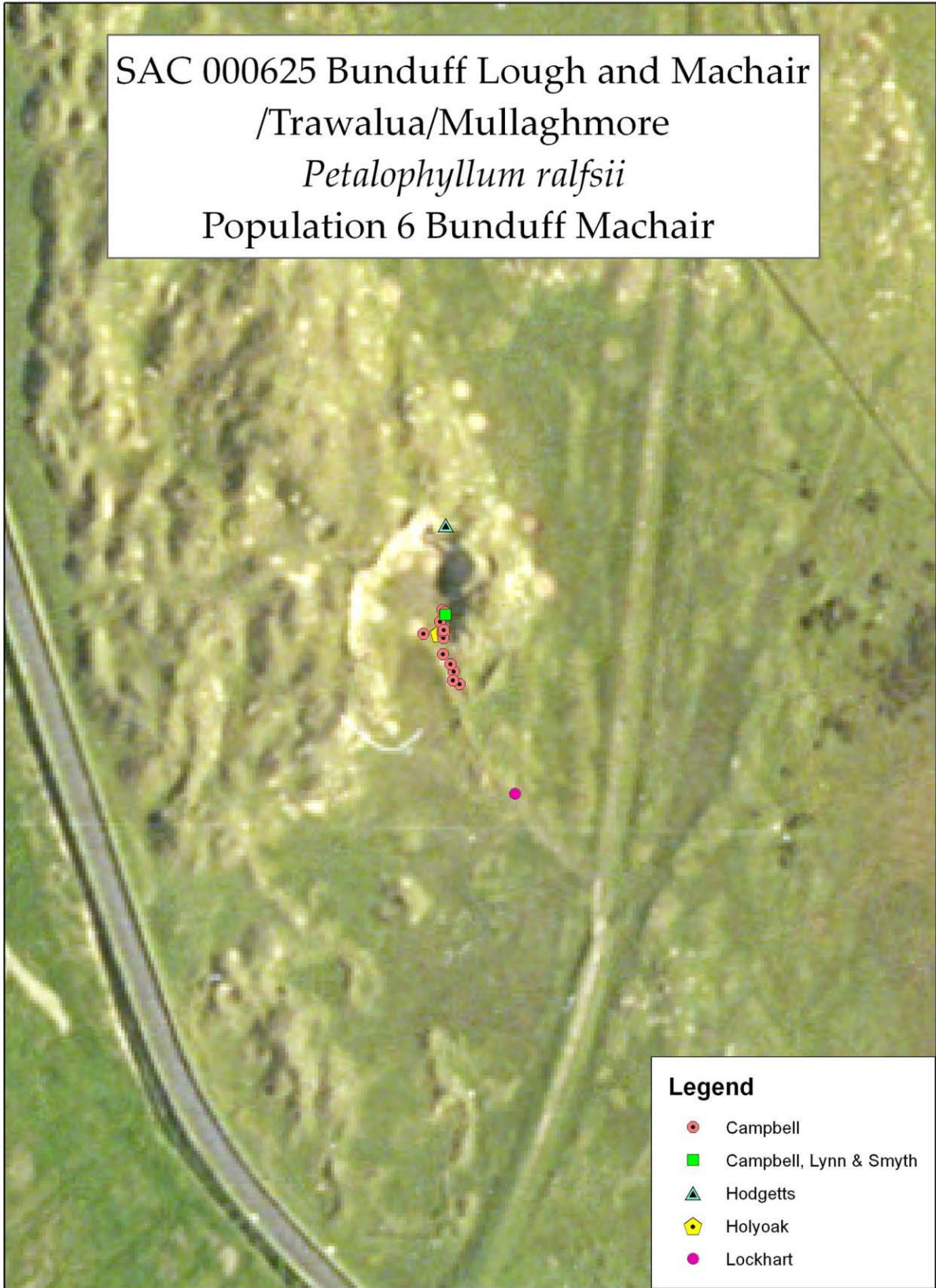


Legend

- Petalophyllum ralfsii* locations
- SAC 000625

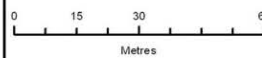
Produced by: Paul Duffy and Teresa Tuttle Conservation Planning National Parks and Wildlife Service Date: 31st January 2013	Conservation Objectives <i>Petalophyllum ralfsii</i> (Natura Code:1395)	<div style="text-align: center;">  <p>0 500 1,000 2,000 Metres</p> </div> <div style="text-align: center;">  <p>N</p> </div> <p align="right">Map Version 1.0</p>
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SAC 000625 Bunduff Lough and Machair
/Trawalua/Mullaghmore
Petalophyllum ralfsii
Population 6 Bunduff Machair



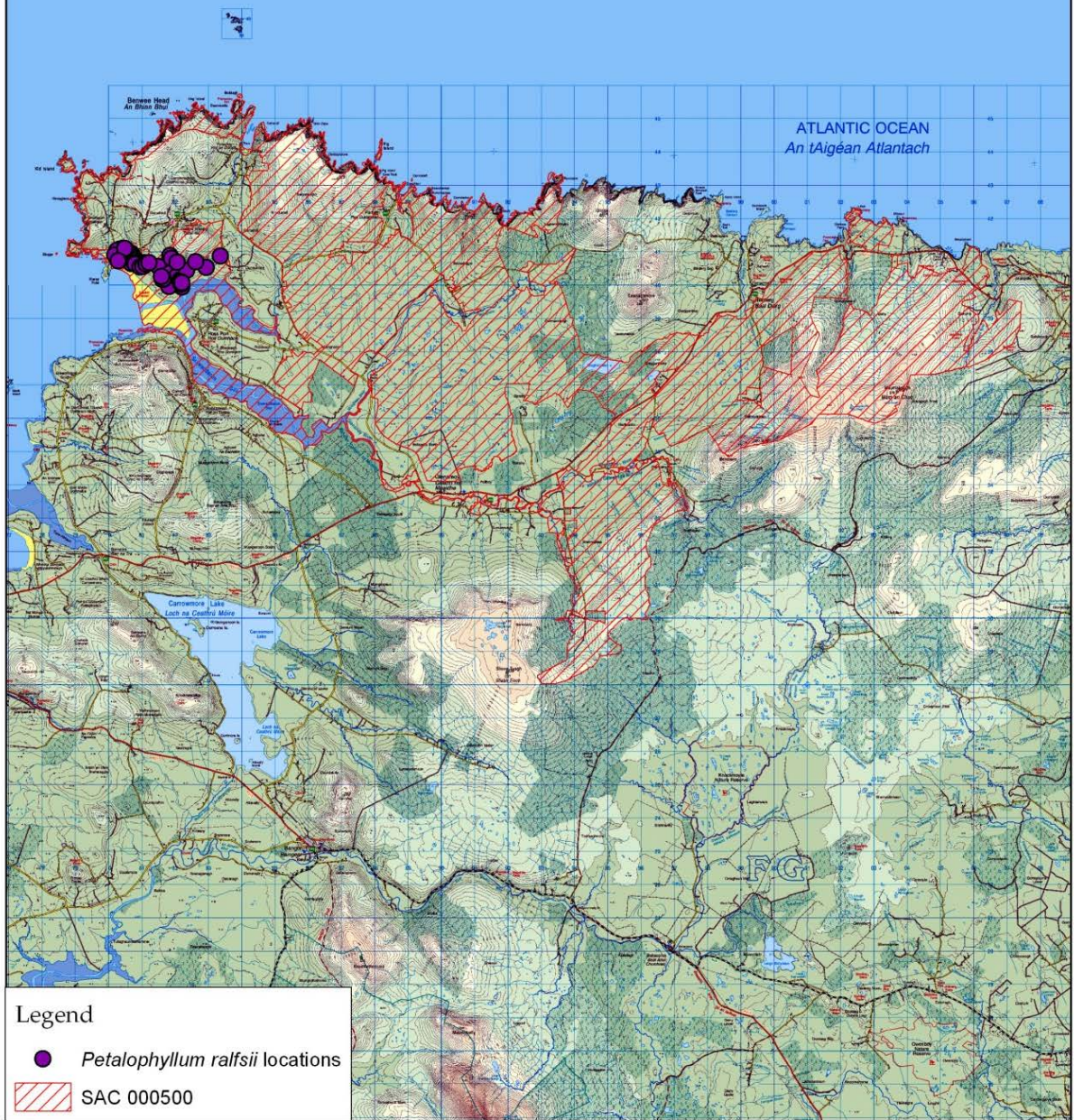
Produced by: Paul Duffy and Teresa Tuttle
Conservation Planning
National Parks and Wildlife Service
Date: 31st January 2013

Conservation Objectives
Petalophyllum ralfsii (Natura Code:1395)



Population 7: Garter Hill, Co. Mayo (Glenamoy Bog Complex SAC 000500)

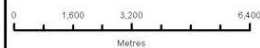
SAC 000500 Glenamoy Bog Complex
Petalophyllum ralfsii
Overview



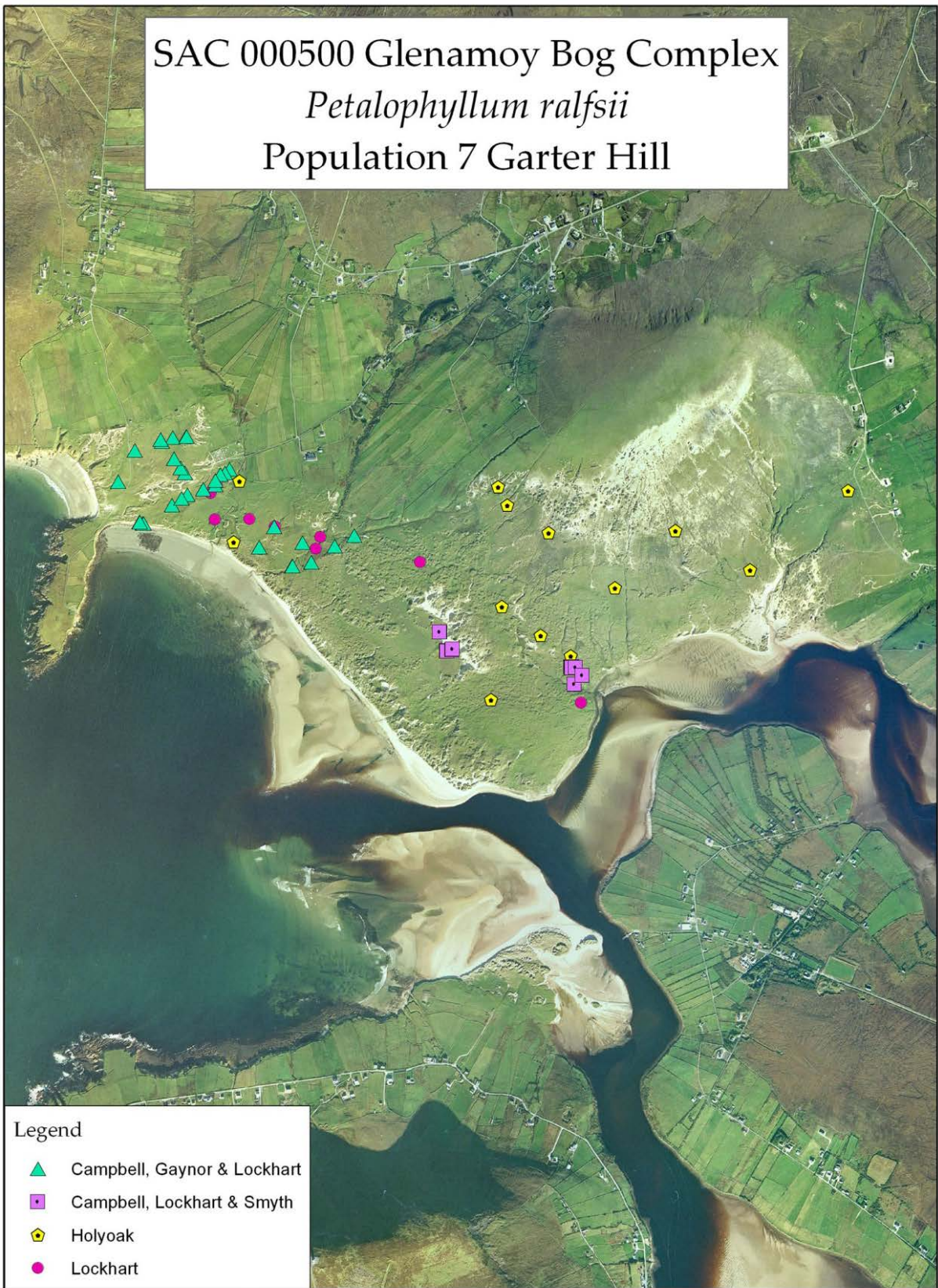
Legend
● *Petalophyllum ralfsii* locations
▨ SAC 000500

Produced by: Paul Duffy and Teresa Tuttle
Conservation Planning
National Parks and Wildlife Service
Date: 19th Feb 2013

Conservation Objectives
Petalophyllum ralfsii (Natura code: 1395)



SAC 000500 Glenamoy Bog Complex
Petalophyllum ralfsii
 Population 7 Garter Hill

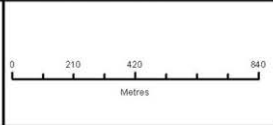


Legend

- ▲ Campbell, Gaynor & Lockhart
- Campbell, Lockhart & Smyth
- ⬠ Holyoak
- Lockhart

Produced by: Paul Duffy and Teresa Tuttle
 Conservation Planning
 National Parks and Wildlife Service
 Date: 19th Feb 2013

Conservation Objectives
Petalophyllum ralfsii (Natura code: 1395)



N

 Map Version 2.0

Population 8a: Doolough Machair and Population 8b: Dooyork Machair, Co. Mayo (Mullet/Blacksod Bay Complex SAC 000470)



SAC 000470 Mullet/Blacksod Bay Complex
Petalophyllum ralfsii
Population 8a Doolough Machair

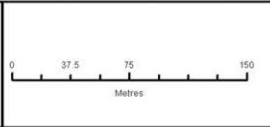



Legend

-  Holyoak
-  Lockhart

Produced by: Paul Duffy and Teresa Tuttle
Conservation Planning
National Parks and Wildlife Service
Date: 30th January 2013

Conservation Objectives
Petalophyllum ralfsii (Natura code: 1395)




Map Version 1.0

SAC 000470 Mullet/Blacksod Bay Complex
Petalophyllum ralfsii
Population 8b Dooyork Machair

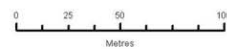


Legend

● Lockhart

Produced by: Paul Duffy and Teresa Tuttle
Conservation Planning
National Parks and Wildlife Service
Date: 30th January 2013

Conservation Objectives
Petalophyllum ralfsii (Natura code: 1395)



Population 9: North Inishkea, Co. Mayo (Inishkea Islands SAC 000507)

SAC 000507 Inishkea Islands
Petalophyllum ralfsii
 Overview

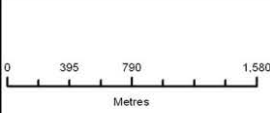


Legend

- *Petalophyllum ralfsii* locations
- SAC 000507

Produced by: Paul Duffy and Teresa Tuttle
 Conservation Planning
 National Parks and Wildlife Service
 Date: 19th February 2013

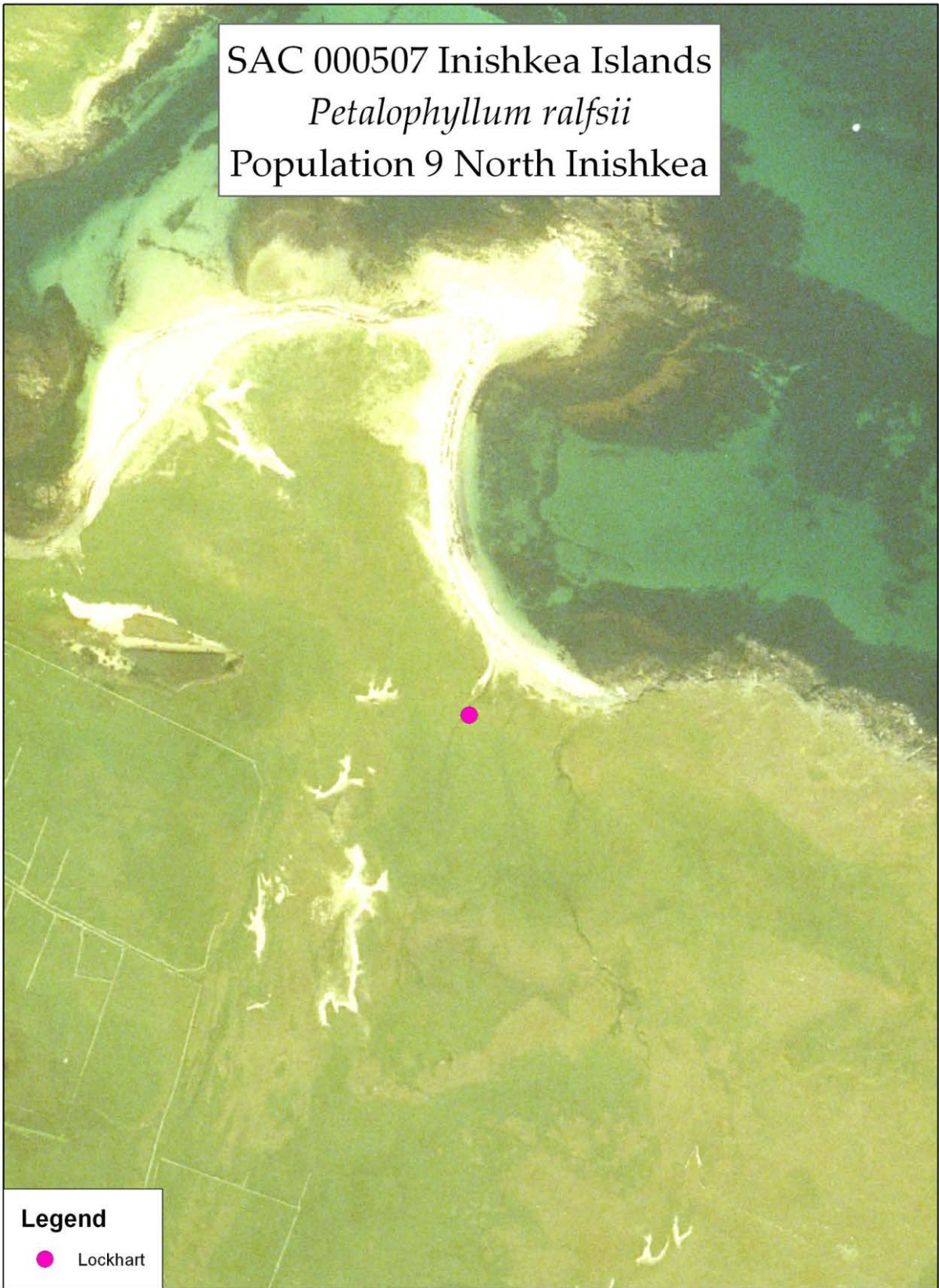
Conservation Objectives
Petalophyllum ralfsii (Natura code: 1395)



N

 Map Version 1.0

SAC 000507 Inishkea Islands
Petalophyllum ralfsii
Population 9 North Inishkea

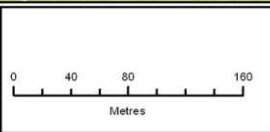


Legend

● Lockhart

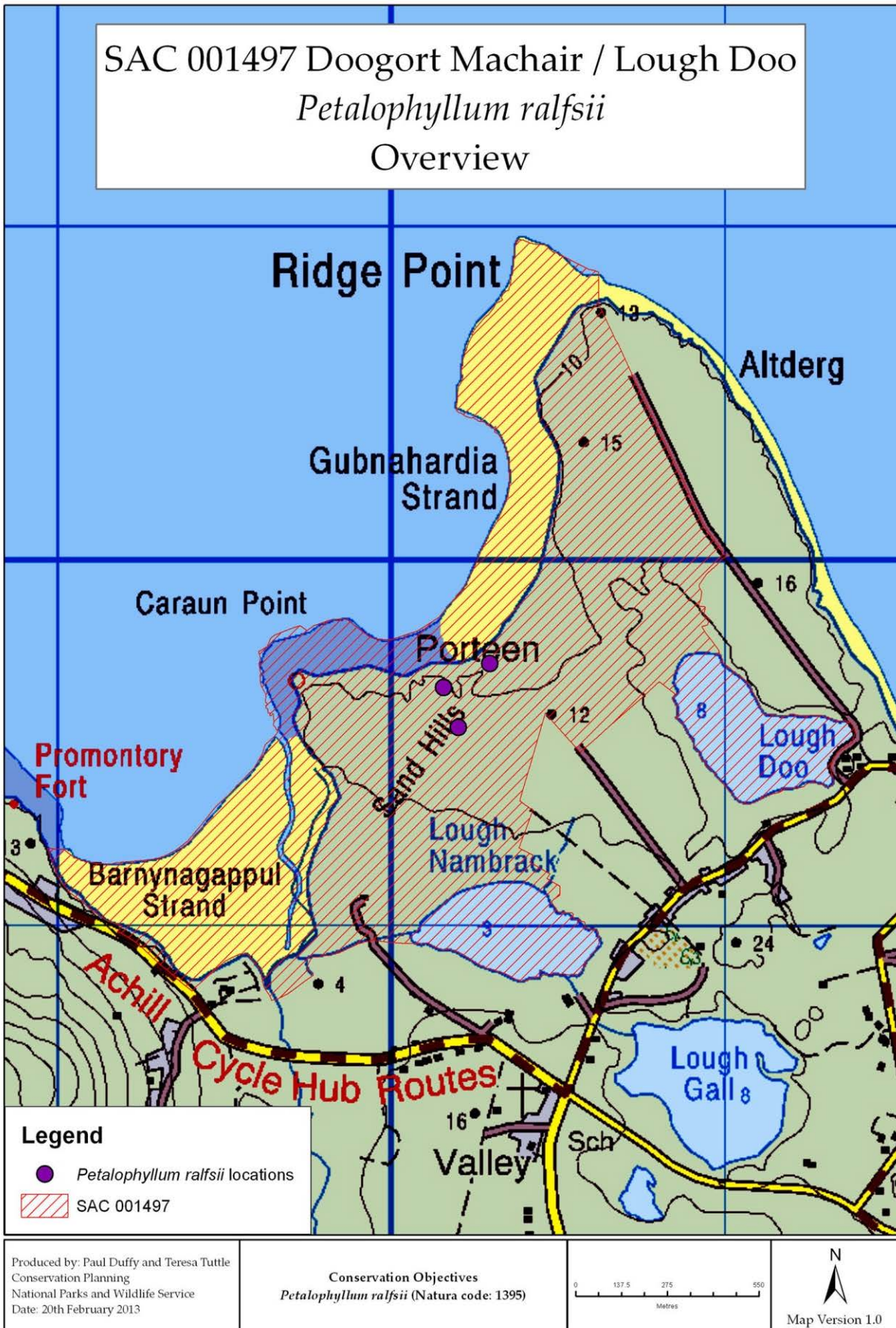
Produced by: Paul Duffy and Teresa Tuttle
Conservation Planning
National Parks and Wildlife Service
Date: 19th February 2013

Conservation Objectives
Petalophyllum ralfsii (Natura code: 1395)

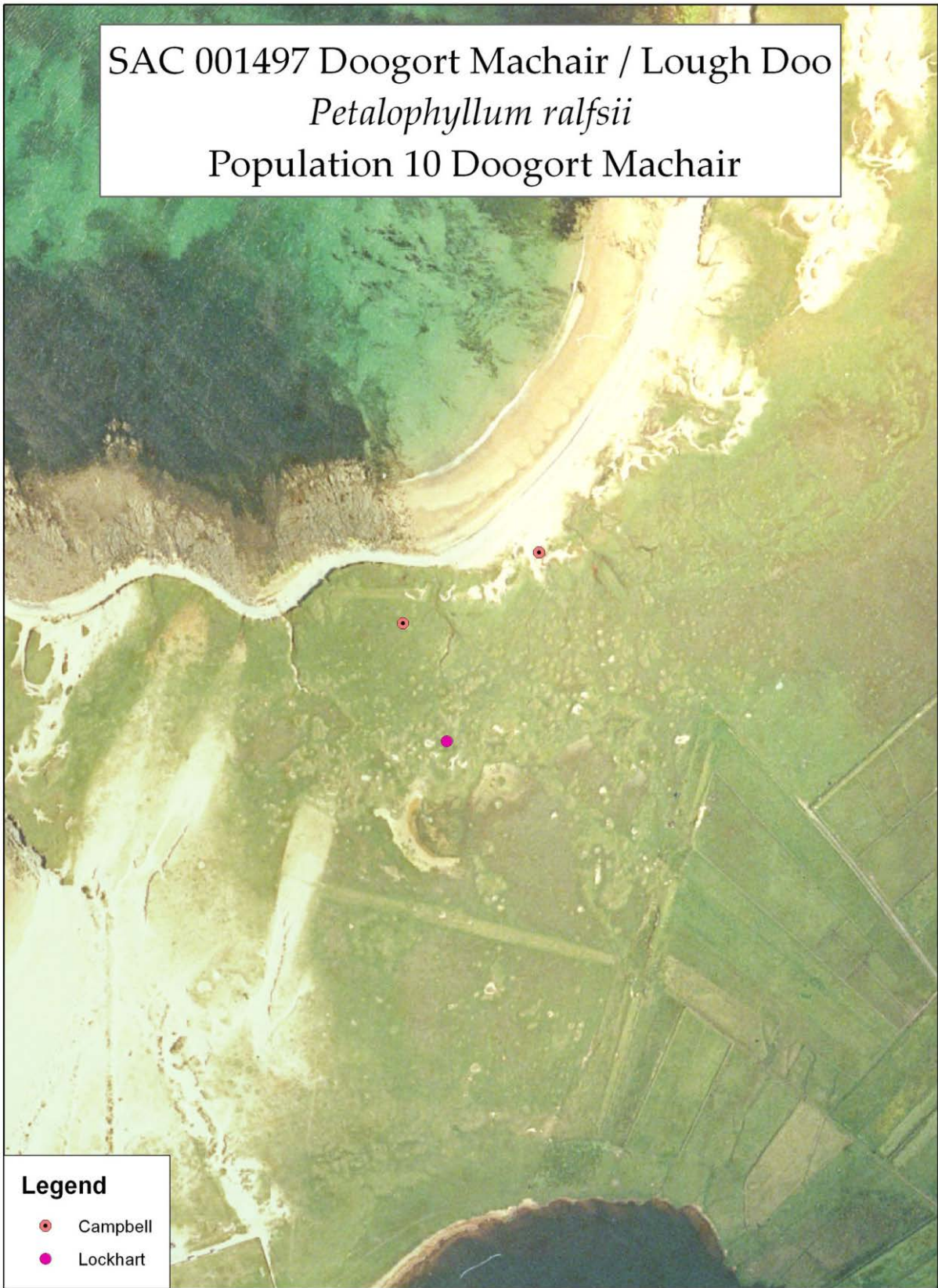


N
Map Version 1.0

**Population 10: Doogort Machair, Co. Mayo
(Doogort Machair/Lough Doo SAC 001497)**



SAC 001497 Doogort Machair / Lough Doo
Petalophyllum ralfsii
Population 10 Doogort Machair

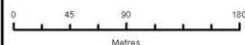


Legend

- Campbell
- Lockhart

Produced by: Paul Duffy and Teresa Tuttle
Conservation Planning
National Parks and Wildlife Service
Date: 20th February 2013

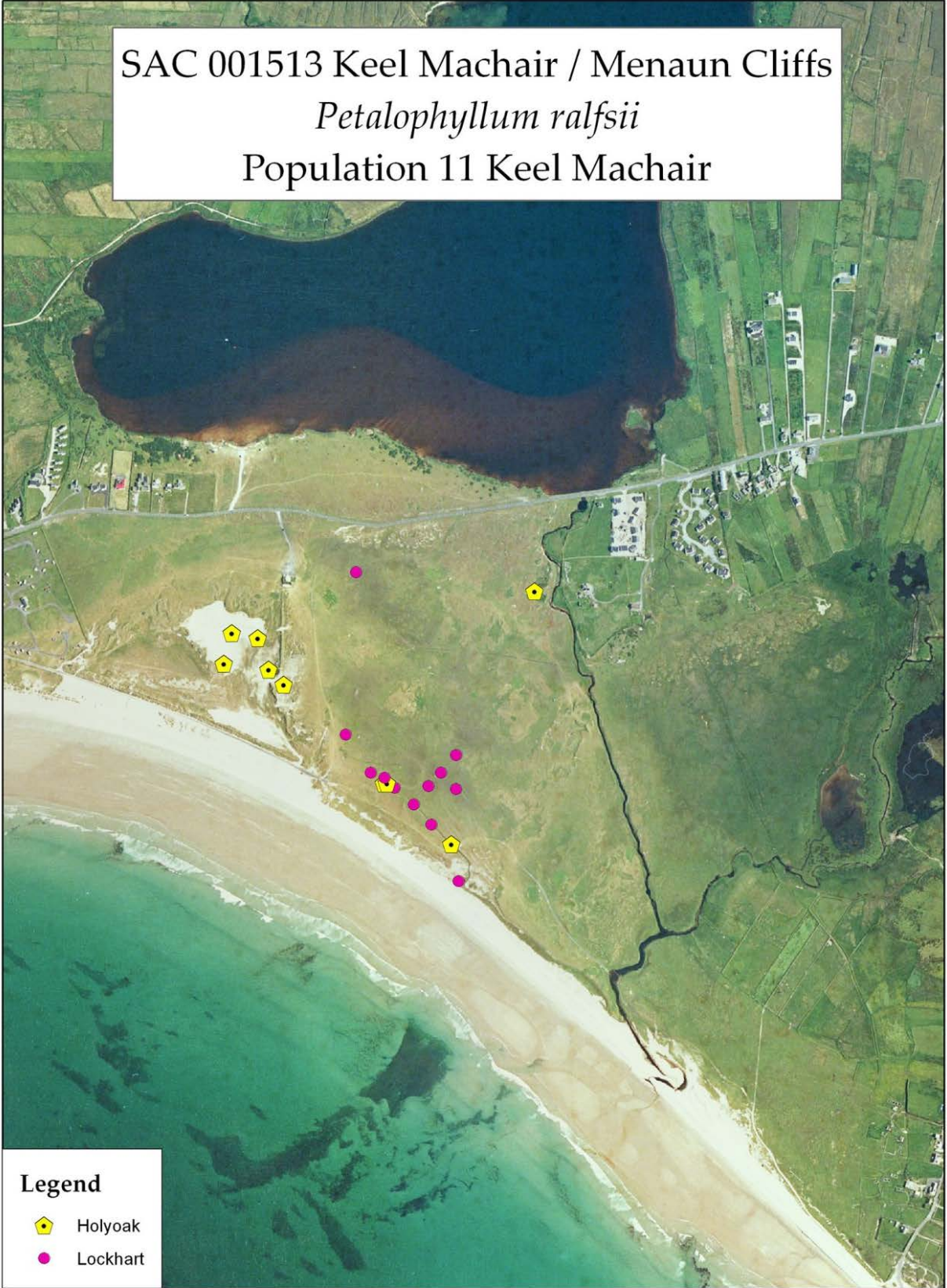
Conservation Objectives
Petalophyllum ralfsii (Natura code: 1395)





Population 11: Keel Machair, Co. Mayo
(Keel Machair/Menaun Cliffs SAC 001513)



SAC 001513 Keel Machair / Menaun Cliffs
Petalophyllum ralfsii
 Population 11 Keel Machair

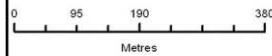


Legend

-  Holyoak
-  Lockhart

Produced by: Paul Duffy and Teresa Tuttle
 Conservation Planning
 National Parks and Wildlife Service
 Date: 20th February 2013

Conservation Objectives
Petalophyllum ralfsii (Natura code: 1395)



**Population 12: Dooaghtry, Co. Mayo
(Mweelrea/Sheeffry/Erriff Complex SAC 001932)**



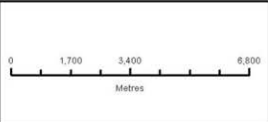
SAC 001932 Mweelrea/Sheeffry/Erriff Complex
Petalophyllum ralfsii
Overview

Legend

- *Petalophyllum ralfsii* locations
- SAC 001932

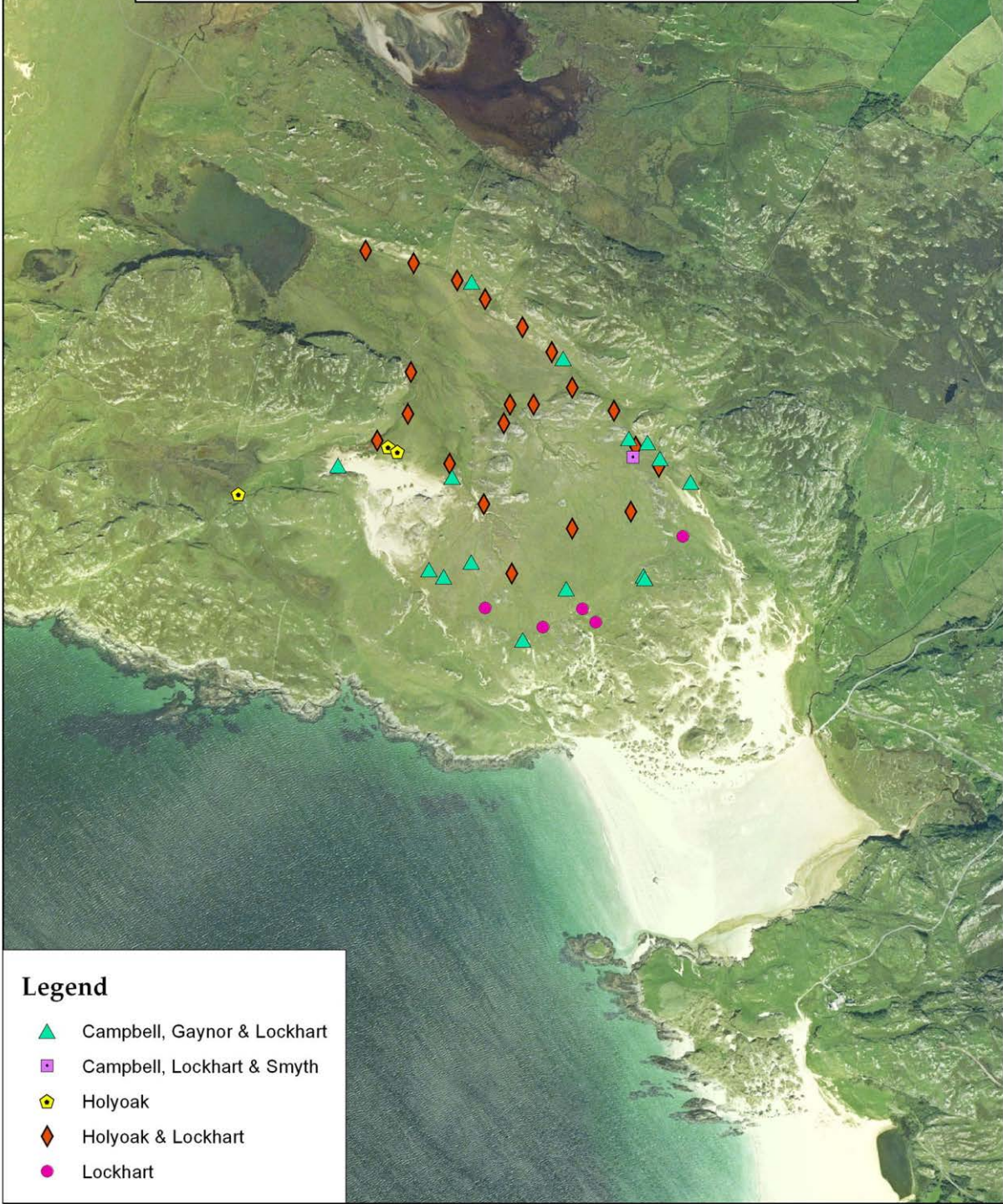
Produced by: Paul Duffy
Conservation Planning
National Parks and Wildlife Service
Date: 21st February 2013

Conservation Objectives
Petalophyllum ralfsii (Natura code: 1395)



N
↑
Map Version 1.0

SAC 001932 Mweelrea/Sheeffry/Erriff Complex
Petalophyllum ralfsii
 Population 12 Dooaghtry



Legend

- ▲ Campbell, Gaynor & Lockhart
- Campbell, Lockhart & Smyth
- ⬠ Holyoak
- ◆ Holyoak & Lockhart
- Lockhart

Produced by: Paul Duffy Conservation Planning National Parks and Wildlife Service Date: 21st February 2013	Conservation Objectives <i>Petalophyllum ralfsii</i> (Natura code: 1395)	<p>0 110 220 440 Metres</p>	<p>N</p> <p>Map Version 1.0</p>
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Population 13: Omey Island Machair, Co. Galway
(Omey Island Machair SAC 001309)



SAC 001309 Omey Island Machair
Petalophyllum ralfsii
Population 13 Omey Island Machair

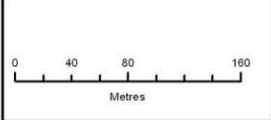


Legend

- Lockhart
- ◆ Long

Produced by: Paul Duffy and Teresa Tuttle
Conservation Planning
National Parks and Wildlife Service
Date: 19th February 2013

Conservation Objectives
Petalophyllum ralfsii (Natura code: 1395)



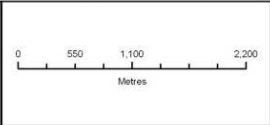
N
Map Version 1.0

Population 14a: Mannin More, Population 14b: Truska Machair and Population 14c: Doon Hill/West of Aillebrack, Co. Galway(Slyne Head Peninsula SAC 002074)



Produced by: Paul Duffy and Teresa Tuttle
Conservation Planning
National Parks and Wildlife Service
Date: 29th January 2013

Conservation Objectives
Petalophyllum ralfsii (Natura code: 1395)





