

# **Ecological Study of the Coastal Habitats in County Fingal**

## **Phase IV - BEES**



**Fingal County Council**

**December 2006**

# **Ecological Study of the Coastal Habitats in County Fingal**

## **Phase IV - BEES**

Prepared by:

Colm S. Ronayne

**December 2006**

## **CONTENTS**

	<b>Page</b>
<b>Summary</b>	<b>2</b>
<b>Acknowledgements</b>	<b>3</b>
<b>Introduction</b>	<b>4</b>
<b>Location Map</b>	<b>5</b>
<b>Report.</b>	
<b>Section 1. Reasoning behind the survey.</b>	<b>6</b>
<b>Section 2. Survey Rationale and Methodology.</b>	<b>7</b>
<b>Section 3. Habitat requirements of Irish bees.</b>	<b>9</b>
<b>Section 4. Site and habitat descriptions.</b>	<b>11</b>
4.1 River Delvin to Bremore mounds.	<b>12</b>
4.2 Holmpatrick, Skerries to Loughshinny harbour.	<b>14</b>
4.3 Loughshinny harbour to Drumanagh Headland.	<b>16</b>
4.4 Kenure beach and Rush, north beach.	<b>18</b>
4.5 Rush, south beach.	<b>20</b>
4.6 Portrane, Burrows.	<b>23</b>
4.7 Portrane, Cliff Walk.	<b>25</b>
4.8 The Island Golf Club, Corballis, Donabate.	<b>27</b>
4.9 Portmarnock Golf Club and Portmarnock Point	<b>30</b>
4.10 Howth.	<b>33</b>
<b>Section 5. Discussion</b>	<b>41</b>
<b>Section 6. Conclusions</b>	<b>43</b>
<b>Appendix 1. Bees recorded from coastal sites in Fingal.</b>	<b>44</b>
<b>Appendix 2. Recorded Species: National status and Fingal status.</b>	<b>46</b>
<b>Appendix 3. Annotated Checklist of Irish Bees</b>	<b>47</b>

## **SUMMARY**

The results of a survey over two seasons (April-September 2004 and 2005), of native bees on ten sections of the coast of county Fingal are presented.

The rationale for, and the methodology of the survey are explained.

The habitat requirements of Irish bees are outlined, and the availability of resources as a determining factor in successful reproduction is emphasised.

Each of the ten surveyed sections of coastline is described in detail, stressing those features that are beneficial or detrimental to bees. Important habitat features necessary for particular species are highlighted. Recommendations for the possible improvement of certain sections of coastline, to the benefit of bees are suggested.

**Appendix 1** is a list of the bee species recorded in each section of coastline, including those species recorded from the area prior to the survey.

**Appendix 2** shows the proposed national status for each of the species recorded from Fingal.

**Appendix 3** is an annotated checklist of Irish bees based on published records up to 2006.

## **ACKNOWLEDGEMENTS**

**Mr. John Quigley**, manager, Portmarnock Golf Club, and  
**Mr. Peter McDunphy**, manager, the Island Golf Club, Corballis, Donabate,  
for permission to carry out bee-survey work on their golf courses.

**Mr. Hans Visser**, Fingal County Council, for providing the aerial  
photographs and detailed maps that made the survey possible.

**David Nash** and **Declan Doogue**, Dublin Naturalists' Field Club, for  
assistance in the field.

## **INTRODUCTION.**

Recognising the ecological importance of the Fingal coast, Fingal County Council initiated an ecological study of the coastal habitats in the County in 2003. This study is the first large-scale ecological study that is being undertaken as part of the county council's Local Biodiversity Action Plan Program. The study will provide detailed and up-to-date information on the status of the coastal habitats and species. This will allow for the preparation of tailor-made action plans for the coastal habitats and flora & fauna species. It is envisaged that the ecological study will be carried out in four phases over the 2003 – 2005 period. This will allow the action plans for the coastal habitats and associated species to be prepared at the end of 2006.

The bee study of the Fingal coast is part of PHASE IV of the ecological study. From an initial assessment it became clear that to date in Ireland, there has been no detailed examination of bee activity along the coast other than incidental observations. Given the lengthy coastline of the island relative to the landmass it would be important to examine the potential of coastal sites for bees. It is only by an actual evaluation of a coastal area like Fingal that one can understand the potential of dunes, cliffs, estuaries etc as feeding and nesting sites for bees.

The objectives of the bee study are as follows:

- Establish which bee species can be found along the Fingal coast.
- Establish which coastal sites are the most important for bees.
- Make recommendations on how to protect and enhance the bee population along the Fingal coast.

## The Fingal Coast Study Area

County Fingal runs north from Dublin City at Sutton north to the border with Co. Meath north of Balbriggan (see figure 1). The Fingal coastline is approximately 45 km long and covers a wide variety of coastal habitats such as the rocky cliffs at Howth, the sedimentary cliffs between Rush and Balbriggan, the dunes and sandy beaches at Donabate for example, the mudflats, salt marshes & brackish waters of the three estuaries; Baldoyle, Broadmeadow & Rogerstown, the islands off the Fingal coast from Rockabill in the north to Ireland's Eye in the south, and of course the Irish sea.



Figure 1: The Fingal Coast Study Area

## Section 1. REASONING BEHIND THE SURVEY.

**1.1** Some species of bee are very familiar. The bumble bees and honey bee that can be seen in parks and gardens are familiar to all. Some bees are small solitary species that go completely unnoticed except by the specialist. Others are so scarce that only one or two Irish people alive today have seen them in their native habitat.

**1.2** One species of solitary bee, *Andrena pilipes*, that was first recorded nesting in an old sand-pit in Skerries over sixty years ago, was only ever found at two other sites in Ireland, one in Wexford and one in Carlow. Both of those sites were later destroyed. *Andrena pilipes* was last recorded in the 'ballast-pit', by the railway station in Skerries, in 1977. The species may now be extinct in Ireland.

**1.3** Some bee species recorded only once or twice in the 1920's, have never been seen since and may now also be extinct in Ireland. Habitats where twenty or more species of bee were easily recorded in the 1960's and 1970's now produce less than half of that number of species.

**1.4** The exact number of bee species occurring in Ireland today is still uncertain. Records for 99 species and sub-species of bee from the island of Ireland have been published (see below and **Appendix 3**) and more are expected to be found. Some of these 'new' bees will have been previously overlooked, but others will be species new to the island, such as the recently recorded *Osmia rufa*. Equally, it is certain that a number of species have been lost over the last century due to habitat loss, but the extinction of a species is less easy to prove, especially when there are so few bee specialists to identify them in the first place.

### Families of Irish bees and number of species and sub-species in each.

<b>Colletinae</b>	<b>8</b>
<b>Andreninae</b>	<b>27 (+2?)</b>
<b>Halictinae</b>	<b>19 (+2?)</b>
<b>Megachilinae</b>	<b>11(+1?)</b>
<b>Nomada</b>	<b>13</b>
<b>Apinae</b>	<b>21</b>
<b>Total:</b>	<b>99 (+5?)</b>



## **Part 2. SURVEY RATIONALE AND METHODOLOGY.**

**2.1** Fingal County Council as part of their survey programme of the heritage of Fingal, commissioned the author to carry out a survey of the bees found in coastal habitats in Fingal.

Following discussions, a selection of ten sites or sections of coastline were chosen as representative of the greater coastline. Sites were chosen on the basis of their known value for wildlife in general, the type of habitat encompassed by each section, the geographical spread over the coastline of the county and their accessibility for the purpose of the survey. The islands of Lambay, Ireland's Eye and the small islands off Skerries (Shenick, St. Patrick's, and Colt) were excluded from the current survey for accessibility reasons.

### **Coastal sections of Fingal surveyed for bees and number of visits to ensure reasonable coverage.**

- |                                                  |           |
|--------------------------------------------------|-----------|
| 1. Delvin River to Bremore Megalithic mounds.    | 2 visits  |
| 2. Holmpatrick, Skerries to Loughshinny Harbour. | 2 visits  |
| 3. Loughshinny and Drumanagh Promontory Fort.    | 4 visits  |
| 4. Kenure beach and Rush, north beach.           | 4 visits  |
| 5. Rush, south beach.                            | 4 visits  |
| 6. Portrane, Burrows.                            | 4 visits. |
| 7. Portrane, Cliff Walk.                         | 2 visits. |
| 8. The Island Golf Course, Donabate.             | 4 visits  |
| 9. Portmarnock Golf Course.                      | 4 visits  |
| 10. Howth Cliff Walk and heath-land.             | 8 visits  |

### **2.2 Survey methodology: Observation, identification, collecting and recording.**

All of the chosen sites were open either to the public or to golf club members, so it was decided to avoid the use of static traps, such as Malaise traps or yellow-pan traps for catching bees.

Instead the following methodology was adopted:

- Walking the site to identify the key areas and the areas of less importance for bees.
- Identifying an optimum standard traverse of the site to include all the key areas, which would be repeated on each subsequent visit
- Field identification of species: Simple observational recording of easily identifiable species, and use of hand nets to catch, identify and release specimens of species that require close observation using hand lens to identify key features.
- Collecting specimens to be returned to the lab for later identification with the aid of a microscope and identification keys. This is an essential procedure to identify critical species that are only distinguishable from more common species by features that cannot be seen in the field.

### **2.3 The schedule of visits to record bees was determined by a number of factors**

#### **2.3.1 Weather: Recording of bees is most productive on warm sunny days.**

Knowledge of the biology and ecology of bees is a pre-requisite for successful fieldwork.

Because they are thermophilic insects, bees generally only fly in warm sunny conditions. Even when temperatures are warm enough to permit flight, if the sun is hidden by cloud, many species will not fly. Exceptions to this rule are the honeybee and the bumble bees. Bumble bees generate internal heat by agitating their flight muscles, thus allowing flight even in very cool conditions. Honeybees rely on the energy provided by their honey store that permits them to continue flying when solitary bees have to return to their nests.

**2.3.2 Flight Season: To get a true picture of the number of bee species at a site, site survey visits should cover early, mid-season and late season species.**

Bees can be found on the wing from early March until the end of October if the weather conditions at the time permit. However not all bee species occur at the same time of year. Some of the least recorded species in Ireland are those that fly for only a few weeks in early spring. Whether this is because they are genuinely rare, or because there are so few Irish entomologists who happen to be in the right place at the right time on a sunny warm day in early spring is open to debate. Other bee species only begin to appear at the end of July, and fly into September/October in good years. The three most productive months in terms of species numbers are May to July, reflecting the peak flowering season in Ireland. But restricting survey work to just those months will miss a number of species completely.

**2.3.3 Size / Complexity of the site: Large diverse sites require more intensive recording efforts.**

The majority of Irish bees are ground nesting species. They dig nest tunnels in suitable soil in hedge banks, glacial drift cliffs, sand dunes, woodland paths and clearings, and garden lawns. There are species that live in dead wood, others that build nests in cavities in walls, and one species that even nests in empty snail shells. So the more diverse the habitat, the more likely it is that the bee fauna will also be diverse. A topographically varied habitat will include many microhabitats, and only some of that will be suitable for nesting bees. Identifying key areas of importance to bees within a larger site requires more time and effort.

**2.3.4 Habitat Identification: Identify nesting areas and foraging areas.**

Bees require both nesting habitat and foraging habitat, which for some species of bumblebee can be up to two kilometres apart. Loss of either can result in the loss of the species from that site. Some bumble bees nest in areas of long rough grass, often entering old field mouse nests to begin their colony. Generally these species will be foraging (collecting pollen and nectar) in separate areas where Clovers form an important component of the flora. If either of these habitats is changed, the bumblebees disappear. Some nesting habitat for bees may simply consist of areas of bare clay/soil on a cliff top. Such sites will not be considered of significance by botanists or entomologists looking at other groups of insects and thus be dismissed as unimportant habitat. Loss of areas such as these is in fact one reason for the decline of ground nesting solitary bees.

## Part 3. HABITAT REQUIREMENTS OF IRISH BEES.

To understand some of the difficulties of successfully managing habitats for bees, one has to be aware of their specific requirements and in particular the importance of the resources in the bee's habitats and the relative abundance of those resources

### 3.1. Resource availability

To maintain viable populations of bees in any area the habitat must provide the following resources:

- Sufficient **nesting sites** suitable for each of the resident species.
- For some species, leafcutter bees (*Megachilidae*) for example, the habitat must contain particular **building materials** with which to construct the nest.
- The habitat must have sufficient **forage plants**, supplying pollen and nectar to last for the reproductive cycle of each species.
- For bumble bees, the habitat must contain suitable **hibernation sites** for over-wintering queens

#### 3.1.1. Nesting Sites

Most Irish bees are **miners**, who burrow into suitable ground to construct their nests. Some bumble bees build surface nests among tall vegetation. A few solitary bee species (some *Megachile*, *Hylaeus*, and the recently introduced species *Osmia rufa*) construct nests in existing cavities in dead wood and hollow bramble stems. One Irish bee, *Osmia aurulenta*, only nests in empty snail-shells.

The ground nesting species favour south-facing banks and cliffs, unstable slopes and field paths; especially when these are bare or sparsely vegetated. Some prefer sandy soil, others clay soils. Nest sites are often scattered and transient within any one area, while others may last for many years if the right habitat conditions persist.

#### 3.1.2. Building Materials

Mining bees dig an entrance tunnel (vertically down or at an angle to the surface), before digging out the brood cells where the eggs will be laid and pollen stored. To be able to dig their nests the ground must be sufficiently friable to allow digging, cohesive enough not to collapse while being dug, and sufficiently well-drained to prevent water-logging, especially in winter.

Most mining bees line their cells with a secretion from glands in their abdomens, the thorax or the head. Members of the genus *Colletes*, who often nest in areas of looser sand, produce a cellophane-like secretion to line their brood cells which acts both to waterproof the cells and has anti-fungal/bacterial properties. The secretion also binds the sand grains together to prevent the collapse of the brood cells.

Leaf-cutter bees, of the genus *Megachile*, use sections of leaf cut from a suitable plant with their mandibles. They line a hollow cavity- often an old beetle boring in dead wood- with sections of leaf to form their brood cells.

*Osmia aurulenta*, a solitary bee, makes a mastic or paste, from chewed up plant material -often from specific plants with probable anti-fungal/bacterial properties- to construct its cells inside clean, dry, empty snail-shells.

Bumble bees often re-use old mice nests among tall vegetation. They gather additional moss and grass fragments in the immediate area and 'card' this material to form an insulating fluffy layer around the brood chamber.

#### 3.1.3. Food plants

Adult bees feed at flowers, where they gather both **nectar** and **pollen**.

- **Nectar** is the high-energy food that allows the adult bee to carry out its daily tasks. Nectar is also a component of the larval food, and in the case of social bees, is processed to fill the ‘honey pots’ in the comb.
- **Pollen** is gathered to stock the brood cells in which the eggs are laid. It is often combined with nectar to form a sticky ball on which the eggs are laid directly, and provides the bee larvae with sufficient protein-rich food to complete their development to adulthood.

Most bees forage for pollen at a wide variety of plants (e.g. the honey bee *Apis mellifera*), but some are specialists, restricted to a single family of plants. For example *Colletes succinctus* specialises in plants of the *Ericaceae* family- primarily heath (*Calluna vulgaris*), and to a lesser extent bell heathers (*Erica* species).

Many of the bee species that emerge in early spring are totally dependent on the presence of willow (*Salix* spp.) catkins for their pollen resources. If the spring is late or very wet the populations of these species can crash dramatically.

Specialist species are thus more vulnerable to the changes in a habitat that affects the abundance of their specific food plants. These specialists are usually the first species to disappear in a changing environment.

#### 3.1.4. Hibernation sites

Bumble bees are social bees, with seasonal colonies founded by a queen, whose female offspring act as workers through the colony’s cycle. Young queens and males are produced toward the end of the cycle, and it is only the newly fertilised young queens that survive to re-start the cycle the following year.

To survive the winter, the young queens must find relatively cool and dry, undisturbed places to hibernate. If they get too damp they may freeze in cold weather, or succumb to fungal infections in milder weather. If they warm up too early in spring they may emerge from hibernation, use up their supply of body fat and starve before any flowers are open. North-facing hedge banks and slopes are a favoured hibernation location. If hedges are grubbed out or ‘tidied up’ bumble bees decline in the area as their hibernation habitat as well as nesting and food resources, disappears.

