

# **Protecting Howth's Habitats**



**A draft discussion document for consideration by Howth SAAO Committee**

**Declan Doogue**

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## Introduction

It is now almost 40 years since the publication of the An Taisce conservation study of the Hill of Howth. It is useful to reflect on the extent to which the significance of biodiversity has altered in the intervening years. That study was conducted long before the publication and enactment of The Habitats Directive, The Wildlife Act (1976) and the Flora Protection Order which derived from that act. Nonetheless it successfully recognised the value of many of the important areas that we would now call habitats, and *inter alia* came to develop a preliminary inventory of sites worthy of protection. In the An Taisce report, landscape and scenery were seen as major aesthetic assets and the wildlife resources of the area were recognised as a form of contributing amenity. This was the framework of understanding of wildlife habitat at that time. Since then, the significance of biodiversity has been officially recognised, resulting in the transposition into Irish law of meaningful legislation designed to protect some of our most significant species and habitats. A number of studies have been conducted which bring us now to a point where it is increasingly possible worthwhile and necessary to identify the whereabouts of many of the rarest species and habitats of the Howth area and to put in place measures to ensure that they continue to thrive in what by any standards is a remarkable landscape. These developments have become possible as a result of recent technological developments, enabling occurrence data of both species as well as related environmental variables to be recorded in the field using the Global Positioning System (GPS) and integrated into Geographical Information Systems (GIS). In this way it become possible to indicate on large-scale maps and high resolution aerial photographs the sites of species or habitats, correct usually to less than 10m.

The flora of Howth in its present condition represents the outcome of a variety of historical land use changes, most of which were not undertaken in the best interests of the flora. The purpose of this report is to outline the sensitivities of the rarest species and habitats to alterations in land use and to use this information and knowledge beneficially. Many sites for rare species have been lost accidentally. A redirected drain may cut off a water supply to an interesting cliff seepage system. Reduction in grazing levels can result in the reinvasion of Bracken and Furze. Discarded garden plants dumped inappropriately can survive to ruin areas of natural vegetation. A wall can be re-pointed wiping out centuries of growth of ferns and lichen.

By alerting the authorities to the potential consequences of land use changes, it is hoped to reduce the inadvertent damage that occurs to important habitats and where possible advance proposals that will go some way towards preserving those that are most threatened. In the course of identifying habitats based primarily on botanical evidence, it also becomes possible to identify areas which often have a high conservation for other wildlife, including butterflies, moths and other invertebrates.

## **The Importance of the Howth Flora**

The biogeographical importance of the Howth peninsula has been long appreciated. Its mixture of steeply sloping acid rocks, flatter limestone rocks, glacial drift, maritime habitats including dune and salt marsh, heathland and cliffs have all combined to produce a habitat and species mixture that encapsulates many aspects of the broader flora of Ireland. It contains many southern floristic elements but also includes species more commonly encountered on the cooler moorlands of the Wicklow Mountains. In Howth a number of species either reach or approach their northern limit in Ireland. This has been a matter of considerable botanical and biogeographical interest and recent researches have resulted in the discovery of various extra native species in some of the undamaged habitats of the peninsula. The juxtaposition of such a diverse range of habitats in a small area has resulted in a correspondingly varied flora, much of which is appreciated by both botanists and non-botanists.

The flowering plants and ferns of Howth have been of interest to Irish and visiting botanists for many years. A substantial body of records of the occurrence of rare plants and habitats from the area has resulted from their visits. However formal botanical listings did not commence until the beginnings of the eighteenth century. Many records of both common and rare plants survive, both as published notes and as preserved specimens in Irish and British herbaria. The following examples are chosen to reflect the rare character of a number of select species, but also to indicate the continuity of botanical recording in the area for almost three centuries and to illustrate the changing character of the botanical research that has occurred over that time.



## An Outline of the History of Botanical Recording in Howth

The first flora of Ireland, *Synopsis Stirpium Hibernicarum*, was published in 1726 and contains records of the occurrence of two species on the peninsula of Howth. Its author, Caleb Threlkeld was a herbalist, based in Dublin who collected or was sent specimens by various correspondents. He featured two Howth plants cited in his original work, Wild Daffodil, *Narcissus biflorus*, which was recorded from “under the skirts of the Hill of Hoath” with the addition that “the roots do vomit, and are good in Burns and Wounds”. Also recorded in this work is a reference to pansies with large yellow flowers that had been “fetch’d from the Hill of Hoath”. Pansies of this description are more likely to be *Viola tricolor* subsp. *tricolor* which occurs on the sandhills on the Claremont strand side of Howth. In the time of Threlkeld, botanists are only beginning to come to an understanding of the identity of many species, being concerned primarily with their utility as herbal medicines. Issues such as their native status, biogeography, taxonomy, habitat indicator status or bio-indicator value were far in the future. The daffodil was introduced, the pansy was native.

The next significant botanist to work Howth was Walter Wade. Following on from the work of Linnaeus, and using Linnean nomenclature, he produced his *Catalogus systematicus Plantarum indigenarum in Comitatu Dublinensi inventarum* (Wade, 1794). He found many interesting plants in the Howth area and often gave useful habitat information as well. For instance he recorded on the Howth specialities, Golden Samphire, *Crithmum maritimum*, “in rock clefts below the light-house at Howth” although an earlier botanist had discovered the species in 1740. It is still a spectacular component of the spray zone vegetation on the cliffs from Red Rock to beyond the Baily. An equally obvious element of the cliff top grassland Bloody Crane’s-bill, *Geranium sanguineum* also came to his attention, where he recorded it ‘Plentifully in bushy places by the shore near the baths’. He was later to be the first to discover another unusual Howth speciality, Madder, *Rubia peregrina* “On the Hill of Hoath, but not in quantity”, and Rough Clover, *Trifolium scabrum* from the Sutton side of Howth. He was also responsible for the discovery of Floating Club-rush, *Eleogiton fluitans* “In the marshy ground at Howth”. Other botanists encountered this species subsequently. Hart found it in a bog near the summit of Howth, and by Ball(y) saggart stream, and it was discovered in quarry pools now dried out about thirty years ago, near Green Hallows. Many of Wade’s discoveries still survive despite recent landscape alterations. These include grass-leaved Orache, *Atriplex littoralis* “In a muddy soil at the south-west side of Howth” and nearby, Frosted Orache, *Atriplex laciniata*. Both these species continue in the area, on the shore opposite St. Fintan’s church. Wade went on to become the main driver for the establishment of the Botanic Gardens in Glasnevin. Other botanists from farther afield were tempted to the Dublin area and made a point of visiting Howth. John Templeton, the main Irish botanist of the day, from Belfast found Sea Wormwood *Seriphidium maritimum* “On the Hill of Howth, on the side of Dublin Bay” in 1799 and later, Lady Kane later recorded it from “Rocks beyond the Martello tower, S.W. side of Howth” sometime before 1833, where it still survives. Templeton also found Sea-purslane, *Atriplex portulacoides* “among the rocks of Howth facing Dublin Bay”. This is not a rare plant in the Dublin area but becomes much rarer in NE Ireland, and hence his appreciation of the significance of its occurrence here.

James Townsend Mackay, curator of the Trinity Botanic Gardens, was a major researcher in Irish botany and travelled extensively in various parts of Ireland. He visited Howth on a number of occasions and discovered one of the great Howth rarities, Bird’s-foot *Ornithopus perpusillus* in great quantity on bare sandy pasture fields on the south side of Howth, where it has been visited by a succession of botanists over the next two centuries. Mackay also recorded the rare sedge *Carex dioica* in a marsh on the east end of the Hill of Howth, which for many years was thought to be extinct. However it has been rediscovered recently on East Mountain.

Lady Kane who wrote a small book on the Irish flora is credited with the discovery of Hairy Violet, *Viola hirta* on the east side of Howth and others were to record it subsequently on the Baily and the Cosh.