N
Map Version 1.0

SAC 002074 Slyne Head Peninsula
Petalophyllum ralfsii
Population 14a Mannin More

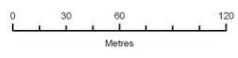


Legend

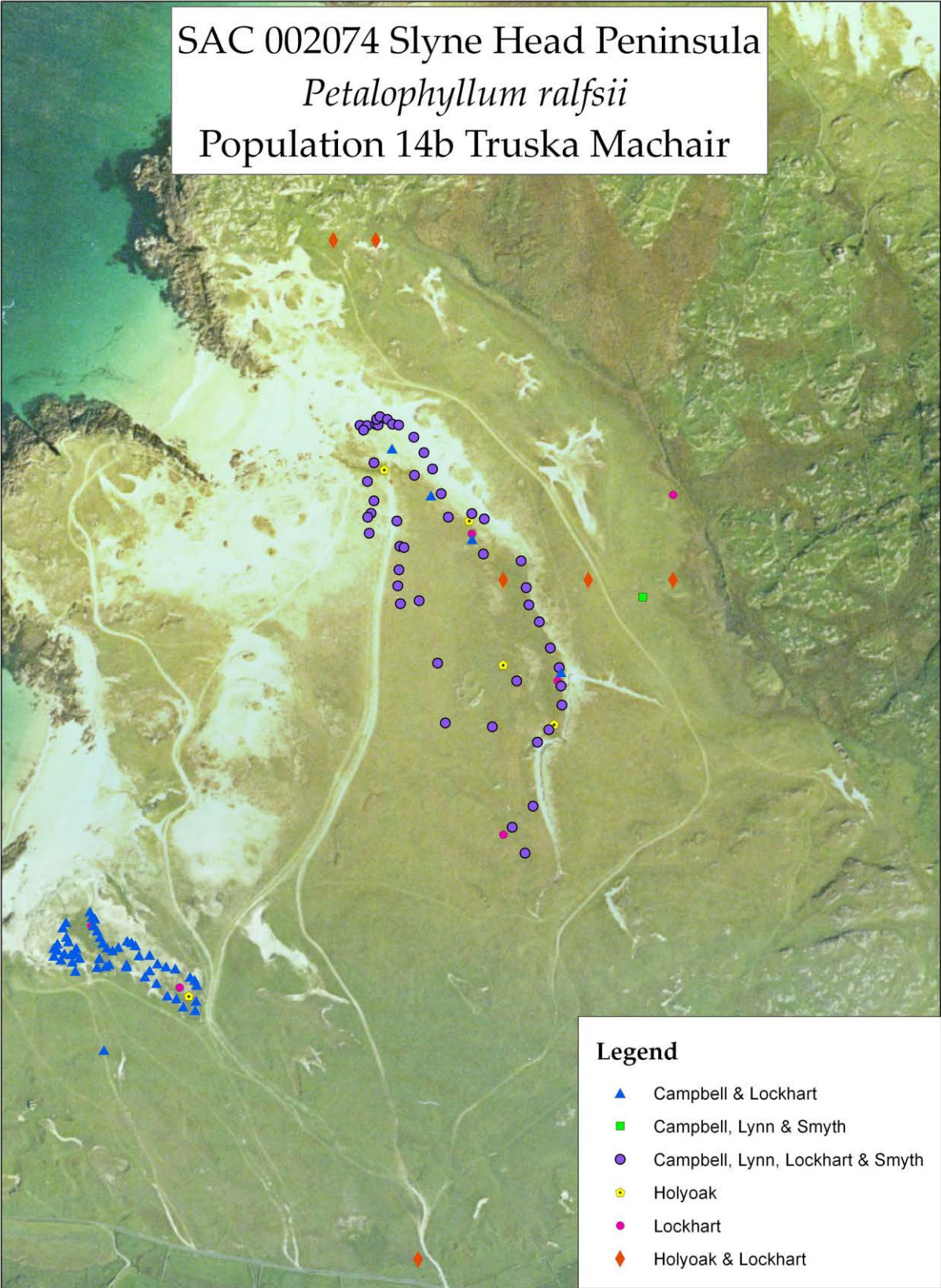
-  Holyoak
-  Lockhart

Produced by: Paul Duffy and Teresa Tuttle
Conservation Planning
National Parks and Wildlife Service
Date: 29th January 2013

Conservation Objectives
Petalophyllum ralfsii (Natura code: 1395)



SAC 002074 Slyne Head Peninsula
Petalophyllum ralfsii
 Population 14b Truska Machair

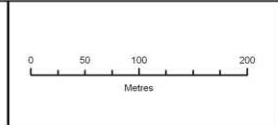


Legend

- ▲ Campbell & Lockhart
- Campbell, Lynn & Smyth
- Campbell, Lynn, Lockhart & Smyth
- Holyoak
- Lockhart
- ◆ Holyoak & Lockhart

Produced by: Paul Duffy and Teresa Tuttle
 Conservation Planning
 National Parks and Wildlife Service
 Date: 23rd January 2013

Conservation Objectives
Petalophyllum ralfsii (Natura code: 1395)



SAC 002074 Slyne Head Peninsula
Petalophyllum ralfsii
Population 14c Doon Hill/West of Aillebrack

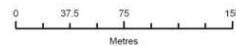


Legend

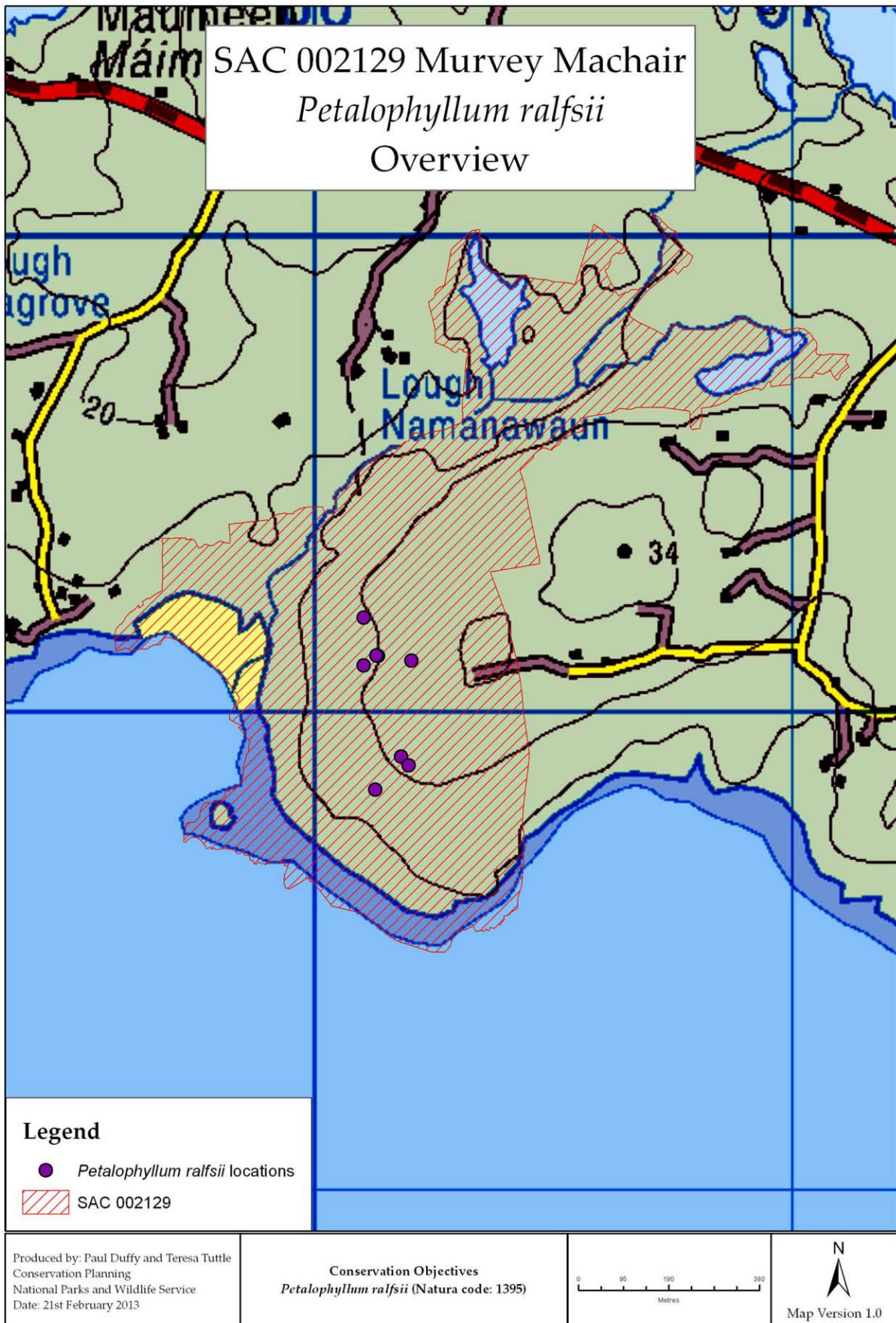
-  Holyoak
-  Lockhart
-  Holyoak & Lockhart

Produced by: Paul Duffy and Teresa Tuttle
Conservation Planning
National Parks and Wildlife Service
Date: 29th January 2013

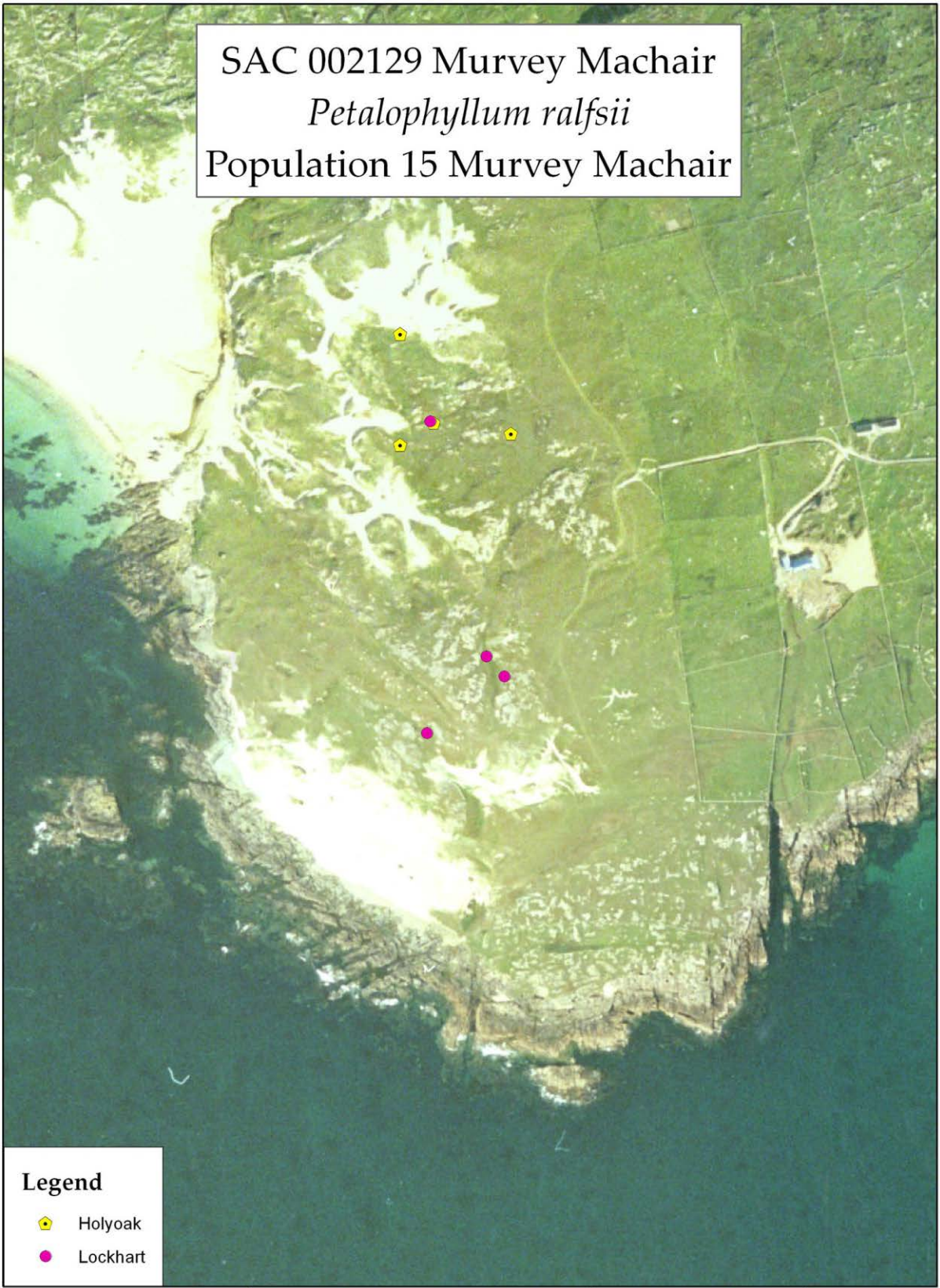
Conservation Objectives
Petalophyllum ralfsii (Natura code: 1395)





Population 15: Murvey Machair, Co. Galway (Murvey Machair SAC 002129)



SAC 002129 Murvey Machair
Petalophyllum ralfsii
Population 15 Murvey Machair



Legend

-  Holyoak
-  Lockhart

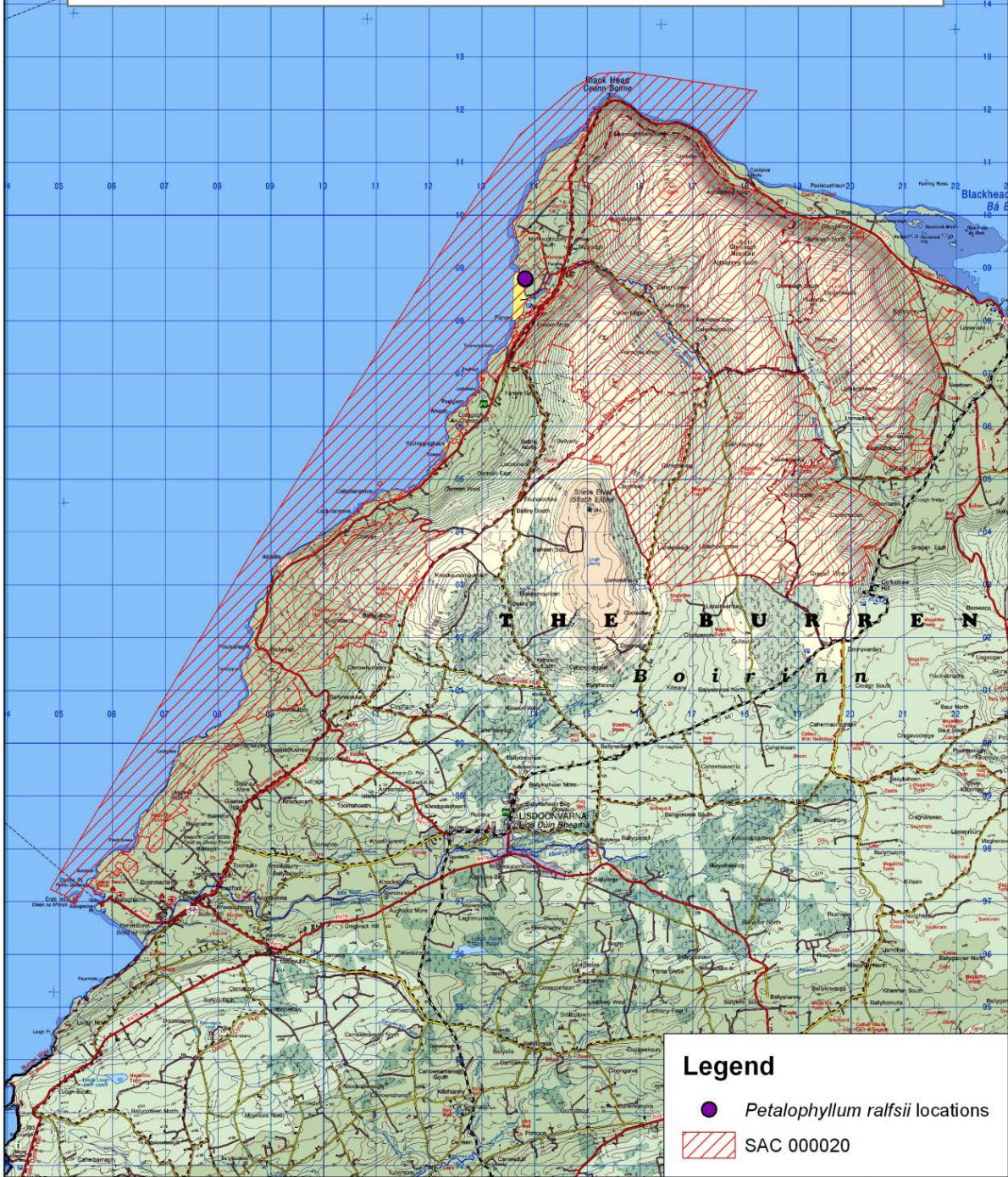
Produced by: Paul Duffy and Teresa Tuttle
Conservation Planning
National Parks and Wildlife Service
Date: 21st February 2013

Conservation Objectives
Petalophyllum ralfsii (Natura code: 1395)



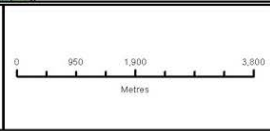
**Population 16: Fanore, Co. Clare
(Black Head-Poulsallagh Complex SAC 000020)**

SAC 000020 Black Head - Poulsallagh Complex
Petalophyllum ralfsii
Overview



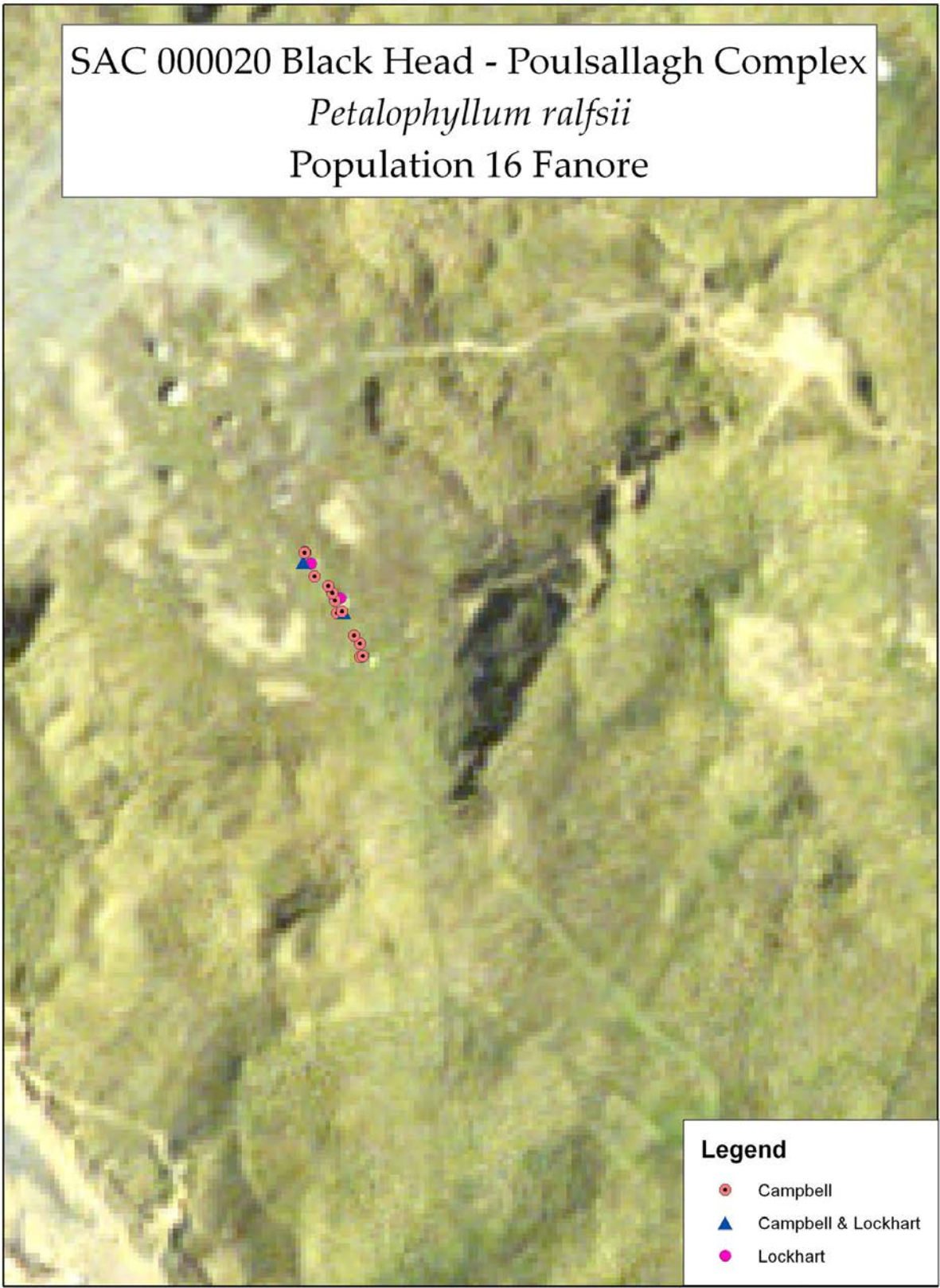
Produced by: Paul Duffy and Teresa Tuttle
Conservation Planning
National Parks and Wildlife Service
Date: 31st January 2013

Conservation Objectives
Petalophyllum ralfsii (Natura Code: 1395)



N
Map Version 1.0

SAC 000020 Black Head - Poulsallagh Complex
Petalophyllum ralfsii
 Population 16 Fanore

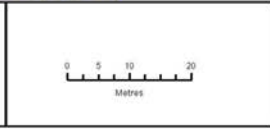


Legend

- Campbell
- ▲ Campbell & Lockhart
- Lockhart

Produced by: Paul Duffy and Teresa Tuttle
 Conservation Planning
 National Parks and Wildlife Service
 Date: 31st January 2013

Conservation Objectives
Petalophyllum ralfsii (Natura Code: 1395)

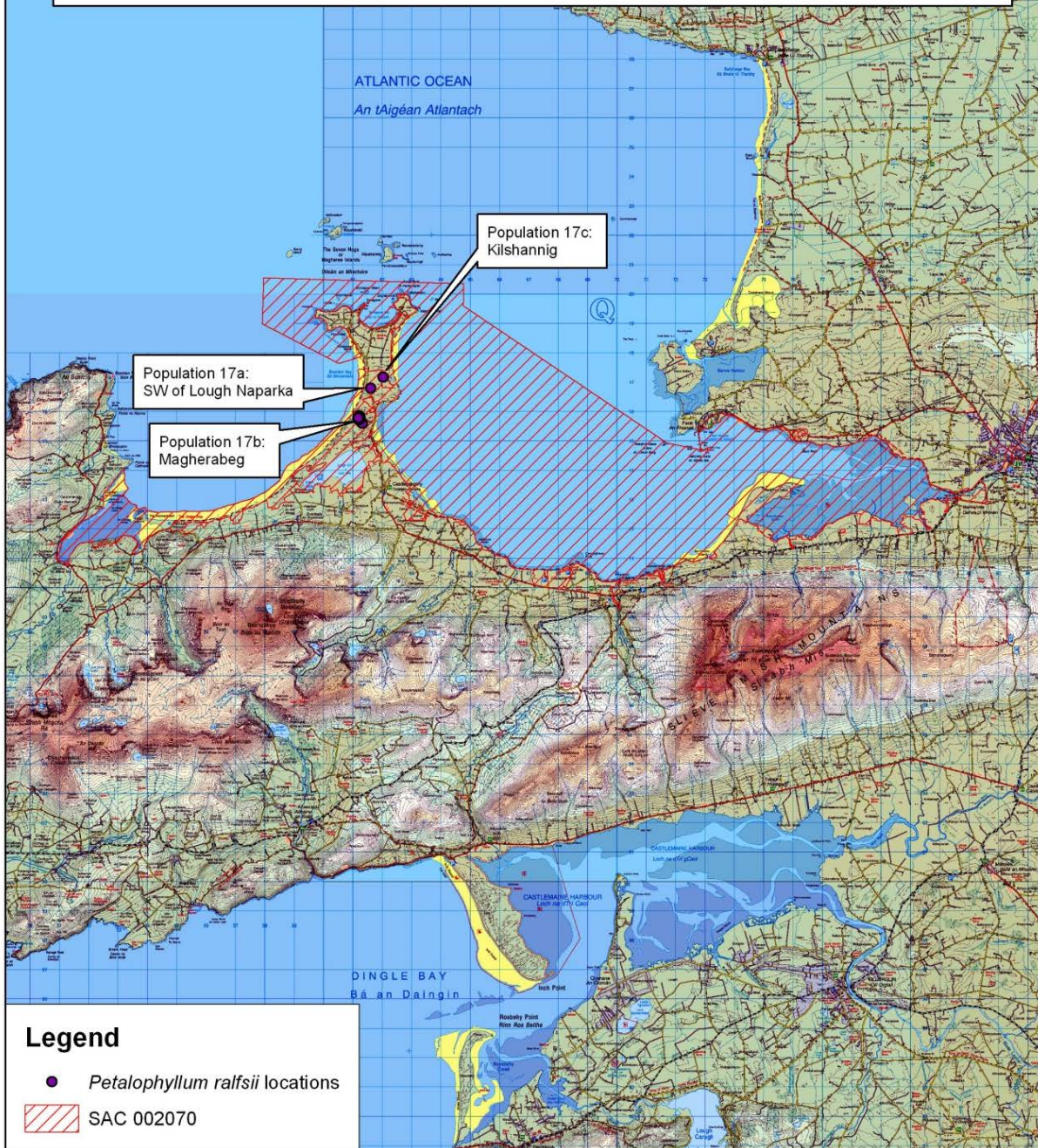


N

 Map Version 1.0

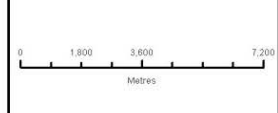
Population 17a: SW of Lough Naparka, Population 17b: Magherabeg and Population 17c: Kilshannig, Co. Kerry (Tralee Bay and Magharees Peninsula, West to Cloghane SAC 002070)

SAC 002070 Tralee Bay and Magharees Peninsula,
West to Cloghane
Petalophyllum ralfsii
Overview



Produced by: Paul Duffy and Teresa Tuttle
Conservation Planning
National Parks and Wildlife Service
Date: 5th March 2013

Conservation Objectives
Petalophyllum ralfsii (Natura code: 1395)



SAC 002070 Tralee Bay and Magharees Peninsula,
West to Cloghane
Petalophyllum ralfsii
Population 17a SW of Lough Naparka

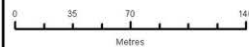


Legend

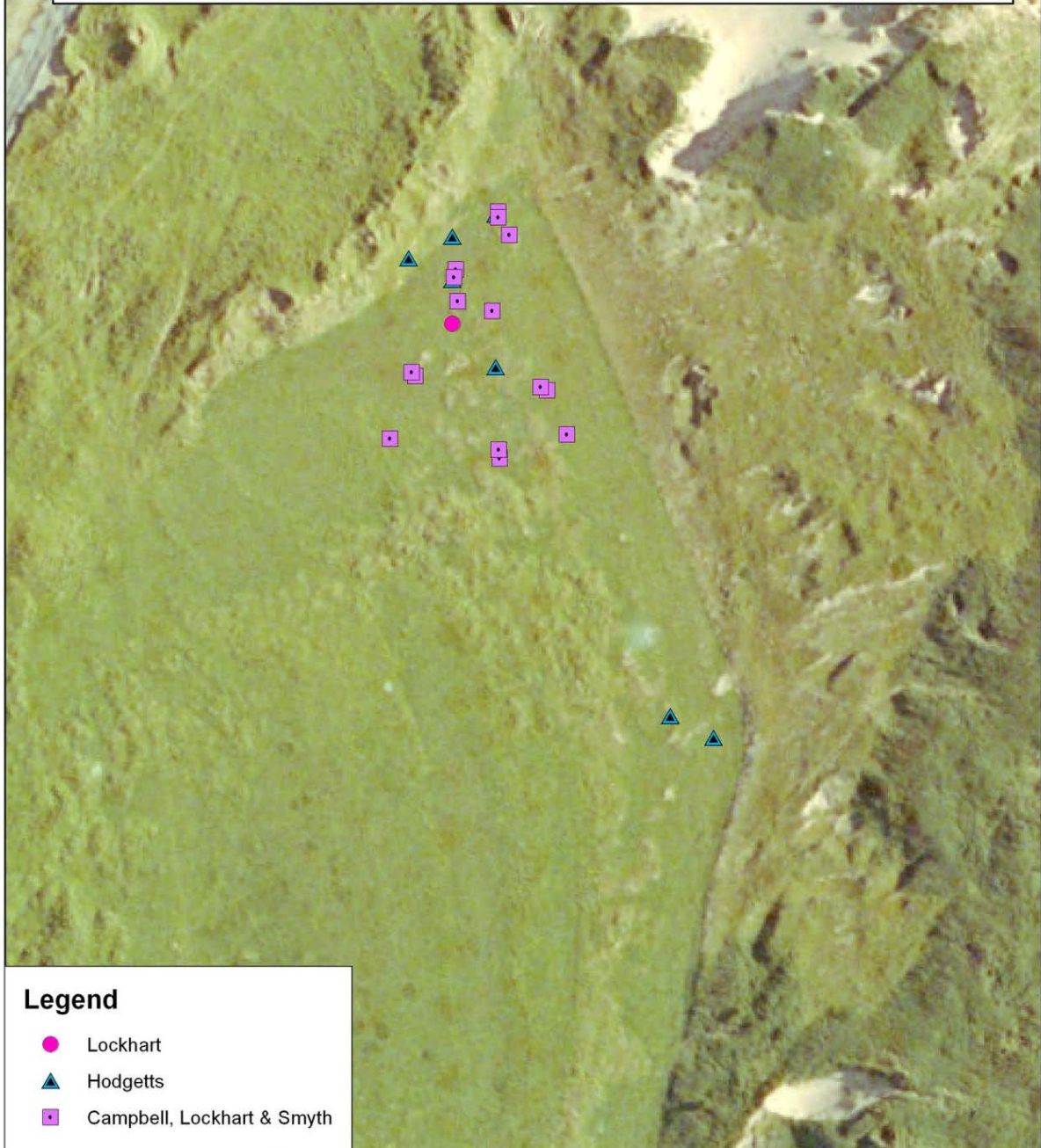
● Lockhart

Produced by: Paul Duffy and Teresa Tuttle
Conservation Planning
National Parks and Wildlife Service
Date: 6th March 2013

Conservation Objectives
Petalophyllum ralfsii (Natura code: 1395)



SAC 002070 Tralee Bay and Magharees Peninsula,
West to Cloghane
Petalophyllum ralfsii
Population 17b Magherabeg

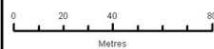


Legend

- Lockhart
- ▲ Hodgetts
- Campbell, Lockhart & Smyth

Produced by: Paul Duffy and Teresa Tuttle
Conservation Planning
National Parks and Wildlife Service
Date: 6th March 2013


Conservation Objectives
Petalophyllum ralfsii (Natura code: 1395)



SAC 002070 Tralee Bay and Magharees Peninsula,
West to Cloghane
Petalophyllum ralfsii
Population 17c Kilshannig

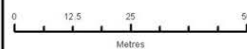


Legend

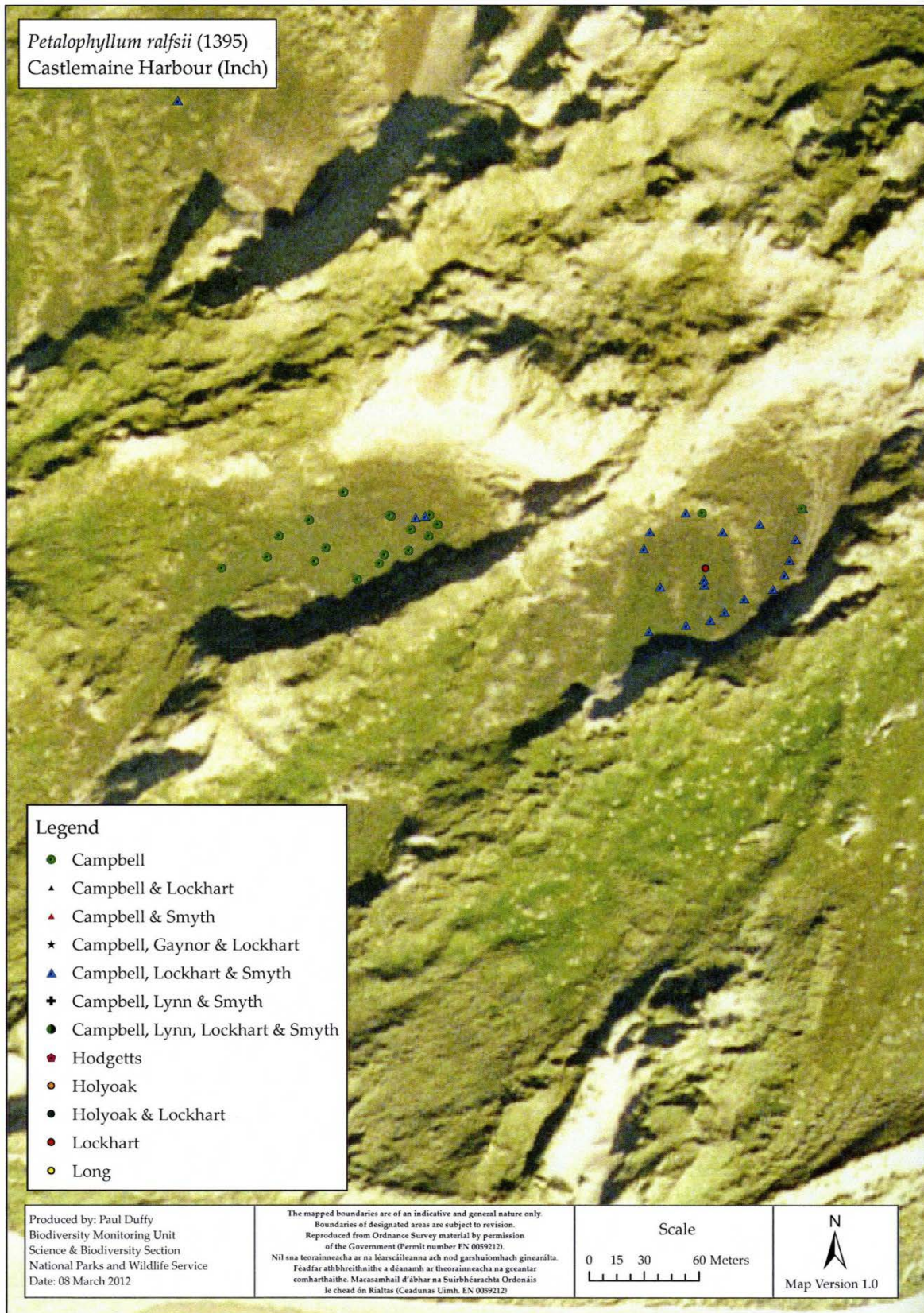
 Hodgetts

Produced by: Paul Duffy and Teresa Tuttle
Conservation Planning
National Parks and Wildlife Service
Date: 6th March 2013

Conservation Objectives
Petalophyllum ralfsii (Natura code: 1395)



**Population 18a: Inch Spit and Population 18b: Rossbehy, Co. Kerry
(Castlemaine Harbour SAC 000343)**



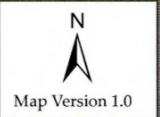
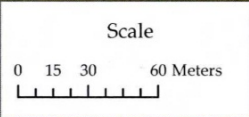
Petalophyllum ralfsii (1395)
 Castlemaine Harbour (Rosbehy)



- Legend**
- Campbell
 - Hodgetts
 - ▲ Holyoak
 - ★ Holyoak & Lockhart
 - Lockhart
 - ▲ Long

Produced by: Paul Duffy
 Biodiversity Monitoring Unit
 Science & Biodiversity Section
 National Parks and Wildlife Service
 Date: 08 March 2012

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 Féadfar athbheithníthe a déanamh ar theorainneacha na gceantar
 comharthaíthe. Macasamhail d'ábhar na Suirbhéarachta Ordonaís
 le chead ón Rialtas (Ceadúnas Uimh. EN 0059212)

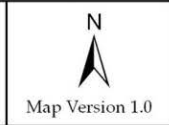
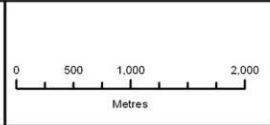


Population 19: West of Inny Ferry, Co. Kerry
 (Ballinskelligs Bay and Inny Estuary 000335)



Produced by: Paul Duffy and Teresa Tuttle
 Conservation Planning
 National Parks and Wildlife Service
 Date: 14th February 2013

Conservation Objectives
Petalophyllum ralfsii (Natura code: 1395)



SAC 000335 Ballinskelligs Bay and Inny Estuary
Petalophyllum ralfsii
Population 19 West of Inny Ferry