#### 3.2. The problem of partial habitats in a fragmented landscape.

To maintain viable populations, bees must have all of the necessary resources available within the flight range of the adult female bee. The total size of the habitat therefore, depends on the distance the resources are from each other, and how far the bee is able to fly to gather the resource. For most species little is known about the habitat size range, but it will be influenced by the species size, the species specialist resource requirements and the quality of the available resources. Bumble bees may fly several kilometres to a particularly rich pollen resource; *Hylaeus* species, our smallest bees, may not forage more than a hundred metres from a nest site.

Many bee species live in habitats where all the resources are in close proximity to one another. *Colletes succinctus* nesting in the dry heath-land soils on Howth for example, is surrounded by its food plant, Heather (*Calluna vulgaris*).

No bees nest in wet ground. Those spring species associated with willows, which grow most abundantly in damp ground, must find suitable nest sites in dryer ground, but close enough to be able to fly to their nectar/pollen sources. The loss of one or other of these **partial habitats** can result in the local extinction of the bees.

Coastal soft-rock cliffs are a prime nesting habitat for bees, but if the floral resources in cliff-top meadows and field headlands disappear, and are replaced by fields with no un-cultivated headlands, the local bee populations decline, and some species will disappear completely.

If bee populations are already isolated, either by distance from other similar bee populations or by a lack of bee friendly habitat, their disappearance is final, as there are no cohort bees to re-populate the vacant habitats.

## **Part 4. SURVEY RESULTS.**

**Part 4.** consists of descriptions of the ten areas of coastline surveyed, with comments and recommendations for the management of the bee habitats within each of the ten survey areas. Each of the sections (e.g. 4.1) has a list of the bees found in that area (4.1.3), and a site by site species list is found in Appendix 1.

### **4.1 River Delvin to Bremore Mounds.**

### **4.2 Coastline from Holmpatrick, Skerries to Loughshinny Harbour.**

### **4.3 Loughshinny Harbour, and Drumanagh Headland.**

### **4.4 Kenure Beach and North Beach, Rush.**

### **4.5 Rush, south beach.**

### **4.6 Portrane Burrows.**

### **4.7 Portrane Cliff Walk.**

### **4.8 The Island Golf Club, Corballis, Donabate.**

### **4.9 Portmarnock Golf Club, and Portmarnock Point.**

### **4.10 Howth.**

For the purposes of the survey, this site was divided into four separate survey zones:

**Zone 1. South cliff walk from Bottle Quay to Drumleck Point.**

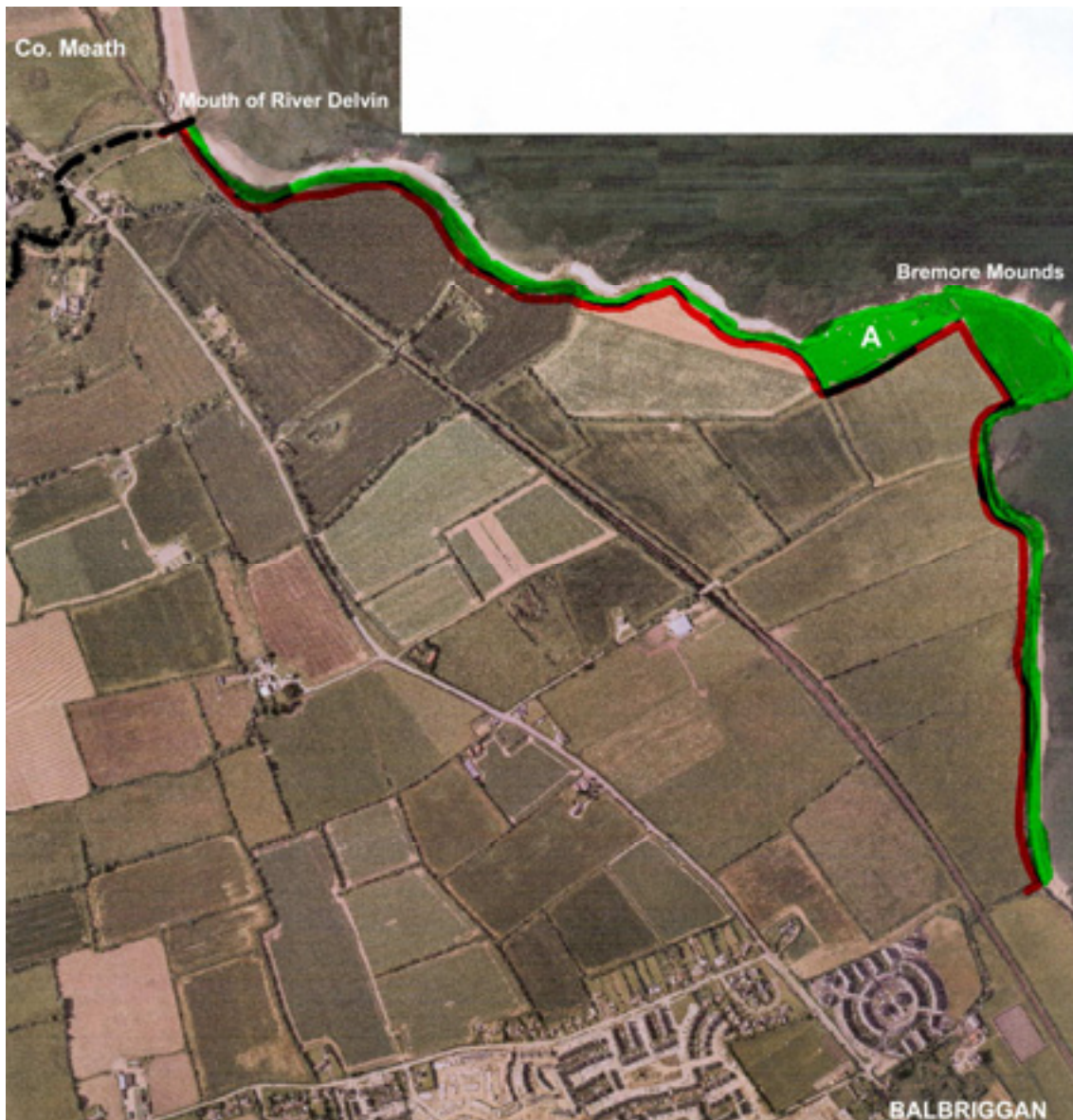
**Zone 2. South cliff walk from Drumleck Point to the Baily.**

**Zone 3. The Outer Baily to the Summit car-park.**

**Zone 4. East cliff walk from the Summit car park to the Nose of Howth, and Balscadden**

## 4.1 River Delvin to Bremore Mounds

**4.1.1** The area is currently of low value for the majority of bee species. The rocky shoreline provides little or no nesting substrates for ground nesting species and the absence of a 'headland' (uncultivated strip around fields) to act as a buffer zone between the intensive agriculture inland and the seashore/cliff boundary has eliminated most potential bee-friendly forage plants along the seashore/field boundaries. Enrichment of the few marginal areas outside of the cultivated fields has resulted in a coarse grass sward unsuitable for most ground nesting bee species, and containing a low diversity of suitable flowering plants.



**4.1.2** A single field (marked A. on the aerial photograph), immediately to the west of the Bremore mounds, had been 'set-aside' during the period of the survey. This field contained the only concentration of flowering plants attractive to bees (thistles, dandelions and ragwort). That field is however, unlikely to provide suitable nesting habitat for more than a few species of solitary bee, and only while the vegetation remains patchy and is not so dense as to shade out the areas of bare soil. *Lasioglossum calceatum* was the only species recorded that is likely to be using this area currently.

The bumble bees observed visiting flowering plants in this field are, with the exception of *Bombus muscorum*, all common and widely distributed species whose status is 'currently un-threatened'. The

majority of bumblebees observed were almost certainly flying in from nearby abandoned sand/gravel pits and uncultivated areas on the softer glacial-till cliffs, less than 1 km away, around Gormanston, Co. Meath, just north of the Delvin river. The direction of flight, and the recording of *Bombus muscorum*, a species that only nests in relatively large areas of uncultivated grassland, supports this observation. A single specimen of *Nomada fabriciana* a cuckoo bee, was found beside the river Delvin. This species is more characteristic of meadows and hedges.

The Bremore mounds themselves are potential nesting sites for smaller solitary bees, while the vegetation cover remains a low thin open sward of high diversity. The presence of the green winged orchid, *Orchis morio*, on these mounds increases the value of this sward. Currently only one of the mounds retains these optimal conditions, and even that mound is being encroached upon by Brambles and coarse grasses.

#### **4.1.3. Bee species recorded from the Bremore Mounds area:**

*Andrena haemorrhoa*, *Andrena bicolor*, *Andrena scotica*, *Halictus rubicundus*, *Lasioglossum calceatum*, *Lasioglossum leucopum*, *Sphecodes geofrellus*, *Nomada fabriciana*, *Nomada marshamella*, *Bombus lucorum*, *Bombus muscorum*, *Bombus pascuorum*, *Bombus pratorum*, *Bombus terrestris*, *Apis mellifera*. Total: 15 species. (See **Appendix 1** for site by site species lists.)

All of the bees recorded here are widespread and common species, only *Bombus muscorum* giving rise to some concern because of a decline in its abundance in the last few decades. As a species of more extensive grasslands, this decline may have been attributable to the switch from hay to silage making in the agricultural sector. In the last year or two the species appears to be making a come back (personal observation), so the perceived decline may be due to more complex factors than agricultural changes alone.

#### **4.1.4. Recommendations for improving the surveyed area as foraging and nesting habitat for bees:**

4.1.4.1. The area of the Bremore mounds should be amalgamated into a single area for conservation management purposes (both ecological and archaeological). The diverse sward of low-growing plants (that includes *Orchis morio*) on the main Bremore mound should be maintained and encouraged to expand. Brambles, coarser grasses and other vigorous plants should be removed and/or prevented from encroaching further on to the mounds. The dryer soils and low sward of the mounds would then attract mining bees to nest.

4.1.4.2. A buffer-zone (3-5m wide), in the form of an uncultivated headland, along the seashore/cultivated field interface should be established in agreement with the relevant landowners. This buffer zone should then be managed (as part of a REPS scheme?) to encourage the re-establishment of seashore/cliff-top plants. To encourage bees to nest, small areas should be mounded or banked, using free-draining subsoil. This could be done in the form of a boundary bank separating the cultivated areas from the buffer zone.

4.1.4.3. The set-aside field: This field should be kept as set-aside, as part of a REPS scheme, in agreement with the landowner. A mowing/grazing regime to remove excess plant material on an annual/bi-annual basis would help to establish a more permanent and diverse flora attractive to foraging bees. To encourage bees to nest, small areas could be mounded or banked (e.g. along the seaward boundary of the field) to provide areas of high insolation with a thin patchy vegetation cover.



## 4. 2. Coastline from Holmpatrick, Skerries to Loughshinny Harbour.

**4. 2. 1** This section of coastline is made up of low rocky and glacial-till cliffs over limestone bedrock. The northern half of the section, closest to Holmpatrick has low eroding glacial-till cliffs, over a rocky shoreline. These would be good nesting habitat for bees, but facing north and north-east they are mostly unsuitable for the ground-nesting bees that require a high degree of insolation (exposure to sunlight) at their nest sites. The southern half of the section, as far as Loughshinny Harbour, has more easterly facing glacial till cliffs, with occasional south-east facing slopes. Intensively cultivated tillage fields run up to the cliff/seashore edges in all but two small areas, and it is these latter areas that form the main centres of interest for bees. Both areas (**A.** and **B.** on the accompanying aerial photo) are covered with unimproved/semi-natural grassland, with a good floral diversity.



**4.2.2** Area **A.** has a gentle slope to the north-east and has a wetter soil than **B.** It is winter grazed by a small number of cattle, resulting in a rich sward which is allowed to flower during spring and summer (Fig. 2). A stone-faced, clay-cored, boundary bank on the western side of this area provides nesting habitat for a small number of bees.

**4.2.3** Area **B.** is more steeply sloping to the east and is well drained with a dryer soil. A small stream at the southern end of **B.** has some wet tufa deposits. **B.** is intermittently grazed by horses from a nearby farm, and has a drier grassland flora. In addition, small rocky outcrops with dry pockets of soil provide nesting habitat for smaller bee species, such as *Andrena semilaevis*, which has been observed nesting here.

**4.2.4** Patches of bramble form thickets on some of the rocky cliff-tops and faces, especially on the cliffs between **A** and **B.** These brambles provide an important forage resource for many insects, including the leaf cutter bee *Megachile willughbiella*, and also provide potential nesting habitat for the small bees of the genus *Hylaeus*.

Preservation of areas (**A.** and **B.**) and the patches of brambles is of primary importance, as they are the only floral

resources for any remaining bee populations in this section of coastline. They have also acted as 'refugia', in a hostile agricultural environment, for the smaller species that still nest there. Their relative isolation, being surrounded by intensive agriculture, suggests they are only partial habitats with only limited nesting areas close by.





**Fig. 2.** Coastal meadow (area A) near Holmpatrick, Skerries.

Photo: C. Ronayne.

**4.2.5. Bee species recorded from the Holmpatrick to Skerries coastline:** *Andrena nigroaenea*, *Andrena semilaevis*, *Andrena scotica*, *Nomada goodeniana*, *Megachile willughbiella*, *Bombus hortorum*, *Bombus pascuorum*, *Bombus pratorum*, *Bombus terrestris*, *Apis mellifera*. Total: 10 species. (See **Appendix 1** for site by site species lists.)

The cuckoo bee *Nomada goodeniana* (listed as Endangered in Fitzpatrick et al., 2006) which has undergone a serious decline, was recorded prior to the survey (May 2002), but not during it. Its presumed hosts *Andrena nigroaenea* and *Andrena scotica* are still present, so the cuckoo bee should still be here. In conjunction with the next sections of coastline (Loughshinny to Rush), this may be one of the last places in Fingal to hold populations of this cuckoo bee. A single male leafcutter bee *Megachile willughbiella* was taken at brambles at the southern end of this section. This is a widespread species in Ireland, but never very abundant as it relies on the availability of holes and crevices in dead wood and plant stems for nesting. In this section of coastline it is depending on the bramble and blackthorn patches that occur on some parts of the cliff tops.

**4.2.6. Recommendations for improving the surveyed area as foraging and nesting habitat for bees:**

4.2.6.1 A buffer zone (3-5m wide), in the form of an uncultivated headland, along the cultivated field/coastal interface, should be established in agreement with the relevant landowners. This buffer zone should then be managed (as part of a REPS scheme?) to encourage the re-establishment of seashore/cliff-top plants. To encourage bees to nest, small areas should be mounded or banked, using free-draining subsoil. This could be done in the form of a boundary bank separating the cultivated areas from the buffer zone.

4.2.6.2. The current winter-grazing regime in area **A**. should be examined to assess its impact on the flora of the area and to see whether the floral diversity of the area would be enhanced by a change in the current regime. If judged satisfactory, the regime should be continued and reinforced through incentives to the grazier.

4.2.6.3. A sympathetic grazing regime should be established for area **B**. to take account of the drier conditions and steeper slope.

4.2.6.4. Existing bramble and blackthorn patches on parts of the cliff tops should be retained. If a buffer zone is established (as in 4.2.6.1), these scrubby areas should be included in that zone.

### 4.3. Loughshinny Harbour and Drumanagh Headland.

**4.3.1** From the car park at Loughshinny Harbour this section incorporates a narrow strip of disturbed undeveloped *Ammophila* sand dunes at the top of Loughshinny beach. This area is too disturbed in summer to be used successfully for nesting by many bees and is now backed by holiday chalets. It does however, include plants such as sea radish (*Raphanus raphanistrum* ssp. *maritimum*), which are highly attractive to foraging bees. Coarser vegetation behind the southern end of the beach provides shelter for nesting bumblebees, while the cliff-face flora also provides good foraging resources.

At the southern end of the beach a small promontory divides Loughshinny bay in half. This is now fenced off and closely grazed by horses, but the southern facing cliff-top margins support a diverse flora. Southward of this promontory, the cliff-tops leading towards Drumanagh headland, as well as some boundary banks are also covered with a diverse flora, including many important bee-forage plants such as birdsfoot trefoil, kidney vetch, thrift, sea campion, and rock sea-spurrey. The soils of the cliff-tops and the banks are also friable enough to allow nest burrows to be made. Erosion of these softer cliffs provides the nesting substrate, but results in a dynamic habitat difficult to manage for conservation. Coarser vegetation is gradually encroaching from nearby cultivated fields and disturbed ground.