## The Work of H. C. Hart.

In the latter half of the nineteenth century, Henry Chichester Hart spent a number of summers examining the flora of Howth. Hart was a well known Shakespearean scholar, explorer, mountain climber and wrote the major work on the flora of Donegal. In the course of visits to his brother who lived at Woodside, Howth, he recorded distribution data on the occurrence of species and went on to compile one of the few local floras ever produced for such a small area. This work, *The Flora of Howth* appeared in 1887 and in it he lists the locations of most of the rare species encountered in the Howth area. It does not provide localities for species that were common both throughout Ireland and in the Howth peninsula. His work formed the basis for most of the Howth records included subsequently in Nathaniel Colgan's *Flora of the County Dublin* and is regularly cited in modern research papers dealing with the conservation and distribution of species in Ireland. By the time his Howth flora was produced, major work had been taking place bringing forward a preliminary analysis of the geographical distributions of most Irish species of flowering plant. As a result it became possible to form a clearer view as to what was rare or common. Hart appreciated the significance of the occurrence of a number of species he had encountered in the course of his researches and he features these prominently in his Flora.

He considered the importance of the Howth flora to be based on two characters – the national rarity of many of the species found and the large number of species to be found in such a small area. He recorded in excess of 520 species from Howth (plus 25 definite introductions) against a known total for Ireland of 950 species at that time. This is a spectacularly high total, well in excess of the average for areas of similar size, boosted by the occurrence of a number of species that are very rare in Ireland. Their presence in Howth is not just by lucky chance, but rather was related to the topographical diversity of the peninsula itself. That physical diversity resulted in a landscape of varied physical attributes, where different species with different habitat requirements grow. A hundred and twenty years ago, botanists were only beginning to come to grips with the basic understanding of the habitat requirements of plants. Words such as bog, fen and marsh had not acquired the more precise meanings which they have in the present day. Localities for plants were not as well defined as they are today with the aid of GPS. Therefore many of Hart's localities are based on topographical features which were familiar in the landscape of the time such as prominent houses, urban features, streams or hills.

Hart realised that many of these plants were nationally rare. His *Flora* produced a detailed snapshot in time of state of the flora in a very limited period. His skills as a mountaineer made it possible for him to explore many of the steepest cliffs where he found many rare species. He distinguished the main habitat types which are still represented – maritime, woodland, moor land marsh, sand-hills as well as a variety of species of weedy species, colonists and aliens. All of these groupings are still present though their relative proportions have changed over time.

The major work of Nathaniel Colgan, *Flora of the County Dublin* appeared in 1904, adding about ten species but provided many new localities for rarer plants previously recorded from Howth as well as confirming many of the records of Hart and the earlier botanists. His main work on the context of Howth was to set within a wider intellectual framework the significance of the occurrence of certain species. By Colgan's time, an appreciation of the role and impact of climate, soils and land-use history had developed. Furthermore Colgan was in a position to make observations and judgements on the status – native or otherwise, of species. His work has been the main kingpin upon which much of the subsequent research into the biogeography, distribution and conservation of the Dublin flora has been based.

New discoveries have indicated the presence of a number of species hitherto unknown from the Dublin area. The work of Dr. John Akeroyd who spent many days in Howth resulted in the discovery of Western Clover, *Trifolium occidentale* and Curved Hard-grass, *Parapholis incurva* in Howth. These discoveries serve to underline the fact that good habitats often have more to offer.

## **The Changing Flora of Howth**

Hart's Flora provides a wonderful itemised listing of the flora of Howth in the years immediately preceding 1887 as well as including with commentary details of earlier records from Threlkeld, Wade, Mackay, Bailey, More and a scattering of others. Using this data set and comparing it to our knowledge of the present state of the flora it becomes possible to track the changing status of individual species and species-groupings. Extending from this, it then becomes possible to comment on the altered condition of certain habitat types and hence on their capacity to maintain populations of certain species in a favourable conservation condition. It is also possible to identify and evaluate the impact of the drivers of environmental change. The distribution of certain species has remained almost unchanged, whilst others have not been seen in Howth for many years. Between these two extremes, the status of many other species has been altered, some increasing and others becoming rarer. The changes that have taken place in the flora are botanical or bio-indicator expressions of the impact of land use changes and other factors. These data provide evidence of the state of the natural environment of Howth, and give indications of future trends and consequences. In effect they serve to anticipate the future state of the flora given current trends and have the potential to become a form of generalised environmental impact statement. More importantly they inform us as to how we may deploy appropriate and effective conservation measures.

The flora of Howth is constantly changing, as it is throughout Ireland. Populations of individual species can increase and contract. Some species literally have good years and bad, and what is good for one species may not be good for another. Colonies of individual species cling on and may sometimes reappear after many years of apparent absence. However changes are taking place at present from which many species are not expected to recover. Building, drainage, grassland management, gardening, tidying up or abandoning certain kinds of pastoral farming, all take their toll. It is the rare species with the most specialised habitat requirements that suffer most.

## Howth Habitats and Threats

Each habitat type has its own suite of characteristic species. These species are typical of individual habitats and within each habitat or site there are variations in the actual composition, depending on other factors that impinge on the site. The dwarf heath combination of Bell Heather, *Erica cinerea*, Ling, *Calluna vulgaris* and Western Gorse, *Ulex gallii* form a spectacular and colourful combination of species in autumn. These species are seldom encountered near the sand dunes where very different habitat conditions pertain resulting in a very different flora with species such as Wall Pepper, *Sedum acre*, Lesser Hawkbit, *Leontodon saxatilis* and a variety of small grasses that demand lime-rich soils. Wetter areas will have additional species. Similarly newly forming habitats will contain species characteristic of the early stages of natural colonisation. Howth has a number of major habitat types, most of which blend into each other. The main habitat types are Woodland, Heathland, Sand Dune, Coastal (Rocky Spray Zone, Salt marsh and Shingle ridge), grassland as well as a mixture of urban habitats including walls, parks, gardens and streets. In natural conditions these habitat types and their associated vegetation would blend into each other gradually, depending usually on the influence of local topography and land-use. However in highly managed areas the transition from one vegetation type to another is often very abrupt, and will be governed by grazing (or the lack of it) mowing, gradient, the proximity of the sea and patterns of land ownership. The flora of most of these habitat types is influenced and modified by the presence of water. Thus there are wet to dry gradients within heathland, grassland, and even within sand dune systems where freshwater is sufficiently close to the surface to exert an influence on species composition. It is sometimes convenient to think in terms of vegetation types – recurring combinations of species that characterise particular habitats and distinguish them from other others.



## Invasive species from Gardens

In recent years, possibly as a result of global warming, a large number of garden species all of which have already demonstrated a propensity for invasiveness have become much commoner throughout Ireland. By 1887, Hart had noticed that a number of garden species were becoming established outside gardens more than a century ago. The favoured climate of Howth, particularly on the south and south-east side had enabled gardeners to introduce many spectacular plants to the area. Unfortunately many of these introduced species found conditions outside gardens equally acceptable and in time have spread onto the cliffs. In recent years it is often the case that unwanted garden plants are dumped directly onto the cliffs and other areas. These are now beginning to form substantial colonies and threaten to engulf the less aggressive local vegetation. This has already happened in the case of the Hottentot Fig, *Carpobrotus edulis* which has completely covered sections of the cliffs at The Needles and Doldrum Bay and is now forming new colonies elsewhere on the peninsula. Interestingly, Hart did not mention this species in his *Flora*, although he includes many other escaped introductions. Notoriously invasive species such as Wall Valerian, *Centranthus ruber* Giant Hogweed, *Heracleum mantegazzianum*, Three-cornered Garlic, *Allium triquetrum*, Skunk Cabbage, *Lysichiton americanus*, Red-hot-pokers of the genus *Kniphophia* as well as Montbretia, *Crocasmia x crocosmiiflora* are now fully established locally. Self-sown Giant Viper's-bugloss, *Echium pininana*, is now beginning to become established, and there are many other species similarly poised to spread judging by their performances elsewhere in Britain and Ireland. Their ecological requirements are matched closely by the warm sunny conditions of the cliffs and they threaten to engulf much of the natural vegetation. This has already happened over much of Doldrum Bay, particularly in relation to the spread of Hottentot Fig. The damage that has been done to many of Howth's important habitats cannot be quantified in sufficient detail, as precise locations for rare plants and invertebrates were usually not available to facilitate direct comparison. However it is usually possible to deduce from an examination of the adjoining undamaged areas, the degree to which natural vegetation has been damaged. Furthermore it then becomes possible to extrapolate the rate at which certain species are spreading and thus anticipate the extent to which further damage will ensue. Dumping of viable garden plants continues to take place in and near these important natural habitats both in small quantities, where they are apparently disposed of by gardeners, but also on a more substantial scale where whole truck loads have been dumped on the cliff paths.