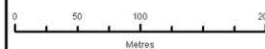


Legend

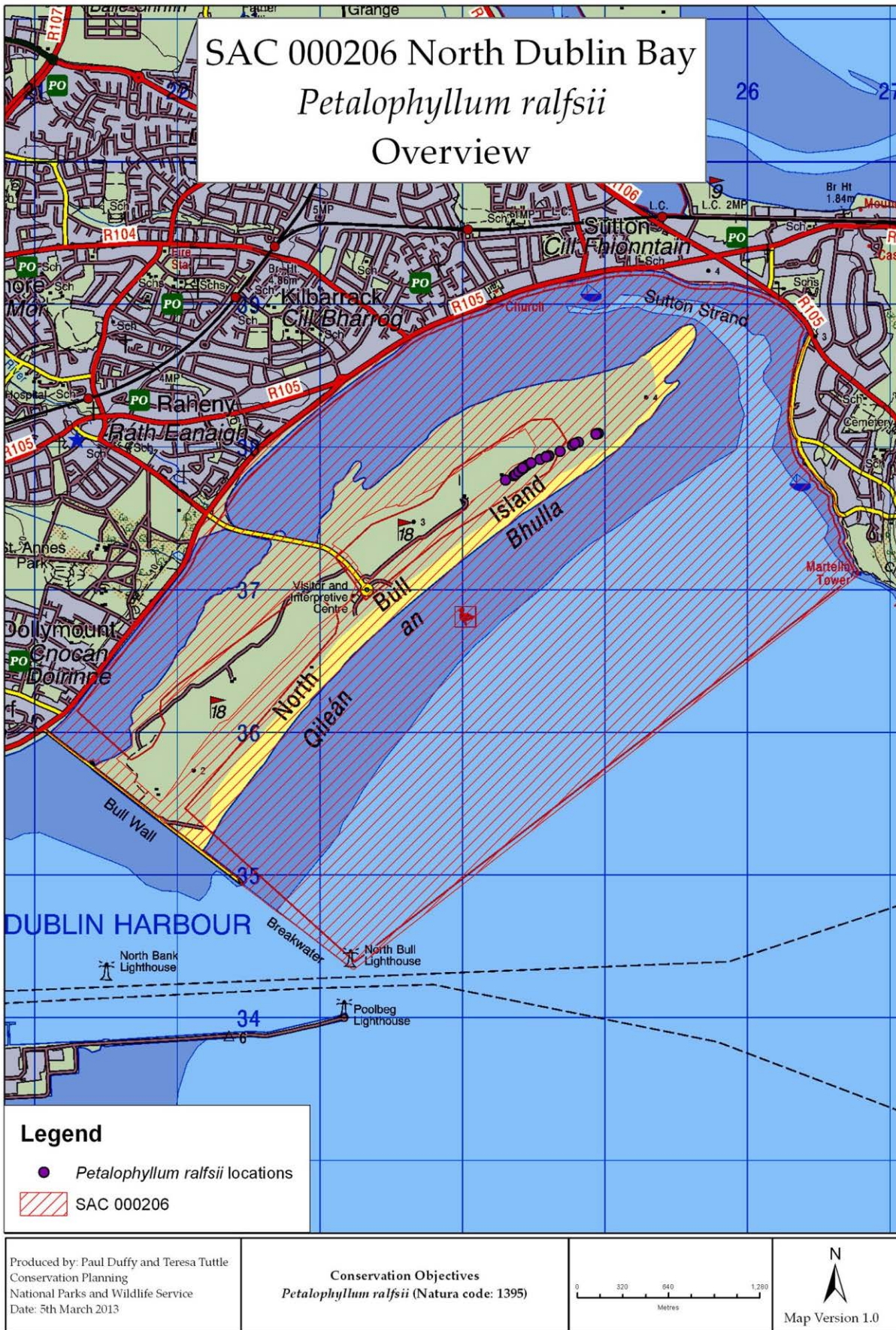
● Lockhart

Produced by: Paul Duffy and Teresa Tuttle
Conservation Planning
National Parks and Wildlife Service
Date: 14th February 2013

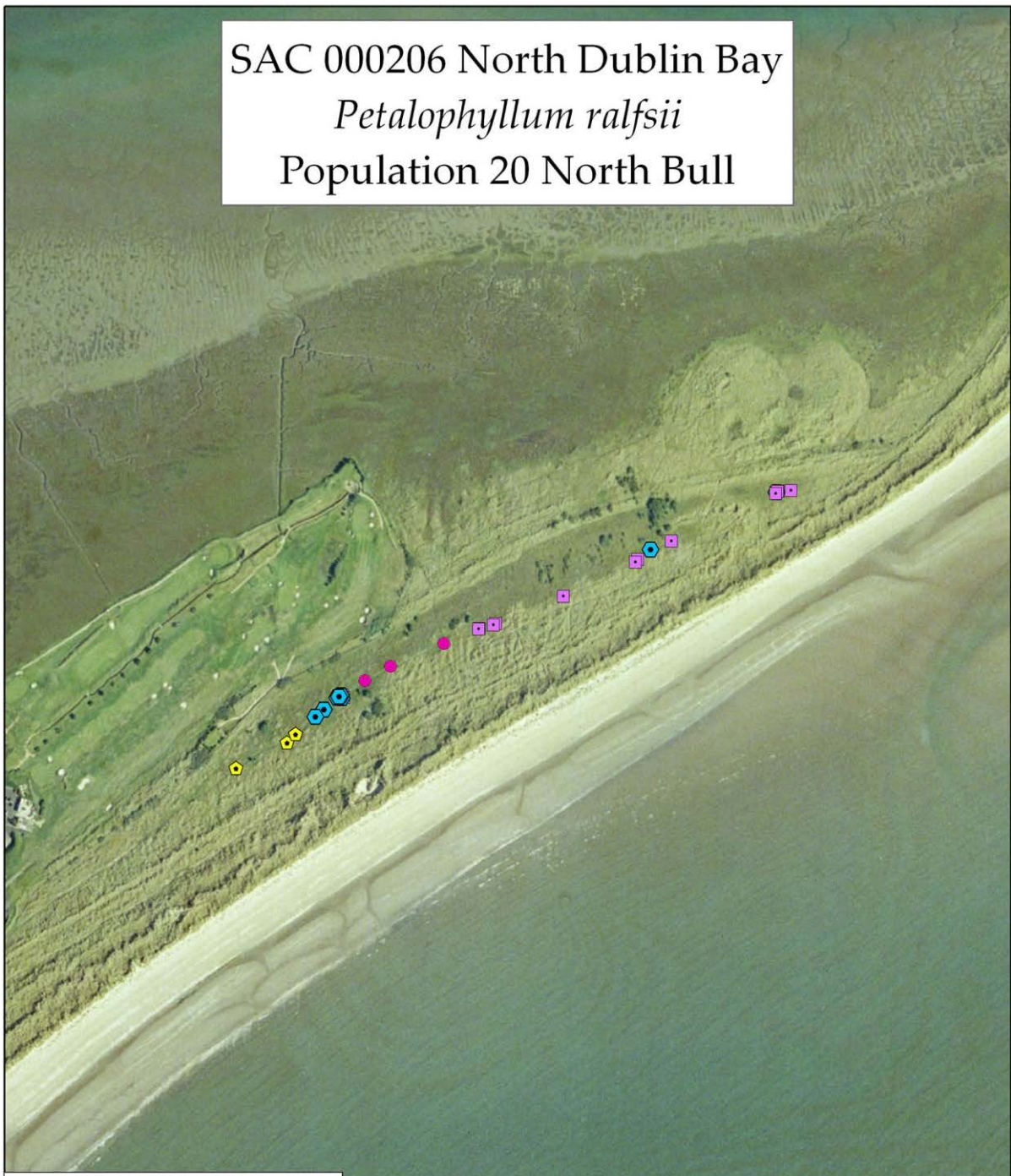
Conservation Objectives
Petalophyllum ralfsii (Natura code: 1395)



Population 20: North Bull, Dublin (North Dublin Bay SAC 000270)



SAC 000206 North Dublin Bay
Petalophyllum ralfsii
 Population 20 North Bull

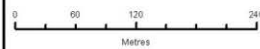


Legend

-  Campbell & Smyth
-  Campbell, Lockhart & Smyth
-  Holyoak
-  Lockhart

Produced by: Paul Duffy and Teresa Tuttle
 Conservation Planning
 National Parks and Wildlife Service
 Date: 5th March 2013

Conservation Objectives
Petalophyllum ralfsii (Natura code: 1395)



**Population 21: Barley Cove, Co. Cork
(Barley Cove to Ballyrisode Point SAC 001040)**



Petalophyllum ralfsii (1395)
Barley Cove to Ballyrisode Point

- Legend**
- Campbell
 - Hodgetts
 - ▲ Holyoak
 - ★ Holyoak & Lockhart
 - Lockhart
 - ▲ Long

Produced by: Paul Duffy
Biodiversity Monitoring Unit
Science & Biodiversity Section
National Parks and Wildlife Service
Date: 08 March 2012

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Feadfar athbhreithniú a déanamh ar theorainneacha na gceantar
comharthaíthe. Macasamhail d'ábhar na Suirbhéaracha Ordoimais
le chead ón Rialtas (Ceadúnas Uimh. EN 0059212)

Scale

0 15 30 60 Meters

N
▲
Map Version 1.0

Appendix II – Site surveillance recording sheets

Individual site surveillance recording sheets have been compiled for the following sites:

- 1.** Rosses Strand, Co. Donegal – Dune slack population
- 2.** Rosepenna, Co. Donegal – Dune slack population
- 3.** Tramore/Black Burrow/SW of Dunfanaghy, Co. Donegal – Dune slack population
- 4a.** Damph Beg, Co. Donegal – Dune slack population
- 4b.** Derrybeg, Co. Donegal – Dune slack population
- 4c.** Keadew Point, Co. Donegal – Dune slack population
- 5a.** Dooy Point, Co. Donegal – Dune slack population
- 5b.** Sheskinmore, Co. Donegal – Dune slack population
- 6.** Bunduff, Co. Sligo – Dune slack population
- 7.** Garter Hill, Co. Mayo – Machair population
- 8a.** Doolough Machair, Co. Mayo – Machair population
- 8b.** Dooyork Machair, Co. Mayo – Machair population
- 9.** North Inishkea, Co. Mayo – Machair population
- 10.** Doogort Machair, Co. Mayo – Machair population
- 11.** Keel Machair, Co. Mayo – Machair population
- 12.** Dooaghtry, Co. Mayo – Machair population
- 13.** Omev Island Machair, Co. Galway – Machair population
- 14a.** Mannin More, Co. Galway – Machair population
- 14b.** Truska Machair, Co. Galway – Machair population
- 14c.** Doon Hill/W. of Aillebrack, Co. Galway – Machair population
- 15.** Murvey Machair, Co. Galway – Machair population
- 16.** Fanore, Co. Clare – Dune slack population
- 17a.** SW of Lough Naparka, Co. Kerry – Dune slack population
- 17b.** Magherabeg, Co. Kerry – Dune slack population
- 17c.** Kilshannig, Co. Kerry – Dune slack population
- 18a.** Inch Spit, Co. Kerry – Dune slack population
- 18b.** Rossbehy, Co. Kerry – Dune slack population
- 19.** West of Inny Ferry, Co. Kerry – Dune slack population
- 20.** North Bull, Dublin – Dune slack population
- 21.** Barley Cove, Co. Cork – Dune slack population

Relevé card for *Petalophyllum ralfsii* fine-scale monitoring

Population:	Rosses Strand	Surveyor:					Date:				
County (vice):	Donegal (H35)	Aerial Photo ID:					O0040-D				
SAC:	Tranarossan & Melmore Lough 194	Discovery Map:					2				
Plot (1 x 1 m) Number	1	2	3	4	5	6	7	8	9	10	11
GPS co-ordinates											
Altitude (m.s.l.)											
Slope (degrees)											
Aspect											
Soil depth (cm)											
Hole dug for groundwater level (✓)											
Mean vegetation height (cm)											
Max. vegetation height (cm)											
Tree cover (nearest 5%)											
Shrub cover (")											
Grass cover (")											
Rush cover (")											
Sedge cover (")											
Forb cover (")											
Fern/fern ally cover (")											
Bryophyte cover (")											
Lichen cover (")											
Algae cover (")											
Litter cover (")											
Cover of bare ground (nearest 1%)											
Cover of surface water (nearest 5%)											
Cover of rock (")											
Cover of dung (")											
No. of indeterminate thalli											
No. of male thalli											
No. of female thalli											
No of immature sporophytes											
No. of mature sporophytes											
Photo ID											
Groundwater depth (cm)											
Groundwater sample taken (✓)											
Soil sample taken (✓)											
Species cover (nearest 5%)	1	2	3	4	5	Species cover (nearest 5%)	1	2	3	4	5
<i>Agrostis stolonifera</i>											
<i>Amblystegium serpens</i> var. <i>salinum</i>											
<i>Aneura pinguis</i>											
<i>Barbula convoluta</i>											
<i>Bellis perennis</i>											
<i>Bryum pseudotriquetrum</i>											
<i>Carex flacca</i>											
<i>Carex panicea</i>											
<i>Ctenidium molluscum</i>											
<i>Cynosurus cristatus</i>											
<i>Distichium inclinatum</i>											
<i>Ditrichum gracile</i>											
<i>Festuca rubra</i>											
<i>Fissidens dubius</i>											
<i>Galium verum</i>											
<i>Hieracium pilosella</i>											
<i>Holcus lanatus</i>											
<i>Hypnum cupressiforme</i>											
<i>Leontodon autumnalis</i>											
<i>Plantago coronopus</i>											
<i>Plantago lanceolata</i>											
<i>Prunella vulgaris</i>											
<i>Thymus praecox</i>											
<i>Syntrichia ruralis</i> var. <i>ruraliformis</i>											
<i>Trichostomum crispulum</i>											
<i>Trifolium dubium</i>											
<i>Trifolium repens</i>											
Other species:											

Assessment of Rosses Strand, Co. Donegal (Tranarossan and Melmore Lough SAC 000194)

Population Assessment for Rosses Strand

Method of assessment	Area of extent of occupancy (m ²)	% of extent covered by population	Target	Result	Pass/Fail
Area of polygon around GPS points			Thalli present		

Habitat Assessment indicators, measures of assessment and targets for Rosses Strand

Indicator	Method of assessment	Target	Result	Pass/Fail
Hydrology <input type="checkbox"/> tick box if surface water present on site	Measuring depth to groundwater level in hole	≤ 80 cm depth from ground surface		
	If bedrock below: Hand should be pressed onto soil surface	Soil surface should be wet/damp		
Shrub cover	Estimation of shrub cover to nearest 5% in each of 2-5 plots	Mean percent shrub cover should not exceed 25%		
Grass cover	Estimation of grass cover to nearest 5% in each of 2-5 plots	Mean percent grass cover should not exceed 60%		
Cover of bare ground	Estimation of cover of bare ground to nearest 1% in each of 2-5 plots	Mean percent cover of bare soil should exceed 5%		
Mean vegetation height	Mean height (cm) of 5 stems per plot averaged in 2-5 plots	Machair: Mean vegetation height should not exceed 6 cm		
		Dune slack : Mean vegetation height should not exceed 9 cm		

Future Prospects Assessment for Rosses Strand

Activity (EU code)	Location (Inside/outside extent of occupancy)	Influence (Positive/Negative/Neutral)	Intensity (High/Medium/Low)	Area affected (0-10m ² ; 11-50m ² ; 51-100m ² ; >100m ²)
Intensive grazing (A04.01)				
Excessive poaching (Trampling, overuse, G05.01)				
Abandonment of pastoral systems, lack of grazing (A04.03)				
Stock feeding (A05.02)				
Restructuring agricultural land holdings (A10)				
Fertilisation (A08)				
Pollution to groundwater (H02)				
Water abstractions from groundwater (J02.07)				
Sand & gravel extraction (C01.01)				
Motorised vehicle damage (G01.03)				
Other outdoor sports & leisure activities (G01.08)				
Sport & leisure structures (G02)				
Dumping (Discharges E03)				
Invasive non-native species (I01)				
Natural erosion (K01.01)				
Biocenotic evolution, succession (incl. enlargement of scrub vegetation area) (K02)				
Species composition change (succession) (K02.01)				
Other:				

Overall Assessment for Rosses Strand

Attribute	Assessment
Population	
Habitat for the species	
Future Prospects	
Overall	

Results of pH analysis of soil and water samples from Rosses Strand

Plot Number:	1	2	3	4	5
Soil pH					
Groundwater pH					

Additional Comments:

Relevé card for *Petalophyllum ralfsii* fine-scale monitoring

Population:	Rosepenna	Surveyor:					Date:				
County (vice):	Donegal (H35)	Aerial Photo ID: 00078-D & 00079-C					Area mapped (✓)				
SAC:	Sheephaven 001190	Discovery Map: 2									
Plot (1 x 1 m) Number	1	2	3	4	5						
GPS co-ordinates											
Altitude (m.s.l.)											
Slope (degrees)											
Aspect											
Soil depth (cm)											
Hole dug for groundwater level (✓)											
Mean vegetation height (cm)											
Max. vegetation height (cm)											
Tree cover (nearest 5%)											
Shrub cover (“)											
Grass cover (“)											
Rush cover (“)											
Sedge cover (“)											
Forb cover (“)											
Fern/fern ally cover (“)											
Bryophyte cover (“)											
Lichen cover (“)											
Algae cover (“)											
Litter cover (“)											
Cover of bare ground (nearest 1%)											
Cover of surface water (nearest 5%)											
Cover of rock (“)											
Cover of dung (“)											
No. of indeterminate thalli											
No. of male thalli											
No. of female thalli											
No of immature sporophytes											
No. of mature sporophytes											
Photo ID											
Groundwater depth (cm)											
Groundwater sample taken (✓)											
Soil sample taken (✓)											
Species cover (nearest 5%)	1	2	3	4	5	Species cover (nearest 5%)	1	2	3	4	5
<i>Agrostis stolonifera</i>						<i>Scorpidium cossonii</i>					
<i>Amblyodon dealbatus</i>						<i>Selaginella selaginoides</i>					
<i>Aneura pinguis</i>						<i>Thuidium abietinum</i> ssp. <i>hystricosum</i>					
<i>Barbula convoluta</i>						<i>Trichostomum crispulum</i>					
<i>Bellis perennis</i>						<i>Trifolium pratense</i>					
<i>Brachythecium mildeanum</i>						<i>Trifolium repens</i>					
<i>Bryum marratii</i>											
<i>Bryum pseudotriquetrum</i>						Other species:					
<i>Calliergonella cuspidata</i>											
<i>Campyliadelphus chrysophyllus</i>											
<i>Campylium chrysophyllum</i>											
<i>Carex flacca</i>											
<i>Cratoneuron filicinum</i>											
<i>Ctenidium molluscum</i>											
<i>Distichium inclinatum</i>											
<i>Ditrichum gracile</i>											
<i>Drepanocladus polygamus</i>											
<i>Entodon concinnus</i>											
<i>Euphrasia nemorosa</i>											
<i>Festuca rubra</i>											
<i>Holcus lanatus</i>											
<i>Homalothecium lutescens</i>											
<i>Juncus articulatus</i>											
<i>Juncus bufonius</i>											
<i>Leiocolea badensis</i>											
<i>Linum catharticum</i>											
<i>Lotus corniculatus</i>											
<i>Moerckia flotoviana</i>											
<i>Pilosella officinarum</i>											
<i>Plantago lanceolata</i>											
<i>Prunella vulgaris</i>											
<i>Riccia cavernosa</i>											
<i>Salix repens</i>											

Assessment of Rosepenna, Co. Donegal (Sheephaven SAC 001190)

Population Assessment for Rosepenna

Method of assessment	Area of extent of occupancy (m ²)	% of extent covered by population	Target	Result	Pass/Fail
Area of polygon around GPS points			Thalli present		

Habitat Assessment indicators, measures of assessment and targets for Rosepenna

Indicator	Method of assessment	Target	Result	Pass/Fail
Hydrology <input type="checkbox"/> tick box if surface water present on site	Measuring depth to groundwater level in hole	≤ 80 cm depth from ground surface		
	If bedrock below: Hand should be pressed onto soil surface	Soil surface should be wet/damp		
Shrub cover	Estimation of shrub cover to nearest 5% in each of 2-5 plots	Mean percent shrub cover should not exceed 25%		
Grass cover	Estimation of grass cover to nearest 5% in each of 2-5 plots	Mean percent grass cover should not exceed 60%		
Cover of bare ground	Estimation of cover of bare ground to nearest 1% in each of 2-5 plots	Mean percent cover of bare soil should exceed 5%		
Mean vegetation height	Mean height (cm) of 5 stems per plot averaged in 2-5 plots	Machair: Mean vegetation height should not exceed 6 cm		
		Dune slack: Mean vegetation height should not exceed 9 cm		

Future Prospects Assessment for Rosepenna

Activity (EU code)	Location (Inside/outside extent of occupancy)	Influence (Positive/Negative/Neutral)	Intensity (High/Medium/Low)	Area affected (0-10m ² ; 11-50m ² ; 51-100m ² ; >100m ²)
Intensive grazing (A04.01)				
Excessive poaching (Trampling, overuse, G05.01)				
Abandonment of pastoral systems, lack of grazing (A04.03)				
Stock feeding (A05.02)				
Restructuring agricultural land holdings (A10)				
Fertilisation (A08)				
Pollution to groundwater (H02)				
Water abstractions from groundwater (J02.07)				
Sand & gravel extraction (C01.01)				
Motorised vehicle damage (G01.03)				
Other outdoor sports & leisure activities (G01.08)				
Sport & leisure structures (G02)				
Dumping (Discharges E03)				
Invasive non-native species (I01)				
Natural erosion (K01.01)				
Biocenotic evolution, succession (incl. enlargement of scrub vegetation area) (K02)				
Species composition change (succession) (K02.01)				
Other:				

Overall Assessment for Rosepenna

Attribute	Assessment
Population	
Habitat for the species	
Future Prospects	
Overall	

Results of analysis of soil and water samples from Rosepenna

Plot Number:	1	2	3	4	5
Soil pH					
Groundwater pH					

Additional Comments:

Relevé card for *Petalophyllum ralfsii* fine-scale monitoring

Population:	Tramore/Black Burrow/SW of Dunfanaghy		Surveyor:		Date:						
County (vice):	Donegal (H35)		Aerial Photo ID:	O0075-D & O0096-B		Area mapped (✓)					
SAC:	Horn Head and Rinclevan 000147		Discovery Map:	2							
Plot (1 x 1 m) Number	1	2	3	4	5						
GPS co-ordinates											
Altitude (m.s.l.)											
Slope (degrees)											
Aspect											
Soil depth (cm)											
Hole dug for groundwater level (✓)											
Mean vegetation height (cm)											
Max. vegetation height (cm)											
Tree cover (nearest 5%)											
Shrub cover (“)											
Grass cover (“)											
Rush cover (“)											
Sedge cover (“)											
Forb cover (“)											
Fern/fern ally cover (“)											
Bryophyte cover (“)											
Lichen cover (“)											
Algae cover (“)											
Litter cover (“)											
Cover of bare ground (nearest 1%)											
Cover of surface water (nearest 5%)											
Cover of rock (“)											
Cover of dung (“)											
No. of indeterminate thalli											
No. of male thalli											
No. of female thalli											
No of immature sporophytes											
No. of mature sporophytes											
Photo ID											
Groundwater depth (cm)											
Groundwater sample taken (✓)											
Soil sample taken (✓)											
Species cover (nearest 5%)	1	2	3	4	5	Species cover (nearest 5%)	1	2	3	4	5
<i>Bellis perennis</i>											
<i>Distichium inclinatum</i>											
<i>Ditrichum gracile</i>											
<i>Festuca rubra</i>											
<i>Linum catharticum</i>											
<i>Plantago coronopus</i>											
<i>Trichostomum crispulum</i>											
Other species:											

Assessment of Tramore/Black Burrow/SW of Dunfanaghy, Co. Donegal (Horn Head & Rinclevan SAC 000147)

Population Assessment for Tramore/Black Burrow/SW of Dunfanaghy

Method of assessment	Area of extent of occupancy (m ²)	% of extent covered by population	Target	Result	Pass/Fail
Area of polygon around GPS points			Thalli present		

Habitat Assessment indicators, measures of assessment and targets for Tramore/Black Burrow/SW of Dunfanaghy

Indicator	Method of assessment	Target	Result	Pass/Fail
Hydrology <input type="checkbox"/> tick box if surface water present on site	Measuring depth to groundwater level in hole	≤ 80 cm depth from ground surface		
	If bedrock below: Hand should be pressed onto soil surface	Soil surface should be wet/damp		
Shrub cover	Estimation of shrub cover to nearest 5% in each of 2-5 plots	Mean percent shrub cover should not exceed 25%		
Grass cover	Estimation of grass cover to nearest 5% in each of 2-5 plots	Mean percent grass cover should not exceed 60%		
Cover of bare ground	Estimation of cover of bare ground to nearest 1% in each of 2-5 plots	Mean percent cover of bare soil should exceed 5%		
Mean vegetation height	Mean height (cm) of 5 stems per plot averaged in 2-5 plots	Machair: Mean vegetation height should not exceed 6 cm		
		Dune slack: Mean vegetation height should not exceed 9 cm		

Future Prospects Assessment for Tramore/Black Burrow/SW of Dunfanaghy

Activity (EU code)	Location (Inside/outside extent of occupancy)	Influence (Positive/Negative/Neutral)	Intensity (High/Medium/Low)	Area affected (0-10m ² ; 11-50m ² ; 51-100m ² ; >100m ²)
Intensive grazing (A04.01)				
Excessive poaching (Trampling, overuse, G05.01)				
Abandonment of pastoral systems, lack of grazing (A04.03)				
Stock feeding (A05.02)				
Restructuring agricultural land holdings (A10)				
Fertilisation (A08)				
Pollution to groundwater (H02)				
Water abstractions from groundwater (J02.07)				
Sand & gravel extraction (C01.01)				
Motorised vehicle damage (G01.03)				
Other outdoor sports & leisure activities (G01.08)				
Sport & leisure structures (G02)				
Dumping (Discharges E03)				
Invasive non-native species (I01)				
Natural erosion (K01.01)				
Biocenotic evolution, succession (incl. enlargement of scrub vegetation area) (K02)				
Species composition change (succession) (K02.01)				
Other:				

Overall Assessment for Tramore/Black Burrow/SW of Dunfanaghy

Attribute	Assessment
Population	
Habitat for the species	
Future Prospects	
Overall	

Results of analysis of soil and water samples from Tramore/Black Burrow/SW of Dunfanaghy

Plot Number:	1	2	3	4	5
Soil pH					
Groundwater pH					

Additional Comments:

Relevé card for *Petalophyllum ralfsii* fine-scale monitoring

Population:	Damp Beg		Surveyor:		Date:						
County (vice):	Donegal (H35)		Aerial Photo ID:	O0134-A	Area mapped (✓)						
SAC:	Gweedore Bay and Islands 001141		Discovery Map:	1							
Plot (1 x 1 m) Number	1	2	3	4	5						
GPS co-ordinates											
Altitude (m.s.l.)											
Slope (degrees)											
Aspect											
Soil depth (cm)											
Hole dug for groundwater level (✓)											
Mean vegetation height (cm)											
Max. vegetation height (cm)											
Tree cover (nearest 5%)											
Shrub cover (“)											
Grass cover (“)											
Rush cover (“)											
Sedge cover (“)											
Forb cover (“)											
Fern/fern ally cover (“)											
Bryophyte cover (“)											
Lichen cover (“)											
Algae cover (“)											
Litter cover (“)											
Cover of bare ground (nearest 1%)											
Cover of surface water (nearest 5%)											
Cover of rock (“)											
Cover of dung (“)											
No. of indeterminate thalli											
No. of male thalli											
No. of female thalli											
No of immature sporophytes											
No. of mature sporophytes											
Photo ID											
Groundwater depth (cm)											
Groundwater sample taken (✓)											
Soil sample taken (✓)											
Species cover (nearest 5%)	1	2	3	4	5	Species cover (nearest 5%)	1	2	3	4	5
<i>Amblyodon dealbatus</i>											
<i>Aneura pinguis</i>											
<i>Bellis perennis</i>											
<i>Bryum pallens</i>											
<i>Carex flacca</i>											
<i>Carex arenaria</i>											
<i>Didymodon fallax</i>											
<i>Didymodon tophaceus</i>											
<i>Distichium inclinatum</i>											
<i>Ditrichum gracile</i>											
<i>Drepanocladus polygamus</i>											
<i>Festuca rubra</i>											
<i>Galium verum</i>											
<i>Luzula campestris</i>											
<i>Moerckia flotoviana</i>											
<i>Parnassia palustris</i>											
<i>Plantago lanceolata</i>											
<i>Scorpidium cossonii</i>											
<i>Senecio jacobaea</i>											
<i>Trichostomum brachydontium</i>											
<i>Tussilago farfara</i>											
Other species:											

Assessment of Damph Beg, Co. Donegal (Gweedore Bay and Islands SAC 001141)

Population Assessment for Damph Beg

Method of assessment	Area of extent of occupancy (m ²)	% of extent covered by population	Target	Result	Pass/Fail
Area of polygon around GPS points			Thalli present		

Habitat Assessment indicators, measures of assessment and targets for Damph Beg

Indicator	Method of assessment	Target	Result	Pass/Fail
Hydrology <input type="checkbox"/> tick box if surface water present on site	Measuring depth to groundwater level in hole	≤ 80 cm depth from ground surface		
	If bedrock below: Hand should be pressed onto soil surface	Soil surface should be wet/damp		
Shrub cover	Estimation of shrub cover to nearest 5% in each of 2-5 plots	Mean percent shrub cover should not exceed 25%		
Grass cover	Estimation of grass cover to nearest 5% in each of 2-5 plots	Mean percent grass cover should not exceed 60%		
Cover of bare ground	Estimation of cover of bare ground to nearest 1% in each of 2-5 plots	Mean percent cover of bare soil should exceed 5%		
Mean vegetation height	Mean height (cm) of 5 stems per plot averaged in 2-5 plots	Machair: Mean vegetation height should not exceed 6 cm		
		Dune slack: Mean vegetation height should not exceed 9 cm		

Future Prospects Assessment for Damph Beg

Activity (EU code)	Location (Inside/outside extent of occupancy)	Influence (Positive/Negative/Neutral)	Intensity (High/Medium/Low)	Area affected (0-10m ² ; 11-50m ² ; 51-100m ² ; >100m ²)
Intensive grazing (A04.01)				
Excessive poaching (Trampling, overuse, G05.01)				
Abandonment of pastoral systems, lack of grazing (A04.03)				
Stock feeding (A05.02)				
Restructuring agricultural land holdings (A10)				
Fertilisation (A08)				
Pollution to groundwater (H02)				
Water abstractions from groundwater (J02.07)				
Sand & gravel extraction (C01.01)				
Motorised vehicle damage (G01.03)				
Other outdoor sports & leisure activities (G01.08)				
Sport & leisure structures (G02)				
Dumping (Discharges E03)				
Invasive non-native species (I01)				
Natural erosion (K01.01)				
Biocenotic evolution, succession (incl. enlargement of scrub vegetation area) (K02)				
Species composition change (succession) (K02.01)				
Other:				

Overall Assessment for Damph Beg

Attribute	Assessment
Population	
Habitat for the species	
Future Prospects	
Overall	

Results of analysis of soil and water samples from Damph Beg

Plot Number:	1	2	3	4	5
Soil pH					
Groundwater pH					

Additional Comments:

Relevé card for *Petalophyllum ralfsii* fine-scale monitoring

Population:	Derrybeg	Surveyor:	O0154-B	Date:							
County (vice):	Donegal (H35)	Aerial Photo ID:	O0154-B	Area mapped (✓)							
SAC:	Gweedore Bay and Islands 001141	Discovery Map:	1								
Plot (1 x 1 m) Number	1	2	3	4	5						
GPS co-ordinates											
Altitude (m.s.l.)											
Slope (degrees)											
Aspect											
Soil depth (cm)											
Hole dug for groundwater level (✓)											
Mean vegetation height (cm)											
Max. vegetation height (cm)											
Tree cover (nearest 5%)											
Shrub cover (“)											
Grass cover (“)											
Rush cover (“)											
Sedge cover (“)											
Forb cover (“)											
Fern/fern ally cover (“)											
Bryophyte cover (“)											
Lichen cover (“)											
Algae cover (“)											
Litter cover (“)											
Cover of bare ground (nearest 1%)											
Cover of surface water (nearest 5%)											
Cover of rock (“)											
Cover of dung (“)											
No. of indeterminate thalli											
No. of male thalli											
No. of female thalli											
No of immature sporophytes											
No. of mature sporophytes											
Photo ID											
Groundwater depth (cm)											
Groundwater sample taken (✓)											
Soil sample taken (✓)											
Species cover (nearest 5%)	1	2	3	4	5	Species cover (nearest 5%)	1	2	3	4	5
<i>Aneura pinguis</i>											
<i>Bellis perennis</i>											
<i>Bryum pallens</i>											
<i>Carex flacca</i>											
<i>Ctenidium molluscum</i>											
<i>Distichium inclinatum</i>											
<i>Ditrichum gracile</i>											
<i>Festuca rubra</i>											
<i>Fissidens dubius</i>											
<i>Leiocolea badensis</i>											
<i>Leontodon autumnalis</i>											
<i>Pilosella officinarum</i>											
<i>Prunella vulgaris</i>											
<i>Ranunculus bulbosus</i>											
<i>Selaginella selaginoides</i>											
<i>Trichostomum crispulum</i>											
Other species:											

Assessment of Derrybeg, Co. Donegal (Gweedore Bay and Islands SAC 001141)

Population Assessment for Derrybeg

Method of assessment	Area of extent of occupancy (m ²)	% of extent covered by population	Target	Result	Pass/Fail
Area of polygon around GPS points			Thalli present		

Habitat Assessment indicators, measures of assessment and targets for Derrybeg

Indicator	Method of assessment	Target	Result	Pass/Fail
Hydrology <input type="checkbox"/> tick box if surface water present on site	Measuring depth to groundwater level in hole	≤ 80 cm depth from ground surface		
	If bedrock below: Hand should be pressed onto soil surface	Soil surface should be wet/damp		
Shrub cover	Estimation of shrub cover to nearest 5% in each of 2-5 plots	Mean percent shrub cover should not exceed 25%		
Grass cover	Estimation of grass cover to nearest 5% in each of 2-5 plots	Mean percent grass cover should not exceed 60%		
Cover of bare ground	Estimation of cover of bare ground to nearest 1% in each of 2-5 plots	Mean percent cover of bare soil should exceed 5%		
Mean vegetation height	Mean height (cm) of 5 stems per plot averaged in 2-5 plots	Machair: Mean vegetation height should not exceed 6 cm		
		Dune slack: Mean vegetation height should not exceed 9 cm		

Future Prospects Assessment for Derrybeg

Activity (EU code)	Location (Inside/outside extent of occupancy)	Influence (Positive/Negative/Neutral)	Intensity (High/Medium/Low)	Area affected (0-10m ² ; 11-50m ² ; 51-100m ² ; >100m ²)
Intensive grazing (A04.01)				
Excessive poaching (Trampling, overuse, G05.01)				
Abandonment of pastoral systems, lack of grazing (A04.03)				
Stock feeding (A05.02)				
Restructuring agricultural land holdings (A10)				
Fertilisation (A08)				
Pollution to groundwater (H02)				
Water abstractions from groundwater (J02.07)				
Sand & gravel extraction (C01.01)				
Motorised vehicle damage (G01.03)				
Other outdoor sports & leisure activities (G01.08)				
Sport & leisure structures (G02)				
Dumping (Discharges E03)				
Invasive non-native species (I01)				
Natural erosion (K01.01)				
Biocenotic evolution, succession (incl. enlargement of scrub vegetation area) (K02)				
Species composition change (succession) (K02.01)				
Other:				

Overall Assessment for Derrybeg

Attribute	Assessment
Population	
Habitat for the species	
Future Prospects	
Overall	

Results of analysis of soil and water samples from Derrybeg

Plot Number:	1	2	3	4	5
Soil pH					
Groundwater pH					

Additional Comments:

Relevé card for *Petalophyllum ralfsii* fine-scale monitoring

Population:	Keadew Point		Surveyor:		Date:						
County (vice):	Donegal (H35)		Aerial Photo ID:	00199-C & 00224-A		Area mapped (✓)					
SAC:	Gweedore Bay and Islands 001141		Discovery Map:	1							
Plot (1 x 1 m) Number	1		2		3						
GPS co-ordinates											
Altitude (m.s.l.)											
Slope (degrees)											
Aspect											
Soil depth (cm)											
Hole dug for groundwater level (✓)											
Mean vegetation height (cm)											
Max. vegetation height (cm)											
Tree cover (nearest 5%)											
Shrub cover (")											
Grass cover (")											
Rush cover (")											
Sedge cover (")											
Forb cover (")											
Fern/fern ally cover (")											
Bryophyte cover (")											
Lichen cover (")											
Algae cover (")											
Litter cover (")											
Cover of bare ground (nearest 1%)											
Cover of surface water (nearest 5%)											
Cover of rock (")											
Cover of dung (")											
No. of indeterminate thalli											
No. of male thalli											
No. of female thalli											
No of immature sporophytes											
No. of mature sporophytes											
Photo ID											
Groundwater depth (cm)											
Groundwater sample taken (✓)											
Soil sample taken (✓)											
Species cover (nearest 5%)	1	2	3	4	5	Species cover (nearest 5%)	1	2	3	4	5
<i>Agrostis stolonifera</i>						<i>Poa pratensis</i>					
<i>Anagallis tenella</i>						<i>Preissia quadrata</i>					
<i>Aneura pinguis</i>						<i>Prunella vulgaris</i>					
<i>Anthyllis vulneraria</i>						<i>Pseudoscleropodium purum</i>					
<i>Armeria maritima</i>						<i>Sagina nodosa</i>					
<i>Barbula convoluta</i>						<i>Scapania gracilis</i>					
<i>Bellis perennis</i>						<i>Succisa pratensis</i>					
<i>Brachythecium albicans</i>						<i>Thymus praecox</i>					
<i>Bryum pallens</i>						<i>Syntrichia ruralis var. ruraliformis</i>					
<i>Bryum pseudotriquetrum</i>						<i>Trifolium repens</i>					
<i>Calliergonella cuspidata</i>											
<i>Campylium stellatum</i>						Other species:					
<i>Carex arenaria</i>											
<i>Carex flacca</i>											
<i>Ctenidium molluscum</i>											
<i>Cochlearia officinalis</i> agg.											
<i>Daucus carota</i>											
<i>Didymodon ferrugineus</i>											
<i>Distichium inclinatum</i>											
<i>Ditrichum gracile</i>											
<i>Drepanocladus polygamus</i>											
<i>Festuca rubra</i>											
<i>Fissidens taxifolius</i> var. <i>taxifolius</i>											
<i>Galium verum</i>											
<i>Hieracium pilosella</i>											
<i>Hypnum cupressiforme</i>											
<i>Leontodon autumnalis</i>											
<i>Lophocolea bidentata</i>											
<i>Lotus corniculatus</i>											
<i>Luzula campestris</i>											
<i>Pilosella officinarum</i>											
<i>Plantago lanceolata</i>											

Assessment of Keadew Point, Co. Donegal (Gweedore Bay and Islands SAC 001141)

Population Assessment for Keadew Point

Method of assessment	Area of extent of occupancy (m ²)	% of extent covered by population	Target	Result	Pass/Fail
Area of polygon around GPS points			Thalli present		

Habitat Assessment indicators, measures of assessment and targets for Keadew Point