**4.3.2** Drumanagh headland could not be visited for the purposes of this survey, due to the erection of exclusion fences early in 2005. The following observations and records are based on information gathered during visits prior to 2005, when access for walkers was unrestricted.

**4.3.3** Drumanagh promontory has a high potential value for bees. It incorporates both nesting resources in the soils of the cliff-tops and south-facing slopes, the un-cultivated banks of the promontory fort defensive ditches and boundaries, as well as foraging resources in the cliff vegetation and unmanaged hedgerows to the west. It also contains the largest area of uncultivated grassland on this section of the Fingal coast that, with sympathetic management, could support larger and more diverse populations of bees, other insects and wildlife. Drumanagh is a National Monument, which has prevented any agricultural ploughing from taking place since its designation, so the grassland is relatively undisturbed. Mowing for hay was undertaken in the past (mid-1990's), after which field thistles and ragwort grew abundantly for some years, providing late season forage resources for many bees. Some grazing by horses has also taken place more recently, but not enough to prevent the establishment of a rather coarse, tussocky, grass-dominated sward. A small stream in the

south western corner of the promontory flows into the defensive ditch. The streamside vegetation provides minor sources of nectar and pollen.

**4.3.4** Drumanagh has potentially attractive nesting habitat for the surface nesting species of bumble bee, including *Bombus muscorum*, a species thought to be in decline due to the loss of this type of habitat. *B. muscorum*, requires taller, unmanaged, flower rich extensive grasslands. A nest searching queen of this species was recorded here in 2003, but successful nesting was not observed.

The slopes on the south facing side of Drumanagh are important foraging areas for solitary bees, with nesting taking place in the friable soils on some of the slopes. An uncommon ant species, *Myrmica sabuleti*, was also recorded nesting here in 2002 by the author. The hedges and brambles on the lanes and fields to the west of the headland also attract two relatively uncommon species *Hylaeus communis* and *Megachile centuncularis*, both of whom nest in hollow plant stems.

**4.3.5. Bee species recorded from Loughshinny Harbour and Drumanagh area:** *Hylaeus communis*, *Andrena bicolor*, *Andrena nigroaenea*, *Andrena scotica*, *Halictus rubicundus*, *Halictus tumulorum*, *Lasioglossum calceatum*, *Lasioglossum cupromicans*, *Lasioglossum nitidiusculum*, *Lasioglossum villosulum*, *Nomada goodeniana*, *Nomada marshamella*, *Nomada panzeri*, *Nomada ruficornis*, *Megachile centuncularis*, *Bombus lucorum*, *Bombus muscorum*, *Bombus pascuorum*, *Bombus pratorum*, *Bombus terrestris*. Total: 20 species. (See **Appendix 1** for site by site species lists.)

The majority of the bees recorded here are widespread and common species. A few species (*Andrena nigroaenea*, *Nomada goodeniana*, and *Bombus muscorum*) are giving rise to concern because of a decline in abundance over the last quarter century. *Andrena nigroaenea* and its associated cuckoo bee *Nomada goodeniana* were recorded more abundantly in the past. The reason for their decline is unknown.

*B. muscorum* is a surface-nester, requiring taller, unmanaged, flower-rich extensive grasslands, so its decline may have been attributable to the switch from hay to silage making in the agricultural sector. A nest-searching queen of this species was recorded on Drumanagh in 2003, but successful nesting was not observed. It is postulated that the floral diversity of the grassland on Drumanagh may still be too low to provide the necessary forage resources for the successful completion of a *B. muscorum* colony. In the last year or two however, *Bombus muscorum* appears to be more common in the Fingal coastal area than previously (personal observation), so the perceived decline of the species may be due to more complex factors than agricultural changes alone. *Lasioglossum cupromicans* was recorded from Drumanagh once during the present survey. A small bronzy-metallic coloured bee, it is an uncommon but widespread species that appears to be declining.

**4.3.6. Recommendations for improving the surveyed area as foraging and nesting habitat for bees:**

4.3.6.1. Beach front and soft-cliff vegetation at Loughshinny harbour should be protected. Developments that threaten to impact on this vegetation should be discouraged.

4.3.6.2. Cliff top vegetation between Loughshinny harbour and Drumanagh should be protected. Invasion by coarse grass species and brambles from nearby fields should be prevented. Florally rich field banks and boundaries should be maintained.

4.3.6.3. Drumanagh Promontory Fort is designated under the National Monuments Act as a national monument, so no disturbance of the ground can take place except under licence from the Minister for the Environment. At some point in the future, subject to a satisfactory resolution of outstanding legal difficulties, archaeological excavations may be permitted on Drumanagh. In this event, provision for the protection of the bee nesting and foraging areas, particularly on the south side of the promontory, should be included in any licence to excavate or to develop the site as a heritage area. The ideal situation would be to have an agreement with the landowner to carry out an annual mowing or winter grazing regime that would promote development of florally diverse grassland. Leaving some areas un-mown in each annual cycle to attract surface nesting bumblebees, such as *Bombus muscorum* and *Bombus lapidarius* should be part of that management regime.



#### 4.4 Kenure Beach and North Beach, Rush.

**4.4.1** This section runs from Kenure beach, around the small bay at Brook's End, across the small headland known locally as Giants Grave, and then along the north beach, Rush, as far as the car park at Rush harbour.

**4.4.2 Kenure Beach** is where the gas inter-connector pipeline from Scotland was brought ashore in the early 1990's, to connect up with a pumping station a few hundred metres inland. Part of the soft-rock cliff at the back of Kenure beach had to be trenched to allow the large diameter pipe-work to come ashore at a suitable angle of incline. The cliff was then rebuilt using rock-filled gabions and covered with subsoil. Ironically perhaps, this now provides a more suitable nesting substrate for bees than the original vertical cliff. The shallower angle of the reconstructed area allows more sunlight on the east facing slope face, while the re-deposited sub-soil is less compacted than was the original cliff material. Re-vegetation has occurred naturally, resulting in thin patchy plant community tolerant of the well drained slope.



**4.4.3** Some slippage has occurred over the years on the reconstructed cliff, and the resulting bare earth patches contain nests of at least three bee species: *A. nigroaenea* (as well as its nest parasite the cuckoo bee *Nomada goodeniana*), *Halictus rubicundus*, and *Lasioglossum villosulum*. The less common species *Lasioglossum cupromicans* recorded on Drumanagh, may also nest here. Other species recorded in the area may also nest here. A small headland at the southern end of Kenure beach is often covered with dumped vegetable material resulting in an enriched soil. The crop of 'weeds' produced here as a result, can often be a short term source of pollen and nectar for foraging bees in the locality.

**4.4.4** South-facing glacial-till cliffs in **Brook's End** bay are composed of too compacted a material, except in the top few centimetres, to be of much value for nesting, but the eroding material deposited at the base of the cliffs supports some plants that are attractive forage plants for bees. On the southern side of Brook's End bay is a former dump that was capped with soil which at one time supported a typical disturbed ground flora that was very attractive to foraging bees.

The headland, of which the former dump forms part, (for the sake of clarity it is referred to in this report

as **Giant's Grave** headland), has the remains of a megalithic tomb on its southern side. In the past the fields on this headland were used as set-aside for a number of seasons, resulting in a varied cover of ruderal plants, which attracted many species of both solitary and social bee during the flowering period. The south facing side of Giant's Grave headland is made up of hard-rock cliffs, with only the top few centimetres of soil suitable for nesting bees. A smaller headland, forming the northern end of North Beach, Rush was also formerly used partly as set-aside, and like the Giant's Grave headland attracted many species of foraging bees.

**4.4.5 North Beach, Rush** was formerly backed by a narrow strip of low *Ammophila*-covered dunes, and in the past would have been an important nesting area for bees. The area is now covered by caravans, mobile homes and holiday chalets. A few bees can still be found nesting here, but due to the high level of disturbance in summer, and increasing development, the prospects are not good.

**4.4.6. Bee species recorded from Kenure Beach and North Beach, Rush:** *Colletes similis*, *Andrena haemorrhoa*, *Andrena bicolor*, *Andrena nigroaenea*, *Andrena semilaevis*, *Andrena subopaca*\*, *Halictus tumulorum*, *Lasioglossum albipes*, *Lasioglossum calceatum*, *Lasioglossum cupromicans*, *Lasioglossum nitidiusculum*, *Lasioglossum villosulum*, *Sphecodes geoffrellus*, *Nomada flavoguttata*, *Nomada goodeniana*, *Nomada striata*\*, *Megachile versicolor*, *Bombus hortorum*, *Bombus lucorum*, *Bombus pascuorum*, *Bombus pratorum*, *Bombus terrestris*, *Apis mellifera* Total: 23 species (\* denotes doubtful records. See **Appendix 1** for the site by site species lists.)

What is immediately noticeable if one looks at the species list for this section in **Appendix 1**, is that the majority of the species recorded, were actually recorded prior to the present survey. Of the total of twenty-three species listed for this area, only six were found during the present survey. Two of the twenty-three species (*Andrena subopaca*, *Nomada striata*) may never have occurred, but that still leaves fifteen species that were not seen in the area during the present survey. While various hypotheses can be put forward to explain some of this discrepancy, including sampling differences and identification errors involving older records, the most likely explanation lies in the changes that have occurred in the habitats sampled. Records from the 1990's for example, were from areas of set-aside with abundant floral nectar and pollen resources. These flower-rich areas were absent during the present survey. Encroaching housing development around Rush has destroyed many small habitat patches immediately behind the coastline. There is little that can be done at North Beach, Rush, so efforts should concentrate on securing the habitats further north - the small headlands at Giants Grave and Brooks End, around to Kenure and Drumanagh.

#### **4.4.7 Recommendations for improving the surveyed area as foraging and nesting habitat for bees:**

4.4.7.1. A buffer zone (3-5m wide), in the form of an uncultivated headland, along the cultivated field/coastal interface, should be established in agreement with the relevant landowners. This buffer zone should then be managed (as part of a REPS scheme?) to encourage the re-establishment of seashore/cliff-top plants. To encourage bees to nest, small areas should be mounded or banked, using free-draining subsoil. This could be done in the form of a boundary bank separating the cultivated areas from the buffer zone.

4.4.7.2. Cliff-top fields at the south end of Kenure beach, on the Giant's Grave headland, and the headland at the northern end of North Beach, Rush, should be managed in agreement with the land-owners, as set-aside land, as part of a REPS scheme. A mowing regime to cut and remove excess plant material on an annual/bi-annual basis would help to establish a more permanent and diverse flora attractive to foraging bees. To encourage bees to nest, small areas could be mounded or banked (e.g. along the seaward boundary of the fields) to provide areas of high insolation with a thin patchy vegetation cover.

## 4.5. Rush, south beach.

**4.5.1.** For survey purposes the south beach at Rush was treated as a separate unit, but from a conservation management point of view, especially where bees (and other flying insects) are concerned, the south beach at Rush should be considered in conjunction with the Portrane Burrows, as the two sites are used by some species of bumble bee as partial habitats, with different requirements fulfilled by the separate units.

**4.5.2.** The two sites are only separated by a narrow tidal channel, easily traversed by foraging bumble bees. Solitary bees are less likely to cross open water, except when caught by the wind, or in conditions of an expanding population. The proximity of the two sites may also buffer the local bee populations against extinction in either unit.



**4.5.3.** The available habitat for bees at Rush south beach is now much reduced from its original extent. The presence of the golf course and caravan parks on parts of the former dunes area, the spread of sea buckthorn (*Hippophae rhamnoides*), and continuing housing development are the main reasons for this reduction.

**4.5.4.** The remaining narrow strip of fixed dunes between the golf course and the beach is dominated by a dense cover of marram grass (*Ammophila arenaria*). The dominance of the marram grass is at the expense of other flowering plants which could be pollen and nectar sources for bees.

Ironically, it is in the marram dominated area, that two bumblebees *Bombus muscorum* and *Bombus lapidarius*, (both species thought to be in decline on the east coast) prefer to nest. One of the factors in the decline of the two species nationally, is the loss of extensive areas of unimproved grasslands, particularly that on the sand dune systems.

**4.5.5.** There are only two areas (**A.** and **B.** on the aerial photograph) on Rush south beach that have concentrations of pollen and nectar producing flowering plants. **A.** is an area of disturbed ground by one of the entrances to the beach, with patches of birds-foot trefoil (*Lotus corniculatus*) and yellow Compositae. **B.** is an area of shorter turf, possibly rabbit grazed, with areas of bare sand, patches of birds-foot trefoil, hearts-ease pansies (*Viola tricolor*), some kidney vetch and yellow Compositae.

Both of these areas are attractive to solitary bees, because of the availability of nectar and pollen sources, and also because the vegetation-cover is thinner with patches of bare sand available for nesting mining species. Area **B.** has a high dune ridge on the northern (golf course) edge and the south facing aspect make it a potentially attractive nesting area for solitary species. The big drawback is that both of these areas are too small on their



own to sustain viable populations of bees. This is where the close proximity of the Portrane Burrows is of importance. Bumble bees, can easily cross the narrow channel from Rush to Portrane, to forage in areas of disturbed ground and unimproved meadows close to the tip of the Burrows peninsula.

**4.5.6.** Sea buckthorn (areas **C.** on the aerial photograph) threatens at least one of the areas mentioned above (**B.**), and has covered a large area in the middle of the dunes further east. Measures to reduce the area of existing sea buckthorn and to prevent its future spread into new areas are recommended. Some areas of buckthorn should be retained to provide shelter for other wildlife.



Figure 3. A male *Megachile* bee

**4.5.7. Bee species recorded from Rush Beach, South:** *Colletes similis*, *Andrena barbilabris*, *Andrena fucata*\*, *Andrena bicolor*, *Andrena nigroaenea*, *Andrena scotica*, *Andrena wilkella*\*, *Halictus rubicundus*, *Halictus tumulorum*, *Lasioglossum albipes*, *Lasioglossum calceatum*, *Lasioglossum nitidiusculum*, *Lasioglossum villosulum*, *Sphecodes geofrellus*, *Osmia aurulenta*, *Bombus hortorum*, *Bombus lapidarius*, *Bombus lucorum*, *Bombus muscorum*, *Bombus pascuorum*, *Bombus terrestris*.

**Total: 21 species** (\* denotes doubtful records. See **Appendix 1** for the site by site species lists.)

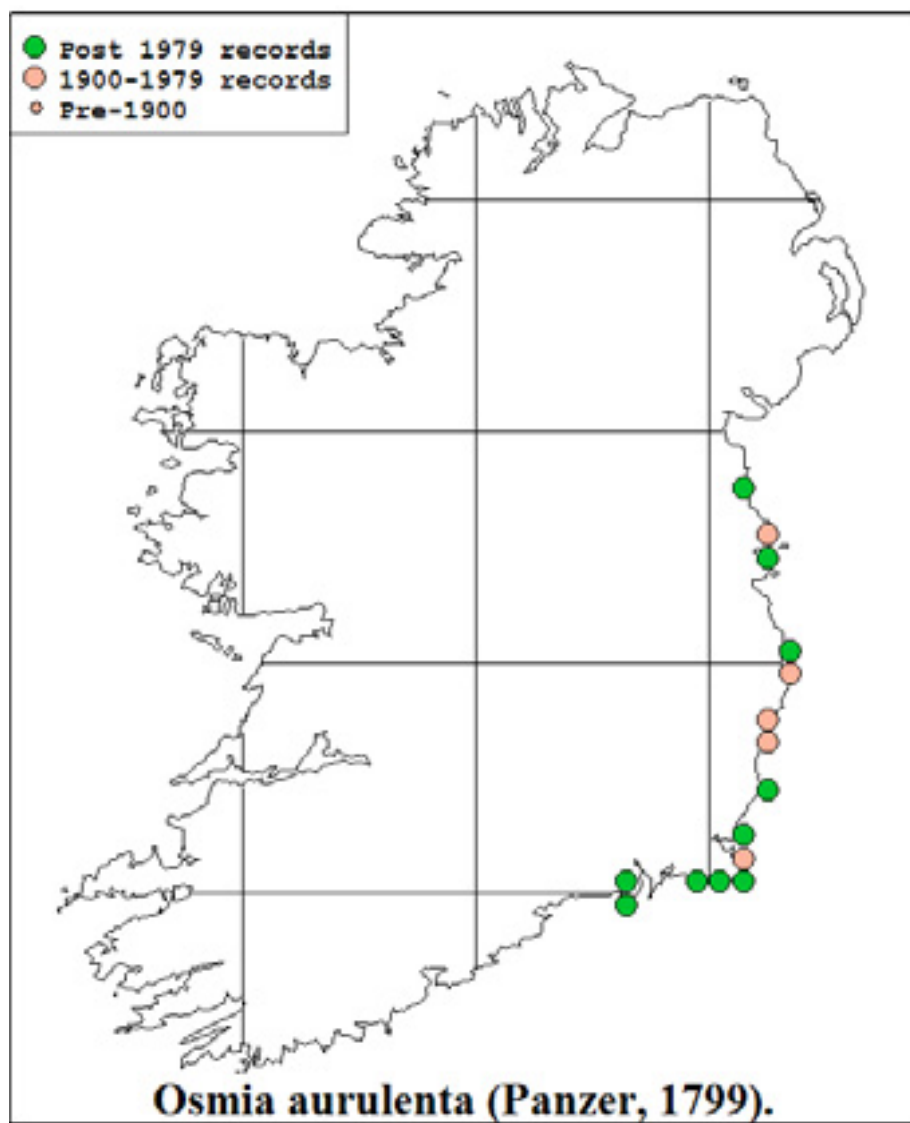
Of the 21 species (2 doubtfully) previously recorded from here only six were found during the current survey (Appendix 1). Among the notable absentees are *Osmia aurulenta*, an east-coast sand dune specialist (see Fig. 4.), and *Bombus lapidarius* which requires extensive areas of unimproved grassland (both 'Near Threatened' in Fitzpatrick et al. 2006.). The absence of *Bombus hortorum* (as on the previous section of coast) may have more to do with intensive horticulture and the use of pesticides in the Rush area.