## Increasing species

A number of native species and archaeophytes (non-native, long-established species, not necessarily of garden origin) have increased their range or arrived in Howth in recent years. Many of these are species with a proven capacity to colonise open ground in build-up districts, especially in those areas that have been treated with weed killers. In general they are species that produce large quantities of air-borne seeds such as those belonging to the willow herb genus – *Epilobium* and the now widespread species, Thale Cress, *Arabis thaliana*. They can appear at a site, usually in parks and the bottoms of walls. Many of these weeds ironically owe their distribution in Howth to the amount of land that is treated with herbicide. Herbicides are usually applied to reach the areas that lawn mowers, trimmers (and gardeners !) cannot reach. They simply create conditions where taller more aggressive grasses and weeds are killed, clearing the ground for other opportunist colonists to move in.

The Main Habitat Groupings and some of the threats are considered under the following headings

### **Coastal Habitats**

Spray Zone Habitats

Salt Marsh Habitats

Sandy Shores

Sand Dunes

### **Woodland**

Amenity Woodland

Wet Woodland

Birch Woodland

### **Heathland**

### **Wetlands**

Open Pools

Marshy Lands

### **Walls**

### **Grassland**

Cliff Top grasslands

Agricultural grassland

Short grassland winter annual communities

Grassland Changes

Abandonment of former grassland

Horse grazing

### **Others**

Building Development

Tillage

Roadside Verges

Recreational Areas

### Spray Zone Habitats

Most of the plants occurring in and above the spray zone have been largely unaffected by changes in land use. One of the more distinctive and familiar species in this zone is Thrift, *Armeria maritima*. The distribution of species such as Sea Samphire, *Crithmum maritimum*, Rock Sea-spurrey, *Spergularia rupicola*, and Rock Sea-lavender, *Limonium binervosum* as well as the much rarer Sea Wormwood, *Seriphidium maritimum* (*Artemisia maritima*) are largely unaltered, although individual colonies are in some places threatened by trampling by visitors. Many of these species occur in cracks in the jointed rocks and are equipped with strong perennial rooting systems that help the plants to withstand wave and wind action. The areas in which they grow are largely unsuitable for agriculture and so have retained their main botanical interest. The main threat to these habitats close to the sea is invasion by alien species, most particularly by Hottentot Fig, *Carpobrotus edulis* which has caused immense damage to the flora and vegetation on the cliffs on the S.E. side of the peninsula.

### Salt Marsh habitats

Salt marsh vegetation occurs in three main types in the peninsula. In one case, a form of salt marsh vegetation has developed where sand, broken sea shells and coastal shingle are trapped at the base of low cliffs where the shore shelves gently. These areas are usually protected from the force of the sea by larger rocks or reefs and are often positioned a little above HTM. In many instances they are irrigated by trickles of freshwater which have percolated through the glacial drift and locally-formed soils. This fresh water reduces the salinity in the soil and maintains continuity of moisture supply at low tides. The standard distinctive species in these areas include a sedge, *Carex distans*, Sea-milkwort, *Glaux maritima* a rush, *Juncus gerardii* and Lax-flowered Sea-lavender, *Limonium humile*, with Silverweed, *Potentilla anserina* at the upper shore levels. This is a fairly common combination of species which is repeated all along the coast.

However in the area at the base of cliffs where these trapped salt marsh features have formed, a number of more significant species occur. The most consistent of these is Brookweed, *Samolus valerandi*, which is also joined in some places by Wild Celery, *Apium graveolens* and Slender Club-rush, *Isolepis cernua*. The continuity of the supply of freshwater to these areas is essential. Where it is cut off, the vegetation loses its distinctive character and reverts to that of typical trapped salt-marsh.

The second type of salt marsh vegetation that has formed is based on shingle. This has developed on the ridge of gravel that has formed on the west side of the west pier. These formations continue outside the Howth peninsula and may be seen in a more developed state along the shore at Baldoyle opposite the site of the old racecourse. They are typically dominated by quantities of Sea-purslane, *Atriplex portulacoides* which holds the shingle / pebble matrix together and which, over time, allows other species to become established.

A third type of salt marsh has formed to the west side of the Cosh. Here in the sheltered area between the road to the golf club and the back of Sutton Railway station a salt marsh has been invaded by *Spartina* grasses. The colonies appear fairly stable now after the initial colonisation. However this species has caused immense damage to the vegetation of the shore from Baldoyle to Portmarnock. The area was the first site in Ireland where Dwarf Glass-wrack, *Zostera noltii* was discovered by A.G. More in 1864, "On mud in the creek close to the Railway Station at Baldoyle". Below the *Spartina* zone, a strong colony of Glass-wort, *Salicornia* occurs

### Sandy Shores

The open sandy shores on the south side of the peninsula have been heavily modified by human activity. The natural gradation from open sandy mud flats through embryonic dunes to mature sand dune grassland has been truncated at the upper end by housing, the construction of a park and the deployment of shore armour. The shore line vegetation here however is fairly typical, where large numbers of species *Atriplex* and *Chenopods* grow in drift lines conforming to the lines of deposited seaweed. These species are nutrient-demanding and thrive on the decomposing algae. A reduced form of fore dune vegetation has also

formed along the shore with common coastal species such as Sea Rocket, *Cakile maritima* and Sand Couch, *Elytrigia juncea*. Sea Bindweed, *Calystegia soldanella* occurred at Greenfields on the shore where it was shown to Hart by Mrs. Mahaffy. This species is known to be sporadic in its appearances and could easily re-assert itself, depending on the movements of sea and wind. It still occurs on North Bull Island and it is possible that seeds from there may be dispersed to the shore at Sutton. In the past a number of weeds of sandy arable ground occurred in this area, but most of these have not been seen for 20 years or more. These included Field Bugloss, *Lycopsis arvensis*, Flixweed, *Descaurania sophia*, and Henbane *Hyoscyamus niger*. Ominously, Hart noted the rate at which the Duke of Argyll's teaplant, *Lycium barbarum* was becoming established on sandy ground and by the road between Greenfields and Sutton. It has the potential to disrupt the upper shore flora in an area that is already under pressure.

Another sandy shore species that has undergone a contraction of range in the east of Ireland is Ray's Knotweed, *Polygonum oxyspermum* subsp. *raii*. This species still occurs on coarse sand in a few coves around the coast at Bottle Quay and Drumleck and may re-appear at Claremont Strand where it was last seen 25 years ago.

### Sand Dunes

The small sand spit known as the Cosh (Cush) was the site for a number of rare species of sand dunes and dune grassland. These included the now legally-protected Hairy Violet, *Viola hirta*, as well as rarities such as Harebell, *Campanula rotundifolia* and Hound's-tongue, *Cynoglossum officinale*. Pools on the course support a number of true aquatic fresh or brackish-water species including Water Milfoil, *Myriophyllum spicatum* and a species of Pondweed, *Potamogeton natans*. These habitats also provide living areas for water beetles, pond skaters, water boatmen and both damselflies and dragon flies. A rare member of the Rush family, *Blasmus rufus* occurred on the margin of a pool near Warren Cottage where it was discovered by Colgan, but has not been seen since.



Sand now accumulates on the foreshore at the western end of Claremont strand, in the sheltered area below the former hotel, resulting in the development of an interesting dune system with many plants typical of more mature dunes also present. The main species involved in this colonisation and consolidation are Wall Pepper, *Sedum acre*, Sand Timothy, *Phleum arenarium* and a moss, *Tortula ruraliformis*.

The most interesting species is *Vulpia fasciculata*, a rare grass hitherto known only in the Howth area, from Ireland's Eye. This area is not trampled to the same degree as other parts of the Burrow / Claremont area and therefore the flora is more natural. More importantly, it has not been invaded to the same degree

by introduced species. However, a number of alien species have taken hold all along the Claremont Strand area and could easily spread into this newly-forming habitat. Most of these are fairly obvious herbaceous perennial garden throw-outs that would be fairly easy to remove. However, a number of introduced trees are also becoming established and their removal should be considered as a matter of urgency.