Indicator	Method of assessment	Target	Result	Pass/Fail
Hydrology <input type="checkbox"/> tick box if surface water present on site	Measuring depth to groundwater level in hole	≤ 80 cm depth from ground surface		
	If bedrock below: Hand should be pressed onto soil surface	Soil surface should be wet/damp		
Shrub cover	Estimation of shrub cover to nearest 5% in each of 2-5 plots	Mean percent shrub cover should not exceed 25%		
Grass cover	Estimation of grass cover to nearest 5% in each of 2-5 plots	Mean percent grass cover should not exceed 60%		
Cover of bare ground	Estimation of cover of bare ground to nearest 1% in each of 2-5 plots	Mean percent cover of bare soil should exceed 5%		
Mean vegetation height	Mean height (cm) of 5 stems per plot averaged in 2-5 plots	Machair: Mean vegetation height should not exceed 6 cm		
		Dune slack: Mean vegetation height should not exceed 9 cm		

Future Prospects Assessment for Keadew Point

Activity (EU code)	Location (Inside/outside extent of occupancy)	Influence (Positive/Negative/Neutral)	Intensity (High/Medium/Low)	Area affected (0-10m ² ; 11-50m ² ; 51-100m ² ; >100m ²)
Intensive grazing (A04.01)				
Excessive poaching (Trampling, overuse, G05.01)				
Abandonment of pastoral systems, lack of grazing (A04.03)				
Stock feeding (A05.02)				
Restructuring agricultural land holdings (A10)				
Fertilisation (A08)				
Pollution to groundwater (H02)				
Water abstractions from groundwater (J02.07)				
Sand & gravel extraction (C01.01)				
Motorised vehicle damage (G01.03)				
Other outdoor sports & leisure activities (G01.08)				
Sport & leisure structures (G02)				
Dumping (Discharges E03)				
Invasive non-native species (I01)				
Natural erosion (K01.01)				
Biocenotic evolution, succession (incl. enlargement of scrub vegetation area) (K02)				
Species composition change (succession) (K02.01)				
Other:				

Overall Assessment for Keadew Point

Attribute	Assessment
Population	
Habitat for the species	
Future Prospects	
Overall	

Results of analysis of soil and water samples from Keadew Point

Plot Number:	1	2	3	4	5
Soil pH					
Groundwater pH					

Additional Comments:

Relevé card for *Petalophyllum ralfsii* fine-scale monitoring

Population:	Dooley Point		Surveyor:		Date:	
County (vice):	Donegal (H35)		Aerial Photo ID:	O0341-B	Area mapped (✓)	
SAC:	West of Ardara/Maas Road 000197		Discovery Map:	10		
Plot (1 x 1 m) Number	1		2		3	
GPS co-ordinates						
Altitude (m.s.l.)						
Slope (degrees)						
Aspect						
Soil depth (cm)						
Hole dug for groundwater level (✓)						
Mean vegetation height (cm)						
Max. vegetation height (cm)						
Tree cover (nearest 5%)						
Shrub cover (“)						
Grass cover (“)						
Rush cover (“)						
Sedge cover (“)						
Forb cover (“)						
Fern/fern ally cover (“)						
Bryophyte cover (“)						
Lichen cover (“)						
Algae cover (“)						
Litter cover (“)						
Cover of bare ground (nearest 1%)						
Cover of surface water (nearest 5%)						
Cover of rock (“)						
Cover of dung (“)						
No. of indeterminate thalli						
No. of male thalli						
No. of female thalli						
No of immature sporophytes						
No. of mature sporophytes						
Photo ID						
Groundwater depth (cm)						
Groundwater sample taken (✓)						
Soil sample taken (✓)						
Species cover (nearest 5%)	1	2	3	4	5	Species cover (nearest 5%)
<i>Amblystegium serpens</i> var. <i>salinum</i>						
<i>Aneura pinguis</i>						
<i>Bellis perennis</i>						
<i>Carex flacca</i>						
<i>Ctenidium molluscum</i>						
<i>Danthonia decumbens</i>						
<i>Ditrichum gracile</i>						
<i>Euphrasia nemorosa</i>						
<i>Galium verum</i>						
<i>Homalothecium lutescens</i>						
<i>Hylocomium splendens</i>						
<i>Hypochaeris radicata</i>						
<i>Linum catharticum</i>						
<i>Lotus corniculatus</i>						
<i>Parnassia palustris</i>						
<i>Pilosella officinarum</i>						
<i>Plantago coronopus</i>						
<i>Plantago lanceolata</i>						
<i>Plantago maritima</i>						
<i>Prunella vulgaris</i>						
<i>Salix repens</i>						
<i>Selaginella selaginoides</i>						
<i>Thuidium abietinum</i> ssp. <i>hystricosum</i>						
<i>Thymus praecox</i>						
<i>Trifolium repens</i>						
Other species:						

Assessment of Dooley Point, Co. Donegal (West of Ardara/Maas Road SAC 000197)

Population Assessment for Dooley Point

Method of assessment	Area of extent of occupancy (m ²)	% of extent covered by population	Target	Result	Pass/Fail
Area of polygon around GPS points			Thalli present		

Habitat Assessment indicators, measures of assessment and targets for Dooley Point

Indicator	Method of assessment	Target	Result	Pass/Fail
Hydrology <input type="checkbox"/> tick box if surface water present on site	Measuring depth to groundwater level in hole	≤ 80 cm depth from ground surface		
	If bedrock below: Hand should be pressed onto soil surface	Soil surface should be wet/damp		
Shrub cover	Estimation of shrub cover to nearest 5% in each of 2-5 plots	Mean percent shrub cover should not exceed 25%		
Grass cover	Estimation of grass cover to nearest 5% in each of 2-5 plots	Mean percent grass cover should not exceed 60%		
Cover of bare ground	Estimation of cover of bare ground to nearest 1% in each of 2-5 plots	Mean percent cover of bare soil should exceed 5%		
Mean vegetation height	Mean height (cm) of 5 stems per plot averaged in 2-5 plots	Machair: Mean vegetation height should not exceed 6 cm		
		Dune slack: Mean vegetation height should not exceed 9 cm		

Future Prospects Assessment for Dooley Point

Activity (EU code)	Location (Inside/outside extent of occupancy)	Influence (Positive/Negative/Neutral)	Intensity (High/Medium/Low)	Area affected (0-10m ² ; 11-50m ² ; 51-100m ² ; >100m ²)
Intensive grazing (A04.01)				
Excessive poaching (Trampling, overuse, G05.01)				
Abandonment of pastoral systems, lack of grazing (A04.03)				
Stock feeding (A05.02)				
Restructuring agricultural land holdings (A10)				
Fertilisation (A08)				
Pollution to groundwater (H02)				
Water abstractions from groundwater (J02.07)				
Sand & gravel extraction (C01.01)				
Motorised vehicle damage (G01.03)				
Other outdoor sports & leisure activities (G01.08)				
Sport & leisure structures (G02)				
Dumping (Discharges E03)				
Invasive non-native species (I01)				
Natural erosion (K01.01)				
Biocenotic evolution, succession (incl. enlargement of scrub vegetation area) (K02)				
Species composition change (succession) (K02.01)				
Other:				

Overall Assessment for Dooley Point

Attribute	Assessment
Population	
Habitat for the species	
Future Prospects	
Overall	

Results of analysis of soil and water samples from Dooley Point

Plot Number:	1	2	3	4	5
Soil pH					
Groundwater pH					

Additional Comments:

Relevé card for *Petalophyllum ralfsii* fine-scale monitoring

Population:	Sheskinmore		Surveyor:		Date:						
County (vice):	Donegal (H35)		Aerial Photo ID:	O0390-C	Area mapped (✓)						
SAC:	West of Ardara/Maas Road 000197		Discovery Map:	10							
Plot (1 x 1 m) Number	1		2		3						
GPS co-ordinates											
Altitude (m.s.l.)											
Slope (degrees)											
Aspect											
Soil depth (cm)											
Hole dug for groundwater level (✓)											
Mean vegetation height (cm)											
Max. vegetation height (cm)											
Tree cover (nearest 5%)											
Shrub cover (“)											
Grass cover (“)											
Rush cover (“)											
Sedge cover (“)											
Forb cover (“)											
Fern/fern ally cover (“)											
Bryophyte cover (“)											
Lichen cover (“)											
Algae cover (“)											
Litter cover (“)											
Cover of bare ground (nearest 1%)											
Cover of surface water (nearest 5%)											
Cover of rock (“)											
Cover of dung (“)											
No. of indeterminate thalli											
No. of male thalli											
No. of female thalli											
No of immature sporophytes											
No. of mature sporophytes											
Photo ID											
Groundwater depth (cm)											
Groundwater sample taken (✓)											
Soil sample taken (✓)											
Species cover (nearest 5%)	1	2	3	4	5	Species cover (nearest 5%)	1	2	3	4	5
<i>Agrostis stolonifera</i>						<i>Trichostomum crispulum</i>					
<i>Aneura pinguis</i>						<i>Trifolium repens</i>					
<i>Anthyllis vulneraria</i>						Other species:					
<i>Barbula convoluta</i>											
<i>Bellis perennis</i>											
<i>Brachythecium albicans</i>											
<i>Bryum pseudotriquetrum</i>											
<i>Calliergonella cuspidata</i>											
<i>Carex flacca</i>											
<i>Cerastium fontanum</i>											
<i>Ctenidium molluscum</i>											
<i>Ditrichum gracile</i>											
<i>Festuca rubra</i>											
<i>Galium verum</i>											
<i>Holcus lanatus</i>											
<i>Hypnum cupressiforme</i>											
<i>Leontodon autumnalis</i>											
<i>Lolium perenne</i>											
<i>Lophocolea bidentata</i>											
<i>Luzula campestris</i>											
<i>Mnium hornum</i>											
<i>Plantago coronopus</i>											
<i>Plantago lanceolata</i>											
<i>Poa pratensis</i>											
<i>Prunella vulgaris</i>											
<i>Ranunculus bulbosus</i>											
<i>Rhytidiadelphus squarrosus</i>											
<i>Riccardia multifida</i>											
<i>Sagina nodosa</i>											
<i>Scapania gracilis</i>											
<i>Thymus praecox</i>											
<i>Trichostomum brachydontium</i>											

Assessment of Sheskinmore, Co. Donegal (West of Ardara/Maas Road SAC 000197)

Population Assessment for Sheskinmore

Method of assessment	Area of extent of occupancy (m ²)	% of extent covered by population	Target	Result	Pass/Fail
Area of polygon around GPS points			Thalli present		

Habitat Assessment indicators, measures of assessment and targets for Sheskinmore

Indicator	Method of assessment	Target	Result	Pass/Fail
Hydrology <input type="checkbox"/> tick box if surface water present on site	Measuring depth to groundwater level in hole	≤ 80 cm depth from ground surface		
	If bedrock below: Hand should be pressed onto soil surface	Soil surface should be wet/damp		
Shrub cover	Estimation of shrub cover to nearest 5% in each of 2-5 plots	Mean percent shrub cover should not exceed 25%		
Grass cover	Estimation of grass cover to nearest 5% in each of 2-5 plots	Mean percent grass cover should not exceed 60%		
Cover of bare ground	Estimation of cover of bare ground to nearest 1% in each of 2-5 plots	Mean percent cover of bare soil should exceed 5%		
Mean vegetation height	Mean height (cm) of 5 stems per plot averaged in 2-5 plots	Machair: Mean vegetation height should not exceed 6 cm		
		Dune slack : Mean vegetation height should not exceed 9 cm		

Future Prospects Assessment for Sheskinmore

Activity (EU code)	Location (Inside/outside extent of occupancy)	Influence (Positive/Negative/Neutral)	Intensity (High/Medium/Low)	Area affected (0-10m ² ; 11-50m ² ; 51-100m ² ; >100m ²)
Intensive grazing (A04.01)				
Excessive poaching (Trampling, overuse, G05.01)				
Abandonment of pastoral systems, lack of grazing (A04.03)				
Stock feeding (A05.02)				
Restructuring agricultural land holdings (A10)				
Fertilisation (A08)				
Pollution to groundwater (H02)				
Water abstractions from groundwater (J02.07)				
Sand & gravel extraction (C01.01)				
Motorised vehicle damage (G01.03)				
Other outdoor sports & leisure activities (G01.08)				
Sport & leisure structures (G02)				
Dumping (Discharges E03)				
Invasive non-native species (I01)				
Natural erosion (K01.01)				
Biocenotic evolution, succession (incl. enlargement of scrub vegetation area) (K02)				
Species composition change (succession) (K02.01)				
Other:				

Overall Assessment for Sheskinmore

Attribute	Assessment
Population	
Habitat for the species	
Future Prospects	
Overall	

Results of analysis of soil and water samples from Sheskinmore

Plot Number:	1	2	3	4	5
Soil pH					
Groundwater pH					

Additional Comments:

Relevé card for *Petalophyllum ralfsii* fine-scale monitoring

Population:	Bunduff	Surveyor:		Date:	
County (vice):	Sligo (H28)	Aerial Photo ID:	16	Area mapped (✓)	
SAC:	Bunduff Lough and Machair/ Trawalua/ Mullaghmore 000625	Discovery Map:	O0711-D		
Plot (1 x 1 m) Number	1	2	3	4	5
GPS co-ordinates					
Altitude (m.s.l.)					
Slope (degrees)					
Aspect					
Soil depth (cm)					
Hole dug for groundwater level (✓)					
Mean vegetation height (cm)					
Max. vegetation height (cm)					
Tree cover (nearest 5%)					
Shrub cover (“)					
Grass cover (“)					
Rush cover (“)					
Sedge cover (“)					
Forb cover (“)					
Fern/fern ally cover (“)					
Bryophyte cover (“)					
Lichen cover (“)					
Algae cover (“)					
Litter cover (“)					
Cover of bare ground (nearest 1%)					
Cover of surface water (nearest 5%)					
Cover of rock (“)					
Cover of dung (“)					
No. of indeterminate thalli					
No. of male thalli					
No. of female thalli					
No of immature sporophytes					
No. of mature sporophytes					
Photo ID					
Groundwater depth (cm)					
Groundwater sample taken (✓)					
Soil sample taken (✓)					
Species cover (nearest 5%)	1	2	3	4	5
<i>Agrostis stolonifera</i>					
<i>Ammophila arenaria</i>					
<i>Aneura pinguis</i>					
<i>Anthoxanthum odoratum</i>					
<i>Barbula convoluta</i>					
<i>Bellis perennis</i>					
<i>Brachythecium mildeanum</i>					
<i>Bryum pseudotriquetrum</i>					
<i>Calliergonella cuspidata</i>					
<i>Carex flacca</i>					
<i>Cynosurus cristatus</i>					
<i>Didymodon fallax</i>					
<i>Didymodon ferrugineus</i>					
<i>Ditrichum gracile</i>					
<i>Entodon concinnus</i>					
<i>Equisetum variegatum</i>					
<i>Festuca rubra</i>					
<i>Hieracium pilosella</i>					
<i>Hylocomium splendens</i>					
<i>Hypochaeris radicata</i>					
<i>Juncus articulatus</i>					
<i>Leontodon autumnalis</i>					
<i>Leontodon saxatilis</i>					
<i>Lotus corniculatus</i>					
<i>Moerckia flotoviana</i>					
<i>Parnassia palustris</i>					
<i>Pellia endiviifolia</i>					
<i>Plantago coronopus</i>					
<i>Pohlia wahlenbergii</i>					
<i>Polygala serpyllifolia</i>					
<i>Prunella vulgaris</i>					
Species cover (nearest 5%)	1	2	3	4	5
<i>Riccardia multifida</i>					
<i>Ranunculus bulbosus</i>					
<i>Rhytidiadelphus squarrosus</i>					
<i>Sagina nodosa</i>					
<i>Sagina procumbens</i>					
<i>Selaginella selaginoides</i>					
<i>Selaginella selaginoides</i>					
<i>Senecio jacobaea</i>					
<i>Taraxacum officinalis</i>					
<i>Thuidium abietinum</i> ssp. <i>hystricosum</i>					
<i>Thuidium tamariscinum</i>					
<i>Thymus praecox</i>					
<i>Trifolium repens</i>					
Other species:					

Assessment of Bunduff, Co. Sligo (Bunduff Lough and Machair/Trawalua/Mullaghmore SAC 000625)

Population Assessment for Bunduff

Method of assessment	Area of extent of occupancy (m ²)	% of extent covered by population	Target	Result	Pass/Fail
Area of polygon around GPS points			Thalli present		

Habitat Assessment indicators, measures of assessment and targets for Bunduff

Indicator	Method of assessment	Target	Result	Pass/Fail
Hydrology <input type="checkbox"/> tick box if surface water present on site	Measuring depth to groundwater level in hole	≤ 80 cm depth from ground surface		
	If bedrock below: Hand should be pressed onto soil surface	Soil surface should be wet/damp		
Shrub cover	Estimation of shrub cover to nearest 5% in each of 2-5 plots	Mean percent shrub cover should not exceed 25%		
Grass cover	Estimation of grass cover to nearest 5% in each of 2-5 plots	Mean percent grass cover should not exceed 60%		
Cover of bare ground	Estimation of cover of bare ground to nearest 1% in each of 2-5 plots	Mean percent cover of bare soil should exceed 5%		
Mean vegetation height	Mean height (cm) of 5 stems per plot averaged in 2-5 plots	Machair: Mean vegetation height should not exceed 6 cm		
		Dune slack : Mean vegetation height should not exceed 9 cm		

Future Prospects Assessment for Bunduff

Activity (EU code)	Location (Inside/outside extent of occupancy)	Influence (Positive/Negative/Neutral)	Intensity (High/Medium/Low)	Area affected (0-10m ² ; 11-50m ² ; 51-100m ² ; >100m ²)
Intensive grazing (A04.01)				
Excessive poaching (Trampling, overuse, G05.01)				
Abandonment of pastoral systems, lack of grazing (A04.03)				
Stock feeding (A05.02)				
Restructuring agricultural land holdings (A10)				
Fertilisation (A08)				
Pollution to groundwater (H02)				
Water abstractions from groundwater (J02.07)				
Sand & gravel extraction (C01.01)				
Motorised vehicle damage (G01.03)				
Other outdoor sports & leisure activities (G01.08)				
Sport & leisure structures (G02)				
Dumping (Discharges E03)				
Invasive non-native species (I01)				
Natural erosion (K01.01)				
Biocenotic evolution, succession (incl. enlargement of scrub vegetation area) (K02)				
Species composition change (succession) (K02.01)				
Other:				

Overall Assessment for Bunduff

Attribute	Assessment
Population	
Habitat for the species	
Future Prospects	
Overall	

Results of analysis of soil and water samples from Bunduff

Plot Number:	1	2	3	4	5
Soil pH					
Groundwater pH					

Additional Comments:

Relevé card for *Petalophyllum ralfsii* fine-scale monitoring

Population:	Garter Hill		Surveyor:		Date:						
County (vice):	Mayo (H27)		Aerial Photo ID:	O0884-C, O0884-D, O0935-A & O0935-B	Area mapped (✓)						
SAC:	Glenamoy Bog Complex 000500		Discovery Map:	22							
Plot (1 x 1 m) Number	1	2	3	4	5						
GPS co-ordinates											
Altitude (m.s.l.)											
Slope (degrees)											
Aspect											
Soil depth (cm)											
Hole dug for groundwater level (✓)											
Mean vegetation height (cm)											
Max. vegetation height (cm)											
Tree cover (nearest 5%)											
Shrub cover (“)											
Grass cover (“)											
Rush cover (“)											
Sedge cover (“)											
Forb cover (“)											
Fern/fern ally cover (“)											
Bryophyte cover (“)											
Lichen cover (“)											
Algae cover (“)											
Litter cover (“)											
Cover of bare ground (nearest 1%)											
Cover of surface water (nearest 5%)											
Cover of rock (“)											
Cover of dung (“)											
No. of indeterminate thalli											
No. of male thalli											
No. of female thalli											
No of immature sporophytes											
No. of mature sporophytes											
Photo ID											
Groundwater depth (cm)											
Groundwater sample taken (✓)											
Soil sample taken (✓)											
Species cover (nearest 5%)	1	2	3	4	5	Species cover (nearest 5%)	1	2	3	4	5
<i>Achillea millifolia</i>						<i>Galium verum</i>					
<i>Agrostis stolonifera</i>						<i>Homalothecium lutescens</i>					
<i>Amblyodon dealbatus</i>						<i>Hydrocotyle vulgaris</i>					
<i>Amblystegium serpens</i> var. <i>salinum</i>						<i>Hypnum cupressiforme</i>					
<i>Anagallis tenella</i>						<i>Juncus articulatus</i>					
<i>Aneura pinguis</i>						<i>Leontodon autumnalis</i>					
<i>Anthoxanthum odoratum</i>						<i>Leontodon saxatilis</i>					
<i>Barbula convoluta</i>						<i>Linum catharticum</i>					
<i>Bellis perennis</i>						<i>Lophocolea bidentata</i>					
<i>Brachythecium albicans</i>						<i>Lotus corniculatus</i>					
<i>Brachythecium rivulare</i>						<i>Luzula campestris</i>					
<i>Bryoerythrophyllum recurvirostrum</i>						<i>Pilosella officinarum</i>					
<i>Bryum pallens</i>						<i>Plagiochila asplenoides</i>					
<i>Bryum pseudotriquetrum</i>						<i>Plantago coronopus</i>					
<i>Calliergonella cuspidata</i>						<i>Plantago lanceolata</i>					
<i>Campyliadelphus chrysophyllus</i>						<i>Poa annua</i>					
<i>Carex arenaria</i>						<i>Pohlia wahlenbergii</i>					
<i>Carex flacca</i>						<i>Prunella vulgaris</i>					
<i>Cerastium fontanum</i>						<i>Ranunculus bulbosus</i>					
<i>Cratoneuron filicinum</i>						<i>Rhytidiadelphus squarrosus</i>					
<i>Ctenidium molluscum</i>						<i>Sagina nodosa</i>					
<i>Daucus carota</i>						<i>Saxifraga tridactylites</i>					
<i>Didymodon fallax</i>						<i>Scorpidium revolvens</i>					
<i>Distichium inclinatum</i>						<i>Selaginella selaginoides</i>					
<i>Ditrichum gracile</i>						<i>Taraxacum officinale</i>					
<i>Entodon concinnus</i>						<i>Thymus praecox</i>					
<i>Equisetum variegatum</i>						<i>Syntrichia ruralis</i> var. <i>ruraliformis</i>					
<i>Erophila verna</i>						<i>Trifolium repens</i>					
<i>Festuca rubra</i>						<i>Veronica arvensis</i>					
<i>Fossombronia incurva</i>											
<i>Hypnum cupressiforme</i>											

Assessment of Garter Hill, Co. Mayo (Glenamoy Bog Complex 000500)

Population Assessment for Garter Hill

Method of assessment	Area of extent of occupancy (m ²)	% of extent covered by population	Target	Result	Pass/Fail
Area of polygon around GPS points			Thalli present		

Habitat Assessment indicators, measures of assessment and targets for Garter Hill

Indicator	Method of assessment	Target	Result	Pass/Fail
Hydrology <input type="checkbox"/> tick box if surface water present on site	Measuring depth to groundwater level in hole	≤ 80 cm depth from ground surface		
	If bedrock below: Hand should be pressed onto soil surface	Soil surface should be wet/damp		
Shrub cover	Estimation of shrub cover to nearest 5% in each of 2-5 plots	Mean percent shrub cover should not exceed 25%		
Grass cover	Estimation of grass cover to nearest 5% in each of 2-5 plots	Mean percent grass cover should not exceed 60%		
Cover of bare ground	Estimation of cover of bare ground to nearest 1% in each of 2-5 plots	Mean percent cover of bare soil should exceed 5%		
Mean vegetation height	Mean height (cm) of 5 stems per plot averaged in 2-5 plots	Machair: Mean vegetation height should not exceed 6 cm		
		Dune slack: Mean vegetation height should not exceed 9 cm		

Future Prospects Assessment for Garter Hill

Activity (EU code)	Location (Inside/outside extent of occupancy)	Influence (Positive/Negative/Neutral)	Intensity (High/Medium/Low)	Area affected (0-10m ² ; 11-50m ² ; 51-100m ² ; >100m ²)
Intensive grazing (A04.01)				
Excessive poaching (Trampling, overuse, G05.01)				
Abandonment of pastoral systems, lack of grazing (A04.03)				
Stock feeding (A05.02)				
Restructuring agricultural land holdings (A10)				
Fertilisation (A08)				
Pollution to groundwater (H02)				
Water abstractions from groundwater (J02.07)				
Sand & gravel extraction (C01.01)				
Motorised vehicle damage (G01.03)				
Other outdoor sports & leisure activities (G01.08)				
Sport & leisure structures (G02)				
Dumping (Discharges E03)				
Invasive non-native species (I01)				
Natural erosion (K01.01)				
Biocenotic evolution, succession (incl. enlargement of scrub vegetation area) (K02)				
Species composition change (succession) (K02.01)				
Other:				

Overall Assessment for Garter Hill

Attribute	Assessment
Population	
Habitat for the species	
Future Prospects	
Overall	

Results of analysis of soil and water samples from Garter Hill

Plot Number:	1	2	3	4	5
Soil pH					
Groundwater pH					

Additional Comments:

Relevé card for *Petalophyllum ralfsii* fine-scale monitoring

Population:	Doolough Machair		Surveyor:		Date:						
County (vice):	Mayo (H27)		Aerial Photo ID:	O1235-C	Area mapped (✓)						
SAC:	Mullet/Blacksod Bay Complex 470		Discovery Map:	22							
Plot (1 x 1 m) Number	1	2	3	4	5						
GPS co-ordinates											
Altitude (m.s.l.)											
Slope (degrees)											
Aspect											
Soil depth (cm)											
Hole dug for groundwater level (✓)											
Mean vegetation height (cm)											
Max. vegetation height (cm)											
Tree cover (nearest 5%)											
Shrub cover (“)											
Grass cover (“)											
Rush cover (“)											
Sedge cover (“)											
Forb cover (“)											
Fern/fern ally cover (“)											
Bryophyte cover (“)											
Lichen cover (“)											
Algae cover (“)											
Litter cover (“)											
Cover of bare ground (nearest 1%)											
Cover of surface water (nearest 5%)											
Cover of rock (“)											
Cover of dung (“)											
No. of indeterminate thalli											
No. of male thalli											
No. of female thalli											
No of immature sporophytes											
No. of mature sporophytes											
Photo ID											
Groundwater depth (cm)											
Groundwater sample taken (✓)											
Soil sample taken (✓)											
Species cover (nearest 5%)	1	2	3	4	5	Species cover (nearest 5%)	1	2	3	4	5
<i>Agrostis stolonifera</i>											
<i>Aneura pinguis</i>											
<i>Bellis perennis</i>											
<i>Brachythecium rivulare</i>											
<i>Bryoerythrophyllum recurvirostrum</i>											
<i>Bryum algovicum</i> var. <i>rutheanum</i>											
<i>Calliergonella cuspidata</i>											
<i>Campyliadelphus chrysophyllus</i>											
<i>Carex arenaria</i>											
<i>Carex flacca</i>											
<i>Ctenidium molluscum</i>											
<i>Ditrichum gracile</i>											
<i>Drepanocladus polygamus</i>											
<i>Eurhynchium praelongum</i>											
<i>Festuca rubra</i>											
<i>Homalothecium lutescens</i>											
<i>Leontodon autumnalis</i>											
<i>Leontodon saxatilis</i>											
<i>Lotus corniculatus</i>											
<i>Luzula campestris</i>											
<i>Pilosella officinarum</i>											
<i>Plantago coronopus</i>											
<i>Plantago lanceolata</i>											
<i>Prunella vulgaris</i>											
<i>Ranunculus bulbosus</i>											
<i>Syntrichia ruralis</i> var. <i>ruraliformis</i>											
<i>Trifolium repens</i>											
Other species:											

Assessment of Doolough Machair, Co. Mayo (Mullet/Blacksod Bay Complex SAC 000470)

Population Assessment for Doolough Machair

Method of assessment	Area of extent of occupancy (m ²)	% of extent covered by population	Target	Result	Pass/Fail
Area of polygon around GPS points			Thalli present		

Habitat Assessment indicators, measures of assessment and targets for Doolough Machair

Indicator	Method of assessment	Target	Result	Pass/Fail
Hydrology <input type="checkbox"/> tick box if surface water present on site	Measuring depth to groundwater level in hole	≤ 80 cm depth from ground surface		
	If bedrock below: Hand should be pressed onto soil surface	Soil surface should be wet/damp		
Shrub cover	Estimation of shrub cover to nearest 5% in each of 2-5 plots	Mean percent shrub cover should not exceed 25%		
Grass cover	Estimation of grass cover to nearest 5% in each of 2-5 plots	Mean percent grass cover should not exceed 60%		
Cover of bare ground	Estimation of cover of bare ground to nearest 1% in each of 2-5 plots	Mean percent cover of bare soil should exceed 5%		
Mean vegetation height	Mean height (cm) of 5 stems per plot averaged in 2-5 plots	Machair: Mean vegetation height should not exceed 6 cm		
		Dune slack; Mean vegetation height should not exceed 9 cm		

Future Prospects Assessment for Doolough Machair

Activity (EU code)	Location (Inside/outside extent of occupancy)	Influence (Positive/Negative/Neutral)	Intensity (High/Medium/Low)	Area affected (0-10m ² ; 11-50m ² ; 51-100m ² ; >100m ²)
Intensive grazing (A04.01)				
Excessive poaching (Trampling, overuse, G05.01)				
Abandonment of pastoral systems, lack of grazing (A04.03)				
Stock feeding (A05.02)				
Restructuring agricultural land holdings (A10)				
Fertilisation (A08)				
Pollution to groundwater (H02)				
Water abstractions from groundwater (J02.07)				
Sand & gravel extraction (C01.01)				
Motorised vehicle damage (G01.03)				
Other outdoor sports & leisure activities (G01.08)				
Sport & leisure structures (G02)				
Dumping (Discharges E03)				
Invasive non-native species (I01)				
Natural erosion (K01.01)				
Biocenotic evolution, succession (incl. enlargement of scrub vegetation area) (K02)				
Species composition change (succession) (K02.01)				
Other:				

Overall Assessment for Doolough Machair

Attribute	Assessment
Population	
Habitat for the species	
Future Prospects	
Overall	

Results of analysis of soil and water samples from Doolough Machair

Plot Number:	1	2	3	4	5
Soil pH					
Groundwater pH					

Additional Comments:

Assessment of Dooyork Machair, Co. Mayo (Mullet/Blacksod Bay Complex SAC 000470)

Population Assessment for Dooyork Machair

Method of assessment	Area of extent of occupancy (m ²)	% of extent covered by population	Target	Result	Pass/Fail
Area of polygon around GPS points			Thalli present		

Habitat Assessment indicators, measures of assessment and targets for Dooyork Machair

Indicator	Method of assessment	Target	Result	Pass/Fail
Hydrology <input type="checkbox"/> tick box if surface water present on site	Measuring depth to groundwater level in hole	≤ 80 cm depth from ground surface		
	If bedrock below: Hand should be pressed onto soil surface	Soil surface should be wet/damp		
Shrub cover	Estimation of shrub cover to nearest 5% in each of 2-5 plots	Mean percent shrub cover should not exceed 25%		
Grass cover	Estimation of grass cover to nearest 5% in each of 2-5 plots	Mean percent grass cover should not exceed 60%		
Cover of bare ground	Estimation of cover of bare ground to nearest 1% in each of 2-5 plots	Mean percent cover of bare soil should exceed 5%		
Mean vegetation height	Mean height (cm) of 5 stems per plot averaged in 2-5 plots	Machair: Mean vegetation height should not exceed 6 cm		
		Dune slack; Mean vegetation height should not exceed 9 cm		

Future Prospects Assessment for Dooyork Machair

Activity (EU code)	Location (Inside/outside extent of occupancy)	Influence (Positive/Negative/Neutral)	Intensity (High/Medium/Low)	Area affected (0-10m ² ; 11-50m ² ; 51-100m ² ; >100m ²)
Intensive grazing (A04.01)				
Excessive poaching (Trampling, overuse, G05.01)				
Abandonment of pastoral systems, lack of grazing (A04.03)				
Stock feeding (A05.02)				
Restructuring agricultural land holdings (A10)				
Fertilisation (A08)				
Pollution to groundwater (H02)				
Water abstractions from groundwater (J02.07)				
Sand & gravel extraction (C01.01)				
Motorised vehicle damage (G01.03)				
Other outdoor sports & leisure activities (G01.08)				
Sport & leisure structures (G02)				
Dumping (Discharges E03)				
Invasive non-native species (I01)				
Natural erosion (K01.01)				
Biocenotic evolution, succession (incl. enlargement of scrub vegetation area) (K02)				
Species composition change (succession) (K02.01)				
Other:				

Overall Assessment for Dooyork Machair

Attribute	Assessment
Population	
Habitat for the species	
Future Prospects	
Overall	

Results of analysis of soil and water samples from Dooyork Machair

Plot Number:	1	2	3	4	5
Soil pH					
Groundwater pH					

Additional Comments:

Assessment of North Inishkea, Co. Mayo (Inishkea Islands SAC 000507)

Population Assessment for North Inishkea

Method of assessment	Area of extent of occupancy (m ²)	% of extent covered by population	Target	Result	Pass/Fail
Area of polygon around GPS points			Thalli present		

Habitat Assessment indicators, measures of assessment and targets for North Inishkea

Indicator	Method of assessment	Target	Result	Pass/Fail
Hydrology <input type="checkbox"/> tick box if surface water present on site	Measuring depth to groundwater level in hole	≤ 80 cm depth from ground surface		
	If bedrock below: Hand should be pressed onto soil surface	Soil surface should be wet/damp		
Shrub cover	Estimation of shrub cover to nearest 5% in each of 2-5 plots	Mean percent shrub cover should not exceed 25%		
Grass cover	Estimation of grass cover to nearest 5% in each of 2-5 plots	Mean percent grass cover should not exceed 60%		
Cover of bare ground	Estimation of cover of bare ground to nearest 1% in each of 2-5 plots	Mean percent cover of bare soil should exceed 5%		
Mean vegetation height	Mean height (cm) of 5 stems per plot averaged in 2-5 plots	Machair: Mean vegetation height should not exceed 6 cm		
		Dune slack; Mean vegetation height should not exceed 9 cm		

Future Prospects Assessment for North Inishkea

Activity (EU code)	Location (Inside/outside extent of occupancy)	Influence (Positive/Negative/Neutral)	Intensity (High/Medium/Low)	Area affected (0-10m ² ; 11-50m ² ; 51-100m ² ; >100m ²)
Intensive grazing (A04.01)				
Excessive poaching (Trampling, overuse, G05.01)				
Abandonment of pastoral systems, lack of grazing (A04.03)				
Stock feeding (A05.02)				
Restructuring agricultural land holdings (A10)				
Fertilisation (A08)				
Pollution to groundwater (H02)				
Water abstractions from groundwater (J02.07)				
Sand & gravel extraction (C01.01)				
Motorised vehicle damage (G01.03)				
Other outdoor sports & leisure activities (G01.08)				
Sport & leisure structures (G02)				
Dumping (Discharges E03)				
Invasive non-native species (I01)				
Natural erosion (K01.01)				
Biocenotic evolution, succession (incl. enlargement of scrub vegetation area) (K02)				
Species composition change (succession) (K02.01)				
Other:				

Overall Assessment for North Inishkea

Attribute	Assessment
Population	
Habitat for the species	
Future Prospects	
Overall	

Results of analysis of soil and water samples from North Inishkea

Plot Number:	1	2	3	4	5
Soil pH					
Groundwater pH					

Additional Comments:

Relevé card for *Petalophyllum ralfsii* fine-scale monitoring

Population:	Doogort Machair		Surveyor:		Date:						
County (vice):	Mayo (H27)		Aerial Photo ID:	O1573-B	Area mapped (✓)						
SAC:	Doogort Machair/Lough Doo 1497		Discovery Map:	22 (& 30)							
Plot (1 x 1 m) Number	1	2	3	4	5						
GPS co-ordinates											
Altitude (m.s.l.)											
Slope (degrees)											
Aspect											
Soil depth (cm)											
Hole dug for groundwater level (✓)											
Mean vegetation height (cm)											
Max. vegetation height (cm)											
Tree cover (nearest 5%)											
Shrub cover (“)											
Grass cover (“)											
Rush cover (“)											
Sedge cover (“)											
Forb cover (“)											
Fern/fern ally cover (“)											
Bryophyte cover (“)											
Lichen cover (“)											
Algae cover (“)											
Litter cover (“)											
Cover of bare ground (nearest 1%)											
Cover of surface water (nearest 5%)											
Cover of rock (“)											
Cover of dung (“)											
No. of indeterminate thalli											
No. of male thalli											
No. of female thalli											
No of immature sporophytes											
No. of mature sporophytes											
Photo ID											
Groundwater depth (cm)											
Groundwater sample taken (✓)											
Soil sample taken (✓)											
Species cover (nearest 5%)	1	2	3	4	5	Species cover (nearest 5%)	1	2	3	4	5
<i>Achillea millefolium</i>											
<i>Bellis perennis</i>											
<i>Brachythecium albicans</i>											
<i>Bryoerythrophyllum recurvirostrum</i>											
<i>Bryum pseudotriquetrum</i>											
<i>Carex flacca</i>											
<i>Cerastium fontanum</i>											
<i>Climacium dendroides</i>											
<i>Cratoneuron filicinum</i>											
<i>Didymodon vinealis</i>											
<i>Ditrichum gracile</i>											
<i>Festuca rubra</i>											
<i>Fissidens dubius</i>											
<i>Galium verum</i>											
<i>Hypnum cupressiforme</i>											
<i>Hypochaeris radicata</i>											
<i>Lophocolea bidentata</i>											
<i>Lotus corniculatus</i>											
<i>Pilosella officinarum</i>											
<i>Plagiomnium ellipticum</i>											
<i>Plantago lanceolata</i>											
<i>Prunella vulgaris</i>											
<i>Ranunculus bulbosus</i>											
<i>Rhytidiadelphus squarrosus</i>											
<i>Sagina procumbens</i>											
<i>Syntrichia ruralis</i>											
<i>Trifolium repens</i>											
Other species:											

Assessment of Doogort Machair ('Achill Island'/Lough Nambrack/Caraun Point), Co. Mayo (Doogort Machair/ Lough Doo SAC 001497)

Population Assessment for Doogort Machair

Method of assessment	Area of extent of occupancy (m ²)	% of extent covered by population	Target	Result	Pass/Fail
Area of polygon around GPS points			Thalli present		

Habitat Assessment indicators, measures of assessment and targets for Doogort Machair