**4.5.8. Recommendations for improving the surveyed area as foraging and nesting habitat for bees:**

No further reduction in the size of the dunes area should be allowed. Developments that impact on the dunes/beach area should be prevented.

The further spread of sea buckthorn (*Hippophae rhamnoides*) should be stopped and the existing areas reduced. The dominant cover of marram grass (*Ammophila arenaria*) should be broken, to allow development of a short flower-rich turf.

The owners/managers of the Rush golf course which backs onto the survey area and occupies former dune land should be encouraged to manage the course in a 'bee-friendly' way. Leaving areas of 'rough' between fairways that contain nesting and foraging resources for bees, reducing the amount of herbicides or pesticides applied to greens and fairways, and leaving bare sandy areas would all contribute to a more bee friendly environment.



**Fig. 4.** The distribution of the sand dune bee *Osmia aurulenta* in Ireland.

Data from the author's database.

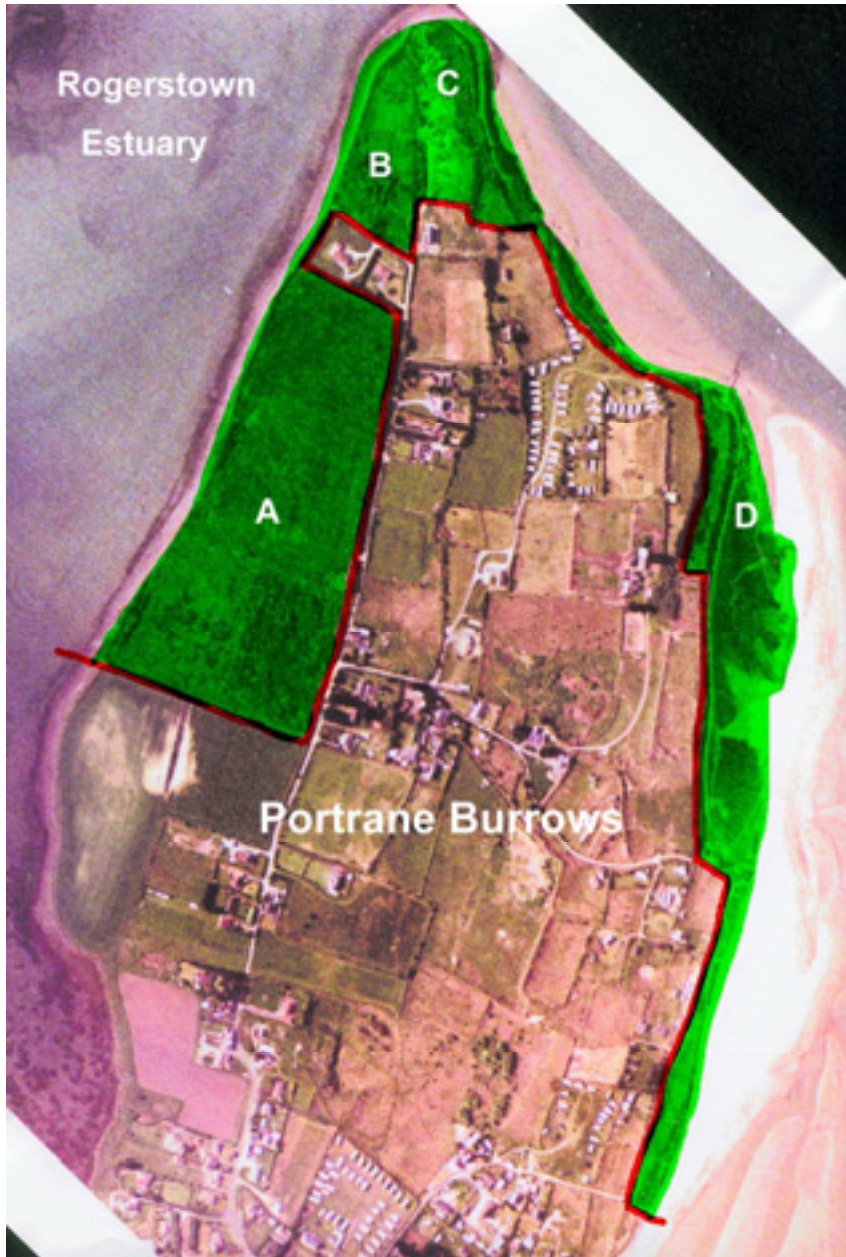
(Map prepared using the DMAP package developed by Dr. Alan Morton.)



## 4.6. Portrane Burrows

**4.6.1.** For the purposes of the survey Portrane Burrows was treated as a separate unit. As pointed out in section 4.5.1., the proximity of Rush south beach to Portrane Burrows means there is a level of interaction between the bee populations on both sites, more obvious among the bumble bees than the solitary bees, that should be taken into account when conservation management plans for either or both of the sites are being formulated.

**4.6.2.** The survey of bees on Portrane Burrows was confined to those areas accessible from public footpaths and areas close to the seashore. A glance at the aerial photograph however shows that there are large areas in the centre of the peninsula potentially of great value for bees and other insects, but as these are on privately owned property no attempt was made to gain access for the purposes of this survey.



**4.6.3.** The Burrows reach their highest point in the ridges of fixed dunes running along the eastern face of the peninsula (area **D.**). These have been heavily modified and in places planted with trees and cut through in other places for access to the sea front. In front of these fixed dunes are low lying banks of sand and shingle, some already vegetated with marram grass, others remaining bare. Between them lie areas of semi-dry salt marsh that appear to be inundated only at extreme high tides. These young dunes are still unsuitable for nesting bees as the sand is too mobile, but they are valuable for many other insects, including close relatives of the bees, the solitary wasps.

**4.6.4.** The east-facing ridge at the back of area **D.** is covered by thick vegetation, including brambles, in many places. These areas provide shelter for the small mammals, field mice especially, whose old nest burrows are a favourite place for bumble bee queens to establish their own nests. The bramble patches also provide nesting habitat for our smallest bees, the *Hylaeus* species.

**4.6.5.** On the Rogerstown estuary (west) side of the peninsula, the habitats have been so heavily modified that no sign of the original dune ridges remain. Instead, anthropogenic (man-made) features now provide the basis for the habitats that still attract bees.

**4.6.6. Area A.** is a large, open field, recently levelled and cleared of hedges and boundary banks. Its value is that it provided a large foraging area for bees. when the largely ruderal flora was in flower. As a grass dominated sward develops this value may decrease. Whether this area was cleared for agriculture or housing development is unclear.

**4.6.7. Area B.** on the other hand, although also of anthropogenic origin, is a much older field and with varied levels, has been left relatively undisturbed in recent years. It has developed a reasonably diverse flora, with areas of bramble scrub, trees, and open grassland. In addition, the western edge bordering the estuary is slightly raised forming a low escarpment or bank. The mixed sandy soil and builders sub-soil forming this low bank now provides nesting sites for bees including *Colletes similis*, *Halictus rubicundus*, *Lasioglossum nitidiusculum* and *Sphecodes geoffrellus*. In the grassland of this field, many bumble bees visit patches of bird's foot trefoil. It is probable that *Bombus muscorum* also nests in this area.

**4.6.8.** The age of **Area C.** lies somewhere between that of areas **A.** and **B.** It is largely covered by builder's rubble, possibly preparatory to development that never took place. It now has a typical disturbed -ground flora, including patches of butterfly bush (*Buddleia davidii*), thistles and ragwort. *Buddleia* is equally attractive to both bumble bees and butterflies. Willow (*Salix* spp.) bushes, possibly planted, possibly self-generated from dumped cuttings, are growing in places and brambles are gradually encroaching. *Salix* catkins are very useful for early emerging *Andrena* species as well as *Bombus* species. The catkins provide pollen early in the year when few other plants have flowered. The variety of flowering plants in this area is highly attractive to bees, including some bumble bees who fly across from the Rush side of the channel.

**4.6.9 Bee species recorded from Portrane Burrows:** *Colletes similis*, *Hylaeus communis*, *Andrena barbilabris*, *Andrena bicolor*, *Andrena nigroaenea*, *Halictus rubicundus*, *Halictus tumulorum*, *Lasioglossum calceatum*, *Lasioglossum cupromicans*, *Lasioglossum nitidiusculum*, *Lasioglossum leucopum*, *Lasioglossum villosulum*, *Sphecodes geoffrellus*, *Bombus hortorum*, *Bombus lucorum*, *Bombus muscorum*, *Bombus pascuorum*, *Bombus pratorum*, *Bombus terrestris*, *Apis mellifera*.

**Total: 20 species** (See **Appendix 1** for the site by site species lists.)

Of the species previously known from Portrane Burrows only *Halictus tumulorum* and *Lasioglossum cupromicans* were absent during this survey. Nine species were added to the local list by the survey. *Halictus tumulorum* is designated as 'Near Threatened' in Fitzpatrick et al. (2006).

#### **4.6.10. Recommendations for improving the surveyed area as foraging and nesting habitat for bees:**

Further development of caravan parks and holiday homes should occur only within existing boundaries. Where possible, future housing development should be confined to the southern 'base' of the peninsula, and there should be a presumption against development of any of the remaining 'green-' or 'brown-field' areas.

The owner of area **A.** should be encouraged to keep it for agricultural purposes, preferably using organic methods. Areas **B.** and **C.** will inevitably become invaded by scrub, reducing their value to bees, unless they are effectively managed, whether by grazing or scrub clearance. The area of highest public pressure is area **D.** Little active management can take place here except to prevent damaging operations and activities such as quad-bike riding, and limiting the access of other vehicles to the beach and dune front.

## 4.7. Portrane Cliff Walk

**4.7.1** The area surveyed runs from the public car park at Portrane Martello tower, to the small beach south of St. Ita's hospital. The narrowness of the publicly accessible area and the closeness of the bedrock to the surface means there are few areas available for nesting, and only a narrow shelf along the cliff tops for natural vegetation.



**4.7.2.** Two features on the path were noted: at **B**, a south-facing embankment is covered by a short flower-rich turf, in which a number of bees were nesting: *Lasioglossum villosulum*, and *Sphecodes geofrellus*. The embankment itself has a high soil content, which is loose enough in places for bees to excavate nests. Further south, at **C**, a narrow shelf of soil above the bedrock supports some typical sea cliff-top flora. the soil is however too shallow to allow bee nests to be excavated. Beyond **C**, the path drops down to meet the beach south of St. Ita's hospital. Some minor beach top vegetation provides limited foraging possibilities.

**4.7.3.** One other area, outside the limits of the survey, but clearly visible from the path, is a field (**A**, on the photograph), that appeared to be a neglected meadow in the grounds of St. Ita's hospital. At the time of the survey there were few plants in flower, but because of its gentle slope and south facing aspect, sheltered by higher ground to the north; it has all the appearance of potentially valuable bee habitat, for both foraging and nesting. The closure and sale of St. Ita's hospital and grounds is planned, so the future of field **A**, may have already been decided.

**4.7.4. Bee species recorded from Portrane cliff-walk:** *Colletes similis*, *Andrena haemorrhoa*, *Halictus rubicundus*, *Halictus tumulorum*, *Lasioglossum villosulum*, *Sphecodes geofrellus*, *Sphecodes monilicornis*, *Bombus lucorum*, *Bombus pascuorum*, *Bombus terrestris*, *Apis mellifera*.

**Total: 11 species** (See **Appendix 1** for the site by site species lists.)

The small number of species recorded here reflects the size of the site, and it is probable that even fewer of the species recorded actually use the area as nesting habitat. The bumble bees, honey bee, and *Colletes similis* were almost certainly, only present to forage on the cliff-top flowers. The smaller bees such as the *Halictus* species and *Sphecodes* do nest in the area, especially in the clay soil of the bank at **B**.

**4.7.5. Recommendations for improving the surveyed area as foraging and nesting habitat for bees:**

The strip of land through which the public cliff-top path traverses is so narrow that it cannot be regarded as a stand-alone site from an ecological point of view. Certainly, few if any bee species would survive here without the presence of further resources in the nearby land.

**4.7.5.(cont.)**

The possibility of acquiring field **A.** (or part of same) and a further strip of land to the north of **A.** as a buffer zone between future developments on the grounds of St. Ita's hospital and the existing coastal cliff-top path, should be investigated. Failing acquisition, an agreement to manage the nearby fields in an environmentally friendly way, as part of any planning permission concerning the development of the St. Ita's site, should be stipulated.



## 4.8 The Island Golf Club, Corballis, Donabate.

**4.8.1** The golf course occupies the largest part of a barrier sand dune system that lies across the mouth of the Broadmeadow estuary between Corballis and Malahide. Formerly, access to the Island Golf Club was often by boat across the narrow channel separating the dune system from the town of Malahide to the south. In old records of bees taken on the sand dunes of 'The Island', it was usually referred to as 'The Island, Malahide'.

**4.8.2.** From the aerial photograph it is clear that the club house, playing surfaces and ancillary facilities probably occupy a little over a third of the entire surface area of the peninsula and that many of the original features of the dune system are still there. Many of the high dunes and old blow-outs (**G**) in the centre of the golf course are in relatively undisturbed condition, and the lower dune ridges (**F**) at the south-eastern corner of the peninsula are completely outside the current system of holes and fairways.



**4.8.3.** As well as the intact dune areas, there are a number of modified areas – a raised area on which builder's rubble was dumped in the past (**A**), some small fields (**B**), a former sand extraction pit and dump (**C**) and an area of exposed sandy shingle and cobbles now gradually re-vegetating naturally (**D**). More recently, to combat erosion at the south-western side of the peninsula, the front of the dunes have been reinforced with revetments (**E**).

Each of the areas noted above is dealt with in more detail in the following paragraphs.

**4.8.4.** During the period of the survey Area **A**. was being redeveloped as an over-flow car-park. Marginal areas to the south, at a lower level than the proposed surface of the car park are overgrown with patches of butterfly bush *Buddleia davidii*, flowering currant (*Ribes* cultivar) and self-sown young sycamore (*Acer pseudoplatanus*) trees. The western margin of the area has a disturbed ground flora including more butterfly bush. The latter, when in flower is highly attractive to bumble bees, including *Bombus muscorum*.

**4.8.5.** Area **B**. appears to have been small cultivated fields (possibly for potatoes) in the past, but these are now completely overgrown with thick grasses and bracken. This is ideal nesting habitat for bumblebees, and is in close proximity to a plentiful supply of nectar and pollen-rich flowers.

**4.8.6.** Area **C.** was a sand and gravel pit and has latterly been used as an un-authorised dump. The ground flora within the pit includes species of orchid and helleborines. Vertical west and south-facing scarps in the pit were important nesting habitat for solitary bees and wasps. Scrubby willow has enveloped one corner -the catkins of willows are an important source of pollen and nectar for early emerging bees.