The lime-rich lowland grasslands associated with the quarry system at Corr Castle were destroyed some years ago. Fragments of the grassland may still be encountered on the railway banks at Claremount where rarer species such as Upright Brome, *Bromopsis erecta*, Hoary Ragwort, *Senecio erucifolius* persist, but most of these habitats are now very overgrown by brambles and escaped garden plants such as Wall Valerian, *Centranthus ruber*. On occasions a few plants of the red-data book species, Blue Fleabane *Erigeron acer*, have occurred on the limestone walls nearby.

## Woodland

### Amenity Woodland

The woodlands associated with Howth Castle were formerly the home for a number of rare species of shady ground, including Early Purple Orchid, *Orchis mascula* and Hairy Wood-rush, *Luzula pilosa*. Many of these have not been seen for many years and much of their apparently suitable habitat may now be occupied by Ramsons, *Allium ursinum*, a type of wild garlic, which forms dense mats of vegetation, but which ousts many of the more delicate woodland species. It may be that the woodlands are actually too shady for some of these species. However the acid character of the soils in these woodlands is expressed by the presence of Foxglove, *Digitalis purpurea* and Wood Sage, *Teucrium scorodonia*. There is considerable potential for restorative conservation measures. Recent works to open up some of the pathways may have a beneficial effect on the flora by letting more light onto the woodland floor. Other dry woodlands occur at Sutton Castle but are very overgrown with brambles and other invasive species.



### Wet Woodland

Woodland of any sort in the context of North County Dublin is an unusual feature and the survival of the wet woodland known as Gray's wood is remarkable. It is extremely wet and contains many species which, though common in the national context are rare in north Co. Dublin. Where trees have fallen they decay slowly and in a very natural way. More importantly, the open areas of the woodland floor are covered with dense mats of liverworts and mosses that indicate that the area may have considerable conservation restoration potential. A recent visit indicated the presence of Ivy Broomrape, *Orobanche hederæ*, a species



usually associated with old native woodland. This species has been recorded from ivy-covered cliffs on the east side of the peninsula near Piper's Gut. The woodland ferns are in particularly good condition here, particularly *Dryopteris dilatata* which forms large clumps in the damper areas of the woods. There is evidence that a number of garden plants have been either dumped into the wood or possibly even deliberately planted. They do little to enhance the natural quality of the site.



Other wet woods occur by the roadside below the Summit Inn, associated with a water course that runs parallel to the road and towards the public park. These are mainly willow woods, and though not noted for any rare species are very typical and in good condition. Grazing impact is slight and they appear to be self sustaining.

#### Birch Woodland

Birch invasion is a major factor in trying to plan for biodiversity. Measures have already been taken to curtail its spread. The problem lies not with the birch itself but with the character of some of the areas into which it may spread. Where it has invaded areas of low conservation value, it provides shelter and a pleasing environment for walkers and contributes something positive to the general environment. However where it has invaded many of the smaller wetland areas on acid soils, much habitat loss has occurred.

#### Heathland

The spectacular heathland systems which dominate much of the shallow soils of Howth are composed of three or four species – particularly *Calluna vulgaris*, *Erica cinerea* and *Ulex gallii*. On slightly deeper soils *Ulex europaeus* dominates. Although these species are widespread in Ireland on shallow acid soils, they contribute greatly to the visual ambience of Howth, particularly in autumn. These vegetation systems have originated in situ, formed over very acid, dry soils largely formed of locally derived parent material. These plants are slow growing and are able to survive on extremely nutrient-poor soils. Burning is a regular feature of these areas. However the vegetation recovers. There are many areas in Howth where the boundaries between areas of heathland that have been recently burnt may be discerned easily – a ragged line between short *Erica cinerea*-dominated vegetation in contradistinction to taller *Calluna* dominated vegetation. However these patterns are often mixed in a mosaic reflecting land use history and many other ecological factors. Various provisions have in the past been made to isolate heathland from encroaching housing. Pathways, earth mounding fire brakes, serve to reduce the threat of fires to property.

These heathland systems are not floristically rich. Most of the diversity is centred on small areas that are a little different from the usual – small rock outcrops where English Stonecrop, *Sedum anglicum*, comes into its own, shallow pools with a variety of rushes, and zones of percolation where slight movements of water can be detected as damp patches of washed out loose peaty soil where they were flushed during heavy rain. To botanists their main interest is in exemplifying patterns of recolonisation. Following burning, a sequence of recolonisation occurs, with a small number of burnt-ground specialists including Heath Groundsel, *Senecio sylvaticus*, Early Hair-grass, *Aira praecox*, Silver Hair-grass, *Aira caryophyllea* and Sheep's Sorrel, *Rumex acetosella* colonising for a few years before dwarf shrub vegetation cover begins to re-assert itself. In recent years some of these exposed areas are becoming colonised by Canadian Fleabane, *Conyza canadensis*, a recent arrival in Ireland which invades a variety of open ground including the typical habitat of Heath Groundsel.



One of the most interesting additions to the native Howth flora has been Climbing Corydalis, *Ceratocarpus claviculata*. This was discovered some years ago on ground that had been recently burnt, in what is its typical natural habitat. It may be a recent arrival but is more likely may have been present in small quantity on the hill for many years but had escaped detection. Given its propensity to grow in recently burnt heathland it may occur in many other parts of the peninsula, only appearing in the short term and depending on the survival of dormant seed to maintain it in the area. The sporadic outbreaks of burning that occur are beneficial to this species – this is precisely the type of ground in which it grows on Killiney Hill and elsewhere. Deliberate heathland burning may prove to be problematical in view of the proximity of housing as well as health and safety issues. A *laissez-faire* approach may be the wisest approach.



## Wetlands

### Open Pools

It is disturbing on reading Hart's flora to come to a realisation of the extent to which the wetland component of the Howth flora has suffered. Hart regularly refers to various substantial wetlands of which there is now no trace. The most serious single-site loss appears to have been in the area around Greenfields where he recorded many plants from what he described as a bog near the shore. Losses here include Water Speedwell, *Veronica anagallis-aquatica* which Hart recorded from "Deep ditches about Greenfields and in a boggy hole between that and Sutton". There were many other quarries in the lower parts of Howth, many of which have been filled in with considerable damage to the native flora. He also discovered a group of species that would be more typical of good-quality lime-rich fenny conditions including Grass of Parnassus, *Parnassia palustris* and few-flowered Spike-rush, *Eleocharis quinqueflora*, both in a marsh "near the summit of Howth". Many efforts have failed to re-find these species although the site still has a limited wetland flora. There were several ponds in Quarry townland, most of which are filled in. Losses here and at the nearby Corr Castle included water buttercups which have become much rarer in modern Ireland.

There are similar references to areas within the upper parts of Howth where rare species were recorded and for which no evidence has been found to identify with certainty the locations of their original sites. Many of these acid water pools may have been associated with the various quarrying operations. As individual small quarries were abandoned, they would have flooded and in time acquired a small number of acid-ground wetland species. One such pool survives in East Mountain, to the west of the car park, occasionally flooding the adjoining track way. It is a significant site for water beetles, dragon flies and damsel flies all of which breed on the site. This small area is a site for one of the rarest Dublin aquatic plant species, Water Purslane, *Peplis portula*. It also has a rare waterside grass, *Glyceria declinata* and was the site until recently for a species of Marsh Speedwell, *Veronica scutellata*. The old botanical records give some indication of the former frequency of this species in the area. Mackay considered it to have been "Plentiful on the Hill of Howth", Hart found it in a "Marshy spot near Cabeena's, and Colgan recorded it from a "Marsh in the centre of Howth". It appears that significant dewatering has occurred in recent years in the upper parts of the Ben. Indeed, Hart commented that the Veronica was very scarce in consequence of drainage, indicating that at last some habitat losses were taking place prior to 1885. This gives us some insight into the validity of the pre-existing body of records and points to the consequences on the flora of water management since the end of the 19<sup>th</sup> century. These processes of dewatering have continued to the present day. Species that were regularly visited in wetland sites as late as the 1980s and for which very precise location data exists have not only lost their rare aquatic plants but in many instances have also lost their water. The Veronica is one. Also not seen recently is Floating Club-rush, *Eleogiton fluitans*, which had a similar distribution. All these species are typical of very acid water habitats, growing either as true aquatics or as emergent vegetation on the acid muddy and peaty soils adjoining these pools.