Indicator	Method of assessment	Target	Result	Pass/Fail
Hydrology <input type="checkbox"/> tick box if surface water present on site	Measuring depth to groundwater level in hole	≤ 80 cm depth from ground surface		
	If bedrock below: Hand should be pressed onto soil surface	Soil surface should be wet/damp		
Shrub cover	Estimation of shrub cover to nearest 5% in each of 2-5 plots	Mean percent shrub cover should not exceed 25%		
Grass cover	Estimation of grass cover to nearest 5% in each of 2-5 plots	Mean percent grass cover should not exceed 60%		
Cover of bare ground	Estimation of cover of bare ground to nearest 1% in each of 2-5 plots	Mean percent cover of bare soil should exceed 5%		
Mean vegetation height	Mean height (cm) of 5 stems per plot averaged in 2-5 plots	Machair: Mean vegetation height should not exceed 6 cm		
		Dune slack; Mean vegetation height should not exceed 9 cm		

Future Prospects Assessment for Doogort Machair

Activity (EU code)	Location (Inside/outside extent of occupancy)	Influence (Positive/Negative/Neutral)	Intensity (High/Medium/Low)	Area affected (0-10m ² ; 11-50m ² ; 51-100m ² ; >100m ²)
Intensive grazing (A04.01)				
Excessive poaching (Trampling, overuse, G05.01)				
Abandonment of pastoral systems, lack of grazing (A04.03)				
Stock feeding (A05.02)				
Restructuring agricultural land holdings (A10)				
Fertilisation (A08)				
Pollution to groundwater (H02)				
Water abstractions from groundwater (J02.07)				
Sand & gravel extraction (C01.01)				
Motorised vehicle damage (G01.03)				
Other outdoor sports & leisure activities (G01.08)				
Sport & leisure structures (G02)				
Dumping (Discharges E03)				
Invasive non-native species (I01)				
Natural erosion (K01.01)				
Biocenotic evolution, succession (incl. enlargement of scrub vegetation area) (K02)				
Species composition change (succession) (K02.01)				
Other:				

Overall Assessment for Doogort Machair

Attribute	Assessment
Population	
Habitat for the species	
Future Prospects	
Overall	

Results of analysis of soil and water samples from Doogort Machair

Plot Number:	1	2	3	4	5
Soil pH					
Groundwater pH					

Additional Comments:

Relevé card for *Petalophyllum ralfsii* fine-scale monitoring

Population:	Keel Machair/Menaun Cliffs	Surveyor:		Date:							
County (vice):	Mayo (H27)	Aerial Photo ID:	O1642-C	Area mapped (✓)							
SAC:	Keel Machair/Menaun Cliffs 001513	Discovery Map:	22 (&30)								
Plot (1 x 1 m) Number	1	2	3	4	5						
GPS co-ordinates											
Altitude (m.s.l.)											
Slope (degrees)											
Aspect											
Soil depth (cm)											
Hole dug for groundwater level (✓)											
Mean vegetation height (cm)											
Max. vegetation height (cm)											
Tree cover (nearest 5%)											
Shrub cover (")											
Grass cover (")											
Rush cover (")											
Sedge cover (")											
Forb cover (")											
Fern/fern ally cover (")											
Bryophyte cover (")											
Lichen cover (")											
Algae cover (")											
Litter cover (")											
Cover of bare ground (nearest 1%)											
Cover of surface water (nearest 5%)											
Cover of rock (")											
Cover of dung (")											
No. of indeterminate thalli											
No. of male thalli											
No. of female thalli											
No of immature sporophytes											
No. of mature sporophytes											
Photo ID											
Groundwater depth (cm)											
Groundwater sample taken (✓)											
Soil sample taken (✓)											
Species cover (nearest 5%)	1	2	3	4	5	Species cover (nearest 5%)	1	2	3	4	5
<i>Agrostis stolonifera</i>											
<i>Aneura pinguis</i>											
<i>Barbula convoluta</i>											
<i>Bellis perennis</i>											
<i>Bryoerythrophyllum recurvirostrum</i>											
<i>Bryum pseudotriquetrum</i>											
<i>Calliergonella cuspidata</i>											
<i>Campylium stellatum</i>											
<i>Carex arenaria</i>											
<i>Didymodon fallax</i>											
<i>Distichium inclinatum</i>											
<i>Drepanocladus polygamus</i>											
<i>Euphrasia tetraquetra</i>											
<i>Festuca rubra</i>											
<i>Fissidens taxifolius</i>											
<i>Juncus articulatus</i>											
<i>Leontodon autumnalis</i>											
<i>Linum catharticum</i>											
<i>Plagiomnium ellipticum</i>											
<i>Plantago coronopus</i>											
<i>Poa annua</i>											
<i>Potentilla anserina</i>											
<i>Prunella vulgaris</i>											
<i>Sagina procumbens</i>											
<i>Scorpidium revolvens</i>											
<i>Selaginella selaginoides</i>											
<i>Trifolium repens</i>											
Other species:											

Assessment of Keel Machair/Menaun Cliffs, Co. Mayo (Keel Machair/Menaun Cliffs SAC 001513)

Population Assessment for Keel Machair/Menaun Cliffs

Method of assessment	Area of extent of occupancy (m ²)	% of extent covered by population	Target	Result	Pass/Fail
Area of polygon around GPS points			Thalli present		

Habitat Assessment indicators, measures of assessment and targets for Keel Machair

Indicator	Method of assessment	Target	Result	Pass/Fail
Hydrology <input type="checkbox"/> tick box if surface water present on site	Measuring depth to groundwater level in hole	≤ 80 cm depth from ground surface		
	If bedrock below: Hand should be pressed onto soil surface	Soil surface should be wet/damp		
Shrub cover	Estimation of shrub cover to nearest 5% in each of 2-5 plots	Mean percent shrub cover should not exceed 25%		
Grass cover	Estimation of grass cover to nearest 5% in each of 2-5 plots	Mean percent grass cover should not exceed 60%		
Cover of bare ground	Estimation of cover of bare ground to nearest 1% in each of 2-5 plots	Mean percent cover of bare soil should exceed 5%		
Mean vegetation height	Mean height (cm) of 5 stems per plot averaged in 2-5 plots	Machair: Mean vegetation height should not exceed 6 cm		
		Dune slack; Mean vegetation height should not exceed 9 cm		

Future Prospects Assessment for Keel Machair/ Menaun Cliffs

Activity (EU code)	Location (Inside/outside extent of occupancy)	Influence (Positive/Negative/Neutral)	Intensity (High/Medium/Low)	Area affected (0-10m ² ; 11-50m ² ; 51-100m ² ; >100m ²)
Intensive grazing (A04.01)				
Excessive poaching (Trampling, overuse, G05.01)				
Abandonment of pastoral systems, lack of grazing (A04.03)				
Stock feeding (A05.02)				
Restructuring agricultural land holdings (A10)				
Fertilisation (A08)				
Pollution to groundwater (H02)				
Water abstractions from groundwater (J02.07)				
Sand & gravel extraction (C01.01)				
Motorised vehicle damage (G01.03)				
Other outdoor sports & leisure activities (G01.08)				
Sport & leisure structures (G02)				
Dumping (Discharges E03)				
Invasive non-native species (I01)				
Natural erosion (K01.01)				
Biocenotic evolution, succession (incl. enlargement of scrub vegetation area) (K02)				
Species composition change (succession) (K02.01)				
Other:				

Overall Assessment for Keel Machair/Menaun Cliffs

Attribute	Assessment
Population	
Habitat for the species	
Future Prospects	
Overall	

Results of analysis of soil and water samples from Keel Machair/Menaun Cliffs

Plot Number:	1	2	3	4	5
Soil pH					
Groundwater pH					

Additional Comments:

Relevé card for *Petalophyllum ralfsii* fine-scale monitoring

Population:	Dooaghtry	Surveyor:		Date:	
County (vice):	Mayo (H27)	Aerial Photo ID:	O2385-D	Area mapped (✓)	
SAC:	Mweelrea/Sheeffry/Erriff Complex 001932	Discovery Map:	37		
Plot (1 x 1 m) Number	1	2	3	4	5
GPS co-ordinates					
Altitude (m.s.l.)					
Slope (degrees)					
Aspect					
Soil depth (cm)					
Hole dug for groundwater level (✓)					
Mean vegetation height (cm)					
Max. vegetation height (cm)					
Tree cover (nearest 5%)					
Shrub cover (“)					
Grass cover (“)					
Rush cover (“)					
Sedge cover (“)					
Forb cover (“)					
Fern/fern ally cover (“)					
Bryophyte cover (“)					
Lichen cover (“)					
Algae cover (“)					
Litter cover (“)					
Cover of bare ground (nearest 1%)					
Cover of surface water (nearest 5%)					
Cover of rock (“)					
Cover of dung (“)					
No. of indeterminate thalli					
No. of male thalli					
No. of female thalli					
No of immature sporophytes					
No. of mature sporophytes					
Photo ID					
Groundwater depth (cm)					
Groundwater sample taken (✓)					
Soil sample taken (✓)					
Species cover (nearest 5%)	1	2	3	4	5
<i>Achillea millifolium</i>					
<i>Agrostis stolonifera</i>					
<i>Amblystegium serpens</i> var. <i>salinum</i>					
<i>Anagallis tenella</i>					
<i>Aneura pinguis</i>					
<i>Barbula convoluta</i>					
<i>Bellis perennis</i>					
<i>Brachythecium albicans</i>					
<i>Brachythecium mildeanum</i>					
<i>Bryum algovicum</i>					
<i>Bryum pallens</i>					
<i>Bryum pseudotriquetrum</i>					
<i>Calliergonella cuspidata</i>					
<i>Carex arenaria</i>					
<i>Carex flacca</i>					
<i>Centaurium erythraea</i>					
<i>Cerastium fontanum</i>					
<i>Cratoneuron filicinum</i>					
<i>Ctenidium molluscum</i>					
<i>Didymodon fallax</i>					
<i>Didymodon vinealis</i>					
<i>Distichium inclinatum</i>					
<i>Ditrichum gracile</i>					
<i>Entodon concinnus</i>					
<i>Equisetum variegatum</i>					
<i>Erophila verna</i>					
<i>Euphrasia</i> sp.					
<i>Festuca rubra</i>					
<i>Holcus lanatus</i>					
<i>Homalothecium lutescens</i>					
<i>Linum catharticum</i>					
<i>Hydrocotyle vulgaris</i>					
Species cover (nearest 5%)	1	2	3	4	5
<i>Juncus acutiflorus</i>					
<i>Juncus articulatus</i>					
<i>Juncus bulbosus</i>					
<i>Jungermannia atrovirens</i>					
<i>Leontodon autumnalis</i>					
<i>Leontodon saxatilis</i>					
<i>Lophocolea bidentata</i>					
<i>Lotus corniculatus</i>					
<i>Luzula campestris</i>					
<i>Pellia endiviifolia</i>					
<i>Plagiochila asplenioides</i>					
<i>Plantago coronopus</i>					
<i>Plantago lanceolata</i>					
<i>Pleurochaete squarrosa</i>					
<i>Pohlia wahlenbergii</i>					
<i>Prunella vulgaris</i>					
<i>Riccardia chamedryfolia</i>					
<i>Rhytiadelphus squarrosus</i>					
<i>Sagina procumbens</i>					
<i>Saxifraga tridactylites</i>					
<i>Scorpidium revolvens</i>					
<i>Selaginella selaginoides</i>					
<i>Syntrichia ruralis</i> var. <i>ruraliformis</i>					
<i>Thymus polytrichus</i>					
<i>Trichostomum brachydontium</i>					
<i>Trifolium dubium</i>					
<i>Trifolium repens</i>					

Assessment of Dooaghty (/Lackakeely/Killadoon), Co. Mayo (Mweelrea/Sheeffry/Erriff Complex SAC 001932)

Population Assessment for Dooaghty

Method of assessment	Area of extent of occupancy (m ²)	% of extent covered by population	Target	Result	Pass/Fail
Area of polygon around GPS points			Thalli present		

Habitat Assessment indicators, measures of assessment and targets for Dooaghty

Indicator	Method of assessment	Target	Result	Pass/Fail
Hydrology <input type="checkbox"/> tick box if surface water present on site	Measuring depth to groundwater level in hole	≤ 80 cm depth from ground surface		
	If bedrock below: Hand should be pressed onto soil surface	Soil surface should be wet/damp		
Shrub cover	Estimation of shrub cover to nearest 5% in each of 2-5 plots	Mean percent shrub cover should not exceed 25%		
Grass cover	Estimation of grass cover to nearest 5% in each of 2-5 plots	Mean percent grass cover should not exceed 60%		
Cover of bare ground	Estimation of cover of bare ground to nearest 1% in each of 2-5 plots	Mean percent cover of bare soil should exceed 5%		
Mean vegetation height	Mean height (cm) of 5 stems per plot averaged in 2-5 plots	Machair: Mean vegetation height should not exceed 6 cm		
		Dune slack; Mean vegetation height should not exceed 9 cm		

Future Prospects Assessment for Dooaghty

Activity (EU code)	Location (Inside/outside extent of occupancy)	Influence (Positive/Negative/Neutral)	Intensity (High/Medium/Low)	Area affected (0-10m ² ; 11-50m ² ; 51-100m ² ; >100m ²)
Intensive grazing (A04.01)				
Excessive poaching (Trampling, overuse, G05.01)				
Abandonment of pastoral systems, lack of grazing (A04.03)				
Stock feeding (A05.02)				
Restructuring agricultural land holdings (A10)				
Fertilisation (A08)				
Pollution to groundwater (H02)				
Water abstractions from groundwater (J02.07)				
Sand & gravel extraction (C01.01)				
Motorised vehicle damage (G01.03)				
Other outdoor sports & leisure activities (G01.08)				
Sport & leisure structures (G02)				
Dumping (Discharges E03)				
Invasive non-native species (I01)				
Natural erosion (K01.01)				
Biocenotic evolution, succession (incl. enlargement of scrub vegetation area) (K02)				
Species composition change (succession) (K02.01)				
Other:				

Overall Assessment for Dooaghtry

Attribute	Assessment
Population	
Habitat for the species	
Future Prospects	
Overall	

Results of analysis of soil and water samples from Dooaghtry

Plot Number:	1	2	3	4	5
Soil pH					
Groundwater pH					

Additional Comments:

Relevé card for *Petalophyllum ralfsii* fine-scale monitoring

Population:	Omey Island Machair		Surveyor:		Date:						
County (vice):	Galway (H16)		Aerial Photo ID:	O2654-D, O2723-B & O2724-A		Area mapped (✓)					
SAC:	Omey Island Machair 001309		Discovery Map:	37							
Plot (1 x 1 m) Number	1	2	3	4	5						
GPS co-ordinates											
Altitude (m.s.l.)											
Slope (degrees)											
Aspect											
Soil depth (cm)											
Hole dug for groundwater level (✓)											
Mean vegetation height (cm)											
Max. vegetation height (cm)											
Tree cover (nearest 5%)											
Shrub cover (“)											
Grass cover (“)											
Rush cover (“)											
Sedge cover (“)											
Forb cover (“)											
Fern/fern ally cover (“)											
Bryophyte cover (“)											
Lichen cover (“)											
Algae cover (“)											
Litter cover (“)											
Cover of bare ground (nearest 1%)											
Cover of surface water (nearest 5%)											
Cover of rock (“)											
Cover of dung (“)											
No. of indeterminate thalli											
No. of male thalli											
No. of female thalli											
No of immature sporophytes											
No. of mature sporophytes											
Photo ID											
Groundwater depth (cm)											
Groundwater sample taken (✓)											
Soil sample taken (✓)											
Species cover (nearest 5%)	1	2	3	4	5	Species cover (nearest 5%)	1	2	3	4	5
<i>Agrostis stolonifera</i>						<i>Rhytidiadelphus squarrosus</i>					
<i>Anagallis tenella</i>						<i>Riccardia chamedryfolia</i>					
<i>Aneura pinguis</i>						<i>Sedum acre</i>					
<i>Barbula convoluta</i>						<i>Selaginella selaginoides</i>					
<i>Bellis perennis</i>						<i>Trifolium repens</i>					
<i>Brachythecium rutabulum</i>											
<i>Bryum pseudotriquetrum</i>						Other species:					
<i>Calliergonella cuspidata</i>											
<i>Campylium stellatum</i>											
<i>Carex flacca</i>											
<i>Carex arenaria</i>											
<i>Ctenidium molluscum</i>											
<i>Cynosurus cristatus</i>											
<i>Didymodon fallax</i>											
<i>Didymodon ferrugineus</i>											
<i>Ditrichum gracile</i>											
<i>Festuca rubra</i>											
<i>Fissidens celticus</i>											
<i>Fissidens dubius</i>											
<i>Galium verum</i>											
<i>Gentianella campestris</i>											
<i>Juncus acutiflorus</i>											
<i>Leontodon autumnalis</i>											
<i>Lotus corniculatus</i>											
<i>Moerckia flotoviana</i>											
<i>Pellia endiviifolia</i>											
<i>Plantago coronopus</i>											
<i>Plantago lanceolata</i>											
<i>Potentilla anserina</i>											
<i>Prunella vulgaris</i>											
<i>Pseudocrossidium hornschurchianum</i>											
<i>Ranunculus bulbosus</i>											

Assessment of Omev Island Machair, Co. Galway (Omev Island Machair SAC 0001309)

Population Assessment for Omev Island Machair

Method of assessment	Area of extent of occupancy (m ²)	% of extent covered by population	Target	Result	Pass/Fail
Area of polygon around GPS points			Thalli present		

Habitat Assessment indicators, measures of assessment and targets for Omev Island

Indicator	Method of assessment	Target	Result	Pass/Fail
Hydrology <input type="checkbox"/> tick box if surface water present on site	Measuring depth to groundwater level in hole	≤ 80 cm depth from ground surface		
	If bedrock below: Hand should be pressed onto soil surface	Soil surface should be wet/damp		
Shrub cover	Estimation of shrub cover to nearest 5% in each of 2-5 plots	Mean percent shrub cover should not exceed 25%		
Grass cover	Estimation of grass cover to nearest 5% in each of 2-5 plots	Mean percent grass cover should not exceed 60%		
Cover of bare ground	Estimation of cover of bare ground to nearest 1% in each of 2-5 plots	Mean percent cover of bare soil should exceed 5%		
Mean vegetation height	Mean height (cm) of 5 stems per plot averaged in 2-5 plots	Machair: Mean vegetation height should not exceed 6 cm		
		Dune slack; Mean vegetation height should not exceed 9 cm		

Future Prospects Assessment for Omev Island

Activity (EU code)	Location (Inside/outside extent of occupancy)	Influence (Positive/Negative/Neutral)	Intensity (High/Medium/Low)	Area affected (0-10m ² ; 11-50m ² ; 51-100m ² ; >100m ²)
Intensive grazing (A04.01)				
Excessive poaching (Trampling, overuse, G05.01)				
Abandonment of pastoral systems, lack of grazing (A04.03)				
Stock feeding (A05.02)				
Restructuring agricultural land holdings (A10)				
Fertilisation (A08)				
Pollution to groundwater (H02)				
Water abstractions from groundwater (J02.07)				
Sand & gravel extraction (C01.01)				
Motorised vehicle damage (G01.03)				
Other outdoor sports & leisure activities (G01.08)				
Sport & leisure structures (G02)				
Dumping (Discharges E03)				
Invasive non-native species (I01)				
Natural erosion (K01.01)				
Biocenotic evolution, succession (incl. enlargement of scrub vegetation area) (K02)				
Species composition change (succession) (K02.01)				
Other:				

Overall Assessment for Omev Island Machair

Attribute	Assessment
Population	
Habitat for the species	
Future Prospects	
Overall	

Results of analysis of soil and water samples from Omev Island Machair

Plot Number:	1	2	3	4	5
Soil pH					
Groundwater pH					

Additional Comments:

Assessment of Mannin More, Co. Galway (Slyne Head Peninsula SAC 002074)

Population Assessment for Mannin More

Method of assessment	Area of extent of occupancy (m ²)	% of extent covered by population	Target	Result	Pass/Fail
Area of polygon around GPS points			Thalli present		

Habitat Assessment indicators, measures of assessment and targets for Mannin More

Indicator	Method of assessment	Target	Result	Pass/Fail
Hydrology <input type="checkbox"/> tick box if surface water present on site	Measuring depth to groundwater level in hole	≤ 80 cm depth from ground surface		
	If bedrock below: Hand should be pressed onto soil surface	Soil surface should be wet/damp		
Shrub cover	Estimation of shrub cover to nearest 5% in each of 2-5 plots	Mean percent shrub cover should not exceed 25%		
Grass cover	Estimation of grass cover to nearest 5% in each of 2-5 plots	Mean percent grass cover should not exceed 60%		
Cover of bare ground	Estimation of cover of bare ground to nearest 1% in each of 2-5 plots	Mean percent cover of bare soil should exceed 5%		
Mean vegetation height	Mean height (cm) of 5 stems per plot averaged in 2-5 plots	Machair: Mean vegetation height should not exceed 6 cm		
		Dune slack; Mean vegetation height should not exceed 9 cm		

Future Prospects Assessment for Mannin More

Activity (EU code)	Location (Inside/outside extent of occupancy)	Influence (Positive/Negative/Neutral)	Intensity (High/Medium/Low)	Area affected (0-10m ² ; 11-50m ² ; 51-100m ² ; >100m ²)
Intensive grazing (A04.01)				
Excessive poaching (Trampling, overuse, G05.01)				
Abandonment of pastoral systems, lack of grazing (A04.03)				
Stock feeding (A05.02)				
Restructuring agricultural land holdings (A10)				
Fertilisation (A08)				
Pollution to groundwater (H02)				
Water abstractions from groundwater (J02.07)				
Sand & gravel extraction (C01.01)				
Motorised vehicle damage (G01.03)				
Other outdoor sports & leisure activities (G01.08)				
Sport & leisure structures (G02)				
Dumping (Discharges E03)				
Invasive non-native species (I01)				
Natural erosion (K01.01)				
Biocenotic evolution, succession (incl. enlargement of scrub vegetation area) (K02)				
Species composition change (succession) (K02.01)				
Other:				

Overall Assessment for Mannin More

Attribute	Assessment
Population	
Habitat for the species	
Future Prospects	
Overall	

Results of analysis of soil and water samples from Mannin More

Plot Number:	1	2	3	4	5
Soil pH					
Groundwater pH					

Additional Comments:

Relevé card for *Petalophyllum ralfsii* fine-scale monitoring

Population:	Truska Machair		Surveyor:		Date:						
County (vice):	Galway (H16)		Aerial Photo ID:	O2929-A, O2929-B & O2929-D	Area mapped (✓)						
SAC:	Slyne Head Peninsula 002074		Discovery Map:	44							
Plot (1 x 1 m) Number	1	2	3	4	5						
GPS co-ordinates											
Altitude (m.s.l.)											
Slope (degrees)											
Aspect											
Soil depth (cm)											
Hole dug for groundwater level (✓)											
Mean vegetation height (cm)											
Max. vegetation height (cm)											
Tree cover (nearest 5%)											
Shrub cover (“)											
Grass cover (“)											
Rush cover (“)											
Sedge cover (“)											
Forb cover (“)											
Fern/fern ally cover (“)											
Bryophyte cover (“)											
Lichen cover (“)											
Algae cover (“)											
Litter cover (“)											
Cover of bare ground (nearest 1%)											
Cover of surface water (nearest 5%)											
Cover of rock (“)											
Cover of dung (“)											
No. of indeterminate thalli											
No. of male thalli											
No. of female thalli											
No of immature sporophytes											
No. of mature sporophytes											
Photo ID											
Groundwater depth (cm)											
Groundwater sample taken (✓)											
Soil sample taken (✓)											
Species cover (nearest 5%)	1	2	3	4	5	Species cover (nearest 5%)	1	2	3	4	5
<i>Agrostis stolonifera</i>						<i>Luzula multiflora</i>					
<i>Amblyodon dealbatus</i>						<i>Moerckia flotoviana</i>					
<i>Amblystegium serpens</i> var. <i>salinum</i>						<i>Nostoc</i> sp.					
<i>Anagallis tenella</i>						<i>Plantago coronopus</i>					
<i>Aneura pinguis</i>						<i>Plantago lanceolata</i>					
<i>Barbula convoluta</i>						<i>Poa annua</i>					
<i>Bellis perennis</i>						<i>Prunella vulgaris</i>					
<i>Brachythecium mildeanum</i>						<i>Ranunculus bulbosus</i>					
<i>Brachythecium rutabulum</i>						<i>Ranunculus repens</i>					
<i>Bryum pseudotriquetrum</i>						<i>Rhytiadelphus squarrosus</i>					
<i>Calliergonella cuspidata</i>						<i>Riccardia chamedryfolia</i>					
<i>Campylium stellatum</i>						<i>Riccardia multifida</i>					
<i>Cardamine pratensis</i>						<i>Sagina procumbens</i>					
<i>Carex arenaria</i>						<i>Syntrichia ruralis</i> var. <i>ruraliformis</i>					
<i>Carex flacca</i>						<i>Thuidium recognitum</i>					
<i>Cerastium fontanum</i>						<i>Thymus praecox</i>					
<i>Cratoneuron filicinum</i>						<i>Trifolium repens</i>					
<i>Didymodon fallax</i>											
<i>Didymodon ferrugineus</i>						Other species:					
<i>Didymodon tophaceus</i>											
<i>Distichium inclinatum</i>											
<i>Ditrichum gracile</i>											
<i>Festuca rubra</i>											
<i>Homalothecium lutescens</i>											
<i>Hypnum cupressiforme</i>											
<i>Iris pseudocorus</i>											
<i>Juncus acutiflorus</i>											
<i>Juncus articulatus</i>											
<i>Leontodon autumnalis</i>											
<i>Linum catharrticum</i>											
<i>Lophocolea bidentata</i>											
<i>Lotus corniculatus</i>											

Assessment of Truska Machair, Co. Galway (Slyne Head Peninsula SAC 002074)

Population Assessment for Truska Machair

Method of assessment	Area of extent of occupancy (m ²)	% of extent covered by population	Target	Result	Pass/Fail
Area of polygon around GPS points			Thalli present		

Habitat Assessment indicators, measures of assessment and targets for Truska Machair

Indicator	Method of assessment	Target	Result	Pass/Fail
Hydrology <input type="checkbox"/> tick box if surface water present on site	Measuring depth to groundwater level in hole	≤ 80 cm depth from ground surface		
	If bedrock below: Hand should be pressed onto soil surface	Soil surface should be wet/damp		
Shrub cover	Estimation of shrub cover to nearest 5% in each of 2-5 plots	Mean percent shrub cover should not exceed 25%		
Grass cover	Estimation of grass cover to nearest 5% in each of 2-5 plots	Mean percent grass cover should not exceed 60%		
Cover of bare ground	Estimation of cover of bare ground to nearest 1% in each of 2-5 plots	Mean percent cover of bare soil should exceed 5%		
Mean vegetation height	Mean height (cm) of 5 stems per plot averaged in 2-5 plots	Machair: Mean vegetation height should not exceed 6cm		
		Dune slack; Mean vegetation height should not exceed 9cm		

Future Prospects Assessment for Truska Machair

Activity (EU code)	Location (Inside/outside extent of occupancy)	Influence (Positive/Negative/Neutral)	Intensity (High/Medium/Low)	Area affected (0-10m ² ; 11-50m ² ; 51-100m ² ; >100m ²)
Intensive grazing (A04.01)				
Excessive poaching (Trampling, overuse, G05.01)				
Abandonment of pastoral systems, lack of grazing (A04.03)				
Stock feeding (A05.02)				
Restructuring agricultural land holdings (A10)				
Fertilisation (A08)				
Pollution to groundwater (H02)				
Water abstractions from groundwater (J02.07)				
Sand & gravel extraction (C01.01)				
Motorised vehicle damage (G01.03)				
Other outdoor sports & leisure activities (G01.08)				
Sport & leisure structures (G02)				
Dumping (Discharges E03)				
Invasive non-native species (I01)				
Natural erosion (K01.01)				
Biocenotic evolution, succession (incl. enlargement of scrub vegetation area) (K02)				
Species composition change (succession) (K02.01)				
Other:				

Overall Assessment for Truska Machair

Attribute	Assessment
Population	
Habitat for the species	
Future Prospects	
Overall	

Results of analysis of soil and water samples from Truska Machair

Plot Number:	1	2	3	4	5
Soil pH					
Groundwater pH					

Additional Comments:

Assessment of Doon Hill/ West of Aillebrack, Co. Galway (Slyne Head Peninsula SAC 002074)

Population Assessment for Doon Hill/ West of Aillebrack

Method of assessment	Area of extent of occupancy (m ²)	% of extent covered by population	Target	Result	Pass/Fail
Area of polygon around GPS points			Thalli present		

Habitat Assessment indicators, measures of assessment and targets for Doon Hill/ West of Aillebrack

Indicator	Method of assessment	Target	Result	Pass/Fail
Hydrology <input type="checkbox"/> tick box if surface water present on site	Measuring depth to groundwater level in hole	≤ 80 cm depth from ground surface		
	If bedrock below: Hand should be pressed onto soil surface	Soil surface should be wet/damp		
Shrub cover	Estimation of shrub cover to nearest 5% in each of 2-5 plots	Mean percent shrub cover should not exceed 25%		
Grass cover	Estimation of grass cover to nearest 5% in each of 2-5 plots	Mean percent grass cover should not exceed 60%		
Cover of bare ground	Estimation of cover of bare ground to nearest 1% in each of 2-5 plots	Mean percent cover of bare soil should exceed 5%		
Mean vegetation height	Mean height (cm) of 5 stems per plot averaged in 2-5 plots	Machair: Mean vegetation height should not exceed 6 cm		
		Dune slack; Mean vegetation height should not exceed 9 cm		

Future Prospects Assessment for Doon Hill/ West of Aillebrack

Activity (EU code)	Location (Inside/outside extent of occupancy)	Influence (Positive/Negative/Neutral)	Intensity (High/Medium/Low)	Area affected (0-10m ² ; 11-50m ² ; 51-100m ² ; >100m ²)
Intensive grazing (A04.01)				
Excessive poaching (Trampling, overuse, G05.01)				
Abandonment of pastoral systems, lack of grazing (A04.03)				
Stock feeding (A05.02)				
Restructuring agricultural land holdings (A10)				
Fertilisation (A08)				
Pollution to groundwater (H02)				
Water abstractions from groundwater (J02.07)				
Sand & gravel extraction (C01.01)				
Motorised vehicle damage (G01.03)				
Other outdoor sports & leisure activities (G01.08)				
Sport & leisure structures (G02)				
Dumping (Discharges E03)				
Invasive non-native species (I01)				
Natural erosion (K01.01)				
Biocenotic evolution, succession (incl. enlargement of scrub vegetation area) (K02)				
Species composition change (succession) (K02.01)				
Other:				

Overall Assessment for Doon Hill/ West of Aillebrack

Attribute	Assessment
Population	
Habitat for the species	
Future Prospects	
Overall	

Results of analysis of soil and water samples from Doon Hill/ West of Aillebrack

Plot Number:	1	2	3	4	5
Soil pH					
Groundwater pH					

Additional Comments:

Relevé card for *Petalophyllum ralfsii* fine-scale monitoring

Population:	Murvey Machair	Surveyor:					Date:				
County (vice):	Galway (H16)	Aerial Photo ID:					O3069-D				
SAC:	Murvey Machair 002129	Discovery Map:					44				
Plot (1 x 1 m) Number	1	2	3	4	5	6	7	8	9	10	11
GPS co-ordinates											
Altitude (m.s.l.)											
Slope (degrees)											
Aspect											
Soil depth (cm)											
Hole dug for groundwater level (✓)											
Mean vegetation height (cm)											
Max. vegetation height (cm)											
Tree cover (nearest 5%)											
Shrub cover (“)											
Grass cover (“)											
Rush cover (“)											
Sedge cover (“)											
Forb cover (“)											
Fern/fern ally cover (“)											
Bryophyte cover (“)											
Lichen cover (“)											
Algae cover (“)											
Litter cover (“)											
Cover of bare ground (nearest 1%)											
Cover of surface water (nearest 5%)											
Cover of rock (“)											
Cover of dung (“)											
No. of indeterminate thalli											
No. of male thalli											
No. of female thalli											
No of immature sporophytes											
No. of mature sporophytes											
Photo ID											
Groundwater depth (cm)											
Groundwater sample taken (✓)											
Soil sample taken (✓)											
Species cover (nearest 5%)	1	2	3	4	5	Species cover (nearest 5%)	1	2	3	4	5
<i>Agrostis stolonifera</i>											
<i>Amblyodon dealbatus</i>											
<i>Amblystegium serpens</i> var. <i>salinum</i>											
<i>Anagallis tenella</i>											
<i>Bellis perennis</i>											
<i>Brachythecium mildeanum</i>											
<i>Bryum pseudotriquetrum</i>											
<i>Calliergonella cuspidata</i>											
<i>Campylopus elodes</i>											
<i>Carex flacca</i>											
<i>Cephalozia bicuspidata</i>											
<i>Cerastium fontanum</i>											
<i>Cratoneuron filicinum</i>											
<i>Didymodon ferrugineus</i>											
<i>Didymodon rigidulus</i>											
<i>Distichium inclinatum</i>											
<i>Ditrichum gracile</i>											
<i>Festuca rubra</i>											
<i>Galium verum</i>											
<i>Leontodon autumnalis</i>											
<i>Lotus corniculatus</i>											
<i>Luzula multiflora</i>											
<i>Moerckia flotoviana</i>											
<i>Pellia endiviifolia</i>											
<i>Plantago coronopus</i>											
<i>Plantago lanceolata</i>											
<i>Prunella vulgaris</i>											
<i>Sagina procumbens</i>											
<i>Thymus praecox</i>											
Other species:											

Assessment of Murvey Machair, Co. Galway (Murvey Machair SAC 002129)

Population Assessment for Murvey Machair

Method of assessment	Area of extent of occupancy (m ²)	% of extent covered by population	Target	Result	Pass/Fail
Area of polygon around GPS points			Thalli present		

Habitat Assessment indicators, measures of assessment and targets for Murvey Machair

Indicator	Method of assessment	Target	Result	Pass/Fail
Hydrology <input type="checkbox"/> tick box if surface water present on site	Measuring depth to groundwater level in hole	≤ 80 cm depth from ground surface		
	If bedrock below: Hand should be pressed onto soil surface	Soil surface should be wet/damp		
Shrub cover	Estimation of shrub cover to nearest 5% in each of 2-5 plots	Mean percent shrub cover should not exceed 25%		
Grass cover	Estimation of grass cover to nearest 5% in each of 2-5 plots	Mean percent grass cover should not exceed 60%		
Cover of bare ground	Estimation of cover of bare ground to nearest 1% in each of 2-5 plots	Mean percent cover of bare soil should exceed 5%		
Mean vegetation height	Mean height (cm) of 5 stems per plot averaged in 2-5 plots	Machair: Mean vegetation height should not exceed 6 cm		
		Dune slack; Mean vegetation height should not exceed 9 cm		

Future Prospects Assessment for Murvey Machair

Activity (EU code)	Location (Inside/outside extent of occupancy)	Influence (Positive/Negative/Neutral)	Intensity (High/Medium/Low)	Area affected (0-10m ² ; 11-50m ² ; 51-100m ² ; >100m ²)
Intensive grazing (A04.01)				
Excessive poaching (Trampling, overuse, G05.01)				
Abandonment of pastoral systems, lack of grazing (A04.03)				
Stock feeding (A05.02)				
Restructuring agricultural land holdings (A10)				
Fertilisation (A08)				
Pollution to groundwater (H02)				
Water abstractions from groundwater (J02.07)				
Sand & gravel extraction (C01.01)				
Motorised vehicle damage (G01.03)				
Other outdoor sports & leisure activities (G01.08)				
Sport & leisure structures (G02)				
Dumping (Discharges E03)				
Invasive non-native species (I01)				
Natural erosion (K01.01)				
Biocenotic evolution, succession (incl. enlargement of scrub vegetation area) (K02)				
Species composition change (succession) (K02.01)				
Other:				

Overall Assessment for Murvey Machair

Attribute	Assessment
Population	
Habitat for the species	
Future Prospects	
Overall	

Results of analysis of soil and water samples from Murvey Machair

Plot Number:	1	2	3	4	5
Soil pH					
Groundwater pH					

Additional Comments:

Relevé card for *Petalophyllum ralfsii* fine-scale monitoring

Population:	Fanore		Surveyor:		Date:						
County (vice):	Clare (H09)		Aerial Photo ID:	O3678-C	Area mapped (✓)						
SAC:	Black Head-Poulsallagh Complex 20		Discovery Map:	51							
Plot (1 x 1 m) Number	1	2	3	4	5						
GPS co-ordinates											
Altitude (m.s.l.)											
Slope (degrees)											
Aspect											
Soil depth (cm)											
Hole dug for groundwater level (✓)											
Mean vegetation height (cm)											
Max. vegetation height (cm)											
Tree cover (nearest 5%)											
Shrub cover (“)											
Grass cover (“)											
Rush cover (“)											
Sedge cover (“)											
Forb cover (“)											
Fern/fern ally cover (“)											
Bryophyte cover (“)											
Lichen cover (“)											
Algae cover (“)											
Litter cover (“)											
Cover of bare ground (nearest 1%)											
Cover of surface water (nearest 5%)											
Cover of rock (“)											
Cover of dung (“)											
No. of indeterminate thalli											
No. of male thalli											
No. of female thalli											
No of immature sporophytes											
No. of mature sporophytes											
Photo ID											
Groundwater depth (cm)											
Groundwater sample taken (✓)											
Soil sample taken (✓)											
Species cover (nearest 5%)	1	2	3	4	5	Species cover (nearest 5%)	1	2	3	4	5
<i>Agrostis stolonifera</i>											
<i>Aneura pinguis</i>											
<i>Barbula convoluta</i>											
<i>Bellis perennis</i>											
<i>Brachythecium mildeanum</i>											
<i>Bryum algovicum</i>											
<i>Bryum pseudotriquetrum</i>											
<i>Carex flacca</i>											
<i>Cerastium fontanum</i>											
<i>Ctenidium molluscum</i>											
<i>Didymodon fallax</i>											
<i>Didymodon vinealis</i>											
<i>Distichium inclinatum</i>											
<i>Ditrichum gracile</i>											
<i>Festuca rubra</i>											
<i>Hypnum cupressiforme</i>											
<i>Leontodon autumnalis</i>											
<i>Lophocolea bidentata</i>											
<i>Lotus corniculatus</i>											
<i>Orthotrichum diaphanum</i>											
<i>Plantago coronopus</i>											
<i>Plantago lanceolata</i>											
<i>Pleurochaete squarrosa</i>											
<i>Ranunculus repens</i>											
<i>Thymus praecox</i>											
<i>Trichostomum crispulum</i>											
<i>Trifolium repens</i>											
Other species:											