**4.8.7.** Area **D.** may also have been used as a source of sand and gravel, or may be the result of natural erosion, leaving the underlying cobble and shingle material, on which the whole dune system is perched, exposed. Gradually this is becoming re-vegetated, and has a rich shingle/sand flora. Bracken and gorse (*Ulex europaeus*) are gradually taking over the northern side, and stands of young aspen (*Populus tremula*) and willow (*Salix* sp.) are spreading by vegetative means in the north-eastern corner.

**4.8.8.** Area **E.** is different from the preceding areas in that, it is part of the original inner high dune ridge, running down to the southwest corner of the peninsula. As estuary water swirls around the tip of the peninsula, erosion was beginning to cut into the western face of the ridge at high tides. In some parts a typical short flower rich turf has developed on the edges of the ridge. The calcium rich sand supports snail populations and these in turn provide empty shells for the snail-shell nesting bee *Osmia aurulenta*. A dune/shingle specialist in Ireland, this species is scattered over the Island Golf Course, especially in the remaining high dunes (areas **G**) and in area **E** on the western facing slopes, where birds-foot trefoil (*Lotus corniculatus*) and restharrow (*Ononis repens*) are important forage plants. (The bee also occurs on the Portmarnock peninsula). Recent grass fires (prior to the survey) may have caused temporary local damage to the population of this bee in area **E**, but are unlikely to cause permanent damage. Erosion of the steep western face of the dune has also reduced the amount of short turf outside of the golf playing surface.

**4.8.9.** Area **F.** is made up of younger, lower dune ridges, partly intersected by salt marsh inlets. Dominated by marram grass (*Ammophila arenaria*) to the exclusion of most flowering plants, means few resources for foraging for bees and the number of solitary bees, who generally forage closer to their nesting areas is consequently lower. It is however prime nesting habitat for bumble bees, who can travel greater distances to foraging areas, as the marram tussocks provide shelter for surface nesters and with plenty of mouse burrows, opportunities for the underground nesters.

**4.8.10.** The high dunes (areas **G**.) are the most important remaining natural features on the golf course. The outline of the areas is only indicated roughly on the accompanying aerial photograph. These areas are important not only for bees, but also for butterflies and other insects, the dune-land specialists in particular. From the bee perspective, the south-facing slopes in old blowouts and areas of exposed sand are important for nesting. The abundance of birds-foot trefoil (*Lotus corniculatus*), rest harrow (*Ononis repens*) and yellow Compositae (*Leontodon* sp., *Crepis* sp., etc.) are important forage resources. The solitary bee *Osmia aurulenta* occurs scattered through these areas (**G**). As a species confined to the east and south eastern coasts in Ireland (**Fig. 4**) preservation of its habitat deserves special attention. The continuing future occurrence of *Osmia aurulenta* in the high dunes area must be in doubt. As the high dunes lose calcium and become more acidic, snail populations will fall, and there are consequently fewer nesting opportunities for this bee. This acidification is arrested locally to some extent by rabbits burrowing in the dunes and exposing more calcium rich sand, but if the rabbit population disappears (and rabbits are generally not welcome on golf courses!).

**4.8.11. Bee species recorded from The Island Golf Club, Corballis, Donabate:** *Colletes similis*, *Andrena barbilabris*, *Andrena haemorrhoa*, *Andrena fucata*\*, *Andrena bicolor*, *Andrena nigroaenea*, *Andrena scotica*, *Andrena subopaca*\*, *Andrena wilkella*, *Halictus rubicundus*, *Halictus tumulorum*, *Lasioglossum calceatum*, *Lasioglossum nitidiusculum*, *Lasioglossum leucopum*, *Lasioglossum villosulum*, *Sphecodes geofrellus*, *Sphecodes ephippius*\*, *Nomada flavoguttata*, *Nomada goodeniana*, *Nomada marshalli*, *Nomada panzeri*, *Nomada ruficornis*, *Osmia aurulenta*, *Bombus hortorum*, *Bombus jonellus*, *Bombus lapidarius*, *Bombus lucorum*, *Bombus muscorum*, *Bombus pascuorum*, *Bombus pratorum*, *Bombus terrestris*, *Apis mellifera*.

**Total: 32 species** (See **Appendix 1** for the site by site species lists.)

It would be easy to ascribe the relatively high species count of bees on the Island Golf Club to the relatively large area of dunes left undisturbed by the golf course, but the situation is rather more complex. Three species were only doubtfully recorded in the past (one, *Andrena wilkella*, was confirmed as present and two were not seen by this survey). Five other species, previously found here, were also not seen during this survey (See **Appendix 1**). Some of the species recorded were found only in the disturbed areas of scrubby vegetation developing in areas **A**, **B** and **C**., and would be more characteristic species of woodland edges and hedgerows than sand dunes. Typical coastal species such as *Colletes similis*, *Andrena barbilabris*, *Osmia aurulenta*, and the bumble bees *Bombus muscorum* and *B. lapidarius* are all present, but a notable absentee is *Colletes floralis*, which would be expected to occur on a large sand dune system such as this (The absence of *Colletes floralis* (a species regarded as 'Near Threatened' in Fitzpatrick et al., 2006.) from 'The Island' and the other sand dune sites in Fingal is discussed more fully in **section 5.4.**).

#### **4.8.12. Recommendations for improving the surveyed area as foraging and nesting habitat for bees:**

The management of the Island Golf Course should be made aware of the environmental value of the areas under their control, and encouraged in preserving those areas not in direct use by the Club.

It is the diversity of habitats, both semi-natural and disturbed, on the 'Island Golf Club' peninsula that accounts for the high species count of bees. So, while the first priority should be to conserve the remaining areas of 'natural' dune ridges, the disturbed areas should not be ignored.

The principal high dune ridges (**G** on the aerial photograph) should be protected from any development that would lead to their disturbance or to a reduction of their area. Rabbits in these high dunes act to continuously recycle sand to the surface, providing new opportunities for ground nesting bees and other insects. By their grazing the rabbits prevent grass species from dominating the vegetation cover, allowing nectar and pollen rich plants to compete successfully. Any threat to the rabbit population should be avoided, as their disappearance would radically alter the ecological balance of the high dunes .

Area **F**, comprising lower and younger dunes outside the current playing areas of the golf course, could be enhanced for bees by reducing the dominant cover of marram grass (*Ammophila arenaria*) to the exclusion of flowering plants such as birds-foot trefoil, kidney vetch, rest-harrow, etc. A small area in **F**. that had suffered an accidental(?) fire shortly before the survey visits, showed vigorous growth of herbaceous plants on the exposed sandy areas, presumably from seeds already in the seed-bank. Any active management of area **F** should be done on a limited basis initially, to allow the monitoring of the results of any such regime change.

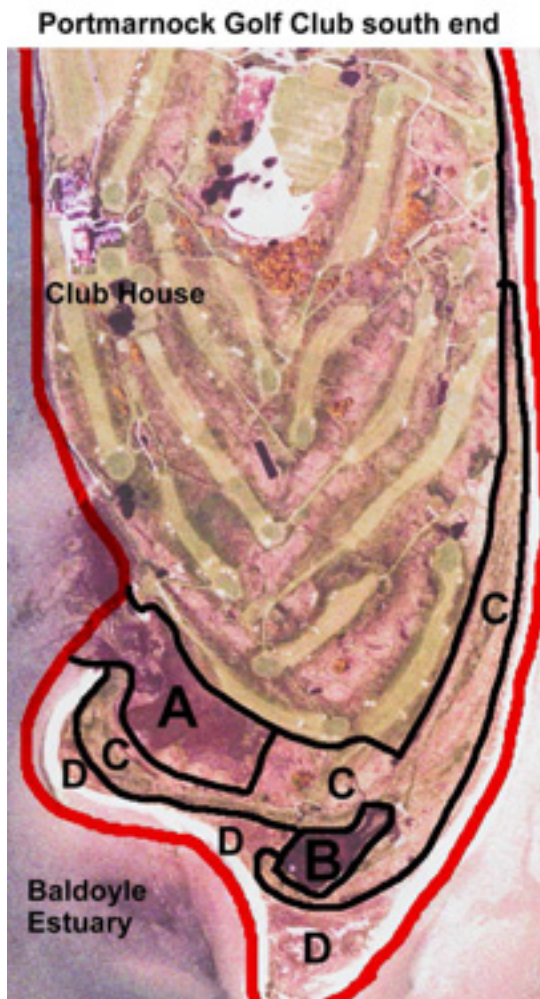
The provision of additional car-parking space in area **A** will presumably have been completed before this report is in press, but areas **B**, **C** and **D**, should be protected from further adverse disturbance. In particular, illegal dumping and burning should be prevented occurring in area **C** (as well as **B** and **D**), either through agreement with the landowner, or by enforcement of existing environmental laws. These areas (**B**, **C** and **D**) are highly diverse florally and topographically, and are therefore highly attractive to many insects, including bees. Many bee species use these areas to forage and to nest. Because these areas are by-products of haphazard development, they are more difficult to promote as places worthy of preservation. Further encroachment of the coarser, denser vegetation (particularly bracken, but also gorse and tree species) should be prevented in area **B** and **D**. A primary aim of any management of these areas should be to retain existing areas of bare sand and shingle, and where feasible to create more such areas. These act as hot-spots for insect species reliant on open sand for nesting.

## 4.9. Portmarnock Golf Club and Portmarnock Point

### 4.9.1. General observations:

The active golf-playing areas and the ancillary facilities such as the club house, car-parks, machinery and storage areas of Portmarnock Golf Club take up a high proportion of the surface area of the Portmarnock peninsula. Few of the original dune features remain intact. Consequently, Portmarnock peninsula has fewer areas of interest for bees than, say the Malahide/Donabate peninsula. Having said that, some of the remaining areas are highly valuable for bees, and if a sympathetic management regime were put in place, other areas could also become of greater interest for bees.

**4.9.2.** Portmarnock peninsula, like that at Malahide/Donabate, is a barrier sand dune system, formed across the mouth of the shallow Baldoyle estuary. A narrow tidal channel separates it from Cush Point on the Sutton side of the bay.



**4.9.3.** The areas of greatest interest for bees are the areas at the southern tip of the peninsula around Portmarnock Point.

Areas **A.** and **B.** are salt marsh and fresh/brackish wetlands respectively. Both lie in the lag areas between the tips of the formerly active dune ridges at Portmarnock Point.

While area **A** is essentially a natural feature, area **B** has been modified, by the construction of a bank and revetment to create a fresh/brackish water pond and sedge beds.

Neither area is of great interest for bees, except that some of the salt marsh plants such as thrift (*Armeria maritima*) sea-lavender (*Limonium vulgare*) sea spurrey (*Spergularia* sp.), are attractive to bumble bees and, during the survey visits, the moisture from the brackish pond kept plants on the surrounding banks alive and in flower during a drought, thus ensuring a continuity of pollen and nectar sources for bees.

**4.9.4.** Between areas **A** and **B**, the low fore dunes (**C**) are now being actively managed by regular close mowing. This prevents or interrupts the flowering of many of the typical herbaceous dune plants, resulting in a grass dominated sward. In addition, parts of **C** close to the salt-marsh are being stripped of turf, presumably to replace damaged areas on the golf fairways. In the short term this latter practice has some beneficial effects- the exposed areas of sand/shingle becoming in effect, seed beds for colonising plants, and the subsequent flush of flowering is beneficial for bees. In the long term however, continuous

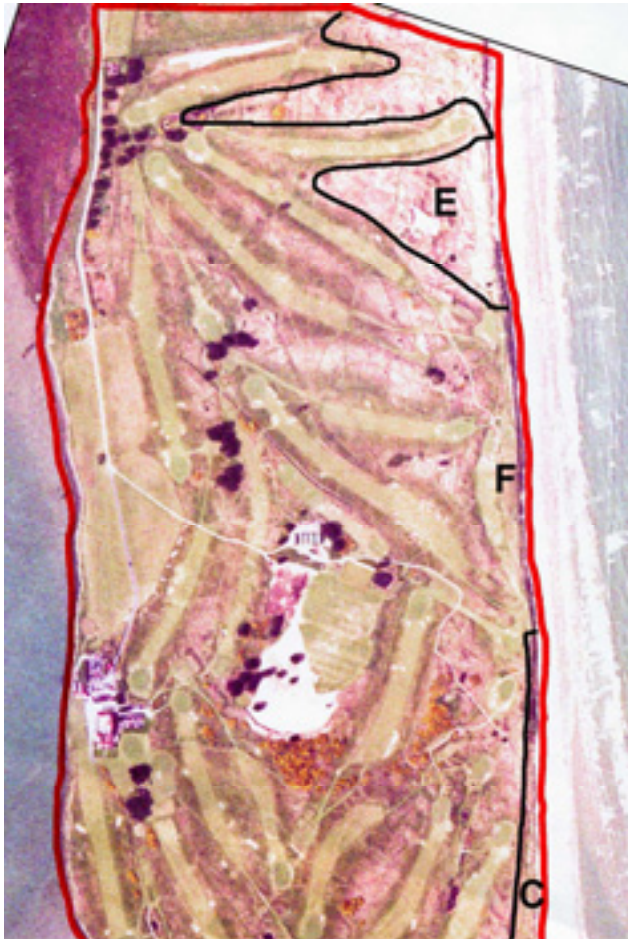
disturbance will reduce any nesting populations of solitary bees. The long term aims for these areas from the evidence of the current mowing regime appears to be to create further golf fairways where none previously existed. This will of course further reduce the available habitat for bees at Portmarnock.

**4.9.5.** Area **D** is the last 'natural' undisturbed part of the peninsula. Comprised of bare sand and shingle, with a vegetation, mainly of marram grass, but with an interesting inter-mix of mainly herbaceous plants, both native (*Lotus corniculatus* in particular), and alien (eg. evening primrose, *Oenothera* sp. and tamarisk, *Tamarix gallica*), this area is the only location on Portmarnock for the solitary bee *Osmia aurulenta*. This snail-shell nesting species only occurs in the lime rich parts of dunes and shingle banks, where adequate food plants are available to carry it through the season from May to August. As a surface nesting species it is vulnerable to trampling pressures from people or machinery.



**4.9.6.** It was disturbing therefore, to see visible herbicide damage (distortion of growth, curling and discoloration of leaves and stems) occurring on part of area **(D)** at Portmarnock Point, outside any currently managed part of the golf course. Tractor tyre-marks leading from managed areas to the beach at Portmarnock Point passed through the centre of this area of distorted plants.

These visible signs suggest an activity, such as herbicide tank-washing or possibly spray calibration, had taken place on or close to the beach. Such activities should never be allowed to take place in area **D**.



**Portmarnock Golf Club, north end**

**4.9.7** To illustrate the fact that not all managed or disturbed areas are 'bad for bees', a small sand pit in area **E** is a good example. This pit is used to provide sand for mixing with soil and peat to produce a top-dressing for use on the golf course. The exposed sand faces in the pit, and disturbed areas of bare sand surrounding the pit are home to many sand-burrowing insects, particularly sand wasps, but also bees. *Andrena barbilabris* was concentrated here, with at least fifty nest holes counted on one visit. Where the *Andrena barbilabris* bees were foraging is unclear, but it may have included a mixed hedge of sea-buckthorn and hawthorn (**F**) along the eastern boundary of the golf course. The bees seen foraging along this hedge included, *Andrena haemorrhoa* and *Halictus rubicundus*, but no *Andrena barbilabris*.

**4.9.8. Bee species recorded from Portmarnock Golf Club:** *Colletes similis*, *Andrena barbilabris*, *Andrena haemorrhoa*, *Andrena bicolor*, *Halictus rubicundus*, *Lasioglossum calceatum*, *Lasioglossum villosulum*, *Sphecodes geofrellus*, *Sphecodes*

*monilicornis*, *Nomada goodeniana*, *Nomada marshamella*, *Osmia aurulenta*, *Bombus distinguendus*, *Bombus jonellus*, *Bombus lucorum*, *Bombus muscorum*, *Bombus pascuorum*, *Bombus terrestris*.

**Total: 18 species** (See **Appendix 1** for the site by site species lists.)

Eighteen species have been recorded from Portmarnock, but three of these (*Sphecodes monilicornis*, *Nomada goodeniana*, *Bombus distinguendus*) were not seen during the present survey. The last species, *Bombus distinguendus*, is now confined to the western-most counties in Ireland, although in the past it was common enough to have been recorded even from St. Stephens Green in Dublin. *Nomada goodeniana* also appears to be in decline, but as a 'cuckoo' species on other bees, principally *Andrena nigroaenea*, the reasons for the decline are not yet understood.