A substantial area of wet land, predominantly acid in the character of its vegetation, still survives on the Ben of Howth. Here there is a sizeable open-water pool, and wet acid and slightly boggy ground with a good and typical selection of boggy ground plants. These areas are highly vulnerable to scrub invasion by Rhododendron and Birch. The hydrology of this area is complex and its waters contribute significantly to other wetland areas on slightly lower ground.

Various ponds, many of which had formed in abandoned quarries were present in Hart's time and were sufficiently and consistently wet enough to sustain a variety of wetland-margin and true aquatic plant species. The actual species in question depended on their proximity to the sea. The quarry pools associated with lower-lying ground were mainly on limestone and had a flora very different from excavations on the acid rocks. Those nearest the sea, especially on limestone had a very different wetland component. There are many ponds in the Howth peninsula that hold water throughout the year. These include a number excavated water features on the various golf courses. The extent to which these result from the diversion of water from natural water courses into artificial water features needs to be considered. However many pools, particularly in the lower parts of Howth are apparently filled by ground water. Many

of these have a very restricted flora due to their brackish character. However they all contribute to the larger pattern of biodiversity and provide important stepping stones or refugia for invertebrate species that are heavily dependent on aquatic habitats

### Marshy Lands

These are areas where water passing through the matrix of glacial till occasionally comes close to the ground surface. Usually these areas have come about as a result of excavations or other earth workings and depending on the character of the soil, they can have species of lime rich or lime poor characteristics. Many of these occur on private land, and may in the past have fulfilled some utilitarian function such as a well or livestock watering area. There is evidence on many of the older maps that a number of these areas were associated with springs in the past. Indeed the ponds may have been dug out on or near the source of the spring. Depending on topography, some of these springs produced sufficient water to form small streamlets which may then have passed underground again to supply other down-slope wetlands, where the fall of land permitted this to take place.

The wetland flora of Howth has deteriorated spectacularly. Hart encountered some wetland species so frequently that he did not feel the need to cite localities for them in his Flora. A number of these otherwise common species elsewhere in Ireland are now exceedingly rare in the peninsula. We can infer where some of the rarer wetland species occurred by reference to the continued presence of their more enduring congeners. However many wetland habitats are in danger for a variety of reasons.



In various parts of Howth, but particularly in the area around Kilrock, there is evidence of the occurrence of flash flooding. Many of the garden walls of the area have incorporated drainage pipes into their structure to liberate water that accumulated rapidly during heavy showers or after extended periods of rainfall. These paths and roads in the area remain wet long after the rain has ceased, indicating the points at which excess water has escaped. There are various devices to direct water into the urban drainage system. In the past some of this water would have passed directly onto the cliffs, such as those surrounding Balcaddan Bay, where they would have percolated through the lime-rich drift soils to form a form of coastal fen-like vegetation. In the past, Butterwort, *Pinguicula vulgaris* and Black Bog-rush, *Schoenus nigricans* were recorded from “Wet banks above the sea between Balcaddan and Kilrock” by Hart. Brookweed, *Samolus valerandi* was also recorded from the area. The *Samolus* is still there, but the rarer two species are no longer evident. This pattern repeats itself around the cliffs. Here and there a few resilient clumps of *Schoenus nigricans* cling on in areas where housing did not come into conflict with nature, indicating the

former presence of these important percolation flushes. Some of the quarries nearer the sea at Kilrock still contain a number of significant species. One very wet area has a virtual sward of Variegated Horsetail, *Equisetum variegatum*, a rare Irish species of lime-rich marshes. Unfortunately this important site is used as a dump for dry filling and garden waste and a good deal of its prime habitat has been covered by this material. However there is potential for remedial works here, entailing the trial removal of an experimental section of the waste material. This would reopen the wet ground beneath and give the wetland plants on the site an opportunity to expand their local range. Where seepage features are most strongly developed, large colonies of the Giant Horsetail, *Equisetum telmateia*, appear, usually indicating the point on a slope where water and its dissolved chemicals, forms springs.



Similar environmental tensions have occurred at various points around the coast of the peninsula. Where there is a direct interaction with housing and amenity the evidence is fairly obvious. In more natural areas the consequences are not as evident. The Whitewater Brook area for instance was once well known for a number of rare wetland species. The area is much poorer now than in the past due to interference with the water flow by a variety of individuals and agencies, compounded by invasion by brambles and alien species. To rectify and restore the original flora in these circumstances would be very difficult.

However the relationship between water supply and the varying soil types, through which it percolates, has the potential to allow new wetland habitats to form. When there is a sufficient supply of clean unpolluted water close to the surface, a number of wetland species have the potential to colonise new ground, particularly if local grassland management is not too severe. An interesting example of this has been the apparently recent arrival on the peninsula of Marsh Helleborine, *Epipactis palustris*, which seems to have arrived by wind-borne seeds from the parent colonies on North Bull Island onto the margins of one of the golf courses.



## Walls

Old walls in the Howth areas are often covered with interesting ferns. The most unusual occurrence is that of the Sea Spleenwort, *Asplenium marinum* on the sea side of the wall running west from Howth Railway Station towards Claremont Strand. This species occurs in the mouths of a few sea-sprayed caves in the cliffs and so its presence here is all the more interesting. The colony is quite strong, but it could be wiped out by spraying with weed killer or by pointing. Tidying up operations including the consequences of failing to control weed killer spray from drifting onto wall plants, have resulted in the destruction of many colonies of rare or interesting species from roadsides and old walls in various parts of Ireland. Well-intentioned tidying up actions can also wipe out colonies of other ferns. Once eliminated they can take many years to become re-established. There are a few colonies of Black Spleenwort, *Asplenium adiantum-nigrum* in areas that could easily be destroyed. This is a comparatively rare fern in the Howth area. While there is little that can be done in relation to privately owned properties other than persuasion, appreciation and recognition, it may be possible within the local authority system to identify individual walls where herbicide application should be avoided.



## Grasslands

### Cliff Top Grassland

This grassland type occurs above the spray zone and can extend some distance up the cliffs. The areas in which it is formed occurred may have been lightly grazed in the past but most of the best surviving sites occur on shallow sandy relatively dry soils over sloping bedrock. The plants that grow here are in the main species that occur on lime-rich grasslands in many parts of Ireland. These species include Carline Thistle, *Carlina vulgaris*, Yellow-wort, *Blackstonia perfoliata*, Rest Harrow, *Ononis repens*, Bloody Cranesbill, *Geranium sanguineum* and Madder, *Rubia peregrina*. These species are not exclusively coastal in their Irish distribution in the sense that they are not dependent on saline conditions. However both the Bloody Cranesbill and the Madder are closely tied to the coast where warmer conditions prevail. This habitat occurs where there is lime-rich, sandy soils, and in recent years has become much reduced in area due to encroachment by Blackthorn, *Prunus spinosa*. Grassland of this type occurs mainly on the south and east sides of the peninsula, particularly on the steep grassy cliffs of the Baily and also below the summit and from there northwards to Kilrock. It appears that the very rare species Hairy Violet, *Viola hirta*, may have occurred in these grasslands. It is a legally-protected species, but recent searches by many botanists have failed to re-find it in Hart's localities.



## Agricultural Grasslands

Most of the grassland on Howth which was formerly grazed can be divided into two broad types – species rich grasslands that have formed on the more lime-rich soils and a usually more species-poor grassland which has formed on more lime-deficient soils. The extent to which these two broad categories overlap relates to the depth of soil, its origins, chemical and physical characteristics as well as its pattern of distribution. In addition many of the soils have been re-worked by various geological and hydrological processes. Lime-rich grasslands have common species such as Bird's-foot Trefoil, *Lotus corniculatus*, Yellow-rattle, *Rhinanthus minor*, Cowslip, *Primula veris* and Black Knapweed, *Centaurea nigra*. Acid soils usually have a greater predominance of Tormentil, *Potentilla erecta* and often grade off into rocky more heathy ground with Wood Sage, *Teucrium scorodonia* Sheep's-bit, *Jasione montana*, and Heath Bedstraw, *Galium saxatile*.