Assessment of Fanore, Co. Clare (Black Head-Poulsallagh Complex SAC 000020)

Population Assessment for Fanore

Method of assessment	Area of extent of occupancy (m ²)	% of extent covered by population	Target	Result	Pass/Fail
Area of polygon around GPS points			Thalli present		

Habitat Assessment indicators, measures of assessment and targets for Fanore

Indicator	Method of assessment	Target	Result	Pass/Fail
Hydrology <input type="checkbox"/> tick box if surface water present on site	Measuring depth to groundwater level in hole	≤ 80 cm depth from ground surface		
	If bedrock below: Hand should be pressed onto soil surface	Soil surface should be wet/damp		
Shrub cover	Estimation of shrub cover to nearest 5% in each of 2-5 plots	Mean percent shrub cover should not exceed 25%		
Grass cover	Estimation of grass cover to nearest 5% in each of 2-5 plots	Mean percent grass cover should not exceed 60%		
Cover of bare ground	Estimation of cover of bare ground to nearest 1% in each of 2-5 plots	Mean percent cover of bare soil should exceed 5%		
Mean vegetation height	Mean height (cm) of 5 stems per plot averaged in 2-5 plots	Machair: Mean vegetation height should not exceed 6 cm		
		Dune slack : Mean vegetation height should not exceed 9 cm		

Future Prospects Assessment for Fanore

Activity (EU code)	Location (Inside/outside extent of occupancy)	Influence (Positive/Negative/Neutral)	Intensity (High/Medium/Low)	Area affected (0-10m ² ; 11-50m ² ; 51-100m ² ; >100m ²)
Intensive grazing (A04.01)				
Excessive poaching (Trampling, overuse, G05.01)				
Abandonment of pastoral systems, lack of grazing (A04.03)				
Stock feeding (A05.02)				
Restructuring agricultural land holdings (A10)				
Fertilisation (A08)				
Pollution to groundwater (H02)				
Water abstractions from groundwater (J02.07)				
Sand & gravel extraction (C01.01)				
Motorised vehicle damage (G01.03)				
Other outdoor sports & leisure activities (G01.08)				
Sport & leisure structures (G02)				
Dumping (Discharges E03)				
Invasive non-native species (I01)				
Natural erosion (K01.01)				
Biocenotic evolution, succession (incl. enlargement of scrub vegetation area) (K02)				
Species composition change (succession) (K02.01)				
Other:				

Overall Assessment for Fanore

Attribute	Assessment
Population	
Habitat for the species	
Future Prospects	
Overall	

Results of analysis of soil and water samples from Fanore

Plot Number:	1	2	3	4	5
Soil pH					
Groundwater pH					

Additional Comments:

Assessment of SW of Lough Naparka, Co. Kerry (Tralee Bay and Magharees Peninsula, West to Cloghane SAC 002070)

Population Assessment for SW of Lough Naparka

Method of assessment	Area of extent of occupancy (m ²)	% of extent covered by population	Target	Result	Pass/Fail
Area of polygon around GPS points			Thalli present		

Habitat Assessment indicators, measures of assessment and targets for SW of Lough Naparka

Indicator	Method of assessment	Target	Result	Pass/Fail
Hydrology <input type="checkbox"/> tick box if surface water present on site	Measuring depth to groundwater level in hole	≤ 80 cm depth from ground surface		
	If bedrock below: Hand should be pressed onto soil surface	Soil surface should be wet/damp		
Shrub cover	Estimation of shrub cover to nearest 5% in each of 2-5 plots	Mean percent shrub cover should not exceed 25%		
Grass cover	Estimation of grass cover to nearest 5% in each of 2-5 plots	Mean percent grass cover should not exceed 60%		
Cover of bare ground	Estimation of cover of bare ground to nearest 1% in each of 2-5 plots	Mean percent cover of bare soil should exceed 5%		
Mean vegetation height	Mean height (cm) of 5 stems per plot averaged in 2-5 plots	Machair: Mean vegetation height should not exceed 6 cm		
		<u>Dune slack</u> : Mean vegetation height should not exceed 9 cm		

Future Prospects Assessment for SW of Lough Naparka

Activity (EU code)	Location (Inside/outside extent of occupancy)	Influence (Positive/Negative/Neutral)	Intensity (High/Medium/Low)	Area affected (0-10m ² ; 11-50m ² ; 51-100m ² ; >100m ²)
Intensive grazing (A04.01)				
Excessive poaching (Trampling, overuse, G05.01)				
Abandonment of pastoral systems, lack of grazing (A04.03)				
Stock feeding (A05.02)				
Restructuring agricultural land holdings (A10)				
Fertilisation (A08)				
Pollution to groundwater (H02)				
Water abstractions from groundwater (J02.07)				
Sand & gravel extraction (C01.01)				
Motorised vehicle damage (G01.03)				
Other outdoor sports & leisure activities (G01.08)				
Sport & leisure structures (G02)				
Dumping (Discharges E03)				
Invasive non-native species (I01)				
Natural erosion (K01.01)				
Biocenotic evolution, succession (incl. enlargement of scrub vegetation area) (K02)				
Species composition change (succession) (K02.01)				
Other:				

Overall Assessment for SW of Lough Naparka

Attribute	Assessment
Population	
Habitat for the species	
Future Prospects	
Overall	

Results of analysis of soil and water samples from SW of Naparka

Plot Number:	1	2	3	4	5
Soil pH					
Groundwater pH					

Additional Comments:

Relevé card for *Petalophyllum ralfsii* fine-scale monitoring

Population:	Magherabeg	Surveyor:		Date:	
County (vice):	Kerry (H01)	Aerial Photo ID:	O5517-C	Area mapped (✓)	
SAC:	Tralee Bay & Magharees Peninsula, West to Cloghane 002070	Discovery Map:	71		
Plot (1 x 1 m) Number	1	2	3	4	5
GPS co-ordinates					
Altitude (m.s.l.)					
Slope (degrees)					
Aspect					
Soil depth (cm)					
Hole dug for groundwater level (✓)					
Mean vegetation height (cm)					
Max. vegetation height (cm)					
Tree cover (nearest 5%)					
Shrub cover (“)					
Grass cover (“)					
Rush cover (“)					
Sedge cover (“)					
Forb cover (“)					
Fern/fern ally cover (“)					
Bryophyte cover (“)					
Lichen cover (“)					
Algae cover (“)					
Litter cover (“)					
Cover of bare ground (nearest 1%)					
Cover of surface water (nearest 5%)					
Cover of rock (“)					
Cover of dung (“)					
No. of indeterminate thalli					
No. of male thalli					
No. of female thalli					
No of immature sporophytes					
No. of mature sporophytes					
Photo ID					
Groundwater depth (cm)					
Groundwater sample taken (✓)					
Soil sample taken (✓)					
Species cover (nearest 5%)	1	2	3	4	5
<i>Agrostis stolonifera</i>					
<i>Amblystegium serpens</i> var. <i>salinum</i>					
<i>Aneura pinguis</i>					
<i>Barbula convuluta</i>					
<i>Bellis perennis</i>					
<i>Brachythecium glareosum</i>					
<i>Brachythecium mildeanum</i>					
<i>Bryoerythrophyllum recurvirostrum</i>					
<i>Bryum pallens</i>					
<i>Bryum pseudotriquetrum</i>					
<i>Calliergonella cuspidata</i>					
<i>Campylium stellatum</i>					
<i>Carex arenaria</i>					
<i>Carex flacca</i>					
<i>Cerastium fontanum</i>					
<i>Cratoneuron filicinum</i>					
<i>Didymodon fallax</i>					
<i>Eucladium verticillatum</i>					
<i>Festuca rubra</i>					
<i>Fissidens adianthoides</i>					
<i>Fissidens taxifolius</i>					
<i>Galium aparine</i>					
<i>Galium verum</i>					
<i>Homalothecium lutescens</i>					
<i>Hypnum lacunosum</i>					
<i>Juncus articulatus</i>					
<i>Leiocolea turbinata</i>					
<i>Leontodon autumnalis</i>					
<i>Lophocolea bidentata</i>					
<i>Lotus corniculatus</i>					
<i>Luzula multiflora</i>					
<i>Nostoc</i> sp.					
Species cover (nearest 5%)	1	2	3	4	5
<i>Plantago coronopus</i>					
<i>Plantago lanceolata</i>					
<i>Polygala vulgaris</i>					
<i>Prunella vulgaris</i>					
<i>Pseudoscleropodium purum</i>					
<i>Ranunculus bulbosus</i>					
<i>Ranunculus repens</i>					
<i>Riccardia multifida</i>					
<i>Sagina nodosa</i>					
<i>Sagina procumbens</i>					
<i>Salix repens</i>					
<i>Scorpidium revolvens</i>					
<i>Senecio jacobaea</i>					
<i>Syntrichia ruralis</i> var. <i>ruraliformis</i>					
<i>Thuidium tamariscinum</i>					
<i>Thymus praecox</i>					
<i>Tortella flavovirens</i>					
<i>Trichostomum brachydontium</i>					
<i>Trifolium repens</i>					
Other species:					

Assessment of Magherabeg, Co. Kerry (Tralee Bay and Magharees Peninsula, West to Cloghane SAC 002070)

Population Assessment for Magherabeg

Method of assessment	Area of extent of occupancy (m ²)	% of extent covered by population	Target	Result	Pass/Fail
Area of polygon around GPS points			Thalli present		

Habitat Assessment indicators, measures of assessment and targets for Magherabeg

Indicator	Method of assessment	Target	Result	Pass/Fail
Hydrology <input type="checkbox"/> tick box if surface water present on site	Measuring depth to groundwater level in hole	≤ 80 cm depth from ground surface		
	If bedrock below: Hand should be pressed onto soil surface	Soil surface should be wet/damp		
Shrub cover	Estimation of shrub cover to nearest 5% in each of 2-5 plots	Mean percent shrub cover should not exceed 25%		
Grass cover	Estimation of grass cover to nearest 5% in each of 2-5 plots	Mean percent grass cover should not exceed 60%		
Cover of bare ground	Estimation of cover of bare ground to nearest 1% in each of 2-5 plots	Mean percent cover of bare soil should exceed 5%		
Mean vegetation height	Mean height (cm) of 5 stems per plot averaged in 2-5 plots	Machair: Mean vegetation height should not exceed 6 cm		
		<u>Dune slack</u> : Mean vegetation height should not exceed 9 cm		

Future Prospects Assessment for Magherabeg

Activity (EU code)	Location (Inside/outside extent of occupancy)	Influence (Positive/Negative/Neutral)	Intensity (High/Medium/Low)	Area affected (0-10m ² ; 11-50m ² ; 51-100m ² ; >100m ²)
Intensive grazing (A04.01)				
Excessive poaching (Trampling, overuse, G05.01)				
Abandonment of pastoral systems, lack of grazing (A04.03)				
Stock feeding (A05.02)				
Restructuring agricultural land holdings (A10)				
Fertilisation (A08)				
Pollution to groundwater (H02)				
Water abstractions from groundwater (J02.07)				
Sand & gravel extraction (C01.01)				
Motorised vehicle damage (G01.03)				
Other outdoor sports & leisure activities (G01.08)				
Sport & leisure structures (G02)				
Dumping (Discharges E03)				
Invasive non-native species (I01)				
Natural erosion (K01.01)				
Biocenotic evolution, succession (incl. enlargement of scrub vegetation area) (K02)				
Species composition change (succession) (K02.01)				
Other:				

Overall Assessment for Magherabeg

Attribute	Assessment
Population	
Habitat for the species	
Future Prospects	
Overall	

Results of analysis of soil and water samples from Magherabeg

Plot Number:	1	2	3	4	5
Soil pH					
Groundwater pH					

Additional Comments:

Assessment of Kilshannig, Co. Kerry (Tralee Bay and Magharees Peninsula, West to Cloghane SAC 002070)

Population Assessment for Kilshannig

Method of assessment	Area of extent of occupancy (m ²)	% of extent covered by population	Target	Result	Pass/Fail
Area of polygon around GPS points			Thalli present		

Habitat Assessment indicators, measures of assessment and targets for Kilshannig

Indicator	Method of assessment	Target	Result	Pass/Fail
Hydrology <input type="checkbox"/> tick box if surface water present on site	Measuring depth to groundwater level in hole	≤ 80 cm depth from ground surface		
	If bedrock below: Hand should be pressed onto soil surface	Soil surface should be wet/damp		
Shrub cover	Estimation of shrub cover to nearest 5% in each of 2-5 plots	Mean percent shrub cover should not exceed 25%		
Grass cover	Estimation of grass cover to nearest 5% in each of 2-5 plots	Mean percent grass cover should not exceed 60%		
Cover of bare ground	Estimation of cover of bare ground to nearest 1% in each of 2-5 plots	Mean percent cover of bare soil should exceed 5%		
Mean vegetation height	Mean height (cm) of 5 stems per plot averaged in 2-5 plots	Machair: Mean vegetation height should not exceed 6 cm		
		Dune slack: Mean vegetation height should not exceed 9 cm		

Future Prospects Assessment for Kilshannig

Activity (EU code)	Location (Inside/outside extent of occupancy)	Influence (Positive/Negative/Neutral)	Intensity (High/Medium/Low)	Area affected (0-10m ² ; 11-50m ² ; 51-100m ² ; >100m ²)
Intensive grazing (A04.01)				
Excessive poaching (Trampling, overuse, G05.01)				
Abandonment of pastoral systems, lack of grazing (A04.03)				
Stock feeding (A05.02)				
Restructuring agricultural land holdings (A10)				
Fertilisation (A08)				
Pollution to groundwater (H02)				
Water abstractions from groundwater (J02.07)				
Sand & gravel extraction (C01.01)				
Motorised vehicle damage (G01.03)				
Other outdoor sports & leisure activities (G01.08)				
Sport & leisure structures (G02)				
Dumping (Discharges E03)				
Invasive non-native species (I01)				
Natural erosion (K01.01)				
Biocenotic evolution, succession (incl. enlargement of scrub vegetation area) (K02)				
Species composition change (succession) (K02.01)				
Other:				

Overall Assessment for Kilshannig

Attribute	Assessment
Population	
Habitat for the species	
Future Prospects	
Overall	

Results of analysis of soil and water samples from Kilshannig

Plot Number:	1	2	3	4	5
Soil pH					
Groundwater pH					

Additional Comments:

Relevé card for *Petalophyllum ralfsii* fine-scale monitoring

Population:	Inch Spit	Surveyor:					Date:	
County (vice):	Kerry (H01)	Aerial Photo ID:		O5930-D & O5986-B		Area mapped (✓)		
SAC:	Castlemaine Harbour 000343	Discovery Map:		78				
Plot (1 x 1 m) Number	1	2	3	4	5			
GPS co-ordinates								
Altitude (m.s.l.)								
Slope (degrees)								
Aspect								
Soil depth (cm)								
Hole dug for groundwater level (✓)								
Mean vegetation height (cm)								
Max. vegetation height (cm)								
Tree cover (nearest 5%)								
Shrub cover (")								
Grass cover (")								
Rush cover (")								
Sedge cover (")								
Forb cover (")								
Fern/fern cover (")								
Bryophyte cover (")								
Lichen cover (")								
Algae cover (")								
Litter cover (")								
Cover of bare ground (nearest 1%)								
Cover of surface water (nearest 5%)								
Cover of rock (")								
Cover of dung (")								
No. of indeterminate thalli								
No. of male thalli								
No. of female thalli								
No of immature sporophytes								
No. of mature sporophytes								
Photo ID								
Groundwater depth (cm)								
Groundwater sample taken (✓)								
Soil sample taken (✓)								
Species cover (nearest 5%)	1	2	3	4	5	Species cover (nearest 5%)	1 2 3 4 5	
<i>Agrostis stolonifera</i>								
<i>Aneura pinguis</i>								
<i>Bellis perennis</i>								
<i>Brachythecium mildeanum</i>								
<i>Bryum pseudotriquetrum</i>								
<i>Calliergonella cuspidata</i>								
<i>Carex arenaria</i>								
<i>Carex flacca</i>								
<i>Carex nigra</i>								
<i>Didymodon fallax</i>								
<i>Festuca rubra</i>								
<i>Leontodon autumnalis</i>								
<i>Lotus corniculatus</i>								
<i>Nostoc</i> sp.								
<i>Plantago lanceolata</i>								
<i>Pohlia wahlenbergii</i>								
<i>Prunella vulgaris</i>								
<i>Rhytidiadelphus triquetrus</i>								
<i>Sagina procumbens</i>								
<i>Salix repens</i>								
<i>Syntrichia ruralis</i> var. <i>ruraliformis</i>								
Other species:								

Assessment of Inch Spit, Co. Kerry (Casltemaine Harbour SAC 000343)

Population Assessment for Inch Spit

Method of assessment	Area of extent of occupancy (m ²)	% of extent covered by population	Target	Result	Pass/Fail
Area of polygon around GPS points			Thalli present		

Habitat Assessment indicators, measures of assessment and targets for Inch Spit

Indicator	Method of assessment	Target	Result	Pass/Fail
Hydrology <input type="checkbox"/> tick box if surface water present on site	Measuring depth to groundwater level in hole	≤ 80 cm depth from ground surface		
	If bedrock below: Hand should be pressed onto soil surface	Soil surface should be wet/damp		
Shrub cover	Estimation of shrub cover to nearest 5% in each of 2-5 plots	Mean percent shrub cover should not exceed 25%		
Grass cover	Estimation of grass cover to nearest 5% in each of 2-5 plots	Mean percent grass cover should not exceed 60%		
Cover of bare ground	Estimation of cover of bare ground to nearest 1% in each of 2-5 plots	Mean percent cover of bare soil should exceed 5%		
Mean vegetation height	Mean height (cm) of 5 stems per plot averaged in 2-5 plots	Machair: Mean vegetation height should not exceed 6 cm		
		Dune slack: Mean vegetation height should not exceed 9 cm		

Future Prospects Assessment for Inch Spit

Activity (EU code)	Location (Inside/outside extent of occupancy)	Influence (Positive/Negative/Neutral)	Intensity (High/Medium/Low)	Area affected (0-10m ² ; 11-50m ² ; 51-100m ² ; >100m ²)
Intensive grazing (A04.01)				
Excessive poaching (Trampling, overuse, G05.01)				
Abandonment of pastoral systems, lack of grazing (A04.03)				
Stock feeding (A05.02)				
Restructuring agricultural land holdings (A10)				
Fertilisation (A08)				
Pollution to groundwater (H02)				
Water abstractions from groundwater (J02.07)				
Sand & gravel extraction (C01.01)				
Motorised vehicle damage (G01.03)				
Other outdoor sports & leisure activities (G01.08)				
Sport & leisure structures (G02)				
Dumping (Discharges E03)				
Invasive non-native species (I01)				
Natural erosion (K01.01)				
Biocenotic evolution, succession (incl. enlargement of scrub vegetation area) (K02)				
Species composition change (succession) (K02.01)				
Other:				

Overall Assessment for Inch Spit

Attribute	Assessment
Population	
Habitat for the species	
Future Prospects	
Overall	

Results of analysis of soil and water samples from Inch Spit

Plot Number:	1	2	3	4	5
Soil pH					
Groundwater pH					

Additional Comments:

Assessment of Rossbehy, Co. Kerry (Castlemaine Harbour SAC 000343)

Population Assessment for Rossbehy

Method of assessment	Area of extent of occupancy (m ²)	% of extent covered by population	Target	Result	Pass/Fail
Area of polygon around GPS points			Thalli present		

Habitat Assessment indicators, measures of assessment and targets for Rossbehy

Indicator	Method of assessment	Target	Result	Pass/Fail
Hydrology <input type="checkbox"/> tick box if surface water present on site	Measuring depth to groundwater level in hole	≤ 80 cm depth from ground surface		
	If bedrock below: Hand should be pressed onto soil surface	Soil surface should be wet/damp		
Shrub cover	Estimation of shrub cover to nearest 5% in each of 2-5 plots	Mean percent shrub cover should not exceed 25%		
Grass cover	Estimation of grass cover to nearest 5% in each of 2-5 plots	Mean percent grass cover should not exceed 60%		
Cover of bare ground	Estimation of cover of bare ground to nearest 1% in each of 2-5 plots	Mean percent cover of bare soil should exceed 5%		
Mean vegetation height	Mean height (cm) of 5 stems per plot averaged in 2-5 plots	Machair: Mean vegetation height should not exceed 6 cm		
		Dune slack: Mean vegetation height should not exceed 9 cm		

Future Prospects Assessment for Rossbehy

Activity (EU code)	Location (Inside/outside extent of occupancy)	Influence (Positive/Negative/Neutral)	Intensity (High/Medium/Low)	Area affected (0-10m ² ; 11-50m ² ; 51-100m ² ; >100m ²)
Intensive grazing (A04.01)				
Excessive poaching (Trampling, overuse, G05.01)				
Abandonment of pastoral systems, lack of grazing (A04.03)				
Stock feeding (A05.02)				
Restructuring agricultural land holdings (A10)				
Fertilisation (A08)				
Pollution to groundwater (H02)				
Water abstractions from groundwater (J02.07)				
Sand & gravel extraction (C01.01)				
Motorised vehicle damage (G01.03)				
Other outdoor sports & leisure activities (G01.08)				
Sport & leisure structures (G02)				
Dumping (Discharges E03)				
Invasive non-native species (I01)				
Natural erosion (K01.01)				
Biocenotic evolution, succession (incl. enlargement of scrub vegetation area) (K02)				
Species composition change (succession) (K02.01)				
Other:				

Overall Assessment for Rossbehy

Attribute	Assessment
Population	
Habitat for the species	
Future Prospects	
Overall	

Results of analysis of soil and water samples from Rossbehy

Plot Number:	1	2	3	4	5
Soil pH					
Groundwater pH					

Additional Comments:

Relevé card for *Petalophyllum ralfsii* fine-scale monitoring

Population:	West of Inny Ferry		Surveyor:			Date:										
County (vice):	Kerry (H01)		Aerial Photo ID:	O6397-D		Area mapped (✓)										
SAC:	Ballinskelligs Bay & Inny Estuary 000335		Discovery Map:	83 (& 84)												
Plot (1 x 1 m) Number	1		2		3		4		5							
GPS co-ordinates																
Altitude (m.s.l.)																
Slope (degrees)																
Aspect																
Soil depth (cm)																
Hole dug for groundwater level (✓)																
Mean vegetation height (cm)																
Max. vegetation height (cm)																
Tree cover (nearest 5%)																
Shrub cover (")																
Grass cover (")																
Rush cover (")																
Sedge cover (")																
Forb cover (")																
Fern/fern ally cover (")																
Bryophyte cover (")																
Lichen cover (")																
Algae cover (")																
Litter cover (")																
Cover of bare ground (nearest 1%)																
Cover of surface water (nearest 5%)																
Cover of rock (")																
Cover of dung (")																
No. of indeterminate thalli																
No. of male thalli																
No. of female thalli																
No of immature sporophytes																
No. of mature sporophytes																
Photo ID																
Groundwater depth (cm)																
Groundwater sample taken (✓)																
Soil sample taken (✓)																
Species cover (nearest 5%)	1	2	3	4	5	Species cover (nearest 5%)					1	2	3	4	5	
<i>Agrostis stolonifera</i>																
<i>Aneura pinguis</i>																
<i>Bellis perennis</i>																
<i>Brachythecium albicans</i>																
<i>Brachythecium rutabulum</i>																
<i>Bryum pseudotriquetrum</i>																
<i>Carex arenaria</i>																
<i>Carex flacca</i>																
<i>Cerastium fontanum</i>																
<i>Festuca rubra</i>																
<i>Lophocolea bidentata</i>																
<i>Lotus corniculatus</i>																
<i>Luzula campestris</i>																
<i>Plagiomnium undulatum</i>																
<i>Plantago lanceolata</i>																
<i>Prunella vulgaris</i>																
<i>Pseudoscleropodium purum</i>																
<i>Rhytidiadelphus squarrosus</i>																
<i>Riccardia multifida</i>																
<i>Sagina procumbens</i>																
<i>Trifolium repens</i>																
Other species:																

Assessment of West of Inny Ferry, Co. Kerry (Ballinskelligs Bay and Inny Estuary SAC 000335)

Population Assessment for West of Inny Ferry

Method of assessment	Area of extent of occupancy (m ²)	% of extent covered by population	Target	Result	Pass/Fail
Area of polygon around GPS points			Thalli present		

Habitat Assessment indicators, measures of assessment and targets for West of Inny Ferry

Indicator	Method of assessment	Target	Result	Pass/Fail
Hydrology <input type="checkbox"/> tick box if surface water present on site	Measuring depth to groundwater level in hole	≤ 80 cm depth from ground surface		
	If bedrock below: Hand should be pressed onto soil surface	Soil surface should be wet/damp		
Shrub cover	Estimation of shrub cover to nearest 5% in each of 2-5 plots	Mean percent shrub cover should not exceed 25%		
Grass cover	Estimation of grass cover to nearest 5% in each of 2-5 plots	Mean percent grass cover should not exceed 60%		
Cover of bare ground	Estimation of cover of bare ground to nearest 1% in each of 2-5 plots	Mean percent cover of bare soil should exceed 5%		
Mean vegetation height	Mean height (cm) of 5 stems per plot averaged in 2-5 plots	Machair: Mean vegetation height should not exceed 6cm		
		Dune slack : Mean vegetation height should not exceed 9cm		

Future Prospects Assessment for West of Inny Ferry

Activity (EU code)	Location (Inside/outside extent of occupancy)	Influence (Positive/Negative/Neutral)	Intensity (High/Medium/Low)	Area affected (0-10m ² ; 11-50m ² ; 51-100m ² ; >100m ²)
Intensive grazing (A04.01)				
Excessive poaching (Trampling, overuse, G05.01)				
Abandonment of pastoral systems, lack of grazing (A04.03)				
Stock feeding (A05.02)				
Restructuring agricultural land holdings (A10)				
Fertilisation (A08)				
Pollution to groundwater (H02)				
Water abstractions from groundwater (J02.07)				
Sand & gravel extraction (C01.01)				
Motorised vehicle damage (G01.03)				
Other outdoor sports & leisure activities (G01.08)				
Sport & leisure structures (G02)				
Dumping (Discharges E03)				
Invasive non-native species (I01)				
Natural erosion (K01.01)				
Biocenotic evolution, succession (incl. enlargement of scrub vegetation area) (K02)				
Species composition change (succession) (K02.01)				
Other:				

Overall Assessment for West of Inny Ferry

Attribute	Assessment
Population	
Habitat for the species	
Future Prospects	
Overall	

Results of analysis of soil and water samples from West of Inny Ferry

Plot Number:	1	2	3	4	5
Soil pH					
Groundwater pH					

Additional Comments:

Relevé card for *Petalophyllum ralfsii* fine-scale monitoring

Population:	North Bull	Surveyor:					Date:				
County (vice):	Dublin (H21)	Aerial Photo ID: O3134-C & O3200-A					Area mapped (✓)				
SAC:	North Dublin Bay SAC 000206	Discovery Map: 50									
Plot (1 x 1 m) Number	1	2	3	4	5		5				
GPS co-ordinates											
Altitude (m.s.l.)											
Slope (degrees)											
Aspect											
Soil depth (cm)											
Hole dug for groundwater level (✓)											
Mean vegetation height (cm)											
Max. vegetation height (cm)											
Tree cover (nearest 5%)											
Shrub cover (“)											
Grass cover (“)											
Rush cover (“)											
Sedge cover (“)											
Forb cover (“)											
Fern/fern ally cover (“)											
Bryophyte cover (“)											
Lichen cover (“)											
Algae cover (“)											
Litter cover (“)											
Cover of bare ground (nearest 1%)											
Cover of surface water (nearest 5%)											
Cover of rock (“)											
Cover of dung (“)											
No. of indeterminate thalli											
No. of male thalli											
No. of female thalli											
No of immature sporophytes											
No. of mature sporophytes											
Photo ID											
Groundwater depth (cm)											
Groundwater sample taken (✓)											
Soil sample taken (✓)											
Species cover (nearest 5%)	1	2	3	4	5	Species cover (nearest 5%)	1	2	3	4	5
<i>Agrostis stolonifera</i>											
<i>Amblystegium serpens</i> var. <i>salinum</i>											
<i>Aneura pinguis</i>											
<i>Anthoxanthum odoratum</i>											
<i>Brachythecium mildeanum</i>											
<i>Carex arenaria</i>											
<i>Carex flacca</i>											
<i>Cirsium palustre</i>											
<i>Cratoneuron filicinum</i>											
<i>Ctenidium molluscum</i>											
<i>Didymodon tophaceus</i>											
<i>Equisetum variegatum</i>											
<i>Festuca rubra</i>											
<i>Glaux maritima</i>											
<i>Holcus lanatus</i>											
<i>Juncus articulatus</i>											
<i>Leontodon autumnalis</i>											
<i>Plantago coronopus</i>											
<i>Plantago lanceolata</i>											
<i>Poa annua</i>											
<i>Polygala serpyllifolia</i>											
<i>Prunella vulgaris</i>											
<i>Ranunculus bulbosus</i>											
<i>Ranunculus repens</i>											
<i>Trifolium pratense</i>											
<i>Trifolium repens</i>											
Other species:											

Assessment of North Bull, Co. Dublin (North Dublin Bay SAC 000206)

Population Assessment for North Bull

Method of assessment	Area of extent of occupancy (m ²)	% of extent covered by population	Target	Result	Pass/Fail
Area of polygon around GPS points			Thalli present		

Habitat Assessment indicators, measures of assessment and targets for North Bull

Indicator	Method of assessment	Target	Result	Pass/Fail
Hydrology <input type="checkbox"/> tick box if surface water present on site	Measuring depth to groundwater level in hole	≤ 80 cm depth from ground surface		
	If bedrock below: Hand should be pressed onto soil surface	Soil surface should be wet/damp		
Shrub cover	Estimation of shrub cover to nearest 5% in each of 2-5 plots	Mean percent shrub cover should not exceed 25%		
Grass cover	Estimation of grass cover to nearest 5% in each of 2-5 plots	Mean percent grass cover should not exceed 60%		
Cover of bare ground	Estimation of cover of bare ground to nearest 1% in each of 2-5 plots	Mean percent cover of bare soil should exceed 5%		
Mean vegetation height	Mean height (cm) of 5 stems per plot averaged in 2-5 plots	Machair: Mean vegetation height should not exceed 6 cm		
		Dune slack: Mean vegetation height should not exceed 9 cm		

Future Prospects Assessment for North Bull

Activity (EU code)	Location (Inside/outside extent of occupancy)	Influence (Positive/Negative/Neutral)	Intensity (High/Medium/Low)	Area affected (0-10m ² ; 11-50m ² ; 51-100m ² ; >100m ²)
Intensive grazing (A04.01)				
Excessive poaching (Trampling, overuse, G05.01)				
Abandonment of pastoral systems, lack of grazing (A04.03)				
Stock feeding (A05.02)				
Restructuring agricultural land holdings (A10)				
Fertilisation (A08)				
Pollution to groundwater (H02)				
Water abstractions from groundwater (J02.07)				
Sand & gravel extraction (C01.01)				
Motorised vehicle damage (G01.03)				
Other outdoor sports & leisure activities (G01.08)				
Sport & leisure structures (G02)				
Dumping (Discharges E03)				
Invasive non-native species (I01)				
Natural erosion (K01.01)				
Biocenotic evolution, succession (incl. enlargement of scrub vegetation area) (K02)				
Species composition change (succession) (K02.01)				
Other:				

Overall Assessment for North Bull

Attribute	Assessment
Population	
Habitat for the species	
Future Prospects	
Overall	

Results of analysis of soil and water samples from North Bull

Plot Number:	1	2	3	4	5
Soil pH					
Groundwater pH					

Additional Comments:

Assessment of Barley Cove, Co. Cork (Barley Cove to Ballyrisode Point 001040)

Population Assessment for Barley Cove

Method of assessment	Area of extent of occupancy (m ²)	% of extent covered by population	Target	Result	Pass/Fail
Area of polygon around GPS points			Thalli present		

Habitat Assessment indicators, measures of assessment and targets for Barley Cove

Indicator	Method of assessment	Target	Result	Pass/Fail
Hydrology <input type="checkbox"/> tick box if surface water present on site	Measuring depth to groundwater level in hole	≤ 80 cm depth from ground surface		
	If bedrock below: Hand should be pressed onto soil surface	Soil surface should be wet/damp		
Shrub cover	Estimation of shrub cover to nearest 5% in each of 2-5 plots	Mean percent shrub cover should not exceed 25%		
Grass cover	Estimation of grass cover to nearest 5% in each of 2-5 plots	Mean percent grass cover should not exceed 60%		
Cover of bare ground	Estimation of cover of bare ground to nearest 1% in each of 2-5 plots	Mean percent cover of bare soil should exceed 5%		
Mean vegetation height	Mean height (cm) of 5 stems per plot averaged in 2-5 plots	Machair: Mean vegetation height should not exceed 6 cm		
		Dune slack: Mean vegetation height should not exceed 9 cm		

Future Prospects Assessment for Barley Cove

Activity (EU code)	Location (Inside/outside extent of occupancy)	Influence (Positive/Negative/Neutral)	Intensity (High/Medium/Low)	Area affected (0-10m ² ; 11-50m ² ; 51-100m ² ; >100m ²)
Intensive grazing (A04.01)				
Excessive poaching (Trampling, overuse, G05.01)				
Abandonment of pastoral systems, lack of grazing (A04.03)				
Stock feeding (A05.02)				
Restructuring agricultural land holdings (A10)				
Fertilisation (A08)				
Pollution to groundwater (H02)				
Water abstractions from groundwater (J02.07)				
Sand & gravel extraction (C01.01)				
Motorised vehicle damage (G01.03)				
Other outdoor sports & leisure activities (G01.08)				
Sport & leisure structures (G02)				
Dumping (Discharges E03)				
Invasive non-native species (I01)				
Natural erosion (K01.01)				
Biocentric evolution, succession (incl. enlargement of scrub vegetation area) (K02)				
Species composition change (succession) (K02.01)				
Other:				

Overall Assessment for Barley Cove

Attribute	Assessment
Population	
Habitat for the species	
Future Prospects	
Overall	

Results of analysis of soil and water samples from Barley Cove

Plot Number:	1	2	3	4	5
Soil pH					
Groundwater pH					

Additional Comments:

Overall Conservation Assessment of each *Petalophyllum ralfsii* population (locality)

Population	Population Assessment	Habitat for the Species Assessment	Future Prospects Assessment	Overall Assessment	Comments
Rosses Strand					
Rosepenna					
Tramore/Black Burrow/SW of Dunfanaghy					
Damph Beg					
Derrybeg					
Keadew Point					
Dooy Point					
Sheskinmore					
Bunduff Machair					
Garter Hill					
Doolough Machair					
Dooyork Machair					
North Inishkea					
Doogort Machair					
Keel Machair					
Dooaghtry					
Omev Island Machair					
Mannin More					
Truska Machair					
Doon Hill/ West of Aillebrack					
Murvey Machair					
Fanore					
SW of Lough Naparka					
Magherabeg					
Kilshannig					
Inch Spit					
Rossbehy					
West of Inny Ferry					
North Bull					
Barley Cove					