The snail-shell nesting bee, *Osmia aurulenta* occurred in good numbers in the western half of area **D**, and was seen visiting birds-foot trefoil and heartsease (*Viola tricolor*) growing in areas of bare shingle, and on the embankment around area **B**. *Osmia aurulenta* was not found in other areas of the peninsula, which emphasises the importance of protecting area **D** from any damaging activity. The absence of *Colletes floralis* on Portmarnock golf course (and 'The Island golf course') is notable, and is discussed more fully in **Section 5.4**.

#### **4.9.9. Recommendations for improving the surveyed area as foraging and nesting habitat for bees:**

The management of Portmarnock Golf Club should be made aware of the environmental value of the areas under their control and encouraged to help in the preservation of those areas outside the playing surface of the golf course.

The areas marked **D** on the aerial photograph, which lie outside the golf course should be protected from any activity that damages the ecology of that area. In particular, no herbicides or pesticides should be used (deliberately or inadvertently) in area **D**. Traffic by vehicles through this area should also be discouraged.

The close mowing of area **C**, which is also outside the current playing area of the golf course, should be the subject of review, to assess the impact of mowing on the flora and fauna of that area. If new fairways are being created in area **C**, then this should be done with regard to the ecology of that area.

The practice of sod-lifting, presumably to repair damaged areas of fairway, should be confined to an area of low ecological value. Setting aside a specific area of cultivated sod-grass, close to the maintenance areas of the golf course would be more appropriate, as well as cost effective.

## 4.10 Howth

### 4.10.1 Howth: survey parameters.

The survey of the coastal habitats was confined to those areas accessible from the public footpaths skirting the coastline. This excludes gardens, farmland, and most areas in private ownership, including the Inner Baily. Exceptions to this rule were the mixed woodland at Sutton House, un-fenced fields and heath-land south of the Carrickbrack road, and the area known as the Outer Baily.

Excluded for reasons of safety were areas below the public footpaths, usually steep slopes, leading to cliffs. Although excluded from this survey, it should be noted that in many cases these steep well-drained slopes provide excellent foraging territory for bees and where there is suitable soil, there are almost certainly nesting areas.

### 4.10.2 Howth: general observations.

The soil type is predominantly acidic because of the underlying geology. Soils are generally very shallow, which limits the number of areas in which underground nesting can occur. Only on the Outer Bailey are there deeper deposits of glacial material, but this glacial till is very compacted and impervious. Only where the glacial till is exposed to weathering on cliff top edges, or has been subjected to root action by plants close to the surface is it suitable for use by some 'mining' bees.

**For descriptive purposes the coastal habitats on Howth are sub-divided into four zones.**

### 4.10.3 Howth: Zone 1, South cliff walk, Bottle Quay to Drumleck Point.

**(Including areas of unfenced heath-land south of the Carrickbrack Road)**

This area is of high value for bees because of the largely south facing aspect of the slopes, shelter from the north, north-west and east, the varied micro-topography, and the diversity of the flora. Its value is only limited by the shallowness of the soils available for nesting, and the absence of grazing animals to keep bracken and gorse in check.

**4.10.3.1 Area A.** This is a gently sloping field with a hedgerow and Sutton House woods on the northern boundary. Isolated willow bushes attract spring flying bees. Vegetation cover is patchy and some top soil appears to have been scraped from the surface of the area and now forms a windrow on the southern boundary of the area.

This area has the potential to be a very good foraging area for bees if the diversity of the flora increases, and grasses are prevented from dominating the vegetation. Improved nesting opportunities could be provided if some minor alterations in ground levels were created – such as the creation of small embankments (of sub-soil with a low clay content), on the northern (south-facing) side of the path.

The existing windrow, of what appears to be topsoil, is so thickly covered with vegetation it might also attract nesting bumble bees in the future, and the developing flora may include nectar and pollen rich flowers.

**4.10.3.2 Area B.** Sutton House wood is included in this report because it contains large numbers of bluebells (*Hyacinthoides* sp.) which, in spring time are visited by bumble bees that nest outside of the wooded area. In combination with catkins on willow bushes in area A, the bluebells are important local sources of pollen and nectar for spring bees. The wood also provides important shelter for bees foraging on hedgerow plants and within area A.





## Howth: Zone 1

**4.10.3.3 Area C.** This is an important area for bees in this part of Howth. It contains a number of major habitat types and numerous micro-habitats.

It contains nesting areas for a number of bee species eg. *Colletes succinctus*, *Andrena minutula*, *Andrena fuscipes*, *Halictus tumulorum*, and is also important for other insects, eg the speckled bush cricket *Leptophyes punctatissima*.

Trees and hedges provide a variety of habitats that attract species such as *Andrena nigroaenea*, *Andrena haemorrhoa*, and many of the more common species of bumble bee. Open grassy areas could be managed to increase their floral diversity

A number of ridges and terraces define the area's topography. To the west a large outcropping of rock (**E**) has dry heath vegetation, including western gorse (*Ulex gallii*) and is an important forage area for solitary bees and bumble bees. Recent fires have led to soil erosion and consequent loss of the vegetation cover. Other rock outcrops (**areas D**) with similar heath land vegetation, are separated by terraces and hollows with deeper soils, supporting more vigorous vegetation of european gorse (*Ulex europaeus*) and bracken. One of these terraces (**area 2**), is a nesting area for the early summer bee *Andrena minutula* and its social parasite bee *Nomada flavoguttata*. Both

species emerge before the new growth of bracken stems shades out the ground.

A nearby short turfed slope (**area 1**) with numerous bare soil patches is heavily rabbit-grazed. This creates ideal conditions for many small bees including *Halictus rubicundus*, *Halictus tumulorum*, *Lasioglossum leucopum* and their various social parasites. Below area C, the raised edges of the cliff walk, where it has eroded into the glacial till, are used as nesting sites by *Colletes succinctus*. This is one of the principal bees to be found in the heath land habitat in late summer, when its chief food plant *Calluna vulgaris*, is in flower.

**4.10.3.4. Area F.** Between the old boathouse and Drumleck Point, the only publicly accessible areas are small patches of vegetation along the cliff tops. These are important floral resources and include some

rare plants eg. *Scilla verna*. Lack of soil depth restricts the number of bee species nesting in these areas.

**4.10.3.5. Area G.** has more acidic cliff-top vegetation with *Calluna* and *Erica*, similar to the heath land higher up the hill. This area is visited by *Colletes succinctus* and *Andrena fuscipes*. Beyond Drumleck Point, the path narrows and is sandwiched between the cliff edge and private gardens. The presence of woodland margins and gardens to the rear of the cliff path are probably why the leafcutter bee *Megachile versicolor* was recorded in this area, along with *Andrena nigroaenea*, *Halictus rubicundus*, and many bumble bees.

#### **4.10.4. Hawth: Zone 2, South cliff walk from Drumleck Point to the Bailly.**

**(not illustrated by an aerial photograph)**

**4.10.4.1.** This is the most restricted section of the cliff walk. The public footpath follows the property line of private gardens on one side, and on the other, the ground slopes away steeply before dropping as cliffs to the sea. As stated previously the private gardens and steep slopes were excluded from this survey, but from what could be seen from the cliff walk, they contain potentially valuable floral resources for foraging bees, where suitable shrubs and annual and perennial flowers are present. Some nesting, especially of bumble bees, can also be expected in the larger less disturbed gardens. Leaf-cutter bees (like *Megachile versicolor*) are more likely to be seen in garden situations where dead wood is left undisturbed.

##### **4.10.4.2. Some observations on Zone 2:**

Hottentot Fig (*Carpobrotus* sp.), is naturalised on some of the south-facing cliffs and slopes. Bumble bees were seen foraging in some numbers at this garden escape. Originating in South Africa, it can form dense trailing mats of new and old growth, carpeting slopes and cliff edges, shading out native plants. One possible side-effect of this is soil/rock slippages in very wet weather.

Dumping of garden waste on the path margin and onto slopes above the cliffs has led to local enrichment of the vegetation in at least two places. This activity should be strongly discouraged.



#### 4.10.5. Howth: Zone 3, The Outer Bailey to the Summit car park.

**4.10.5.1. Area A.** Consists of sea-cliffs and steep slopes leading to the cliffs. Only the very tops of the cliffs could be included in this survey for safety reasons, but where soil and vegetation occur on the lower slopes bee nesting may also occur. Where weathering of the glacial till overlying the bedrock has occurred the material is suitable for nesting bees. The slopes on the south side of the Bailey are more favourable to bees than the east facing slopes.



**Howth: Zone 3**

**4.10.5.2. Area B.** The relatively flat surface of the Outer Bailey is covered by a mixture of acidic heath and grassland. Nesting and foraging opportunities are available for both bumble bees and solitary species. The exposed edges of paths and cliff edges on the northern side of the outer Bailey are used by several solitary bee species, including *Colletes succinctus*, *Andrena fuscipes*, *Nomada rufipes*, and *Lasioglossum calceatum*. Plentiful bee-forage plants, including devilsbit scabious (*Succisa pratensis*), wild carrot (*Daucus carota*), bladder and sea campion (*Silene vulgaris* and *S. maritima*), yellow Compositae, as well as *Calluna vulgaris* and *Erica cinerea*, are available within the outer Bailey. Perhaps

the only restriction the area imposes on bees is one of exposure, there being almost no shelter from three (north, east and south) of the four compass points.

Bracken and gorse (*U. europaeus*) appear to be spreading on the outer Bailey. While bracken and gorse do provide valuable cover for nesting bumble bees, there is enough cover available in nearby area **C**, to allow the habitat on the Bailey to be managed in such a way as to promote only the low growing heath and grassland species.

**4.10.5.3. Area C.** This area is now thickly covered by a dense growth of gorse (*Ulex europaeus*) and bracken, suggesting that it may have been grazed in the past. The ground is covered by a thick layer of bracken frond litter which helps shade out all but the most vigorous herbaceous plants. This is actually good nesting habitat for bumble bee species like *Bombus pascuorum*, *Bombus pratorum* and *Bombus jonellus*. On the other hand not many solitary bees will use this type of densely shaded habitat. If the area was managed to create a mosaic of open patches within the gorse and bracken it would be of more value to solitary bees. The area is also of value for over-wintering bumble bee queens.

**4.10.5.4. Area D.** This is an intact piece of heath land with typical vegetation and is a valuable forage area for some of the species eg. *Colletes succinctus*, nesting on the outer Bailey. **Area E** is a small area of tree and shrubs that provides shelter and nesting opportunities for bumble bees. **G** and **F** comprise areas of heath land at different stages of development. Some have been recently burnt, and had little sign of re-growth at the time of the survey. Others have a dense vegetation cover with bracken beginning to appear in patches. Where frequent repeated burning has taken place grasses are taking over from heath land species.

Management of Zone 3 should be aimed at maintaining the greatest diversity of successional stages of the heath land species and preventing grasses from dominating recently burnt areas. Control of bracken will pose major problems in the future

#### **4.10.6. Howth: Zone 4, Cliff walk from the Summit to the Nose of Howth and Balscadden Bay**

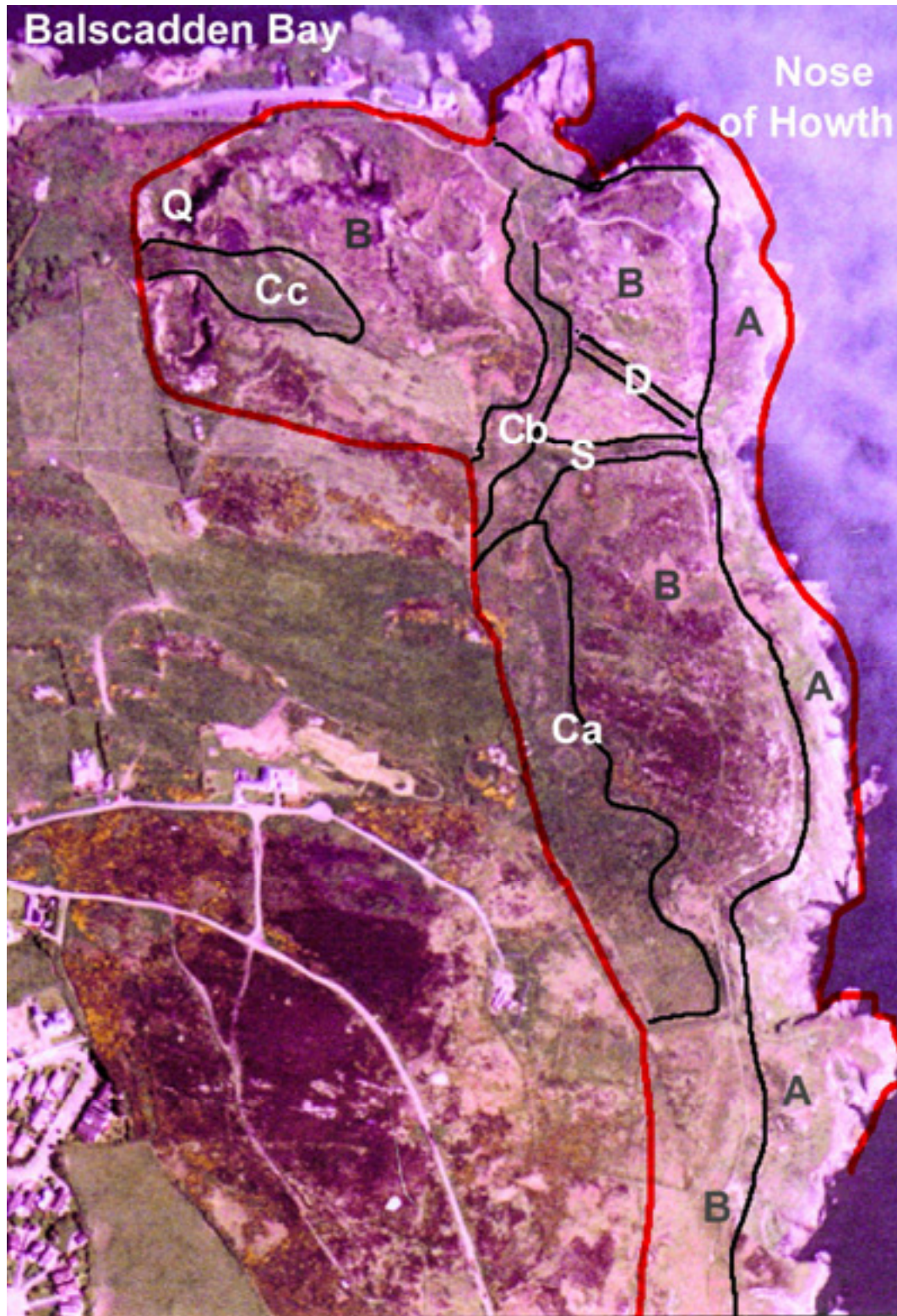
**4.10.6.1. Area A.** Consists of sea-cliffs and steep slopes leading to the cliffs. Only the very tops of the cliffs could be included in this survey for safety reasons, but lower slopes that have some soil pockets and vegetation cover may also be suitable for nesting bees. Because of the east-facing aspect these cliff top slopes receive less sun and are therefore less favourable to bees. Where weathering of the glacial till overlying the bedrock has occurred the material is suitable for nesting bees.

**4.10.6.2. Areas B.** These are heath land areas lying mostly up-hill from the east cliff-walk. The shallowness of the soils overlying the bed-rock limits the attractiveness as nesting habitat for most solitary bee species. Only those specialist heath land species *Colletes succinctus* and *Andrena fuscipes* were seen in abundance. Smaller species of *Halictus* and *Lasioglossum* were observed nesting in the raised edges of the cliff path where this had eroded into the underlying soil.

**4.10.6.3. Areas C.** Area **C** comprises more enriched vegetation, including areas of bramble and bracken. Bramble, when in flower, is attractive to most bees and provides nesting opportunities for *Hylaeus* species in dead stems and both bramble and bracken provide shelter for nesting bumble bees.

**Ca**, lying on the boundary of the survey area, but extending further up the hill is occasionally grazed by horses, but is mostly a grass sward of relatively little interest for bees. Changing the grazing regime here to winter-grazing only, would benefit flowering plants and provide valuable resources for bees. **Cb** and **Cc** are pathways in hollows between rock outcrops, with brambles and bracken lining the path. Deeper soils that hold more moisture have accumulated in these hollow areas resulting in lush vegetation.