## Short Grassland Winter Annual Communities.

Many of these species are visible for short periods every year and their population sizes fluctuate, depending on weather and other factors. Therefore allowances must be made for apparent disappearances or substantial reductions on population size. Some of the rarest species in Ireland belong to this group of plants, which include Bird's Foot, *Ornithopus perpusillus*, Rough Clover, *Trifolium scabrum*, Knotted Clover, *Trifolium striatum* and Bird's-foot Clover, *Trifolium ornithopodioides*. Their conservation is a matter of the highest priority. Collectively their populations are very small and concentrated in a few small areas, all of which are suffering as the result of grazing reduction and consequent encroachment by Bracken, Brambles and Furze. These actions entail immediate grassland management measures to stall the continued invasion by scrub in order to open up some of the grassland and provide living space for these species before the character of the shallow soils is irretrievably altered. There are surviving colonies of this suite of species in the Red Rock area and to a lesser degree at the Summit Viewing Point Car Park. Former colonies for some of these species occurred near the Baily. These open grassy areas impinge onto more acid soils near the sea and in the early parts of the year produce sheets of Spring Squills, *Scilla verna*. This is one of the most emblematic species in the Howth flora and where it occurs numerous other interesting species may also be encountered. Trampling has been seen to damage vegetation and to impede its re-growth. Ironically some of the winter annual species are tolerant of trampling where the ground is open but stony, because it holds back the growth of scrub and heath which would otherwise shade or crowd out some



### Abandonment of former grassland

The major reduction in the amount of grazing has resulted in the encroachment of bracken onto many of the grasslands of Howth. This is particularly evident on the east side of the peninsula, but its impact can be seen throughout the peninsula. Where grazing has continued, particularly by horses, on slightly lime-rich soils an abundance of wild flowers, typical of lime rich grassland is evident, especially in June and July. It appears that much of the bracken-dominated areas may have been former woodland which was subsequently converted to pasture. Evidence for this includes the abundance of woodland or woodland-margin species such as Pignut *Conopodium majus* and Bluebell, *Hyacinthoides non-scripta*, Primrose, *Primula vulgaris*, and Violet *Viola riviniana* all of which thrive beneath the Bracken canopy and flower early in the year before the canopy closes in. However in many areas there is a sufficient amount of ground that has retained its open-grassland character and has not yet been reinvaded by the bracken.

On more acid soils, grassland protection is more difficult. Here Brambles and Furze are reasserting themselves in the absence of grazing, reclaiming ground that was theirs before agriculture. Brambles are particularly invasive, and many bramble species favour acid soil conditions. A single bramble bush of diameter 1 meter can produce many rapidly growing first-year shoots that can grow several metres in a season. These shoot in turn root and form new plants. In a few years that single plant can engulf more than 100 square metres of grassland. The significance of this is that many of the grassland sites and their species have already been lost. In some instances small streamlets have been completely covered over with brambles, resulting in the disappearance of their associated aquatic and water-side vegetation habitats.

### Horse grazing

Grazing by horses at certain levels of intensity has been seen to be greatly beneficial to the local flora. One of Dublin's rarest orchids, the Frog Orchid, *Coeloglossum viride* has grown in a field on East Mountain for many years. Another Orchid, Green-winged



*Anacamptis morio*, which was once a Flora Protection Order species, was recorded on a number of occasions until quite recently, in a paddock near Green Hollows where it may have been dug out. Other recent confirmations of rare species include the grassland ferns Adder's Tongue, *Ophioglossum vulgatum* and Moonwort, *Botrychium lunaria*, both of which have occurred on grassy fields east of Casana Rock. It is the level of grazing and the nature of the pasture that matter. Where grazing is too heavy a dense may of rosette-forming species forms. Where grazing is too light or abandoned, aggressive grass species take over,

species numbers fall and conservation value diminishes. A number of sites occur throughout the peninsula where apparently suitable grassland habitat has survived. The stocking levels are appropriate to maintain some of the existing diversity and also serve to keep invasive scrub and bracken at bay. The significant difference between grazing by horses and other livestock from a conservation perspective is that grasslands are not managed to maximise meat production, and therefore do not require major fertiliser inputs. As a result the sward often contains many species that are not grasses. Several areas still retain many colourful species through the year although their numbers decrease as the cumulative effect of grazing takes effect. The overall visual impact of this is that of grassy fields with many yellow and pink-flowered species which are both aesthetically pleasing and floristically interesting. In addition, other less conspicuous species are also retained as well. Most of these areas are clearly in private ownership and many are reverting to bracken or even furze and bramble scrub.

#### Building development.

Buildings *per se* have clearly altered the natural character of much of the Howth area. Not only in the actual footprint of the buildings themselves, but with the attendant infrastructural effects during the building phase and immediately after as the local flora is eliminated and replaced by a suite of garden weeds many of which now come from garden centres and landscaping operations. Many other consequences result from housing and other development including alteration to the ground hydrology, changes to land use, bringing on abandonment effects. There are many instances where roadside verges are treated as if they were extensions of the gardens they adjoin and are often sprayed with weed-killers, mown as lawns or even planted with foreign perennials.

#### Tillage

The virtual abandonment of tillage within the peninsula has resulted in the disappearance of a number of weeds of cultivation, particularly on the south side of the peninsula. Rare species such as Round-fruited Poppy, *Papaver hybridum* and Shepherd's-needle, *Scandix pecten-veneris* have not been seen for many years in Howth though once known from cornfields at The Cliffs, The Needles and Drumleck. These are nationally rare species (*Papaver hybridum* is legally-protected under the Flora Protection Order), and it is possible that these and other species may still survive as dormant seed in these areas. However it is very difficult to manage and maintain weed systems of this sort, partly because the original seed bank may now have died. Even if colonies of these species can be rediscovered, it requires long-term agreement between landowners and other agencies to maintain a system of arable cropping. Many other weeds of tillage and waste places turn up occasionally, usually where excavations have brought dormant seed to the surface. On occasions some of these usually annual weeds flourish for a year or two, but then disappear again as rough grasses and stronger weeds grow back.



## Roadside Verges

Two rare Irish species have stable and apparently permanent colonies on roadsides in Howth. These are Tor-grass, *Brachypodium pinnatum* and Hedge Bedstraw, *Galium mollugo*. The Grass has been recorded on a consistent basis on roadsides formed along the line of the old tramway below the Summit Inn and on Thormanby Road. The Bedstraw population has become very small in recent years and may be suffering from encroachment by Wall Valerian and Alexanders. Indeed many of the roadside verges in Howth are under threat from tidying up, herbicide application, mowing and planting.



## Recreational Areas

The loss of habitat that has resulted from the development of the golf clubs cannot now be quantified. It is evident that large areas of grassy heathland acid grassland have been incorporated into their layout. Furthermore, natural water courses, above and below ground have been covered and otherwise managed. The impact of these major land use alterations is difficult to assess at this stage. However it appears that water levels of the adjoining natural areas need to be monitored. Drying out of some of the Bog Asphodel, *Narthecium ossifragum*, flushes has been noted and associated with subsequent bracken invasion.

Some of the lands in the care of Fingal Parks Department have some potential where the water table is sufficiently high. The park grassland adjoining Gray's Wood has a number of wetland rushes and grasses and the grass-cutting regime could easily be modified to allow these species to flourish. Other drier grassland areas also have conservation potential. The timing of mowing operations is crucial in this respect. If the grass is cut too early, the future flowering stems are destroyed. It is possible to set aside small areas nearer the inner less public edges of some of these properties and allow the plants that survive there the opportunity to flower. Cutting the vegetation of these sections can take place at the end of the flowering season after the plants have had an opportunity to set and cast good seed. Follow-up operations might include scuffing designated sections of the park to allow seeds to take root. These areas would then look far better and the loss of amenity space would be slight. Indeed if these areas are not treated with herbicides, the unsightly brown scar that appears as the poisoned plants die will not ensue.

## **Habitat Conservation Measures**

One of the aims of this report is to inform and alert the concerned parties to the consequences of certain actions that may result in the reduction of the Howth flora and its habitats. The previous section has outlined the types of habitat that occur in Howth and has indicated the susceptibilities of these habitats to processes that are already in train. No habitat is safe. Drainage, abandonment of grazing, roadside verge management, herbicide application, heathland fire protection measures, building and amenity grassland all serve to alter the natural vegetation, usually for the worse. Different actions are indicated for different sites and habitat types. In some instances no action is immediately indicated. In others, urgent action is required. In areas where the local authority actually is the owner or custodian of property, there may be a greater prospect of success in completing certain conservation tasks. In the case of private property where land-use changes, especially abandonment, are taking place there is much less that can be achieved without the goodwill of the owner. However there are many coastal areas where significant habitats exist that are in effect public areas. There is abundant opportunity in these areas, to develop useful projects that will be of considerable benefit to the natural environment and habitats.

