

Habitat Survey of Dalkey Island

September 2018

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1. Introduction



Map of Dalkey Island © Google

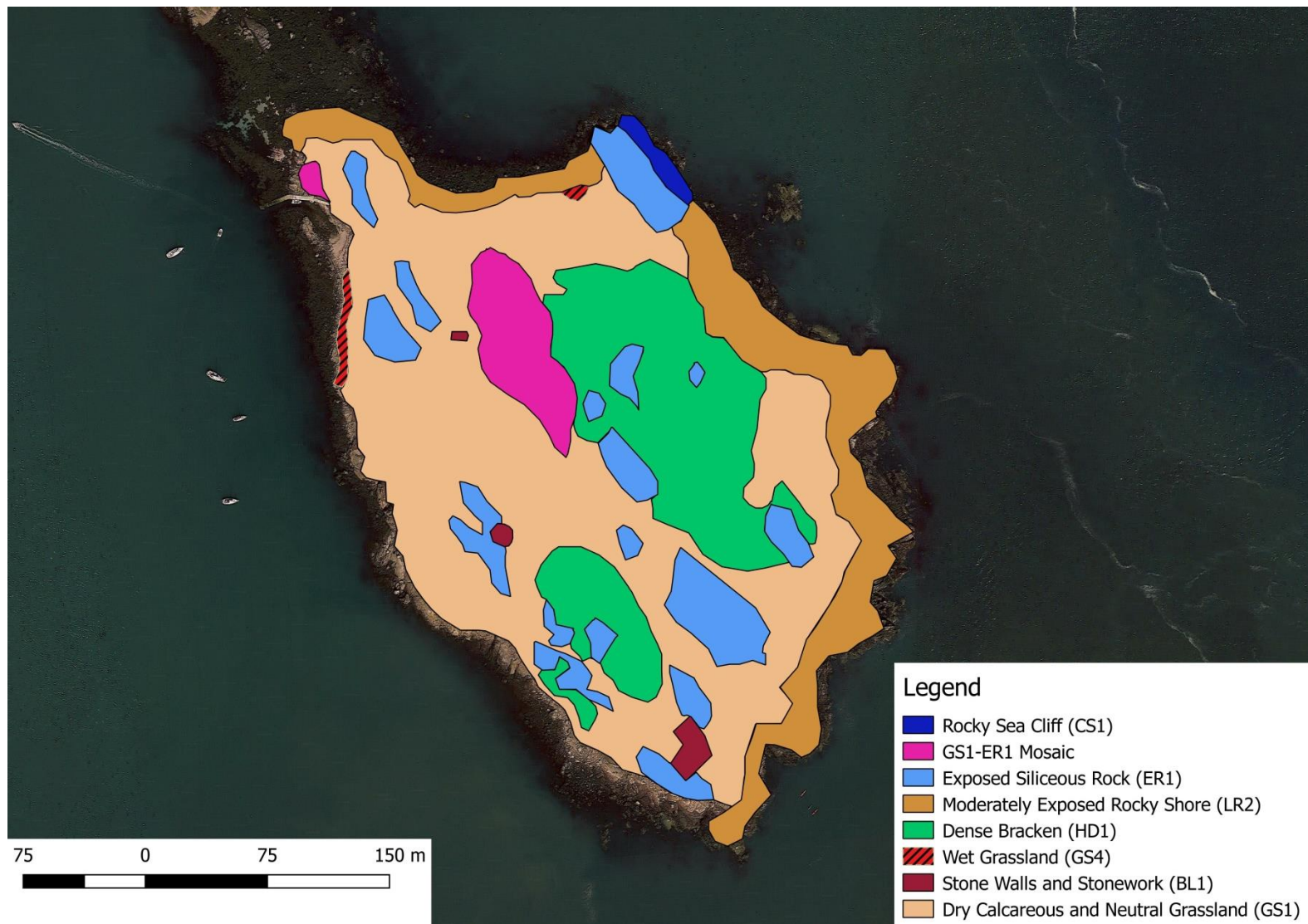
Dalkey Island is a small island of c. 9 hectares, located just off the east coast of south Dublin in the vicinity of Dalkey. It is of immense importance, not only for its archaeological heritage, but also for its rich animal and plant life. A number of bird species (including rarities such as the roseate tern) are known to nest on the island, and a litany of rare plant species have also been found, which are well-adapted to the short, maritime grasslands which are in abundance on the island. It is therefore one of the key sites within the Dun Laoghaire-Rathdown County Council area that is currently being closely monitored to maintain and enhance its heritage and biodiversity value.