**Howth: Zone 4**

**4.10.6.4.** Three features of interest should be noted in Zone 4: A former boundary bank and ditch (**D**), running north-west to south-east. This is one of the few areas with soil loose enough for nesting bees in the areas of heath-land (**B**). The low bank and ditch (south-west facing) also provide shelter in an otherwise exposed area. Specimens of *Andrena fuscipes*, *Nomada rufipes*, *Colletes succinctus*, *Halictus tumulorum*, *Lasioglossum leucopum*, and *Sphecodes geoffrellus* were among the bees seen here.



A small stream (S) provides moisture in an otherwise dry area. The vegetation on either side is richer with some plants not commonly found in other parts of this Zone.

The only specimen taken during the survey of the solitary bee *Andrena tarsata*, was taken at tormentil (*Potentilla erecta*) close to this stream. Tormentil is an important forage plant for smaller bee species on heath land and acidic ground. It flowers before the *Calluna* and *Erica* flowers appear, thus filling a gap between early season flowers and the heather flowers of late summer. The vegetation along the banks of the small stream (S) and along side paths Cb and Cc is lush than the surrounding heath land vegetation. During periods of drought these areas had plants in flower when other areas had dried up.

The quarry (Q) above the car park at Balscadden is of interest because of the floral diversity in such a small area. The north-facing aspect and the generally wet conditions of the ground, mean that no ground-nesting bees use the quarry to nest in, but the rich flora attracts many insects. The alien plant, teasel (*Dipsacus fullonum*) that grows in abundance is very attractive to both bumble bees and to butterflies when in flower, and makes this area of local importance.

**4.10.7. Bee species recorded from Howth:** *Colletes similis*, *Colletes floralis*, *Colletes succinctus*, *Andrena haemorrhoa*, *Andrena bicolor*, *Andrena fuscipes*, *Andrena nigroaenea*, *Andrena tarsata*, *Andrena semilaevis*, *Halictus rubicundus*, *Halictus tumulorum*, *Lasioglossum albipes*, *Lasioglossum leucopum*, *Lasioglossum punctatissimum*\*, *Lasioglossum villosulum*, *Sphecodes geofrellus*, *Sphecodes monilicornis*, *Nomada flavoguttata*, *Nomada rufipes*, *Nomada striata*, *Megachile centuncularis*, *Megachile versicolor*, *Bombus distinguendus*, *Bombus hortorum*, *Bombus jonellus*, *Bombus lapidarius*, *Bombus lucorum*, *Bombus muscorum*, *Bombus pascuorum*, *Bombus pratorum*, *Bombus terrestris*, *Apis mellifera*.

**Total: 32 species** (See Appendix 1 for the site by site species lists.)

Four out of the 32 species recorded from Howth were not seen during this survey namely, *Nomada striata*, *Bombus distinguendus*, *Colletes similis*, and *Lasioglossum punctatissimum*. The last species was only doubtfully recorded previously, the first two are probably extinct locally, and the third *Colletes similis*, prefers habitats with looser sandy soil.

Two species, *Colletes floralis* and *Andrena tarsata* were represented by a single specimen of each. Neither species was seen at any of the other sites surveyed. The occurrence of *Colletes floralis* is discussed more fully in Section 5.4., but *Andrena tarsata* might have been expected to occur more commonly as its principal forage plant tormentil (*Potentilla erecta*) is relatively common on Howth.

Three species, *Colletes succinctus*, *Andrena fuscipes*, and the cuckoo bee *Nomada rufipes* were also only found on Howth, but occurred commonly there. The first two of these (*Colletes succinctus* and *Andrena fuscipes*) are oligolectic on Ericaceae (i.e. they forage for pollen and nectar only on heathers), and *Andrena fuscipes* is the main host for *Nomada rufipes*. So they might also be found on Ireland's Eye and Lambay Island, where these Ericaceae still occur.

The two *Megachile* species found are most likely to occur where dead wood provides nesting opportunities and it is not a coincidence that both were found close to wooded or garden areas.

The high number of bumble bee species reflects both the diversity of habitats in the areas surveyed, but also the ability of bumble bees to forage long distances from nesting areas.

#### **4.10.8. Recommendations for improving the surveyed areas as foraging and nesting habitat for bees.**

##### **Zone 1.**

The owners of Sutton House woods (area B) should be made aware of the environmental value of the area under their control and encouraged to help in the preservation of the ecology of the woodland, particularly the ground flora component.

**Area A** should be managed to produce flower rich grassland, with a limited amount of willow (*Salix* sp.) scrub allowed to grow to provide microclimatic conditions in what is a rather exposed site. Where possible, the boundary between A and Sutton House woods (B) should become less linear, by allowing some shrubs to develop into the grassland. Patches of bramble on this boundary should be left.

Areas C, D and E. are a mosaic of acid heath land, gorse and bracken scrub and semi-improved grassland. The landowners of these areas (some appear to be privately owned, others may be Co. Council or St. Lawrence estate-owned) should be made aware of the environmental value of the area under their

control. Areas of grassland that are already being cut, could be mown to encourage a more diverse sward, areas of gorse and bracken need management to prevent their further spread into areas of heath land. Increased vigilance to prevent heath land fires on already damaged areas is essential-the loss of soil pockets in area **E** may prevent healthy re-growth of heath species.

Area **1** is kept clear of gorse and bracken by rabbits grazing the short turf and they should be protected from any activity that would diminish their role in this area. Area **2** would benefit from similar grazing, but bracken has already become dominant here. Cutting and removing the litter from this small area would benefit the solitary bees that nest in the drift soil of this patch.

Where the public path cuts through deeper pockets of boulder clay, the raised path edge provides opportunities for ground nesting bees. These vertical edges should be occasionally 'scraped' to expose fresh soil. Where vegetation obscures the edges it should be cut back. (This recommendation applies generally to other paths on all the sites surveyed)

The potential value of areas **F** and **G** for bees is determined to a great extent by the condition of the privately owned lands bordering the public path. At present a great proportion of this contains woodland, scrub, as well as some gardens, and these are all of benefit to the bee fauna. Developments that might change the character of those areas should be carefully assessed before any permission is granted.

### **Zone 2.**

The owners of private gardens bordering the cliff-top path should be made aware of the environmental value of their own properties, and the part their gardens play in the wider ecology of the area. They should be encouraged to help in the preservation of the ecology of the area.

Dumping of garden waste on the path margin and onto slopes above the cliffs has led to local enrichment of vegetation in a few places. This activity should be discouraged.

The spread of Hottentot Fig (*Carpobrotus* sp.), naturalised on some of the south-facing cliffs and slopes, should be monitored. While it is a forage plant for bumble bees, this garden escape of South African origin, forms dense mats of new and old growth, carpeting slopes and out competing native plants.

### **Zone 3.**

On the outer Bailey (area **B**), bracken and gorse (*U. europaeus*) should be reduced as much as possible and the areas of heath and acidic grassland promoted. Short turf with bare patches would be most likely to attract ground nesting bees. At present these bees are mainly confined to the margins close to paths and cliff edges. The outer Bailey, as a relatively self contained area, might be one of the few places where fenced-in grazing animals could be used successfully- sheep being obvious candidates.

Areas **C**, **F**, and **G** are all sections of heath land showing the effects of different stages of neglect. The ultimate aim of any management regime for these areas should be to restore them to something resembling area **B**. In the short term, maintaining the greatest diversity of successional stages of the heath land species and preventing grasses from dominating recently burnt areas should be the priority. Control of bracken poses the greatest hurdle to be overcome.

### **Zone 4.**

Areas of heath land (**B** and **C**) should be managed to promote diversity of successional stages of the heath land flora. Where bracken and gorse are starting to dominate, grazing and trampling by animals should be tried as a means of control. This should be done only as part of a monitored strategy. Nearby areas of grazed land (immediately outside of the surveyed zone) now appear to be in permanent grassland, with the consequent loss of biodiversity. This situation must be avoided within the surveyed area.

Small features are important in this zone. Minor changes in topography mean the difference between suitable and unsuitable ground for nesting bees. The soils are generally thin and confined to hollows between the ridges of exposed bedrock. The bank and ditch at **D** provide a sheltered south-facing aspect on an exposed slope. The soil used to build the bank (originally much higher one presumes) is less compacted than the thin soil over the surrounding bedrock. This feature should be protected (or at least noted as being of value). This type of feature could be usefully replicated to enhance bee habitat in say, Zone 1 (area **A**).

The quarry above the car park at Balscadden Bay should be protected from unauthorised dumping.

## Section 5. Discussion

**5.1.** Ireland has approximately 100 native species of bees, compared with a figure of about 250 species in Britain and well over three hundred in France. Europe wide however, bees are in decline. A combination of habitat destruction, habitat fragmentation, and general deterioration in the quality of the remaining habitats have all combined to put wild bees at the top of the list when it comes to endangered groups of insects. In Britain, Falk (1991) estimated that 5% of the fauna had become extinct during the twentieth century. In Ireland, Fitzpatrick et al. (2006) say three Irish species are now extinct here (not having been seen since 1935) and at least another thirty species are either in danger of extinction, in serious decline or vulnerable to extinction.

These insects act as pollinators not only of wild plants but make a significant contribution to the pollination of many commercially important crops. It is in our own long term interest to act to conserve them by protecting their habitats.

**5.2.** The greatest diversity of bees occurs in warmer, drier climates such as the countries bordering the Mediterranean. This attachment to heat and sun is reflected here in Ireland, with the best bee habitats being in the drier warmer parts of the country -the sunny east and south-east counties, and the least number of species occurring in the wetter north and west of Ireland. Drier well-draining soils play their part, as it is in these that most bees dig their nests. Where the soils are wetter or consist of impervious clays, bees struggle to make a living.

The coastal areas of the east and south-east of Ireland, where there are extensive areas of sandy free-draining soils, should therefore be the most 'bee-friendly' areas and in some places this is still true. However the increasing use of coastal dunes and beaches for leisure activities, and the loss of many large dune systems to golf courses have contributed significantly to the decline of many species.

The most significant factor in the decline of bees has been the development of modern farming techniques. This has been a long term wounding force, starting back in the early 19th century with the division and ploughing up of former common grazing land, and accelerating with the development of chemical fertilisers, herbicides and pesticides in the second half of the 20th century. The damage inflicted by the intensive use of DDT, organo-phosphates, organo-chlorines and other chemicals is well documented for many birds, mammals and other vertebrates, but there is no research as far as I am aware on the losses to the insect fauna. The introduction of myxomatosis into the rabbit population in the 1950's and the crash of their population would have had many undocumented effects on the insect populations of coastal grasslands, especially in sand dune systems.

The major loss of natural habitats to agriculture had only recently been halted and now other pressures have emerged. Latterly, the demand for new housing and the development of the building industry has led to the disappearance of old 'brown-field' sites such as sand and gravel-pits that acted as refuges for many species. Increasing numbers of houses are being built on former holiday home and caravan sites at the back of beaches and dunes, and the demand for access to more coastal land by developers is growing increasingly strident.

So, Fingal with its high proportion of the Irish market-garden industry (that was heavily reliant on chemical controls, even until quite recently), its intensive agriculture, its paucity of semi-natural habitats, its high population relative to size (and even higher proportion of golf courses), is probably not the most bee-friendly place in Ireland.

**5.3.** Having said that, this survey has revealed records of forty-nine species of bees in coastal habitats in Fingal. With further effort that number could undoubtedly be raised. Factors such as time of year of a visit, weather at the time, even the time of day can influence what species are seen at a particular site, and it is only over a period of five or six years and many visits at different times of year that one can say with confidence that the fauna of a site has been thoroughly investigated.

Among the forty-nine species recorded are a number of species (*Andrena fucata*, *Nomada striata*, *Nomada panzeri*, and *Bombus distinguendus*), for which only old records exist, the bees not being seen during the two seasons of field work carried out in 2004 and 2005. Further recording effort might reveal the presence of the first three, but *Bombus distinguendus* is extinct in most of Ireland, except the extreme

west and north-west. This was a species of extensive un-improved grasslands, last seen in Fingal on Howth in 1950.

While the loss of *Bombus distinguendus* is to be lamented, the continuing presence of some other species is heart warming. The beautiful little solitary bee *Osmia aurulenta* is a dune/shingle specialist in Ireland. It only occurs on the east and south-east coasts in Ireland, where it builds its cells only inside empty snail-shells. In Switzerland, where it also occurs, it nests in dead plant stems and other cavities as well as snail-shells. It is vulnerable to trampling of the dune and shingle habitat, so is likely to suffer in areas where beaches and sand dunes have heavy public usage.

**5.4.** Finding a single specimen of a species is enough to confirm its presence, but not finding any others raises many questions. A worn female *Colletes floralis* was captured on the heath land above the cliff walk, north of the Baily, Howth. This was the only specimen found during the two seasons of field work on the coastal sites of Fingal. *Colletes floralis* is a relatively common sight on sandy coastal habitats around most of Ireland. On the south and east coast it often shares the same nesting patches of sand with *Colletes similis*, as at Baltray Co. Louth, and at sites in Wicklow and Wexford. *Colletes similis* was recorded from six of the sites looked at for this survey, yet no *Colletes floralis* were found at these sites. It may be that *Colletes floralis* never occurred at any of these sites. Neither are there any records of the species from North Bull Island, to the north of Howth.

Finding the *Colletes floralis* specimen on Howth, is itself somewhat puzzling, as it is a species of more sandy habitats than occur on the cliffs of Howth. One possible answer, which will have to await further recording efforts, is that the specimen was blown from Ireland's Eye, where a dune system does occur. Less likely, but by no means impossible is the possibility of nesting sites occurring on other parts of Howth hill away from the immediate coastal fringe. Stelfox(1927) reported many inland sites for the species in the south-east of Ireland, but I know of only one non-coastline site still in existence (see below).

*Colletes floralis* assumes its great importance when looked at from a European perspective. Although relatively common in Ireland, the species is rare or endangered in the other European countries where it is found. Ireland holds 90% of the population in the Atlantic zone (Fitzpatrick et al. 2006, who classify it as 'Near Threatened' on this basis).

The only population of *Colletes floralis* that the author is currently aware of in Fingal, is in the old gravel and sand pit by the railway station in Skerries, where it shares the habitat with *Colletes similis*. This site also had a population of the solitary bee *Andrena pilipes*, until as recently as 1977. This was one of only three known sites in Ireland for that species, now thought to be extinct in Ireland.

The site, known locally as the Ballast Pit, is to be developed in the very near future -for a swimming pool.

**5.5.** Appendix 1, which gives the site by site species lists, highlights some apparently startling losses, particularly in the area centred on Rush. If these figures reflect the reality on the ground, then the bee diversity of the area has crashed. This should not be that surprising. One has to remember that many old records date from the period 1920 to 1948, when A.W. Stelfox was the entomologist in the National Museum, and occasionally holidayed in the Rush area. The environs of Rush would have been relatively unspoilt at the time, and the sand dunes and their hinterland more or less intact. The effects of market-gardening would have been relatively benign until the post-Second World War period, as the use of chemical controls was limited. Certainly the more persistent organo-phosphates were yet to be seen. The introduction of effective and persistent chemical pesticides, the increased demand for fresh vegetables, the building of the golf course on the dunes, the loss of marginal habitats, and the more recent housing boom are all likely to contribute to the apparent loss of species.

## Section 6.

## CONCLUSIONS

The most important bee habitats of all the sites surveyed are those on the Howth peninsula, the sand dunes of the Island Golf Club peninsula, Donabate, and the Portmarnock Golf Club peninsula. These are the only sites on the coast that still have all the resources necessary to support healthy bee populations. Rush south beach and Portrane Burrows have either lost major components of habitat (Rush) or have become too fragmented (Portrane). Other areas looked at for this survey, are either too small and have only some of the resources required by bees, or are threatened by development and leisure pressures.

The areas of coastline between Holmpatrick Skerries, around Loughshinny and the Drumanagh headland Rush north beach are important for the cuckoo bee *Nomada goodeniana*

Howth, for reasons of size and the high proportion of land area that remains in a semi-natural state, is of prime importance. It has the largest area of coastal dry heath-land in Fingal. The three bee species particularly associated with this heath-land (*Colletes succinctus*, *Andrena fuscipes* and its nest parasite, the cuckoo bee *Nomada rufipes*) are abundant on the Howth peninsula. These three species may also occur on the islands of Lambay and Ireland's Eye (neither of which were looked at in the present survey) but they are unlikely to be found there in the same numbers, nor will they be found anywhere else in Fingal.