The condition of the flora and habitats of Howth as we encounter them in the 21<sup>st</sup> century are the outcome of many historical, geographical, economic and social interactions. Many habitats for rare plants recorded mainly in the 19<sup>th</sup> and early 20<sup>th</sup> centuries have now been lost and are unlikely to re-appear because their former habitats have been completely altered, de-natured and are no longer remotely suitable. It is extremely difficult, indeed virtually impossible, to undo, recreate and maintain the combinations of circumstances that favoured these lost species and sites. However a number of the rarest Irish species still survive on the peninsula and are worthy of appropriate conservation measures. In the process of protecting these species, many other species and habitats can also be protected. It is worth bearing in mind at all times that certain nationally rare species continue to thrive in the Howth area for reasons unrelated to local short-term management actions. The chief of these are climate, topography, structural diversity of existing landscape, former land use history, the distribution of glacial drift and its relationship with the underlying natural hydrology and geology. The outlined options are intended to protect the most endangered species and habitats. It is these that give Howth its distinctive character. It would be unfortunate if rare resources were deployed to protect species and habitats that were not endangered.

It is essential at all stages that any contemplated actions with hydrological implications be thoroughly assessed.

## Types of Conservation Action

### Do Nothing Option

In many instances there is no necessity to do anything, other than continue to monitor the conservation status of a number of sentinel or indicator species. If they continue to thrive, then no direct action may be called for at the time. The spray zone species and habitats are fairly secure in areas that are not trampled by sight-seers and anglers, although areas where visitors congregate for several hours tend to become littered and generally degraded. The main threat in these areas is from dumping of viable garden plants and the spread of alien invasive species.

### Actions to retain.

These are envisaged as actions that are intended to retain rare species or habitats in a favourable conservation status. These actions are usually precautionary – *i.e.* to ensure that certain habitats that might come under threat either as a result of some infrastructural or habitat change such as piping water away from a wetland site, planting a small conifer wood, road widening operations and roadside verge grass cutting. By being aware of the character of individual sites (wetland, roadside verge etc.) it becomes possible to anticipate the likely damage that might occur in the event of some development or land use alteration being considered. In this way, remedial and amelioration proposals can be proposed and enacted.

### Actions to rescue

These are envisaged as urgent operations where an existing population of a rare species or habitat is under threat. It involves identifying the nature and impact of the threat and devising measures to reduce or nullify its effect. Actions of this type are of the “fire-brigade” variety and are envisaged as being short-term measures that require sustainable long term follow-up operations.

### Actions to enhance or restore

Habitat restoration is a vexed area. There is a difference between assisting a piece of land to recover its former flora and fauna (by reversing the processes that have caused it to lose these in the first instance) and inventing a new habitat type and planting or sowing it with inappropriate species, in the name of biodiversity. In this respect one useful line of practical conservation is immediately possible. A number of sites on the peninsula are in the care and ownership of Fingal County Council Parks Department. These are, in the main, grassy habitats and although they have lost most of their interesting species as a result of historic land use changes, they have some amenity and educational conservation value. A climate now exists where wild-flower meadows are considered a desirable component in local biodiversity plans. Grassland can be managed in order to allow the existing surviving species to spread. This measure is profoundly different from the widespread sowing of seeds into an open area. Delivery of the aspiration entails the protection of existing colonies of non-grassy species within a site, allowing them to flower and set seed. Species-poor areas with a dense grassy sward would simultaneously be closely mown and the ground scuffed at the end of the growing period. This would emulate the effects of cattle and open up areas of soil where naturally-occurring seeds from the immediate vicinity would fall and germinate. In areas near the sea where the soil is more lime rich, there is an abundance of locally present naturally-occurring species such as Wild Carrot, *Daucus carota*, Knapweed, *Centaurea nigra*, and Field Scabious, *Knautia arvensis*. Furthermore, on one site near Red Rock, there is a water course, largely underground which if managed carefully may be used to restore wetland habitat. When water is allowed to follow its own line as it moves down slope, it creates local small areas where damp grassland, muddy areas, pools and even rivulets can form and attract wetland species. It was often the case that surplus water was piped or otherwise conducted off a site as quickly as possible in order to improve its agricultural productivity. Nature conservation in such circumstances requires the reduction in the rate of loss of water, thereby extracting the maximum ecological benefit from the available water. The low damp cliffs below the site have a number of percolation and trapped salt marsh features and as such would continue to benefit from the water

management regime that might be implemented. The site is also near to the very important sites at Red Rock where the rare winter annual community survives and is also close to the colony of *Parapholis incurva* and *Trifolium occidentale* near the Martello tower.

Pond and wetland construction.

Pond excavation as well as more modest actions such as removing the upper layers of soil to improve access to the water table are useful measures with the potential to enhance, retain or sometimes by reactivation of dormant seed in the soil, to extend the life of populations of certain species. The sites need to be selected carefully to avoid damage to the existing flora and with due consideration to ownership and public safety issues. However design options include a gradual tapering off of slopes to avoid sudden drops and the provision or retention of solid features such as rocks and soil islands in any such developments. The pond and flooding areas in the public park below The Summit (Samuel's Reservoir) have been colonised by a wide variety of wetland species that are otherwise rare in Howth.

Golf courses, by virtue of their irrigation and wetland management systems have great potential for restoring some of the lost flora and habitats, not by planting but by slight modifications of the landscape designed to maintain open water and waterside muddy conditions. Similarly, damp areas on land in public ownership, many of which are likely to have been more open in the past (cattle pools, spring wells, rivulets and seepages) can be managed in order to allow wetland species from local native sources to spread naturally into the area.

#### Conservation Philosophy

It may appear axiomatic that rare plants are rare because the habitat conditions which they require are themselves rare. Plants with wide ecological amplitudes can occupy various habitats or can spread into habitats that are widespread. Depending on their size, competitiveness and longevity they may be frequent or rare within their preferred habitat types. In simple terms, large aggressive nutrient-demanding species tend to become commoner and small delicate species are frequently overwhelmed by them. In situations where water tables are falling this situation is compounded where larger perennial species with deep rooting-systems can to some extent remain in contact with the ground water supply, while their smaller more shallowly rooting companions effectively become isolated from the ground water and the throughput of nutrients and eventually become crowded out, shaded and die.

It is essential that any actions should be designed to retain the most natural habitats and rare native species. In terms of resource deployment (money, labour, voluntary effort, goodwill) it is essential that the wisest use be made of these resources in order to protect these habitats. There is little sense in expending effort protecting species and habitats that are not endangered, if those that are directly and seriously threatened are ignored. However although there are many areas in Howth where the vegetation is not directly threatened, there are many areas where indirect threats exist. Many of the wetland features of the cliffs have been lost as a result of routing natural waters courses into pipes and drains.

These processes are evident in Howth. The losses have already been discussed. However there are major areas of conservation activity that are neither expensive nor difficult to implement. There are other actions that are in the short term aspirational and may remain so until these issues of ownership, funding and public safety are more fully worked out.

Actions to preserve and protect the native flora and habitats.

Measures to protect nature are not easily enacted. The historic factors that led to the establishment of a species on a site and enabled it to continue successfully there for hundreds of years may no longer apply. We are therefore now looking in many instances at small degraded examples of what was formerly prime habitat. Ecologists look at the current geographical distribution of species and by understanding their current ecology and habitat preferences advance proposals to ensure the continuance of the species. In a sense it is analogous to the work of medical services. There is an initial presentation, diagnosis, prognosis, and treatment. In some cases intervention may be called for, in others it may be inappropriate.

Any contemplated wildlife conservation actions may therefore be considered within the following interrogatory framework.

What do we want to achieve?

What are the conditions that cause this species to be present at a particular site?

Is its continued occurrence threatened, and if so, what actions, if any can be implemented in order to maintain the colony of the species in a favourable conservation status?

Is it a species or habitat that is sufficiently important to warrant the implementation of conservation measures?

What happens if we do nothing?

What will these measures cost and what are the prospects that they will succeed?