For example, over the last 2 years, Dun Laoghaire-Rathdown County Council has endeavoured to eradicate (or at least significantly reduce) the brown rat and rabbit populations from Dalkey Island, in an attempt to protect the vegetation from overgrazing and soil disturbance by rabbits and the bird life from egg raiding by rats. In order to monitor how the vegetation on the island may change following on from this reduction in herbivore activity, permanent quadrats were established in numerous locations throughout the island during August of 2018 (FitzGerald 2018). Associated with this work, a survey of all the habitats (vegetation types) occurring on the island was also required, in order to aid the monitoring of the various habitats (vegetation types) to be found here. A detailed GIS vegetation map was also to be produced for the entire island.

The bedrock geology of Dalkey Island is composed primarily of the acidic rock granite, but much of the island is also overlain by a fairly thin layer of somewhat more lime-enriched glacial deposits (Dun Laoghaire-Rathdown County Geological Site Report: Dalkey Island, https://jetstream.gsi.ie/iwdds/delivery/GSI_Transfer/Geoheritage/DLR006_Dalkey_Island.pdf). In this report, the glacial deposits are described as a “*granite cobble-rich till*”. The island is in fact “*slightly saucer-shaped...the surface of which dips gently towards the well near the landing place*” (on the western margin of the island). The overlying glacial till thus acts as a “*reservoir for rainfall on the island to sustain the small flow in the well*”. The old well still survives at the western edge of the island.

2. Habitats

In total, seven habitats/vegetation types were discovered and mapped during the present survey, namely: dry grassland, rock outcrops, wet grassland, dense bracken, sea cliffs, rocky shores and walls and buildings. A number of interesting points of information can be gleaned by studying the vegetation map above. Firstly, there is clearer more rocky outcrops and exposed ground in the east and south of the island, however, in the deeper soils between this rocky outcrops, dense bracken has taken a serious foothold also in parts. In the north and west of the island, deeper soils clearly predominate, however, bracken is not to be found on this side of the island and dry grassland is dominant. As discussed above, the west (and north) of the island is slightly lower than the centre of the island and the glacial till acts as a reservoir for rainwater, funnelling it towards this lower ground (thus allowing the well to be constructed here). This is the most likely explanation for the throughput of trickling fresh water which has in turn caused the development of two small patches of wet grassland on the north and west margins of the island. In some areas, a complex mix of multiple habitats was found in a small area, and in such cases, the patches were described as being a “*mosaic*” of those habitats. Each of the separate habitats/vegetation types are outlined in greater detail below:



Vegetation map of Dalkey Island – background layer © Google

2.1. Dry grassland:

Dalkey Island is in large part covered by dry grassland. This is the most abundant habitat/vegetation type to be found on the island (see habitat map above). In places, the soil is deep and neutral to lime-rich (due to an abundance of glacial sediment overlying the acidic granite bedrock), whilst on more rocky ground, particularly on the margins of the island, the soil is much more thin and coarse in character. Here, more neutral-acidic soil species can be found growing on the more granite-rich soils which have less overlying glacial sediment. The dry grassland vegetation on the island is most closely associated with the dry calcareous and neutral grassland (GS1) habitat type of Fossitt (2000), but likely being closer to the neutral side of the spectrum.

On the deeper, neutral-calcareous soils, *Holcus lanatus* (Yorkshire Fog), *Poa trivialis* (Rough Meadow-grass) and *Tripleurospermum maritimum* (Sea Mayweed) are common species, and *Silene uniflora* (Sea Campion) and *Hypochaeris radicata* (Cat's-ear) can also be found occasionally. Typical species on the thinner, neutral-acidic grasslands include *Festuca rubra* agg. (Red Fescue), *Agrostis capillaris* (Common Bent), *Sedum anglicum* (English Stonecrop), *Sedum acre* (Biting Stonecrop), *Aira praecox* (Early Hair-grass) and *Rumex acetosella* (Sheep's Sorrel). This dry grassland habitat also has a distinct coastal element in some areas, with the salt-tolerant *Plantago coronopus* (Buck's-horn Plantain) and *Armeria maritima* (Thrift) being found, especially on the thinner soils on the margins of the island. This dry grassland vegetation type readily grades into the exposed siliceous rock (ER1) vegetation type (see below) (Fossitt 2000) and the two habitats sometimes form a complex habitat mosaic (see habitat map above).