Appendix III – GPS points and associated data for maps

Pop. No.	Population (SAC)	X	Y	10km_ Grid Sq	1km_ Grid Sq	Date	Year	Source	Accuracy	Notes
1	Rosses Strand (Tranarossan and Melmore)	211860	442820	C14	C1142	25/05/2002	2002	Holyoak	GPS	
1	Rosses Strand (Tranarossan and Melmore)	211860	442800	C14	C1142	08/05/2006	2006	Lockhart	GPS	
1	Rosses Strand (Tranarossan and Melmore)	211853.34	442804.56	C14	C1142	01/04/2009	2009	Campbell, Lockhart & Smyth	GPS	Extent of cover
1	Rosses Strand (Tranarossan and Melmore)	211855.95	442803.47	C14	C1142	01/04/2009	2009	Campbell, Lockhart & Smyth	GPS	Extent of cover
1	Rosses Strand (Tranarossan and Melmore)	211859.13	442802.1	C14	C1142	01/04/2009	2009	Campbell, Lockhart & Smyth	GPS	Extent of cover
1	Rosses Strand (Tranarossan and Melmore)	211855.9	442805.57	C14	C1142	01/04/2009	2009	Campbell, Lockhart & Smyth	GPS	Extent of cover
1	Rosses Strand (Tranarossan and Melmore)	211854.68	442806.18	C14	C1142	01/04/2009	2009	Campbell, Lockhart & Smyth	GPS	Extent of cover
1	Rosses Strand (Tranarossan and Melmore)	211917.63	442806.55	C14	C1142	01/04/2009	2009	Campbell, Lockhart & Smyth	GPS	Extent of cover
1	Rosses Strand (Tranarossan and Melmore)	211917.93	442808.7	C14	C1142	01/04/2009	2009	Campbell, Lockhart & Smyth	GPS	Extent of cover
1	Rosses Strand (Tranarossan and Melmore)	211919.43	442806.08	C14	C1142	01/04/2009	2009	Campbell, Lockhart & Smyth	GPS	Extent of cover
1	Rosses Strand (Tranarossan and Melmore)	211855.09	442804.78	C14	C1142	01/04/2009	2009	Campbell, Lockhart & Smyth	GPS	P ralfsii; Plot 1 (T1)
1	Rosses Strand (Tranarossan and Melmore)	211918.5	442803.93	C14	C1142	01/04/2009	2009	Campbell, Lockhart & Smyth	GPS	P ralfsii; Plot 2 (T2)
1	Rosses Strand (Tranarossan and Melmore)	211856.27	442804.94	C14	C1142	08/04/2010	2010	Campbell & Smyth	GPS	P ralfsii
2	Rosepenna (Sheephaven)	212069	437224	C13	C1237	05/08/1999	1999	Holyoak	From Map/Ortho	Derived from sketch map
2	Rosepenna (Sheephaven)	212038	437192	C13	C1237	05/08/1999	1999	Holyoak	From Map/Ortho	Derived from sketch map
2	Rosepenna (Sheephaven)	212007.15	437391.76	C13	C1237	01/04/2009	2009	Campbell, Lockhart & Smyth	GPS	P ralfsii; Plot 1 (R1)
3	Tramore (Horn Head & Rinclevan)	198240	436010	B93	B9836	02/06/2002	2002	Holyoak	GPS	Corresponds to Recorder record for species
4a	Damph Beg (Gweedore Bay and Islands)	180230	429550	B82	B8029	27/04/2002	2002	Holyoak	GPS	Corresponds to Recorder record for species
4a	Damph Beg (Gweedore Bay and Islands)	180198	429474	B82	B8029	04/08/1999	1999	Holyoak	From Map/Ortho	Derived from sketch map
4b	Derrybeg (Gweedore Bay and Islands)	179870	426190	B72	B7926	28/04/2002	2002	Holyoak	GPS	Corresponds to Recorder record for species
4b	Derrybeg (Gweedore Bay and Islands)	179865	426198	B72	B7926	08/05/2006	2006	Lockhart	GPS	
4c	Keadew Point (Gweedore Bay and Islands)	173090	418140	B71	B7318	25/04/2002	2002	Holyoak	GPS	Corresponds to Recorder record for species
4c	Keadew Point (Gweedore Bay and Islands)	173293	418100	B71	B7318	09/02/1998	1998	Lockhart	From Map/Ortho	Derived from sketch map
4c	Keadew Point (Gweedore Bay and Islands)	173293	418100	B71	B7318	09/05/2006	2006	Lockhart	GPS	Relocated Lockhart 1998 Record
4c	Keadew Point (Gweedore Bay and Islands)	173089	418141	B71	B7318	09/05/2006	2006	Lockhart	GPS	Relocated Holyoak Record
4c	Keadew Point (Gweedore Bay and Islands)	173292.66	418095.58	B71	B7318	02/04/2009	2009	Campbell, Lockhart & Smyth	GPS	P ralfsii; Plot 1 (KP1)
4c	Keadew Point (Gweedore Bay and Islands)	173087.02	418033.41	B71	B7318	07/04/2010	2010	Campbell & Smyth	GPS	P ralfsii; Plot 2 (KP2)
4c	Keadew Point (Gweedore Bay and Islands)	173088.61	418030.64	B71	B7318	02/04/2009	2009	Campbell, Lockhart & Smyth	GPS	Extent of cover
4c	Keadew Point (Gweedore Bay and Islands)	173087.43	418032.72	B71	B7318	02/04/2009	2009	Campbell, Lockhart & Smyth	GPS	Extent of cover
4c	Keadew Point (Gweedore Bay and Islands)	173085.58	418035.38	B71	B7318	02/04/2009	2009	Campbell, Lockhart & Smyth	GPS	Extent of cover
4c	Keadew Point (Gweedore Bay and Islands)	173080.64	418044.46	B71	B7318	02/04/2009	2009	Campbell, Lockhart & Smyth	GPS	Extent of cover
4c	Keadew Point (Gweedore Bay and Islands)	173077.37	418045.13	B71	B7318	02/04/2009	2009	Campbell, Lockhart & Smyth	GPS	Extent of cover
4c	Keadew Point (Gweedore Bay and Islands)	173082.39	418037.62	B71	B7318	02/04/2009	2009	Campbell, Lockhart & Smyth	GPS	Extent of cover
5a	Doey Point (West of Ardara/Maas Road)	175830	402360	B70	B7502	24/04/2002	2002	Holyoak	GPS	Derived from sketch map
5a	Doey Point (West of Ardara/Maas Road)	175888	402216	B70	B7502	03/08/1999	1999	Holyoak	From Map/Ortho	Derived from sketch map
5b	Sheskinmore (West of Ardara Maas Road)	168980	395452	G69	G6895	11/02/1998	1998	Lockhart	From Map/Ortho	Records same location as Campbell 2009 GPS records
5b	Sheskinmore (West of Ardara Maas Road)	168980	395454	G69	G6895	09/05/2006	2006	Lockhart	GPS	Records same location as Campbell 2009 GPS records
5b	Sheskinmore (West of Ardara Maas Road)	168980.53	395451.32	G69	G6895	31/03/2009	2009	Campbell, Lockhart & Smyth	GPS	P ralfsii; Plot 1 (S1)
5b	Sheskinmore (West of Ardara Maas Road)	168980.27	395451.5	G69	G6895	31/03/2009	2009	Campbell, Lockhart & Smyth	GPS	P ralfsii
5b	Sheskinmore (West of Ardara Maas Road)	168976.32	395450.82	G69	G6895	31/03/2009	2009	Campbell, Lockhart & Smyth	GPS	P ralfsii; Plot 2 (S2)
5b	Sheskinmore (West of Ardara Maas Road)	168984.16	395450.44	G69	G6895	07/04/2010	2010	Campbell & Smyth	GPS	P ralfsii
5b	Sheskinmore (West of Ardara Maas Road)	168983.08	395453.05	G69	G6895	07/04/2010	2010	Campbell & Smyth	GPS	P ralfsii
5b	Sheskinmore (West of Ardara Maas Road)	168980.93	395453.08	G69	G6895	07/04/2010	2010	Campbell & Smyth	GPS	P ralfsii
5b	Sheskinmore (West of Ardara Maas Road)	168982.45	395451.79	G69	G6895	31/03/2009	2009	Campbell, Lockhart & Smyth	GPS	Extent of cover
5b	Sheskinmore (West of Ardara Maas Road)	168980.59	395451.92	G69	G6895	31/03/2009	2009	Campbell, Lockhart & Smyth	GPS	Extent of cover
5b	Sheskinmore (West of Ardara Maas Road)	168976.83	395451.76	G69	G6895	31/03/2009	2009	Campbell, Lockhart & Smyth	GPS	Extent of cover
5b	Sheskinmore (West of Ardara Maas Road)	168973.85	395450.69	G69	G6895	31/03/2009	2009	Campbell, Lockhart & Smyth	GPS	Extent of cover
6	Bunduff (Bunduff Lough and Machair / Trawalua / Mullaghmore)	170741	356198	G75	G7056	11/03/1998	1998	Lockhart	From Map/Ortho	Derived from sketch map
6	Bunduff (Bunduff Lough and Machair / Trawalua / Mullaghmore)	170718	356247	G75	G7056	31/07/1999	1999	Holyoak	From Map/Ortho	Records same location as Campbell 2009 GPS records
6	Bunduff (Bunduff Lough and Machair / Trawalua / Mullaghmore)	170720	356280	G75	G7056	27/06/2003	2003	Hodgetts	GPS	Recorder Record needs amending

Pop. No.	Population	X	Y	10km_ Grid_Sq	1km_ Grid_Sq	Date	Year	Source	Accuracy	Notes
6	Bunduff (Bunduff Lough and Machair / Trawalua / Mullaghmore)	170724.23	356231.35	G75	G7056	30/03/2009	2009	Campbell	GPS	Extent of cover
6	Bunduff (Bunduff Lough and Machair / Trawalua / Mullaghmore)	170722.41	356235.2	G75	G7056	30/03/2009	2009	Campbell	GPS	Extent of cover
6	Bunduff (Bunduff Lough and Machair / Trawalua / Mullaghmore)	170719.13	356240.48	G75	G7056	30/03/2009	2009	Campbell	GPS	Extent of cover
6	Bunduff (Bunduff Lough and Machair / Trawalua / Mullaghmore)	170713.1	356246.73	G75	G7056	30/03/2009	2009	Campbell	GPS	Extent of cover
6	Bunduff (Bunduff Lough and Machair / Trawalua / Mullaghmore)	170718.16	356250.42	G75	G7056	30/03/2009	2009	Campbell	GPS	Extent of cover
6	Bunduff (Bunduff Lough and Machair / Trawalua / Mullaghmore)	170719.01	356253.94	G75	G7056	30/03/2009	2009	Campbell	GPS	Extent of cover
6	Bunduff (Bunduff Lough and Machair / Trawalua / Mullaghmore)	170719.68	356253.3	G75	G7056	30/03/2009	2009	Campbell	GPS	Extent of cover
6	Bunduff (Bunduff Lough and Machair / Trawalua / Mullaghmore)	170722.16	356232.54	G75	G7056	30/03/2009	2009	Campbell	GPS	P ralfsii; Plot 1 (B1)
6	Bunduff (Bunduff Lough and Machair / Trawalua / Mullaghmore)	170719.21	356245.46	G75	G7056	15/03/2010	2009	Campbell	GPS	P ralfsii; Plot 2 (B2)
6	Bunduff (Bunduff Lough and Machair / Trawalua / Mullaghmore)	170719.83	356252.51	G75	G7056	11/03/2011	2011	Campbell, Lynn & Smyth	GPS	P ralfsii; Plot 3 (B3)
6	Bunduff (Bunduff Lough and Machair / Trawalua / Mullaghmore)	170719.02	356247.41	G75	G7056	15/03/2010	2010	Campbell	GPS	P ralfsii
6	Bunduff (Bunduff Lough and Machair / Trawalua / Mullaghmore)	170719.34	356247.78	G75	G7056	15/03/2010	2010	Campbell	GPS	P ralfsii
6	Bunduff (Bunduff Lough and Machair / Trawalua / Mullaghmore)	170721.37	356237.47	G75	G7056	15/03/2010	2010	Campbell	GPS	P ralfsii
7	Garter Hill (Glenamoy Bog Complex)	80613	340901	F84	F8040	07/04/1998	1998	Lockhart	From Map/Ortho	Derived from Orthos
7	Garter Hill (Glenamoy Bog Complex)	80588	340861	F84	F8040	07/04/1998	1998	Lockhart	From Map/Ortho	Derived from Orthos
7	Garter Hill (Glenamoy Bog Complex)	80606	340746	F84	F8040	07/04/1998	1998	Lockhart	From Map/Ortho	Derived from Orthos
7	Garter Hill (Glenamoy Bog Complex)	80756	340748	F84	F8040	07/04/1998	1998	Lockhart	From Map/Ortho	Derived from Orthos
7	Garter Hill (Glenamoy Bog Complex)	80867	340716	F84	F8040	07/04/1998	1998	Lockhart	From Map/Ortho	Derived from Orthos
7	Garter Hill (Glenamoy Bog Complex)	81045	340619	F84	F8140	07/04/1998	1998	Lockhart	From Map/Ortho	Derived from Orthos
7	Garter Hill (Glenamoy Bog Complex)	81499	340561	F84	F8140	07/04/1998	1998	Lockhart	From Map/Ortho	Derived from Orthos
7	Garter Hill (Glenamoy Bog Complex)	82199	339951	F83	F8239	07/04/1998	1998	Lockhart	From Map/Ortho	Derived from Orthos
7	Garter Hill (Glenamoy Bog Complex)	80715	340915	F84	F8040	16/04/1999	1999	Holyoak	From Map/Ortho	Holyoak_a - derived from sketch map
7	Garter Hill (Glenamoy Bog Complex)	81809	339965	F83	F8139	16/04/1999	1999	Holyoak	From Map/Ortho	Holyoak_b - derived from sketch map
7	Garter Hill (Glenamoy Bog Complex)	81856	340369	F84	F8140	16/04/1999	1999	Holyoak	From Map/Ortho	Holyoak_c - derived from sketch map
7	Garter Hill (Glenamoy Bog Complex)	82024	340244	F84	F8240	16/04/1999	1999	Holyoak	From Map/Ortho	Holyoak_d - Relevé 1 - derived from sketch map
7	Garter Hill (Glenamoy Bog Complex)	82155	340156	F84	F8240	16/04/1999	1999	Holyoak	From Map/Ortho	Holyoak_e - derived from sketch map
7	Garter Hill (Glenamoy Bog Complex)	82347	340450	F84	F8240	16/04/1999	1999	Holyoak	From Map/Ortho	Holyoak_f - derived from sketch map
7	Garter Hill (Glenamoy Bog Complex)	82935	340528	F84	F8240	16/04/1999	1999	Holyoak	From Map/Ortho	Holyoak_g - derived from sketch map
7	Garter Hill (Glenamoy Bog Complex)	83361	340874	F84	F8340	16/04/1999	1999	Holyoak	From Map/Ortho	Holyoak_h - derived from sketch map
7	Garter Hill (Glenamoy Bog Complex)	80690	340650	F84	F8040	30/09/2003	2003	Holyoak	GPS	Corresponds to Recorder record for species
7	Garter Hill (Glenamoy Bog Complex)	81840	340890	F84	F8140	30/09/2003	2003	Holyoak	GPS	
7	Garter Hill (Glenamoy Bog Complex)	81880	340810	F84	F8140	30/09/2003	2003	Holyoak	GPS	
7	Garter Hill (Glenamoy Bog Complex)	82060	340690	F84	F8240	30/09/2003	2003	Holyoak	GPS	
7	Garter Hill (Glenamoy Bog Complex)	82610	340700	F84	F8240	30/09/2003	2003	Holyoak	GPS	
7	Garter Hill (Glenamoy Bog Complex)	81065	340671	F84	F8140	04/07/2006	2006	Lockhart	GPS	
7	Garter Hill (Glenamoy Bog Complex)	80482.696	341107.2	F84	F8041	14/05/2009	2009	Campbell, Gaynor & Lockhart	GPS	P ralfsii; Plot 1 (GH1)
7	Garter Hill (Glenamoy Bog Complex)	80280.245	340735.23	F84	F8040	14/05/2009	2009	Campbell, Gaynor & Lockhart	GPS	P ralfsii; Plot 2 (GH2)
7	Garter Hill (Glenamoy Bog Complex)	80864.842	340714.92	F84	F8040	14/05/2009	2009	Campbell, Gaynor & Lockhart	GPS	P ralfsii; Plot 3 (GH3)
7	Garter Hill (Glenamoy Bog Complex)	80989.366	340646.64	F84	F8040	14/05/2009	2009	Campbell, Gaynor & Lockhart	GPS	P ralfsii; Plot 4 (GH4)
7	Garter Hill (Glenamoy Bog Complex)	80609.588	340897.22	F84	F8040	14/05/2009	2009	Campbell, Gaynor & Lockhart	GPS	P ralfsii; Plot 5 (GH5)
7	Garter Hill (Glenamoy Bog Complex)	82156.328	340104.24	F84	F8240	21/04/2010	2010	Campbell, Lockhart & Smyth	GPS	P ralfsii; Plot 6 (GH6)
7	Garter Hill (Glenamoy Bog Complex)	81638.72	340180.7	F84	F8140	21/04/2010	2010	Campbell, Lockhart & Smyth	GPS	P ralfsii; Plot 7 (GH7)
7	Garter Hill (Glenamoy Bog Complex)	80293.696	340730.22	F84	F8040	14/05/2009	2009	Campbell, Gaynor & Lockhart	GPS	P ralfsii

Pop. No.	Population	X	Y	10km_Grid_Sq	1km_Grid_Sq	Date	Year	Source	Accuracy	Notes
7	Garter Hill (Glenamoy Bog Complex)	82170.296	340030.55	F84	F8240	21/04/2010	2010	Campbell, Lockhart & Smyth	GPS	P ralfsii
7	Garter Hill (Glenamoy Bog Complex)	82168.939	340032.04	F84	F8240	21/04/2010	2010	Campbell, Lockhart & Smyth	GPS	P ralfsii
7	Garter Hill (Glenamoy Bog Complex)	82169.438	340032.1	F84	F8240	21/04/2010	2010	Campbell, Lockhart & Smyth	GPS	P ralfsii
7	Garter Hill (Glenamoy Bog Complex)	82157.214	340103.67	F84	F8240	21/04/2010	2010	Campbell, Lockhart & Smyth	GPS	P ralfsii
7	Garter Hill (Glenamoy Bog Complex)	82155.82	340105.45	F84	F8240	21/04/2010	2010	Campbell, Lockhart & Smyth	GPS	P ralfsii
7	Garter Hill (Glenamoy Bog Complex)	82157.705	340105.58	F84	F8240	21/04/2010	2010	Campbell, Lockhart & Smyth	GPS	P ralfsii
7	Garter Hill (Glenamoy Bog Complex)	82159.215	340105.57	F84	F8240	21/04/2010	2010	Campbell, Lockhart & Smyth	GPS	P ralfsii
7	Garter Hill (Glenamoy Bog Complex)	82158.024	340103.1	F84	F8240	21/04/2010	2010	Campbell, Lockhart & Smyth	GPS	P ralfsii
7	Garter Hill (Glenamoy Bog Complex)	82175.743	340105.15	F84	F8240	21/04/2010	2010	Campbell, Lockhart & Smyth	GPS	P ralfsii
7	Garter Hill (Glenamoy Bog Complex)	82203.531	340069.34	F84	F8240	21/04/2010	2010	Campbell, Lockhart & Smyth	GPS	P ralfsii
7	Garter Hill (Glenamoy Bog Complex)	81614.931	340176.31	F84	F8140	21/04/2010	2010	Campbell, Lockhart & Smyth	GPS	P ralfsii
7	Garter Hill (Glenamoy Bog Complex)	81614.396	340174.97	F84	F8140	21/04/2010	2010	Campbell, Lockhart & Smyth	GPS	P ralfsii
7	Garter Hill (Glenamoy Bog Complex)	81614.374	340175.21	F84	F8140	21/04/2010	2010	Campbell, Lockhart & Smyth	GPS	P ralfsii
7	Garter Hill (Glenamoy Bog Complex)	81614.474	340175.4	F84	F8140	21/04/2010	2010	Campbell, Lockhart & Smyth	GPS	P ralfsii
7	Garter Hill (Glenamoy Bog Complex)	81616.491	340174.81	F84	F8140	21/04/2010	2010	Campbell, Lockhart & Smyth	GPS	P ralfsii
7	Garter Hill (Glenamoy Bog Complex)	81638.994	340180.46	F84	F8140	21/04/2010	2010	Campbell, Lockhart & Smyth	GPS	P ralfsii
7	Garter Hill (Glenamoy Bog Complex)	81640.059	340183.75	F84	F8140	21/04/2010	2010	Campbell, Lockhart & Smyth	GPS	P ralfsii
7	Garter Hill (Glenamoy Bog Complex)	81585.027	340258.34	F84	F8140	21/04/2010	2010	Campbell, Lockhart & Smyth	GPS	P ralfsii
7	Garter Hill (Glenamoy Bog Complex)	81584.667	340259.01	F84	F8140	21/04/2010	2010	Campbell, Lockhart & Smyth	GPS	P ralfsii
7	Garter Hill (Glenamoy Bog Complex)	80421.633	340810.28	F84	F8040	12/05/2009	2009	Campbell, Gaynor & Lockhart	GPS	Extent of habitat
7	Garter Hill (Glenamoy Bog Complex)	80670.356	340965.36	F84	F8040	12/05/2009	2009	Campbell, Gaynor & Lockhart	GPS	Extent of cover
7	Garter Hill (Glenamoy Bog Complex)	80651.821	340949.85	F84	F8040	12/05/2009	2009	Campbell, Gaynor & Lockhart	GPS	Extent of cover
7	Garter Hill (Glenamoy Bog Complex)	80630.791	340943.18	F84	F8040	12/05/2009	2009	Campbell, Gaynor & Lockhart	GPS	Extent of cover
7	Garter Hill (Glenamoy Bog Complex)	80610.397	340917.63	F84	F8040	12/05/2009	2009	Campbell, Gaynor & Lockhart	GPS	Extent of cover
7	Garter Hill (Glenamoy Bog Complex)	80557.011	340879.58	F84	F8040	12/05/2009	2009	Campbell, Gaynor & Lockhart	GPS	Extent of cover
7	Garter Hill (Glenamoy Bog Complex)	80487.67	340855.2	F84	F8040	12/05/2009	2009	Campbell, Gaynor & Lockhart	GPS	Extent of cover
7	Garter Hill (Glenamoy Bog Complex)	80462.771	340839.31	F84	F8040	12/05/2009	2009	Campbell, Gaynor & Lockhart	GPS	Extent of cover
7	Garter Hill (Glenamoy Bog Complex)	80477.577	340950.46	F84	F8040	12/05/2009	2009	Campbell, Gaynor & Lockhart	GPS	Extent of cover
7	Garter Hill (Glenamoy Bog Complex)	80459.02	340971.26	F84	F8040	12/05/2009	2009	Campbell, Gaynor & Lockhart	GPS	Extent of cover
7	Garter Hill (Glenamoy Bog Complex)	80430.732	341011.96	F84	F8041	12/05/2009	2009	Campbell, Gaynor & Lockhart	GPS	Extent of cover
7	Garter Hill (Glenamoy Bog Complex)	80425.021	341104.06	F84	F8041	12/05/2009	2009	Campbell, Gaynor & Lockhart	GPS	Extent of cover
7	Garter Hill (Glenamoy Bog Complex)	80376.683	341085.69	F84	F8041	12/05/2009	2009	Campbell, Gaynor & Lockhart	GPS	Extent of cover
7	Garter Hill (Glenamoy Bog Complex)	80372.742	341094.33	F84	F8041	12/05/2009	2009	Campbell, Gaynor & Lockhart	GPS	Extent of cover
7	Garter Hill (Glenamoy Bog Complex)	80259.494	341046.96	F84	F8041	12/05/2009	2009	Campbell, Gaynor & Lockhart	GPS	Extent of cover
7	Garter Hill (Glenamoy Bog Complex)	80186.135	340910.88	F84	F8040	12/05/2009	2009	Campbell, Gaynor & Lockhart	GPS	Extent of cover
7	Garter Hill (Glenamoy Bog Complex)	80296.941	340730.32	F84	F8040	12/05/2009	2009	Campbell, Gaynor & Lockhart	GPS	Extent of cover
7	Garter Hill (Glenamoy Bog Complex)	80800.599	340627.39	F84	F8040	12/05/2009	2009	Campbell, Gaynor & Lockhart	GPS	Extent of cover
7	Garter Hill (Glenamoy Bog Complex)	80943.842	340545.29	F84	F8040	12/05/2009	2009	Campbell, Gaynor & Lockhart	GPS	Extent of cover
7	Garter Hill (Glenamoy Bog Complex)	80945.375	340544.49	F84	F8040	12/05/2009	2009	Campbell, Gaynor & Lockhart	GPS	Extent of cover
7	Garter Hill (Glenamoy Bog Complex)	81026.805	340561.14	F84	F8140	12/05/2009	2009	Campbell, Gaynor & Lockhart	GPS	Extent of cover
7	Garter Hill (Glenamoy Bog Complex)	81127.822	340633.11	F84	F8140	12/05/2009	2009	Campbell, Gaynor & Lockhart	GPS	Extent of cover
7	Garter Hill (Glenamoy Bog Complex)	81213.045	340677.2	F84	F8140	12/05/2009	2009	Campbell, Gaynor & Lockhart	GPS	Extent of cover
7	Garter Hill (Glenamoy Bog Complex)	80483.536	341107.06	F84	F8041	14/05/2009	2009	Campbell, Gaynor & Lockhart	GPS	Extent of cover
7	Garter Hill (Glenamoy Bog Complex)	80280.496	340735.28	F84	F8040	14/05/2009	2009	Campbell, Gaynor & Lockhart	GPS	Extent of cover
8a	Doolough (Mullet / Blacksod Bay Complex)	73612	322434	F72	F7322	08/04/1998	1998	Lockhart	From Map/Ortho	Derived from Ortho - not Grid Ref. from Site Card
8a	Doolough (Mullet / Blacksod Bay Complex)	73600	322300	F72	F7322	17/04/1999	1999	Holyoak	GPS	Also includes Relevé data
8a	Doolough (Mullet / Blacksod Bay Complex)	73612	322434	F72	F7322	27/04/2006	2006	Lockhart	From Map/Ortho	Relocated in 1998 Location - No GPS position recorded
8b	Dooyork (Mullet / Blacksod Bay Complex)	73716	320247	F72	F7320	09/04/1998	1998	Lockhart	From Map/Ortho	Derived from Orthos - not Grid Ref. from Site Card - Also includes Relevé data - Searched for by Holyoak 1999, but not relocated
9	North Inishkea (Inishkea Islands)	56608	323352	F52	F5623	29/07/1998	1998	Lockhart	Grid Ref from Record Card	Corresponds to Recorder record for species

Pop. No.	Population	X	Y	10km_Grid_Sq	1km_Grid_Sq	Date	Year	Source	Accuracy	Notes
10	Doogort (Doogort Machair / Lough Doo)	70200	309500	F70	F7009	05/04/1998	1998	Lockhart	Grid Ref from Record Card	Corresponds to Recorder record for species - Also includes Relevé data - Searched for by Holyoak 1999 and Lockhart 2006, but not relocated
10	Doogort (Doogort Machair / Lough Doo)	70155	309620	F70	F7009	15/10/2009	2009	Campbell & Lockhart	GPS	
10	Doogort (Doogort Machair / Lough Doo)	70294	309692	F70	F7009	21/10/2010	2010	Campbell & Lockhart	GPS	43 thalli in a 25 x 50 cm quadrat - altitude was 4.258m with 0.5m accuracy
11	Keel Machair (Keel Machair / Menaun Cliffs)	64703	304393	F60	F6404	06/04/98	1998	Lockhart	From Map/Ortho	1998 Point 1 (not numbered in record card)
11	Keel Machair (Keel Machair / Menaun Cliffs)	64665	304430	F60	F6404	06/04/98	1998	Lockhart	From Map/Ortho	1998 Point 2 (not numbered in record card)
11	Keel Machair (Keel Machair / Menaun Cliffs)	64631	304468	F60	F6404	06/04/98	1998	Lockhart	From Map/Ortho	1998 Point 3 (not numbered in record card)
11	Keel Machair (Keel Machair / Menaun Cliffs)	64594	304501	F60	F6404	06/04/98	1998	Lockhart	From Map/Ortho	1998 Point 4 (not numbered in record card) - Also includes Relevé data (R1 from Record Card)
11	Keel Machair (Keel Machair / Menaun Cliffs)	64548	304530	F60	F6404	06/04/98	1998	Lockhart	From Map/Ortho	1998 Point 5 (not numbered in record card)
11	Keel Machair (Keel Machair / Menaun Cliffs)	64500	304603	F60	F6404	06/04/98	1998	Lockhart	From Map/Ortho	1998 Point 6 (not numbered in record card)
11	Keel Machair (Keel Machair / Menaun Cliffs)	64660	304504	F60	F6404	06/04/98	1998	Lockhart	From Map/Ortho	1998 Point 7 (not numbered in record card)
11	Keel Machair (Keel Machair / Menaun Cliffs)	64684	304530	F60	F6404	06/04/98	1998	Lockhart	From Map/Ortho	1998 Point 8 (not numbered in record card)
11	Keel Machair (Keel Machair / Menaun Cliffs)	64713	304498	F60	F6404	06/04/98	1998	Lockhart	From Map/Ortho	1998 Point 9 (not numbered in record card)
11	Keel Machair (Keel Machair / Menaun Cliffs)	64713	304564	F60	F6404	06/04/98	1998	Lockhart	From Map/Ortho	1998 Point 10 (not numbered in record card)
11	Keel Machair (Keel Machair / Menaun Cliffs)	64520	304917	F60	F6404	06/04/98	1998	Lockhart	From Map/Ortho	1998 Point 11 (not numbered in record card)
11	Keel Machair (Keel Machair / Menaun Cliffs)	64265	304741	F60	F6404	17/04/99	1999	Holyoak	From Map/Ortho	Holyoak Point a
11	Keel Machair (Keel Machair / Menaun Cliffs)	64352	304730	F60	F6404	17/04/99	1999	Holyoak	From Map/Ortho	Holyoak Point b
11	Keel Machair (Keel Machair / Menaun Cliffs)	64574	304510	F60	F6404	17/04/99	1999	Holyoak	From Map/Ortho	Holyoak Point c
11	Keel Machair (Keel Machair / Menaun Cliffs)	64704	304392	F60	F6404	17/04/99	1999	Holyoak	From Map/Ortho	Holyoak Point d
11	Keel Machair (Keel Machair / Menaun Cliffs)	64865	304880	F60	F6404	17/04/99	1999	Holyoak	From Map/Ortho	Holyoak Point e
11	Keel Machair (Keel Machair / Menaun Cliffs)	64280	304800	F60	F6404	28/06/03	2003	Holyoak	GPS	Corresponds to Recorder record for species
11	Keel Machair (Keel Machair / Menaun Cliffs)	64580	304510	F60	F6404	28/06/03	2003	Holyoak	GPS	
11	Keel Machair (Keel Machair / Menaun Cliffs)	64380	304700	F60	F6404	28/06/03	2003	Holyoak	GPS	
11	Keel Machair (Keel Machair / Menaun Cliffs)	64330	304790	F60	F6404	28/06/03	2003	Holyoak	GPS	
11	Keel Machair (Keel Machair / Menaun Cliffs)	64575	304520	F60	F6404	07/07/06	2006	Lockhart	GPS	
11	Keel Machair (Keel Machair / Menaun Cliffs)	64718	304321	F60	F6404	07/07/06	2006	Lockhart	GPS	
12	Dooaghry (Mweelrea / Sheeffry / Erriff Complex)	75183	268535	L76	L7568	25/11/97	1997	Lockhart	From Map/Ortho	Derived from Ortho - not Grid Ref. from Site Card - Also includes Relevé data
12	Dooaghry (Mweelrea / Sheeffry / Erriff Complex)	75154	268564	L76	L7568	25/11/97	1997	Lockhart	From Map/Ortho	Derived from Ortho - not Grid Ref. from Site Card
12	Dooaghry (Mweelrea / Sheeffry / Erriff Complex)	74947	268566	L76	L7468	25/11/97	1997	Lockhart	From Map/Ortho	Derived from Ortho - not Grid Ref. from Site Card
12	Dooaghry (Mweelrea / Sheeffry / Erriff Complex)	75000	269000	L76	L7569	20/04/99	1999	Holyoak & Lockhart	Grid Ref from Record Card	Grid Ref. from Record Card
12	Dooaghry (Mweelrea / Sheeffry / Erriff Complex)	75003	268640	L76	L7568	20/04/99	1999	Holyoak & Lockhart	From Map/Ortho	Derived from Map / Ortho - Approx. location only
12	Dooaghry (Mweelrea / Sheeffry / Erriff Complex)	75132	268735	L76	L7568	20/04/99	1999	Holyoak & Lockhart	From Map/Ortho	Derived from Map / Ortho - Approx. location only
12	Dooaghry (Mweelrea / Sheeffry / Erriff Complex)	75258	268772	L76	L7568	20/04/99	1999	Holyoak & Lockhart	From Map/Ortho	Derived from Map / Ortho - Approx. location only
12	Dooaghry (Mweelrea / Sheeffry / Erriff Complex)	75317	268868	L76	L7568	20/04/99	1999	Holyoak & Lockhart	From Map/Ortho	Derived from Map / Ortho - Approx. location only
12	Dooaghry (Mweelrea / Sheeffry / Erriff Complex)	75268	268911	L76	L7568	20/04/99	1999	Holyoak & Lockhart	From Map/Ortho	Derived from Map / Ortho - Approx. location only
12	Dooaghry (Mweelrea / Sheeffry / Erriff Complex)	75222	268987	L76	L7568	20/04/99	1999	Holyoak & Lockhart	From Map/Ortho	Derived from Map / Ortho - Approx. location only
12	Dooaghry (Mweelrea / Sheeffry / Erriff Complex)	75132	269036	L76	L7569	20/04/99	1999	Holyoak & Lockhart	From Map/Ortho	Derived from Map / Ortho - Approx. location only
12	Dooaghry (Mweelrea / Sheeffry / Erriff Complex)	75050	269000	L76	L7569	20/04/99	1999	Holyoak & Lockhart	From Map/Ortho	Derived from Map / Ortho - Approx. location only

Pop. No.	Population	X	Y	10km_Grid_Sq	1km_Grid_Sq	Date	Year	Source	Accuracy	Notes
12	Dooaghtry (Mweelrea / Sheeffry / Erriff Complex)	74987	268960	L76	L7468	20/04/99	1999	Holyoak & Lockhart	From Map/Ortho	Derived from Map / Ortho - Approx. location only
12	Dooaghtry (Mweelrea / Sheeffry / Erriff Complex)	74871	268874	L76	L7468	20/04/99	1999	Holyoak & Lockhart	From Map/Ortho	Derived from Map / Ortho - Approx. location only
12	Dooaghtry (Mweelrea / Sheeffry / Erriff Complex)	74944	268788	L76	L7468	20/04/99	1999	Holyoak & Lockhart	From Map/Ortho	Derived from Map / Ortho - Approx. location only
12	Dooaghtry (Mweelrea / Sheeffry / Erriff Complex)	74788	269069	L76	L7469	20/04/99	1999	Holyoak & Lockhart	From Map/Ortho	Derived from Map / Ortho - Approx. location only
12	Dooaghtry (Mweelrea / Sheeffry / Erriff Complex)	74782	268980	L76	L7468	20/04/99	1999	Holyoak & Lockhart	From Map/Ortho	Derived from Map / Ortho - Approx. location only
12	Dooaghtry (Mweelrea / Sheeffry / Erriff Complex)	74716	268924	L76	L7468	20/04/99	1999	Holyoak & Lockhart	From Map/Ortho	Derived from Map / Ortho - Approx. location only
12	Dooaghtry (Mweelrea / Sheeffry / Erriff Complex)	75089	269112	L76	L7569	20/04/99	1999	Holyoak & Lockhart	From Map/Ortho	Derived from Map / Ortho - Approx. location only
12	Dooaghtry (Mweelrea / Sheeffry / Erriff Complex)	75026	269165	L76	L7569	20/04/99	1999	Holyoak & Lockhart	From Map/Ortho	Derived from Map / Ortho - Approx. location only
12	Dooaghtry (Mweelrea / Sheeffry / Erriff Complex)	74947	269225	L76	L7469	20/04/99	1999	Holyoak & Lockhart	From Map/Ortho	Derived from Map / Ortho - Approx. location only
12	Dooaghtry (Mweelrea / Sheeffry / Erriff Complex)	74887	269265	L76	L7469	20/04/99	1999	Holyoak & Lockhart	From Map/Ortho	Derived from Map / Ortho - Approx. location only
12	Dooaghtry (Mweelrea / Sheeffry / Erriff Complex)	74794	269302	L76	L7469	20/04/99	1999	Holyoak & Lockhart	From Map/Ortho	Derived from Map / Ortho - Approx. location only
12	Dooaghtry (Mweelrea / Sheeffry / Erriff Complex)	74691	269329	L76	L7469	20/04/99	1999	Holyoak & Lockhart	From Map/Ortho	Derived from Map / Ortho - Approx. location only
12	Dooaghtry (Mweelrea / Sheeffry / Erriff Complex)	74420	268810	L76	L7468	11/07/2003	2003	Holyoak	GPS	Grid Ref. for remainder of records for this visit - although it is a considerable distance (c.320m) from the main body of records - Corresponds to one of the two Recorder records for species - Recorder location needs to be verified
12	Dooaghtry (Mweelrea / Sheeffry / Erriff Complex)	74740	268910	L76	L7468	11/07/2003	2003	Holyoak	GPS	GPS Record for 3 thalli found on 16/07/03 - Corresponds to one of the two Recorder records for species
12	Dooaghtry (Mweelrea / Sheeffry / Erriff Complex)	74760	268900	L76	L7468	11/07/2003	2003	Holyoak	GPS	GPS Record of hundreds of thalli found on 19/10/03
12	Dooaghtry (Mweelrea / Sheeffry / Erriff Complex)	75070	268525	L76	L7568	05/07/2006	2006	Lockhart	GPS	Also contains list of spp. associated with the record
12	Dooaghtry (Mweelrea / Sheeffry / Erriff Complex)	75369	268719	L76	L7568	05/07/2006	2006	Lockhart	GPS	
12	Dooaghtry (Mweelrea / Sheeffry / Erriff Complex)	75284.972	268634.65	L76	L7568	13/05/2009	2009	Campbell, Gaynor & Lockhart	GPS	Extent of cover
12	Dooaghtry (Mweelrea / Sheeffry / Erriff Complex)	74827.298	268648.67	L76	L7468	13/05/2009	2009	Campbell, Gaynor & Lockhart	GPS	Extent of cover
12	Dooaghtry (Mweelrea / Sheeffry / Erriff Complex)	75288.45	268629.21	L76	L7568	13/05/2009	2009	Campbell, Gaynor & Lockhart	GPS	P ralfsii; Plot 1 (D1)
12	Dooaghtry (Mweelrea / Sheeffry / Erriff Complex)	75027.492	268497.96	L76	L7568	13/05/2009	2009	Campbell, Gaynor & Lockhart	GPS	P ralfsii; Plot 2 (D2)
12	Dooaghtry (Mweelrea / Sheeffry / Erriff Complex)	74857.854	268633.01	L76	L7468	13/05/2009	2009	Campbell, Gaynor & Lockhart	GPS	P ralfsii; Plot 3 (D3)
12	Dooaghtry (Mweelrea / Sheeffry / Erriff Complex)	74916.855	268664.69	L76	L7468	13/05/2009	2009	Campbell, Gaynor & Lockhart	GPS	P ralfsii; Plot 4 (D4)
12	Dooaghtry (Mweelrea / Sheeffry / Erriff Complex)	75262.951	268887.3	L76	L7568	20/04/2010	2010	Campbell, Lockhart & Smyth	GPS	P ralfsii; Plot 5 (D5)
12	Dooaghtry (Mweelrea / Sheeffry / Erriff Complex)	75120.156	268607.98	L76	L7568	13/05/2009	2009	Campbell, Gaynor & Lockhart	GPS	P ralfsii