Will the rare species and habitats be any better off as a result of our actions?

The central thesis in planning for the benefit of biodiversity is to extend due recognition to habitats and organisms and to place their welfare in a more prominent position while actions, planning and other measures and alterations are occurring. The pleasing and colourful ambience afforded by naturally-occurring mixed wild flower meadows, including their associated butterflies and other insects are powerful propellants in persuading people of the merits of habitat protection. People often appreciate the visual diversity and are surprised when they encounter sites that display a good range of the appropriate species. However many inconspicuous species of far greater biogeographical significance are understandably not noticed in these circumstances, but all contribute to the holistic character of the local ecosystem. Biodiversity protection is for the benefit of all the organisms and as yet, hierarchical and legal structures have yet to be developed to determine exactly the degree to which different conflicting resources and social aspirations and value systems come into conflict. Nonetheless a good deal can be discovered by reflecting on which combinations of management and environmental circumstances caused these interesting habitats to come into existence and which factors have caused them to be degraded.

These rare habitats are rare because they have developed or survived in unusual circumstances. It is extremely difficult to "create" them. The unfortunate practice of planting and sowing so called wild-flower meadows is to be deprecated not only because the species involved are usually by definition, neither wild (having been sown) or from meadows (as they are mostly cornfield weeds that have not been seen, even in cornfields, for many years). More seriously, they oblige these species to grow, at least for a year or two, in areas to which they do not belong, thus making a nonsense of plant ecology, and some have the potential to become invasive themselves in areas that are already under threat from a huge array of introduced garden escapes and ejectives.

## The Site Inventory

Criteria for site selection.

This list comprises an inventory of the most important botanical sites on the Howth peninsula. The selection of sites was determined primarily by their included floristic interest or significance. Factors such as ownership, practicality of conservation, cost of acquisition and maintenance were not considered. The floristic elements considered in developing the list included

- a. The occurrence of a nationally rare species
- b. The occurrence of a nationally rare habitat type
- c. The degree of naturalness of the habitat
- d. The strategic contribution of the habitat to other linked habitat systems.
- e. The occurrence of species, widespread throughout Ireland, but rare in north Co. Dublin
- f. The restorative potential of areas which are in public ownership

- a. The occurrence of a nationally rare species.

A number of nationally-rare species occur on the Howth peninsula. Hart's list, augmented and amplified by the work of others in the intervening 132 years provides a sound basis for the identification of important or significant plant sites and habitats. Howth is well endowed with nationally rare species. Successive visits by members of the Dublin Naturalists' Field Club from its foundation (1886) have ensured a continuity of monitoring since Hart's time, followed by Colgan's Flora of the County Dublin (1904) to the present day. Colgan's work set previous Howth botanical studies in the broader county context and even in a wider national and European perspective. As a result of research by many visiting botanists, and the sharing of information within the botanical recording community, it has been possible to rediscover the locations of a number of these rare species. It has often been possible to estimate the sites of their former occurrence and in a number of instances to establish the reasons for their local extinction. The site list thus contains references to species that still occur on the peninsula but also indicates, where appropriate, sites where these species were known to have occurred even though they have not been seen recently at these sites. A number of these species belong to the winter annual group of species and may re-appear in a number of apparently suitable sites or extend onto certain sites that lie in close proximity to existing colonies.

- b. The occurrence of a nationally rare habitat type

Rare species do not occur in isolation. They often occur in association with other rare species. If the habitat type is rare, it often follows that other rare species typical of this habitat may also occur. A habitat type contains many species that give it its distinct character. For many years botanists and field ecologists appreciated that certain habitats and habitat types were more interesting than others, in that they contained numbers of species that were rare in the broader landscape. Recently, the importance of the preservation of these tracts of countryside has been more formally recognised e.g. the so-called "Habitats Directive". Thus, a number of habitats in the Howth peninsula particularly in the spray zone contain combinations of species that occur in very narrow bands above HTM on the cliff sides. Shallow-soil habitats overlying acid rocks are also of great importance in Howth, as this habitat has become so endangered in Ireland in recent times. The amount of space that these species and habitat types occupy in Howth at present has been greatly diminished following the abandonment of grazing and the consequent encroachment by Furze and Bracken.

c. The degree of naturalness of the habitat

Some habitats are virtually dependent on man's intervention if they are to retain their important species. Many habitats have been invaded by garden escapes and are in the process of losing their distinctive character.

Some habitats are much less self-sustaining than others. Habitats and plant communities that are the natural expression of continuing natural processes are themselves in general sustainable. Others that are dependent on interference by man create difficulties in terms of long-term management. Ideally, the less management needed the greater the prospects of success. Interventions, particularly on an on-going basis are expensive to maintain and monitor. Many habitats and vegetation types that are not stable and self-sustaining have evolved or reverted into other types.

d. The strategic contribution of the site or habitat to other linked habitat systems.

Many habitats are linked by networks of smaller habitat features that enable a species to spread from one area to another. A small area where a temporary pool forms on a track high on the Ben of Howth may be indicative of a subterranean water course, where rainwater gradually moves through the soil down the slope, where it joins with other underground water movements. Gradually these trickles join to form more evident movements of water, sometimes surfacing as streamlets or appearing briefly as springs to disappear again, depending on the characteristics of the local topography. Eventually these water courses lead to the sea and contribute in a very significant manner to the coastal flushed habitats that were such an important feature of the cliff-bottom flora. Where the water of these flushes has been intercepted and routed into drains and pipes, the ecological benefits are lost, structural diversity is reduced and colonies of a species are lost at a local level. A very ordinary-looking movement of water through species-poor agricultural soil can result in an expression of natural lime-rich flora and vegetation on the cliffs and rock outcrops when the water finally percolates through the soils above.

e. The occurrence of species, widespread throughout Ireland, but rare in north Co. Dublin

The Howth peninsula has been likened to an island of acid rock surrounded by a sea of limestone, and this is largely true. The ordinary Bell heather, *Erica cinerea* occurs commonly in Howth (and also on Ireland's Eye and Lambay), but nowhere else in Fingal. Broadly similar patterns apply to Bog Asphodel, *Narthecium ossifragum*, Ling, *Calluna vulgaris* and a number of acid ground species.

f. The restorative potential of areas in public ownership.

Although these areas may not have rare species, they have the advantage of being in public ownership. It therefore becomes possible to implement grassland management regimes (mowing, strimming etc) to enable the existing flora to re-assert it. Furthermore, if benign grassland management regimes are maintained, other species might be expected over time to spread back into these sites from the hinterland. These principles apply also to roadside verges and other areas that are managed by the local authority.





<b>Site name</b>	<b>Site number</b>
Kilrock Quarry	1
Greenhollows pools	2
Clifftop grassland	3
The Baily	4
Roadside bank @ St. Fintans	5
Summit roadside bank	6
Railway station wall	7
Semi-natural grassland	8
West_pier_shingle(salt)_marsh	9
Claremont_beach	10
Burrow_beach	11
The_Cosh	12
Sutton_salt_marsh	13
Fintans_shore	14
Bottle_quay	15
Sutton_castle_field	16
Red_rock	17
Martello_tower_seepage_zone_grassland	18
Martello_tower_Spray_grassland	19
Sheeps_hole_worm_hole_Drumleck_point	20
Shearwater_cottage	21
Red_rock_worm_hole	22
Schoenus_flush_boathouse	23
Whitewater_brook	24
Frog_orchis_field_east_mountain	25
East_mountain_good_field	26
Kilrock_marsh	27
East_mountain	28
Kilrock_wet_area_in_quarry	29
Kilrock_calcareous_springs	30
Kilrock_marsh	31
Lower_cliff_path	32
Lower_cliff_path	33
Reservoir	34
pitch_putt_course_fen	35
Dunhill_marsh	36
Potential_wetland	37
Fox_quarry	38
Bog_of_the_frogs	39
Orchis_morio_field	40
Summit_carpark	41
Summit_marsh_complex	42
Samuels_resevoir	43
Greys_wood	44

Greys_wood_streams	45
Conifer_plantation	46
Coastal_grassland	47
Summit_car_park_field	48
Asgard	49
Howth_golf_club_marsh	50
Black_linn_wetland_complex	51
Howth_estate_woodland	52
Cannon_rock_grassland	53

Ecologically important Sites.