Dry neutral to calcareous grassland covers much of the central portion of the island – 3rd August 2018.



Dry grassland grading into granite rock outcrops. The vegetation at this margin intergrades with one another, forming a complex habitat mosaic in some places – 27th July 2018.

A number of rare plants have been recorded from this coastal rocky grassland on the island in recent decades, including a set of rare *Trifolium* species that are specific to this dry, open, coastal heathland habitat (Doogue *et al.* 1998). These include *Trifolium ornithopodioides* (Bird's-foot Clover), *Trifolium scabrum* (Rough Clover) and *Trifolium occidentale* (Western Clover) (Doogue *et al.* 1998, Reynolds & Nash 2010). These low-growing species often occupy the transition zone between heathland and siliceous outcrop habitats (akin to the GS1-ER1 mosaic in the habitat map above) (see **3.4. Monitoring** for management recommendations for these species).



Dry neutral-acidic grassland, here occurring on thin soil over granite on the NW margin of the island, near the boat landing area (very much parched by the recent drought weather). Rare *Trifolium* species can be found in this vegetation in the spring – 27th July 2018.

On the more disturbed/eroded ground surrounding the areas with (formerly) large numbers of rabbits, a different kind of disturbed neutral-calcareous grassland occurs. This sub-habitat favours such classic species of disturbed, nutrient-rich soils as *Urtica dioica* (Common Nettle), *Sonchus asper* (Prickly Sowthistle), *Cirsium vulgare* (Spear Thistle) and *Stellaria media* (Common Chickweed), and such scarce coastal species as *Erodium maritimum* (Sea Stork's-bill) and *Carduus tenuiflorus* (Slender Thistle) (see below) (Doogue *et al.* 1998). In some areas of the northwest of the island, *Atriplex* species can be found abundantly in this disturbed grassland including, *Atriplex prostrata* agg. (Spear-leaved Orache), *Atriplex littoralis* (Grass-leaved Orache) and the possible hybrid between the two.



Dry grassland occurring on disturbed ground. A more significant weed flora is present here – 27th July 2018.



Disturbed/Eroded dry grassland, with *Atriplex* species scattered throughout.

2.2. Rock outcrops:

This vegetation type occurs on extremely thin soil overlying (or directly on) the granite outcrops scattered across the island. It is most closely associated with the exposed siliceous rock (ER1) vegetation type of Fossitt (2000). This vegetation type shares a very similar set of common species with the dry grassland vegetation occurring on thinner, neutral-acidic soils (see above). Common species to be found on rock outcrops on the island include *Festuca ovina* agg. (Sheep's Fescue), *Festuca rubra* agg. (Red Fescue), *Sedum anglicum* (English Stonecrop), *Aira praecox* (Early Hair-grass) and *Rumex acetosella* (Sheep's Sorrel). Some of the species in this habitat may also be found on old granite wall tops (see **2.7. Walls and buildings**).



Granite rock outcrops in the northeastern corner of the island, with adjoining dry grassland.

2.3. Wet grassland:

Wet grassland occurs in two places, on the western and northern margins of the island, respectively. This habitat type has developed as a result of the seepage of freshwater (derived from rainwater) through the soil (and on the surface of the bedrock below the soil) onto the sloping ground at the edges of the island. This seepage of freshwater has allowed wet grassland vegetation to develop. It has the closest affinity with the wet grassland (GS4) vegetation type of Fossitt (2000). Common species here include *Potentilla anserina* (Creeping Cinquefoil), *Ranunculus repens* (Creeping Buttercup), *Agrostis stolonifera* (Creeping Bent), *Juncus bufonius* (Toad Rush), *Juncus articulatus* (Jointed Rush), *Epilobium obscurum* (Short-fruited Willowherb) and *Isolepis setacea* (Bristle Club-rush). Where wet freshwater pools have formed in the rocky

ground below the wet slopes and well at the western side of the island, the aquatic *Lemna minor* (Common Duckweed) was found occurring. It was also found in the well itself. *Carex distans* (Distant Sedge) was also found on the western margin of the island on damp sandy/rocky ground near the seepage areas. In the patch of wet grassland at the northern edge of the island, *Cochlearia officinalis* agg. (Common Scurvygrass) can be found occurring in the vegetation, along with *Atriplex prostrata* agg. (Spear-leaved Orache). This suggests the potential for a salt marsh habitat to develop in the future on these wet rocky margins, if a sufficient salt water input can be sustained.