Pop. No.	Population	X	Y	10km_Grid_Sq	1km_Grid_Sq	Date	Year	Source	Accuracy	Notes
12	Dooaghtry (Mweelrea / Sheeffry / Erriff Complex)	75386.294	268835.23	L76	L7568	15/05/2009	2009	Campbell, Gaynor & Lockhart	GPS	P ralfsii
12	Dooaghtry (Mweelrea / Sheeffry / Erriff Complex)	75320.771	268885.51	L76	L7568	15/05/2009	2009	Campbell, Gaynor & Lockhart	GPS	P ralfsii
12	Dooaghtry (Mweelrea / Sheeffry / Erriff Complex)	75293.977	268919.56	L76	L7568	15/05/2009	2009	Campbell, Gaynor & Lockhart	GPS	P ralfsii
12	Dooaghtry (Mweelrea / Sheeffry / Erriff Complex)	75253.639	268927.99	L76	L7568	15/05/2009	2009	Campbell, Gaynor & Lockhart	GPS	P ralfsii
12	Dooaghtry (Mweelrea / Sheeffry / Erriff Complex)	75113.325	269099.24	L76	L7569	15/05/2009	2009	Campbell, Gaynor & Lockhart	GPS	P ralfsii
12	Dooaghtry (Mweelrea / Sheeffry / Erriff Complex)	74918.354	269261.94	L76	L7469	15/05/2009	2009	Campbell, Gaynor & Lockhart	GPS	P ralfsii
12	Dooaghtry (Mweelrea / Sheeffry / Erriff Complex)	74632.84	268870.06	L76	L7468	15/05/2009	2009	Campbell, Gaynor & Lockhart	GPS	P ralfsii
12	Dooaghtry (Mweelrea / Sheeffry / Erriff Complex)	74876.001	268845.68	L76	L7468	15/05/2009	2009	Campbell, Gaynor & Lockhart	GPS	P ralfsii
13	Omey Island Machair (Omey Island Machair)	55835	256023	L55	L5556	08/10/1998	1998	Lockhart	From Map/Ortho	Derived from sketch map - Grid Ref. on Record Card L558560 - Also includes Relevé data
13	Omey Island Machair (Omey Island Machair)	55920	255980	L55	L5555	08/10/1998	1998	Lockhart	From Map/Ortho	Derived from sketch map - Grid Ref. on Record Card L558560
13	Omey Island Machair (Omey Island Machair)	56275	255562	L55	L5655	08/10/1998	1998	Lockhart	From Map/Ortho	Derived from sketch map - Grid Ref. on Record Card L563555 - Also includes Relevé data
13	Omey Island Machair (Omey Island Machair)	56330	255510	L55	L5655	09/10/2006	2006	Long	GPS	From email attached to Site File - (2 plants)
13	Omey Island Machair (Omey Island Machair)	56320	255510	L55	L5655	09/10/2006	2006	Long	GPS	From email attached to Site File - (1 plant)
13	Omey Island Machair (Omey Island Machair)	56290	255540	L55	L5655	09/10/2006	2006	Long	GPS	From email attached to Site File - (3 plants)
13	Omey Island Machair (Omey Island Machair)	56373	255524	L55	L5655	03/11/2006	2006	Lockhart	GPS	
13	Omey Island Machair (Omey Island Machair)	55927	255983	L55	L5555	03/11/2006	2006	Lockhart	GPS	
14a	Mannin More (Slyne Head Peninsula)	60670	246090	L64	L6046	16/05/2004	2004	Holyoak	GPS	Holyoak Record (A) corresponds to record M1 from Excel Sheet attached to site file - Corresponds to Recorder Record for the Site - also contains associated species list
14a	Mannin More (Slyne Head Peninsula)	60730	246040	L64	L6046	16/05/2004	2004	Holyoak	GPS	Holyoak Record (B) corresponds to record M2 from Excel Sheet attached to site file
14a	Mannin More (Slyne Head Peninsula)	60708	246080	L64	L6046	29/10/2006	2006	Lockhart	GPS	Corresponds to record M3 from Excel Sheet attached to site file
14a	Mannin More (Slyne Head Peninsula)	60627	246274	L64	L6046	29/10/2006	2006	Lockhart	GPS	Corresponds to record M4 from Excel Sheet attached to site file
14a	Mannin More (Slyne Head Peninsula)	60626	246313	L64	L6046	29/10/2006	2006	Lockhart	GPS	Corresponds to record M5 from Excel Sheet attached to site file
14a	Mannin More (Slyne Head Peninsula)	60613	246373	L64	L6046	29/10/2006	2006	Lockhart	GPS	Corresponds to record M6 from Excel Sheet attached to site file
14a	Mannin More (Slyne Head Peninsula)	60486	246412	L64	L6046	29/10/2006	2006	Lockhart	GPS	Corresponds to record M7 from Excel Sheet attached to site file
14a	Mannin More (Slyne Head Peninsula)	60686	246074	L64	L6046	29/10/2006	2006	Lockhart	GPS	Referred to in Field Notes - No corresponding record in Excel Sheet
14b	Truska Machair (Slyne Head Peninsula)	58400	245300	L54	L5845	06/10/1998	1998	Lockhart	Grid Ref. from Record Card	Truska Population 1 - Corresponds to record T1 from Excel sheet attached to site file - corresponds to Lockhart as Population 4 - NOTE - Not same as Campbell Population 1
14b	Truska Machair (Slyne Head Peninsula)	58400	245300	L54	L5845	21/04/1999	1999	Holyoak & Lockhart	Grid Ref. from Record Card	Holyak relocation of Truska Population 1 - Corresponds to record T1 from Excel sheet attached to site file - corresponds to Lockhart as Population 4 - NOTE - Not same as Campbell Population 1

Pop. No.	Population	X	Y	10km_Grid_Sq	1km_Grid_Sq	Date	Year	Source	Accuracy	Notes
14b	Truska Machair (Slyne Head Peninsula)	58500	245800	L54	L5845	06/10/1998	1998	Lockhart	Grid Ref. from Record Card	Truska Population 2 - Corresponds to record T2 from Excel sheet attached to site file - also contains Relevé data - corresponds to Lockhart Population 6 - corresponds to Campbell Population 1
14b	Truska Machair (Slyne Head Peninsula)	58700	246200	L54	L5846	06/10/1998	1998	Lockhart	Grid Ref. from Record Card	Truska Population 3 - Corresponds to record T11 from Excel sheet attached to site file - corresponds to Lockhart Population 5
14b	Truska Machair (Slyne Head Peninsula)	58600	246100	L54	L5846	21/04/1999	1999	Holyoak & Lockhart	Grid Ref. from Record Card	Truska Population 2 - Corresponds to record T3 from Excel sheet attached to site file - Relevé 1
14b	Truska Machair (Slyne Head Peninsula)	58500	246100	L54	L5846	21/04/1999	1999	Holyoak & Lockhart	Grid Ref. from Record Card	Truska Population 2 - Corresponds to record T4 from Excel sheet attached to site file - Relevé 2
14b	Truska Machair (Slyne Head Peninsula)	58700	246100	L54	L5846	21/04/1999	1999	Holyoak & Lockhart	Grid Ref. from Record Card	Truska Population 3 - Corresponds to record T12 from Excel sheet attached to site file - corresponds to Holyoak Population 7 - corresponds to Campbell Population 3
14b	Truska Machair (Slyne Head Peninsula)	58300	246500	L54	L5846	21/04/1999	1999	Holyoak & Lockhart	Grid Ref. from Record Card	Truska Population 4 - Corresponds to T13 from Excel sheet attached to site file - corresponds to Holyoak Population 8
14b	Truska Machair (Slyne Head Peninsula)	58350	246500	L54	L5846	21/04/1999	1999	Holyoak & Lockhart	Grid Ref. from Record Card	Truska Population 4 - Corresponds to T14 from Excel Sheet attached to site file - said in Excel Sheet to correspond to Holyoak Population 9 - corresponds to one of the two Recorder Records for the site
14b	Truska Machair (Slyne Head Peninsula)	58500	246000	L54	L5846	11/05/2004	2004	Holyoak	GPS	Truska Population 2 - Corresponds to record T5 from Excel Sheet attached to site file - corresponds to one of the two Recorder Records for the site - corresponds to Campbell Population 1
14b	Truska Machair (Slyne Head Peninsula)	58360	246230	L54	L5846	11/05/2004	2004	Holyoak	GPS	Truska Population 2 - corresponds to record T6 from Excel Sheet attached to site file - corresponds to Campbell Population 1
14b	Truska Machair (Slyne Head Peninsula)	58460	246170	L54	L5846	11/05/2004	2004	Holyoak	GPS	Truska Population 2 - corresponds to record T7 from Excel Sheet attached to site file - corresponds to Campbell Population 1 - listed as occurring between here and record T8
14b	Truska Machair (Slyne Head Peninsula)	58560	245930	L54	L5845	11/05/2004	2004	Holyoak	GPS	Truska Population 2 - corresponds to record T8 from Excel Sheet attached to site file - corresponds to Campbell Population 1 - listed as occurring between here and record T7
14b	Truska Machair (Slyne Head Peninsula)	58130	245610	L54	L5845	11/05/2004	2004	Holyoak	GPS	Truska Population 5 - corresponds to record T15 from Excel Sheet attached to site file - corresponds to one of the two Recorder records for the site - corresponds to Campbell Population 2
14b	Truska Machair (Slyne Head Peninsula)	58564	245981	L54	L5845	02/11/2006	2006	Lockhart	GPS	Truska Population 2 - corresponds to record T9 from Excel Sheet attached to site file - corresponds to Campbell Population 1
14b	Truska Machair (Slyne Head Peninsula)	58463	246154	L54	L5846	02/11/2006	2006	Lockhart	GPS	Truska Population 2 - corresponds to record T10 from Excel Sheet attached to site file - corresponds to Campbell Population 1
14b	Truska Machair (Slyne Head Peninsula)	58119	245620	L54	L5845	02/11/2006	2006	Lockhart	GPS	Truska Population 5 - corresponds to record T16 from Excel Sheet attached to site file - corresponds to Campbell Population 2
14b	Truska Machair (Slyne Head Peninsula)	58015	245692	L54	L5845	02/11/2006	2006	Lockhart	GPS	Truska Population 5 - corresponds to record T17 from Excel Sheet attached to site file - corresponds to Campbell Population 2
14b	Truska Machair (Slyne Head Peninsula)	58331.308	246281.98	L54	L5846	17/02/2009	2009	Campbell, Lynn, Lockhart & Smyth	GPS	Extent of cover; Truska Machair Population 1
14b	Truska Machair (Slyne Head Peninsula)	58339.528	246281.43	L54	L5846	17/02/2009	2009	Campbell, Lynn, Lockhart & Smyth	GPS	Extent of cover; Truska Machair Population 1

Pop. No.	Population	X	Y	10km_ Grid_Sq	1km_ Grid_Sq	Date	Year	Source	Accuracy	Notes
14c	Doon Hill/ W. of Aillebrack (Slyne Head Peninsula)	58380	242520	L54	L5842	10/11/1997	1997	Lockhart	Grid Ref. from Record Card	Aillebrack Population 1 - corresponds to record A1 from Excel Sheet attached to site file - relocated by Lockhart 1998
14c	Doon Hill/ W. of Aillebrack (Slyne Head Peninsula)	58380	242520	L54	L5842	06/10/1998	1998	Lockhart et. al.	Grid Ref. from Record Card	Aillebrack Population 1 - corresponds to record A1 from Excel Sheet attached to site file - 1997 record relocated in 1998; Revisit to same X,Y, with different population count
14c	Doon Hill/ W. of Aillebrack (Slyne Head Peninsula)	58000	242800	L54	L5842	06/10/1998	1998	Lockhart	Grid Ref. from Excel Sheet	Aillebrack Population 2 - corresponds to record A2 from Excel Sheet attached to site file - corresponds to Holyoak Population 2
14c	Doon Hill/ W. of Aillebrack (Slyne Head Peninsula)	58100	242900	L54	L5842	07/10/1998	1998	Lockhart	Grid Ref. from Excel Sheet	Aillebrack Population 2 - corresponds to record A3 from Excel Sheet attached to site file corresponds to Holyoak Population 3
14c	Doon Hill/ W. of Aillebrack (Slyne Head Peninsula)	58000	242800	L54	L5842	22/04/1999	1999	Holyoak & Lockhart	Grid Ref. from Excel Sheet	Holyoak Population 2 - Aillebrack Population 2 - corresponds to record A2 from Excel Sheet attached to site file; Revisit to same X,Y, with different population count
14c	Doon Hill/ W. of Aillebrack (Slyne Head Peninsula)	58100	242900	L54	L5842	22/04/1999	1999	Holyoak & Lockhart	Grid Ref. from Excel Sheet	Holyoak Population 3 - Aillebrack Population 3 - corresponds to record A3 from Excel Sheet attached to site file; Revisit to same X,Y, with different population count
14c	Doon Hill/ W. of Aillebrack (Slyne Head Peninsula)	58020	242800	L54	L5842	10/05/2004	2004	Holyoak	GPS	Aillebrack Population 2 - corresponds to record A4 from Excel Sheet attached to site file - corresponds to Recorder Record for the site
14c	Doon Hill/ W. of Aillebrack (Slyne Head Peninsula)	57980	242790	L54	L5742	10/05/2004	2004	Holyoak	GPS	Aillebrack Population 2 - corresponds to record A5 from Excel Sheet attached to site file
14c	Doon Hill/ W. of Aillebrack (Slyne Head Peninsula)	58240	243110	L54	L5843	10/05/2004	2004	Holyoak	GPS	Aillebrack Population 2 - corresponds to record A6 from Excel Sheet attached to site file
14c	Doon Hill/ W. of Aillebrack (Slyne Head Peninsula)	58010	242720	L54	L5842	10/05/2004	2004	Holyoak	GPS	Aillebrack Population 2 - corresponds to record A7 from Excel Sheet attached to site file
14c	Doon Hill/ W. of Aillebrack (Slyne Head Peninsula)	58082	242944	L54	L5842	30/10/2006	2006	Lockhart	GPS	Aillebrack Population 2 - corresponds to record A8 from Excel Sheet attached to site file
15	Murvey Machair (Murvey Machair)	66124	238840	L63	L6638	05/10/1998	1998	Lockhart	From Map/Ortho	Derived from Ortho - June 1998 Record - Grid Ref. on Record Card L662389
15	Murvey Machair (Murvey Machair)	66178	238909	L63	L6638	05/10/1998	1998	Lockhart	From Map/Ortho	Derived from Ortho - October 1998 Record - Grid Ref. on Record Card L662389 - Also includes Relevé data
15	Murvey Machair (Murvey Machair)	66100	239100	L63	L6639	22/04/1999	1999	Holyoak	Grid Ref from Record Card	Grid Ref from Record Card
15	Murvey Machair (Murvey Machair)	66100	239200	L63	L6639	22/04/1999	1999	Holyoak	Grid Ref from Record Card	Grid Ref from Record Card
15	Murvey Machair (Murvey Machair)	66130	239120	L63	L6639	09/05/2004	2004	Holyoak	GPS	Holyoak Point a - Corresponds to Recorder Record for the Site
15	Murvey Machair (Murvey Machair)	66200	239110	L63	L6639	09/05/2004	2004	Holyoak	GPS	Holyoak Point b - also contains associated species list
15	Murvey Machair (Murvey Machair)	66127	239121	L63	L6639	01/11/2006	2006	Lockhart	GPS	Stated in notes as relocated Holyoak Point a record - site c. 4m from original record
15	Murvey Machair (Murvey Machair)	66194	238891	L63	L6638	01/11/2006	2006	Lockhart	GPS	
16	Fanore (Black Head - Poulsallagh Complex)	113818	208806	M10	M1308	24/02/1998	1998	Lockhart	From Map/Ortho	Derived from Ortho - also contains associated species list
16	Fanore (Black Head - Poulsallagh Complex)	113824	208799	M10	M1308	31/10/2006	2006	Lockhart	GPS	
16	Fanore (Black Head - Poulsallagh Complex)	113828.08	208787.04	M10	M1308	17/04/2009	2009	Campbell	GPS	P ralfsii; Plot 1 (F1)
16	Fanore (Black Head - Poulsallagh Complex)	113823.34	208795.94	M10	M1308	17/04/2009	2009	Campbell	GPS	P ralfsii; Plot 2 (F2)
16	Fanore (Black Head - Poulsallagh Complex)	113824.79	208796.1	M10	M1308	22/03/2010	2010	Campbell & Lockhart	GPS	P ralfsii
16	Fanore (Black Head - Poulsallagh Complex)	113816.47	208806.38	M10	M1308	22/03/2010	2010	Campbell & Lockhart	GPS	P ralfsii; Plot 3 (F3)
16	Fanore (Black Head - Poulsallagh Complex)	113828.59	208787.24	M10	M1308	17/04/2009	2009	Campbell	GPS	Extent of cover
16	Fanore (Black Head - Poulsallagh Complex)	113827.97	208789.75	M10	M1308	17/04/2009	2009	Campbell	GPS	Extent of cover

Pop. No.	Population	X	Y	10km_Grid_Sq	1km_Grid_Sq	Date	Year	Source	Accuracy	Notes
16	Fanore (Black Head - Poulsallagh Complex)	113826.83	208791.42	M10	M1308	17/04/2009	2009	Campbell	GPS	Extent of cover
16	Fanore (Black Head - Poulsallagh Complex)	113824.39	208796.33	M10	M1308	17/04/2009	2009	Campbell	GPS	Extent of cover
16	Fanore (Black Head - Poulsallagh Complex)	113822.89	208798.54	M10	M1308	17/04/2009	2009	Campbell	GPS	Extent of cover
16	Fanore (Black Head - Poulsallagh Complex)	113822.4	208800.02	M10	M1308	17/04/2009	2009	Campbell	GPS	Extent of cover
16	Fanore (Black Head - Poulsallagh Complex)	113821.56	208801.5	M10	M1308	17/04/2009	2009	Campbell	GPS	Extent of cover
16	Fanore (Black Head - Poulsallagh Complex)	113818.76	208803.44	M10	M1308	17/04/2009	2009	Campbell	GPS	Extent of cover
16	Fanore (Black Head - Poulsallagh Complex)	113816.92	208808.28	M10	M1308	17/04/2009	2009	Campbell	GPS	Extent of cover
16	Fanore (Black Head - Poulsallagh Complex)	113816.71	208808.23	M10	M1308	17/04/2009	2009	Campbell	GPS	Extent of cover
17a	SW of Lough Naparka (Tralee Bay and Magharees Peninsula West to Cloghane)	61600	116800	Q61	Q6116	30/01/1998	1998	Lockhart	Grid Ref from Record Card	Grid Ref from Record Card - also contains associated species list
17b	Magherabeg (Tralee Bay and Magharees Peninsula West to Cloghane)	61200	115800	Q61	Q6115	28/01/1998	1998	Lockhart	Grid Ref from Record Card	Grid Ref from Record Card - also contains associated species list - Searched for again by Lockhart in 06 but not relocated
17b	Magherabeg (Tralee Bay and Magharees Peninsula West to Cloghane)	61300	115620	Q61	Q6115	22/05/2003	2003	Hodgetts	GPS	Corresponds to one of the seven recorder records for the site - also contains associated species list
17b	Magherabeg (Tralee Bay and Magharees Peninsula West to Cloghane)	61220	115780	Q61	Q6115	22/05/2003	2003	Hodgetts	GPS	Corresponds to one of the seven recorder records for the site - also contains associated species list
17b	Magherabeg (Tralee Bay and Magharees Peninsula West to Cloghane)	61320	115610	Q61	Q6115	22/05/2003	2003	Hodgetts	GPS	Corresponds to one of the seven recorder records for the site - also contains associated species list
17b	Magherabeg (Tralee Bay and Magharees Peninsula West to Cloghane)	61220	115850	Q61	Q6115	22/05/2003	2003	Hodgetts	GPS	Corresponds to one of the seven recorder records for the site - also contains associated species list
17b	Magherabeg (Tralee Bay and Magharees Peninsula West to Cloghane)	61180	115830	Q61	Q6115	22/05/2003	2003	Hodgetts	GPS	Corresponds to one of the seven recorder records for the site - also contains associated species list
17b	Magherabeg (Tralee Bay and Magharees Peninsula West to Cloghane)	61200	115820	Q61	Q6115	22/05/2003	2003	Hodgetts	GPS	Corresponds to one of the seven recorder records for the site - also contains associated species list
17b	Magherabeg (Tralee Bay and Magharees Peninsula West to Cloghane)	61200	115840	Q61	Q6115	22/05/2003	2003	Hodgetts	GPS	Corresponds to one of the seven recorder records for the site - also contains associated species list
17b	Magherabeg (Tralee Bay and Magharees Peninsula West to Cloghane)	61221.1	115851.33	Q61	Q6115	02/03/2009	2009	Campbell, Lockhart & Smyth	GPS	Extent of cover
17b	Magherabeg (Tralee Bay and Magharees Peninsula West to Cloghane)	61201.617	115824.87	Q61	Q6115	02/03/2009	2009	Campbell, Lockhart & Smyth	GPS	Extent of cover
17b	Magherabeg (Tralee Bay and Magharees Peninsula West to Cloghane)	61202.6	115810.29	Q61	Q6115	02/03/2009	2009	Campbell, Lockhart & Smyth	GPS	Extent of cover
17b	Magherabeg (Tralee Bay and Magharees Peninsula West to Cloghane)	61183.075	115776.06	Q61	Q6115	02/03/2009	2009	Campbell, Lockhart & Smyth	GPS	Extent of cover
17b	Magherabeg (Tralee Bay and Magharees Peninsula West to Cloghane)	61171.377	115747.23	Q61	Q6115	02/03/2009	2009	Campbell, Lockhart & Smyth	GPS	Extent of cover
17b	Magherabeg (Tralee Bay and Magharees Peninsula West to Cloghane)	61221.757	115738.21	Q61	Q6115	02/03/2009	2009	Campbell, Lockhart & Smyth	GPS	Extent of cover
17b	Magherabeg (Tralee Bay and Magharees Peninsula West to Cloghane)	61252.709	115749.29	Q61	Q6115	02/03/2009	2009	Campbell, Lockhart & Smyth	GPS	Extent of cover
17b	Magherabeg (Tralee Bay and Magharees Peninsula West to Cloghane)	61226.315	115840.67	Q61	Q6115	02/03/2009	2009	Campbell, Lockhart & Smyth	GPS	Extent of cover
17b	Magherabeg (Tralee Bay and Magharees Peninsula West to Cloghane)	61218.506	115805.87	Q61	Q6115	02/03/2009	2009	Campbell, Lockhart & Smyth	GPS	Extent of cover
17b	Magherabeg (Tralee Bay and Magharees Peninsula West to Cloghane)	61243.621	115769.51	Q61	Q6115	02/03/2009	2009	Campbell, Lockhart & Smyth	GPS	Extent of cover
17b	Magherabeg (Tralee Bay and Magharees Peninsula West to Cloghane)	61221.252	115848.73	Q61	Q6115	02/03/2009	2009	Campbell, Lockhart & Smyth	GPS	P ralfsii; Plot 1 (M1)
17b	Magherabeg (Tralee Bay and Magharees Peninsula West to Cloghane)	61200.813	115821.27	Q61	Q6115	02/03/2009	2009	Campbell, Lockhart & Smyth	GPS	P ralfsii; Plot 2 (M2)
17b	Magherabeg (Tralee Bay and Magharees Peninsula West to Cloghane)	61221.405	115742.18	Q61	Q6115	02/03/2009	2009	Campbell, Lockhart & Smyth	GPS	P ralfsii; Plot 3 (M3)

Pop. No.	Population	X	Y	10km_Grid_Sq	1km_Grid_Sq	Date	Year	Source	Accuracy	Notes
17b	Magherabeg (Tralee Bay and Magharees Peninsula West to Cloghane)	61240.63	115770.88	Q61	Q6115	02/03/2009	2009	Campbell, Lockhart & Smyth	GPS	P ralfsii; Plot 4 (M4)
17b	Magherabeg (Tralee Bay and Magharees Peninsula West to Cloghane)	61181.396	115777.69	Q61	Q6115	02/03/2009	2009	Campbell, Lockhart & Smyth	GPS	P ralfsii; Plot 5 (M5)
17c	Kilshannig (Tralee Bay and Magharees Peninsula West to Cloghane)	62030	117170	Q61	Q6217	21/05/2003	2003	Hodgetts	GPS	Corresponds to the recorder record for the site - also contains associated species list
18a	Inch (Castlemaine Harbour)	67405	97049	V69	V6697	26/09/1983	1983	Lockhart	Unknown	Point from last submission (66830, 97499) corrected to this location
18a	Inch (Castlemaine Harbour)	67457.907	97081.59	V69	V6797	03/03/2009	2009	Campbell, Lockhart & Smyth	GPS	Extent of cover
18a	Inch (Castlemaine Harbour)	67434.20	97073.23	V69	V6797	03/03/2009	2009	Campbell, Lockhart & Smyth	GPS	Extent of cover
18a	Inch (Castlemaine Harbour)	67414.10	97068.91	V69	V6797	03/03/2009	2009	Campbell, Lockhart & Smyth	GPS	Extent of cover
18a	Inch (Castlemaine Harbour)	67374.38	97069.07	V69	V6797	03/03/2009	2009	Campbell, Lockhart & Smyth	GPS	Extent of cover
18a	Inch (Castlemaine Harbour)	67371.13	97059.94	V69	V6797	03/03/2009	2009	Campbell, Lockhart & Smyth	GPS	Extent of cover
18a	Inch (Castlemaine Harbour)	67380.00	97039.11	V69	V6797	03/03/2009	2009	Campbell, Lockhart & Smyth	GPS	Extent of cover
18a	Inch (Castlemaine Harbour)	67373.92	97014.86	V69	V6797	03/03/2009	2009	Campbell, Lockhart & Smyth	GPS	Extent of cover
18a	Inch (Castlemaine Harbour)	67394.23	97018.20	V69	V6797	03/03/2009	2009	Campbell, Lockhart & Smyth	GPS	Extent of cover
18a	Inch (Castlemaine Harbour)	67407.40	97021.00	V69	V6797	03/03/2009	2009	Campbell, Lockhart & Smyth	GPS	Extent of cover
18a	Inch (Castlemaine Harbour)	67415.20	97025.45	V69	V6797	03/03/2009	2009	Campbell, Lockhart & Smyth	GPS	Extent of cover
18a	Inch (Castlemaine Harbour)	67425.89	97032.57	V69	V6797	03/03/2009	2009	Campbell, Lockhart & Smyth	GPS	Extent of cover
18a	Inch (Castlemaine Harbour)	67441.50	97037.83	V69	V6797	03/03/2009	2009	Campbell, Lockhart & Smyth	GPS	Extent of cover
18a	Inch (Castlemaine Harbour)	67447.63	97045.41	V69	V6797	03/03/2009	2009	Campbell, Lockhart & Smyth	GPS	Extent of cover
18a	Inch (Castlemaine Harbour)	67450.52	97053.50	V69	V6797	03/03/2009	2009	Campbell, Lockhart & Smyth	GPS	Extent of cover
18a	Inch (Castlemaine Harbour)	67453.87	97064.90	V69	V6797	03/03/2009	2009	Campbell, Lockhart & Smyth	GPS	Extent of cover
18a	Inch (Castlemaine Harbour)	67254.76	97078.03	V69	V6797	05/05/2010	2010	Campbell	GPS	Extent of cover
18a	Inch (Castlemaine Harbour)	67259.07	97072.92	V69	V6797	05/05/2010	2010	Campbell	GPS	Extent of cover
18a	Inch (Castlemaine Harbour)	67254.20	97066.68	V69	V6797	05/05/2010	2010	Campbell	GPS	Extent of cover
18a	Inch (Castlemaine Harbour)	67244.48	97070.33	V69	V6797	05/05/2010	2010	Campbell	GPS	Extent of cover
18a	Inch (Castlemaine Harbour)	67243.26	97058.85	V69	V6797	05/05/2010	2010	Campbell	GPS	Extent of cover
18a	Inch (Castlemaine Harbour)	67229.96	97056.70	V69	V6797	05/05/2010	2010	Campbell	GPS	Extent of cover
18a	Inch (Castlemaine Harbour)	67227.11	97051.94	V69	V6797	05/05/2010	2010	Campbell	GPS	Extent of cover
18a	Inch (Castlemaine Harbour)	67215.21	97043.17	V69	V6797	05/05/2010	2010	Campbell	GPS	Extent of cover
18a	Inch (Castlemaine Harbour)	67191.99	97053.07	V69	V6797	05/05/2010	2010	Campbell	GPS	Extent of cover
18a	Inch (Castlemaine Harbour)	67166.25	97055.24	V69	V6797	05/05/2010	2010	Campbell	GPS	Extent of cover
18a	Inch (Castlemaine Harbour)	67141.59	97049.28	V69	V6797	05/05/2010	2010	Campbell	GPS	Extent of cover
18a	Inch (Castlemaine Harbour)	67189.18	97075.55	V69	V6797	05/05/2010	2010	Campbell	GPS	Extent of cover
18a	Inch (Castlemaine Harbour)	67207.80	97090.53	V69	V6797	05/05/2010	2010	Campbell	GPS	Extent of cover
18a	Inch (Castlemaine Harbour)	67457.42	97081.47	V69	V6797	03/03/2009	2009	Campbell	GPS	P ralfsii; Plot 1 (I1)
18a	Inch (Castlemaine Harbour)	67393.99	97079.35	V69	V6797	03/03/2009	2009	Campbell, Lockhart & Smyth	GPS	P ralfsii; Plot 2 (I2)
18a	Inch (Castlemaine Harbour)	67205.89	97129.08	V69	V6797	03/03/2009	2009	Campbell, Lockhart & Smyth	GPS	P ralfsii; Plot 3 (I3)
18a	Inch (Castlemaine Harbour)	67404.22	97040.09	V69	V6797	03/03/2009	2009	Campbell, Lockhart & Smyth	GPS	P ralfsii
18a	Inch (Castlemaine Harbour)	67252.21	97077.64	V69	V6797	03/03/2009	2009	Campbell, Lockhart & Smyth	GPS	P ralfsii; Plot 4 (I4)
18a	Inch (Castlemaine Harbour)	67247.02	97076.80	V69	V6797	03/03/2009	2009	Campbell, Lockhart & Smyth	GPS	P ralfsii
18a	Inch (Castlemaine Harbour)	67117.86	97303.72	V69	V6797	03/03/2009	2009	Campbell, Lockhart & Smyth	GPS	P ralfsii
18a	Inch (Castlemaine Harbour)	67197.96	97060.34	V69	V6797	05/05/2010	2010	Campbell	GPS	P ralfsii
18a	Inch (Castlemaine Harbour)	67172.69	97066.83	V69	V6797	05/05/2010	2010	Campbell	GPS	P ralfsii
18a	Inch (Castlemaine Harbour)	67403.02	97079.12	V69	V6797	26/02/2011	2011	Campbell	GPS	P ralfsii
18a	Inch (Castlemaine Harbour)	67233.72	97077.54	V69	V6797	26/02/2011	2011	Campbell	GPS	P ralfsii
18a	Inch (Castlemaine Harbour)	67232.76	97077.93	V69	V6797	26/02/2011	2011	Campbell	GPS	P ralfsii
18b	Rossbehy (Castlemaine Harbour)	64750	91630	V69	V6491	22/05/2006	2006	Holyoak	GPS	
18b	Rossbehy (Castlemaine Harbour)	64760	91614	V69	V6491	12/10/2012	2012	Lockhart	GPS	S of small track to the south of road
18b	Rossbehy (Castlemaine Harbour)	64753	91612	V69	V6491	12/10/2012	2012	Lockhart	GPS	S of small track to the south of road

Pop. No.	Population	X	Y	10km_ Grid_Sq	1km_ Grid_Sq	Date	Year	Source	Accuracy	Notes
19	West of Inny Ferry (Ballinskelligs Bay and Inny Estuary)	47265	68175	V46	V4768	25/01/1998	1998	Lockhart	From Map/Ortho	Record relocated from Grid Ref. from Record card (V474682) and point from last submission which was in the wrong location - Also includes Relevé data
19	West of Inny Ferry (Ballinskelligs Bay and Inny Estuary)	47255	68199	V46	V4768	25/01/1998	1998	Lockhart	From Map/Ortho	Record relocated from Grid Ref. from Record card (V474682) and point from last submission which was in the wrong location - Also includes Relevé data
20	North Bull (North Dublin Bay)	324451	237872	O23	O2437	16/06/1999	1999	Lockhart	From Map/Ortho	Derived from Ortho - not Grid Ref. from Site Card - Also includes Relevé data
20	North Bull (North Dublin Bay)	324481	237889	O23	O2437	16/06/1999	1999	Lockhart	From Map/Ortho	Derived from Map / Ortho - Approx. location only
20	North Bull (North Dublin Bay)	324544	237916	O23	O2437	16/06/1999	1999	Lockhart	From Map/Ortho	Derived from Map / Ortho - Approx. location only
20	North Bull (North Dublin Bay)	324300	237770	O23	O2433	17/11/2004	2004	Holyoak	GPS	
20	North Bull (North Dublin Bay)	324360	237800	O23	O2437	17/11/2004	2004	Holyoak	GPS	
20	North Bull (North Dublin Bay)	324370	237810	O23	O2437	17/11/2004	2004	Holyoak	GPS	
20	North Bull (North Dublin Bay)	324421.18	237853.26	O23	O2437	11/02/2009	2009	Campbell, Lockhart & Smyth	GPS	Extent of cover
20	North Bull (North Dublin Bay)	324423.62	237854.41	O23	O2437	11/02/2009	2009	Campbell, Lockhart & Smyth	GPS	Extent of cover
20	North Bull (North Dublin Bay)	324423.45	237854.66	O23	O2437	11/02/2009	2009	Campbell, Lockhart & Smyth	GPS	Extent of cover
20	North Bull (North Dublin Bay)	324585.49	237933.52	O23	O2437	11/02/2009	2009	Campbell, Lockhart & Smyth	GPS	Extent of cover
20	North Bull (North Dublin Bay)	324937.38	238095.15	O23	O2438	11/02/2009	2009	Campbell, Lockhart & Smyth	GPS	Extent of cover
20	North Bull (North Dublin Bay)	324935.06	238093.49	O23	O2438	11/02/2009	2009	Campbell, Lockhart & Smyth	GPS	Extent of cover
20	North Bull (North Dublin Bay)	324934.93	238092.85	O23	O2438	11/02/2009	2009	Campbell, Lockhart & Smyth	GPS	Extent of cover
20	North Bull (North Dublin Bay)	324421.92	237853.58	O23	O2437	11/02/2009	2009	Campbell, Lockhart & Smyth	GPS	Extent of cover
20	North Bull (North Dublin Bay)	324423.1	237855.26	O23	O2437	11/02/2009	2009	Campbell, Lockhart & Smyth	GPS	Extent of cover
20	North Bull (North Dublin Bay)	324585.73	237933.4	O23	O2437	11/02/2009	2009	Campbell, Lockhart & Smyth	GPS	Extent of cover
20	North Bull (North Dublin Bay)	324426.57	237852.2	O23	O2437	11/02/2009	2009	Campbell, Lockhart & Smyth	GPS	Extent of cover
20	North Bull (North Dublin Bay)	324424.5	237854.55	O23	O2437	11/02/2009	2009	Campbell, Lockhart & Smyth	GPS	Extent of cover
20	North Bull (North Dublin Bay)	324952.77	238095.73	O23	O2438	07/10/2009	2009	Campbell, Lockhart & Smyth	GPS	P ralfsii
20	North Bull (North Dublin Bay)	324937.53	238094.53	O23	O2438	07/10/2009	2009	Campbell, Lockhart & Smyth	GPS	P ralfsii
20	North Bull (North Dublin Bay)	324811.85	238036.32	O23	O2438	07/10/2009	2009	Campbell, Lockhart & Smyth	GPS	P ralfsii
20	North Bull (North Dublin Bay)	324772.09	238014.33	O23	O2438	07/10/2009	2009	Campbell, Lockhart & Smyth	GPS	P ralfsii
20	North Bull (North Dublin Bay)	324769.48	238011.48	O23	O2438	07/10/2009	2009	Campbell, Lockhart & Smyth	GPS	P ralfsii
20	North Bull (North Dublin Bay)	324684.83	237971.11	O23	O2437	07/10/2009	2009	Campbell, Lockhart & Smyth	GPS	P ralfsii
20	North Bull (North Dublin Bay)	324684.77	237971.07	O23	O2437	07/10/2009	2009	Campbell, Lockhart & Smyth	GPS	P ralfsii
20	North Bull (North Dublin Bay)	324605.04	237939.26	O23	O2437	07/10/2009	2009	Campbell, Lockhart & Smyth	GPS	P ralfsii
20	North Bull (North Dublin Bay)	324602.67	237937.46	O23	O2437	07/10/2009	2009	Campbell, Lockhart & Smyth	GPS	P ralfsii
20	North Bull (North Dublin Bay)	324424.33	237851.49	O23	O2437	20/06/2010	2010	Campbell & Smyth	GPS	P ralfsii
20	North Bull (North Dublin Bay)	324935.95	238093.5	O23	O2438	20/06/2010	2010	Campbell & Smyth	GPS	P ralfsii
20	North Bull (North Dublin Bay)	324787.4	238026	O23	O2438	15/10/2010	2010	Campbell & Smyth	GPS	P ralfsii
20	North Bull (North Dublin Bay)	324403.18	237838.13	O23	O2437	15/10/2010	2010	Campbell & Smyth	GPS	P ralfsii
20	North Bull (North Dublin Bay)	324392.92	237829.72	O23	O2437	15/10/2010	2010	Campbell & Smyth	GPS	P ralfsii
20	North Bull (North Dublin Bay)	324418.77	237851.92	O23	O2437	11/03/2011	2011	Campbell & Smyth	GPS	P ralfsii
20	North Bull (North Dublin Bay)	324937	238095	O23	O2438	11/02/2009	2009	Campbell, Lockhart & Smyth	GPS	Plot 1
20	North Bull (North Dublin Bay)	324935	238092	O23	O2438	11/02/2009	2009	Campbell, Lockhart & Smyth	GPS	Plot 2
20	North Bull (North Dublin Bay)	324585	237933	O23	O2437	11/02/2009	2009	Campbell, Lockhart & Smyth	GPS	Plot 3
20	North Bull (North Dublin Bay)	324423	237855	O23	O2437	13/02/2009	2009	Campbell & Smyth	GPS	Plot 4
20	North Bull (North Dublin Bay)	324421	237853	O23	O2437	13/02/2009	2009	Campbell & Smyth	GPS	Plot 5
21	Barley Cove (Barley Cove To Ballyrisode Point)	76991	25984	V72	V7625	13/10/2012	2012	Lockhart	GPS	
21	Barley Cove (Barley Cove To Ballyrisode Point)	77060	25950	V72	V7725	13/10/2012	2012	Lockhart	GPS	
21	Barley Cove (Barley Cove To Ballyrisode Point)	76905	25834	V72	V7625	13/10/2012	2012	Lockhart	GPS	
21	Barley Cove (Barley Cove To Ballyrisode Point)	76903	25832	V72	V7625	13/10/2012	2012	Lockhart	GPS	