Old well at the western margin of the island – wet grassland vegetation can be found surrounding this site – 3rd August 2018.



Wet grassland vegetation occurring on wet ground by the well – *Potentilla anserina* and *Ranunculus repens* can be seen here; *Armeria maritima* can also be seen on the drier rockier ground – 3rd August 2018.



Lemna minor occurring in freshwater pools below the well – 3rd August 2018.



***Carex distans* on wet rocky ground near the well in the west of the island – 3rd August 2018.**



Fruits of *Carex distans* – 3rd August 2018.

2.4. Dense bracken:

Dense *Pteridium aquilinum* (Bracken) scrub (Dense Bracken HD1 according to Fossitt 2000) does occur on the island, mostly in areas with soil deep enough to accommodate the plant's deep system of rhizomes. The species creates a very dense canopy cover so there are very few plant species which can live below it. Sometimes, a substitute woodland flora can be found occurring under such dense stands of *Pteridium aquilinum*, however, this was not observed on the island. The herb layer was dominated by *Holcus lanatus* (Yorkshire Fog), *Holcus mollis* (Creeping Soft-grass), *Urtica dioica* (Common Nettle) and *Stellaria media* (Common Chickweed). This is one of the more invasive and problematic plant species occurring on the island and recommendations for its control are outlined below (see **3.1. Control of *Pteridium aquilinum* (Bracken)**).



Pteridium aquilinum scrub developed just southeast of the martello tower in the southern portion of the island. This area is being kept under control by the rocky ground to the west and the well-trodden rocky path to the east. However, it is spreading towards the south and southwest – 3rd August 2018.



Goats feeding on *Pteridium aquilinum* in the east of the island – 3rd August 2018.

2.5. Sea Cliffs:

No sheer, or notably high sea cliffs are to be found on the island. However, the definition given by Fossitt (2000) for the rocky sea cliff (CS1) habitat is as follows, “*steep or vertical rocky cliffs on the coast that are greater than 5 m in height. They may ascend in steps and have ledges, crevices and overhangs*”. Therefore, according to this definition, the cliffs at the northeastern corner of the island can be considered as this habitat and are covered predominantly with lichen. However, no vascular plant vegetation has developed on this sea cliff to date. Rocky seashore slopes do occur along the eastern and southeastern margins of the island, however, they do not qualify as this habitat due to a lack of height and steepness.



Rock sea cliff habitat at the northeastern edge of the island, with no visible vegetation present – 3rd August 2018.

2.6. Rocky shores:

This habitat type occurs extensively along the northern, eastern and southeastern margins of the island. Virtually no vascular plant vegetation can be found here, and it is dominated by lichens and seaweeds. As such, this habitat is most readily comparable with the moderately exposed rocky shores (LR2) habitat of Fossitt (2000). At the northeast of the island, this shore becomes steep and high enough to be categorised as sea cliff habitat (see above).

2.7. Walls and buildings:

This vegetation occurs on the various built structures found on the island, including the old church, the battery and the martello tower, all of which are

built of granite rock. It is comparable with the stone walls and stonework (BL1) habitat/vegetation type of Fossitt (2000). Common species to be found on walls on the island include *Galium verum* (Lady's Bedstraw), *Achillea millefolium* (Yarrow), *Festuca ovina* (Sheep's Fescue), *Spergularia rupicola* (Rock Sea-spurrey), *Taraxacum* agg. (Dandelions), *Malva sylvestris* (Common Mallow) and *Plantago lanceolata* (Ribwort Plantain). *Hedera helix* (Ivy) can also be found on the walls of the old church. Lime-loving species occur in the lime-mortared parts of the walls, whereas acid-loving species tend to grow directly on the granite rocks. The rare *Trifolium scabrum* (see **2.1. Dry Grassland**) has been recorded from the tops of the battery walls and so can be very important habitats for conservation purposes (Reynolds & Nash 2010).



Wall vegetation developed on the ruins of the old battery at the southern edge of the island – 3rd August 2018.

3. Recommendations

3.1. Control of *Pteridium aquilinum* (Bracken):

Pteridium aquilinum (Bracken) is one of the more invasive and problematic plant species occurring on the island. It has been spreading extensively in the southern and eastern portions of the island. Control measures will need to be introduced for this species to avoid any further expansion. Complete physical removal is very difficult to carry out comprehensively due to the extensive rhizome system of the plant. However, Le Duc et al. (2007) conducted a longterm heathland vegetation restoration experiment in an area that was invaded by bracken (in Peak District National Park, UK) and found that cutting of the bracken twice per year (June and August) over a prolonged period of time (potentially from 20-30 years before local extinction of bracken is achieved), along with light grazing levels, led to a significant reduction in the extent of bracken (and its leaf litter) and also encouraged restoration of the natural vegetation. They found that this methodology was much more effective than any other tried, including herbicide application. Although grazers generally do not eat bracken, goats were indeed observed feeding on fronds of this species in the east of Dalkey Island (see photo in **2.4. Dense Bracken**), so goat grazing, combined with the biannual control approach, will likely be highly effective over time, and should be trialed soon.

3.2. Visitors and fire:

Visitors frequently travel to the island by boat or by kayak on a daily basis. Visitors generally stay on the well-trodden paths that link the island's landing point with the church, martello tower and old battery, and so these areas are where most of the human traffic is concentrated. The majority of the rare plants occur away from these concentrated areas and are not particularly vulnerable to human trampling in any case (and may even be helped by

trampling of ground, which maintains it in an open state). Therefore, there are no areas that need be cordoned off to protect vulnerable plant species. Similarly, trampling is not generally negatively affecting the dry grassland areas, and the trampling is in some places supplementing the grazing efforts of the goats in keeping the grasslands relatively open and less rank in nature. Excessive trampling will need to be monitored in some areas, as some areas are already suffering from severe erosion, and trampling may further encourage this process. With this in mind, there is an argument to be made for cordoning off the more heavily eroded GS1-ER1 mosaic areas outlined in the vegetation map above (for a period of 2-3 years or more).

Another management concern is the potential for people to spread litter on the island, both by short term visitors and also by illegal campers, as this can negatively affect the habitats of Dalkey Island. For example, discarded glass containers can ignite fires in the vicinity of a feature. This can have a severe effect on the vegetation and species in those areas.

Visitors may also bring dogs with them on to the island. This should be heavily discouraged (or outright banned) to the island, as the dogs will help to artificially increase nutrient levels on the island with their faeces. This will in turn encourage the spread of weed species such as *Urtica dioica* (Common Nettle). Only a small patch of *Urtica dioica* occurs at the northeastern corner of the site, on formerly rabbit-disturbed and eroded ground, and this is unlikely to spread as the eroded area becomes overgrown and stabilised again over time due to the reduction in rabbit numbers. However, this patch should be monitored to ensure that it does not spread.

3.3. Monitoring:

A number of rare plant species have been recorded in the past from the island and many of these (particularly rare *Trifolium* species – see **2.1. Dry grassland**) still maintain healthy populations on the island. They require very open ground on thin rocky soils (or alternatively, well-grazed ground) in order to thrive, and so it will be very important to monitor the populations of these rare species in the future to see how the reduction in rabbit numbers will affect them. Rabbits were formerly effective grazers in this vegetation, however, they were so effective as grazers that they were also causing extensive soil erosion and were

overgrazing many areas, and so their eradication/reduction on the island is a very welcome development. Some minor grazing is probably needed in the long term to maintain the rare *Trifolium* populations, however, these open areas on very thin soil don't often become overgrown, even with little or no grazing, as it is so difficult for plants to dominate on these substrates. They can, however, become overgrown by such grasses as *Festuca rubra* agg. (Red Fescue) over time if they are not grazed in a minor way. The goats on the island will likely be able to provide this minor grazing, and rabbits are not necessary for this purpose.

Five quadrats have been established and recorded on the island in August of 2018 (FitzGerald 2018). This quadrat recording should continue on an annual basis in order to track any changes which may occur in the different vegetation types over the coming years. In particular, the removal of rabbits from the island will have effects on the vegetation due to the resulting reduction in grazing pressure. Soil erosion is likely to reduce, and this feature should also be noted (and photographed) in any future quadrat recording. A new habitat map could be produced every c. five years in order to monitor broad habitat/vegetation changes (or stability) over prolonged periods of time.

Finally, the bracken populations on the island (discussed above) should be monitored on an annual basis to ensure they do not encroach further on the island's natural habitats. Dry grassland on the deeper soils in the west of the island is the habitat which is most vulnerable to bracken encroachment. This monitoring should be conducted in combination with the biannual cutting measures outlined above.

4. References

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