Another species, *Colletes floralis* was recorded on Howth, but no breeding site was located. A search for the location of breeding areas of this species should be a priority, especially on the islands of Ireland's Eye and Lambay, but also again on other parts of the Portmarnock and Donabate peninsulas.

One species previously recorded from Howth (*Bombus distinguendus*), has disappeared completely from eastern Ireland, most probably as a result of the loss of extensive winter-grazed grasslands. The disappearance of grazing animals including rabbits, from habitats on Howth is likely to have continuing detrimental consequences into the future.

The sand dunes on which the Island Golf Course is located are relatively intact. This contrasts with the dunes on Portmarnock peninsula, and reflects the different demands placed on the two golf courses. The difference in the total number of bee species recorded from each dune system (32 for Malahide, 18 for Portmarnock including all records prior to the present survey)) since recording began would seem to be reflecting this difference, but those figures almost certainly also reflect recording effort – probably more visits to the Island than there were visits to Portmarnock.

While the present survey concentrated solely on the chosen coastal habitats, any future management plans for the conservation of bees (and other invertebrates) on Fingal's coastal habitats must take cognisance of those areas adjacent to the sites surveyed for this report. Many of the smaller sites looked at will be of little future value to the remaining bees that use the sites, unless the land adjoining them becomes more bee-friendly. As these smaller sites become more isolated in an increasingly fragmented landscape, resident bees will become locally extinct.

Agriculture was the main driving force in the fragmentation of the local landscape until recently. Today, development for housing and leisure has become the main reason for the disappearance of our remaining bee-friendly marginal areas.

## References

Falk, S. (1991).

A review of the scarce and threatened bees, wasps, and ants of Great Britain.  
Research and Survey in nature conservation No. 35, Nature Conservancy Council,  
Peterborough, England.

Fitzpatrick, U., Murray, T.E., Paxton, R.J., & Brown, M.J.F. (2006).

From IUCN regional red lists to national lists of conservation priority species -a  
model using Irish bees.

on [www.npws.ie/PublicationsLiterature/RegionalRedLists/Regional Red List of Irish  
Bees](http://www.npws.ie/PublicationsLiterature/RegionalRedLists/Regional%20Red%20List%20of%20Irish%20Bees). Accessed November 2006.

Ronayne, C. and O'Connor, J. P. (2003).

Distributional records of some Aculeata (Hymenoptera) collected in Ireland from  
1980-2002.

Bulletin of the Irish biogeographical Society No. 27: 227-254.

Ronayne, C. and O'Connor, J. P. (2006).

Further distributional records of Irish Aculeata (Hymenoptera), and a species list for  
Ireland.

Bulletin of the Irish biogeographical Society No. 30: 28-91.

Stelfox, A. W. (1927).

A List of the Hymenoptera Aculeata of Ireland.

Proceedings of the Royal Irish Academy 22(B): 201-335.



# APPENDIX 1. Bees recorded from coastal sites in Fingal.

Bees recorded from coastal sites in Fingal. Part 1

Species Name	Survey Area Name									
	Belvin to more	Impatrick to oughshinny	oughshinny Harbour nanagh	ure and ach North	ach South	e s	e ilk	onabate Island GC	tmarnock Golf Club	7th
<i>communis</i>			X			X				
<i>similis</i>				XO	X	XO	X	XO	X	
<i>floralis</i>										
<i>succinctus</i>										
<i>barbilabris</i>					XO	XO		XO	XO	
<i>haemorrhhoa</i>	X			O			X	XO	X	
<i>fucata</i>					O*			O*		
<i>bicolor</i>	X		XO	O	O	X		XO	X	
<i>fuscipes</i>										
<i>nigroaenea</i>		X	X	X	O	XO		XO		
<i>tarsata</i>										
<i>semilaevis</i>		XO		O						
<i>scotica</i>	X	XO	XO		O			XO		
<i>subopaca</i>				O*				O*		
<i>Andrena wilkella</i>					O*			XO*		
<i>Halictus rubicundus</i>	X		XO	X	XO	XO	XO	XO	X	XO
<i>Halictus tumulorum</i>			XO	XO	O	O	X	O		XO
<i>Lasioglossum albipes</i>				O	O					X
<i>Lasioglossum calceatum</i>	XO		XO	XO	XO	X	X	XO	X	
<i>Lasioglossum cupromicans</i>			XO	O		O				
<i>Lasioglossum nitidiusculum</i>			X	O	O	XO		XO		
<i>Lasioglossum punctatissimum</i>										O*
<i>Lasioglossum leucopum</i>	X					X		XO		XO
<i>Lasioglossum villosulum</i>			XO	O	O	XO	XO	X	X	XO
<i>Sphcodes geofrellus</i>	X			XO	O	XO	X	XO	X	XO
<i>Sphcodes ephippius</i>								O*		
<i>Sphcodes monilicornis</i>							X		O	X

KEY: X = species recorded in 2004 or 2005, during the course of this survey (In the case of Drumanagh 2000-2003. See section 4.3.2.).  
O = species recorded from that site prior to the start of the current survey. O\* denotes old records that may be doubtful

# Bees recorded from coastal sites in Fingal. Part 2

Bee Species Name	Survey Area Name									
	R. Delvin to Bremore	Holmpatrick to Loughshinny	Loughshinny Harbour to Drumanagh	Kenure and Rush Beach North	Rush Beach South	Portrane Burrows	Portrane Cliff walk	Donabate The Island GC	Portmarnock Golf Club	Howth
<i>Nomada fabriciana</i>	X									
<i>Nomada flavoguttata</i>				O				O		X
<i>Nomada goodeniana</i>		O	XO	O				O	O	
<i>Nomada marshamella</i>	X		XO					XO	X	
<i>Nomada panzeri</i>			O					O		
<i>Nomada rufipes</i>										
<i>Nomada ruficornis</i>			O					XO		XO
<i>Nomada striata</i>				O*						O
<i>Osmia aurulenta</i>					O			XO	X	
<i>Megachile centuncularis</i>			X							X
<i>Megachile versicolor</i>				O						XO
<i>Megachile willughbiella</i>		X								
<i>Bombus distinguendus</i>									O	O
<i>Bombus hortorum</i>		XO		O	O	X		O		XO
<i>Bombus jonellus</i>								XO	X	XO
<i>Bombus lapidarius</i>					O			XO		XO
<i>Bombus lucorum</i>	X		X	O	XO	XO	X	XO	X	XO
<i>Bombus muscorum</i>	X		XO		X	X		XO	X	XO
<i>Bombus pascuorum</i>	X	XO	XO	XO	X	XO	X	XO	X	XO
<i>Bombus pratorum</i>	X	X	X	X		X		X		X
<i>Bombus terrestris</i>	X	X	X	XO	X	X	X	XO	X	XO
<i>Apis mellifera</i>	X	X		X		X	X	X		X
<b>Total species recorded per site</b> (less no of species not seen during this survey )	<b>15</b>	<b>10 (-1)</b>	<b>20 (-2)</b>	<b>24 (-14)</b>	<b>21(-13)</b>	<b>20</b>	<b>11</b>	<b>32(-8)</b>	<b>18(-3)</b>	<b>32(-4)</b>
<b>Total species this survey</b>	<b>15</b>	<b>9</b>	<b>18</b>	<b>10</b>	<b>8</b>	<b>20</b>	<b>11</b>	<b>24</b>	<b>15</b>	<b>28</b>

KEY: X = species recorded in 2004 or 2005, during the course of this survey (In the case of Drumanagh 2000-2003. See section 4.3.2.).

O = species recorded from that site prior to the start of the current survey. O\* denotes old records that may be doubtful

## Appendix 2.

### RECORDED SPECIES: NATIONAL STATUS AND FINGAL STATUS

Species Name	National Status IUCN Category	Suggested local status in Fingal	Comment
<i>Hylaeus communis</i>	LC	LC	An aerial nester in dead bramble stems and other plants. Uncommon.
<i>Colletes similis</i>	NT	NT	The commonest species of this genus on the east coast.
<i>C. floralis</i>	NT	EN	The Irish population is of international significance. Locally endangered.
<i>C. succinctus</i>	LC	VU	In Fingal only recorded from Howth; may occur Ireland's Eye & Lambay
<i>Andrena barbilabris</i>	NT	NT	A species mainly of sand dunes; vulnerable to development on dunes.
<i>A. haemorrhoa</i>	LC	LC	Widespread and common
<i>A. fucata</i>	NT	DD	Only one or two records from Fingal. Needs further research.
<i>A. bicolor</i>	LC	LC	A common species having two broods each year.
<i>A. fuscipes</i>	VU	VU	Recorded only from Howth, but might occur on Ireland's Eye and Lambay
<i>A. nigroaenea</i>	VU	NT	Sometimes common in suitable sites.
<i>A. tarsata</i>	LC	DD	Only one record from Fingal (Howth, 2004). Needs further research.
<i>A. semilaevis</i>	VU	VU	Nesting sites are often small in area and vulnerable.
<i>A. scotica</i>	LC	LC	Becoming less common in Fingal.
<i>A. subopaca</i>	LC	EX	The only Fingal records (from the 1920's) give imprecise locations.
<i>A. wilkella</i>	VU	VU	Uncommon and not abundant where it is found; Declining?
<i>H. rubicundus</i>	LC	LC	One of the most common and widespread solitary bees.
<i>H. tumulorum</i>	VU	LC	More common than available records suggest; common on Howth.
<i>L. albipes</i>	LC	LC	A very common and widespread species
<i>L. calceatum</i>	LC	LC	A very common and widespread species
<i>L. cupromicans</i>	LC	DD	An uncommon species in Fingal.
<i>L. nitidiusculum</i>	EN	VU	Appears to be declining; missing from some former sites
<i>L. punctatissimum</i>	LC	DD	Only one doubtful old record; possibly misidentified?
<i>L. leucopum</i>	LC	LC	Common and widespread in a variety of habitats
<i>L. villosulum</i>	LC	LC	Generally common, but appears to be absent from some former sites
<i>Sphecodes geofrellus</i>	LC	LC	A cuckoo species, associated with smaller <i>Lasioglossum</i> species
<i>S. ephippius</i>	LC	LC	A cuckoo species, associated with <i>Halictus tumulorum</i>
<i>S. monilicornis</i>	LC	LC	A cuckoo species, associated with <i>Lasioglossum albipes</i> and <i>calceatum</i>
<i>Nomada fabriciana</i>	LC	LC	A cuckoo species, associated with <i>Andrena bicolor</i>
<i>N. flavoguttata</i>	LC	LC	A cuckoo species, associated with small <i>Andrena</i> species
<i>N. goodeniana</i>	EN	EN	A cuckoo species, associated with <i>Andrena nigroaenea</i> , among others.
<i>N. marshalli</i>	LC	LC	A cuckoo species, associated with various <i>Andrena</i> species
<i>N. panzeri</i>	NT	NT	A cuckoo species, associated with various <i>Andrena</i> species
<i>N. rufipes</i>	LC	VU	A cuckoo species, associated with <i>Andrena fuscipes</i>
<i>N. ruficornis</i>	LC	LC	A cuckoo species, associated with <i>Andrena haemorrhoa</i>
<i>N. striata</i>	EN	EX	A cuckoo species, associated with <i>Andrena wilkella</i>
<i>Osmia aurulenta</i>	NT	VU	Confined to sand dunes, on the east and south coasts.
<i>Megachile centuncularis</i>	NT	NT	More often seen in gardens than on the coast. Aerial nester.

<i>M. versicolor</i>	<b>DD</b>	<b>DD</b>	Widespread but uncommon; nests in cavities
<i>M. willughbiella</i>	<b>NT</b>	<b>DD</b>	Widespread but uncommon; nests in cavities
<i>Bombus distinguendus</i>	<b>EN</b>	<b>EX</b>	Extinct in Fingal; last recorded on Howth in 1950.
<i>B. hortorum</i>	<b>LC</b>	<b>NT</b>	An underground nester, preferring deeper flowers eg Honeysuckle
<i>B. jonellus</i>	<b>LC</b>	<b>NT</b>	A species mainly of heath-land and sand dunes.
<i>B. lapidarius</i>	<b>NT</b>	<b>NT</b>	A species of dunes and unimproved grassland; declining.
<i>B. lucorum</i>	<b>LC</b>	<b>LC</b>	One of the more common bumblebees.
<i>B. muscorum</i>	<b>NT</b>	<b>NT</b>	A species of dunes and unimproved grassland; declining
<i>B. pascuorum</i>	<b>LC</b>	<b>LC</b>	The most common Irish bumblebee, found everywhere.
<i>B. pratorum</i>	<b>LC</b>	<b>LC</b>	A small bumble bee that starts early and is usually gone by August.
<i>B. terrestris</i>	<b>LC</b>	<b>LC</b>	Imported Dutch bees are used for pollination of glasshouse crops.
<i>Apis mellifera</i>	<b>LC</b>	<b>LC</b>	Usually only common near where Apiarists keep hives.

---

\*Fitzpatrick, U., Murray, T.E., Paxton, R.J., & Brown, M.J.F. (2006). From IUCN regional red lists to national lists of conservation priority species -a model using Irish bees.

available at [http://www.npws.ie/PublicationsLiterature/RegionalRedLists/Regional Red List of Irish Bees](http://www.npws.ie/PublicationsLiterature/RegionalRedLists/Regional%20Red%20List%20of%20Irish%20Bees)

\*\*Probable local status is the authors assessment, based on data from the current survey and previous records from Fingal.

IUCN Categories: Least Concern=**LC**; Near Threatened=**NT**; Vulnerable=**VU**; Endangered=**EN**; Extinct=**EX**; Data Deficient=**DD**.

## Appendix 3.

### AN ANNOTATED CHECKLIST OF IRISH BEES

A number of species new to the Irish fauna have recently been reported (Fitzpatrick et al., 2006), but as some of these are awaiting confirmation, they are included only at the end of the relevant sections. A # symbol is used to indicate where these additional species may be placed.

Most bees have no common or vernacular names, so the scientific names are given priority in this account. Where vernacular names exist these are inserted after the scientific name.

---

#### Colletinae (8+ Species)

##### *Colletes* (#).

Three of the four species occurring in Ireland are recorded from Fingal. *Colletes floralis* is the only Irish bee to occur more commonly here than elsewhere in Europe. The Irish populations are therefore of international significance.

*Colletes daviesanus* Smith, F., 1846.

*Colletes similis* Schenck, 1853.

*Colletes floralis* Eversmann, 1852.

*Colletes succinctus* (Linnaeus, 1758).

(Fitzpatrick et al. (2006) added *Colletes fodiens* to the Irish list, but this has yet to be confirmed)

##### *Hylaeus* masked bees.

Masked bees get their common name from the pale yellow or cream coloured markings on the bee's face. They are very small black species (5-7mm long), with an appearance unlike most other Irish bees, and they are easily mistaken for some of the small solitary wasps. Three of our species nest in dead wood or in hollow bramble stems, while *Hylaeus hyalinatus* has been seen nesting in sandy ground. They occur in coastal habitats as well as inland.

*Hylaeus communis* Nylander, 1852

*Hylaeus confusus* Nylander, 1852.

*Hylaeus brevicornis* Nylander, 1852.

*Hylaeus hyalinatus* Smith, F., 1843.

---

#### Andreninae (27+ Species)

**Andreninae** (#) mining bees. The *Andrena* are ground-nesting bees that excavate burrows in clay and sandy well-drained soils. Some species form large nesting aggregations, where each female builds its own nest. If the conditions remain stable these aggregations can last for many years. Other species seem to only nest solitarily. The genus *Andrena* includes some of our scarcest bees, and two or three *Andrena* species (e.g. *Andrena fulva*, *A. pilipes*, and *A. rosae*) may have already become extinct in Ireland.

*Andrena apicata* Smith, F., 1847.

*Andrena denticulata* (Kirby, 1802).

*Andrena clarkella* (Kirby, 1802).

*Andrena fuscipes* (Kirby, 1802).

*Andrena fucata* Smith, F., 1847.

*Andrena haemorrhoa* (Fabricius, 1781).

*Andrena fulva* (Müller in Allioni, 1766).

*Andrena pilipes* Fabricius, 1781.

*Andrena lapponica* Zetterstedt, 1838.

*Andrena tarsata* Nylander, 1848.

*Andrena praecox* (Scopoli, 1763).

*Andrena coitana* (Kirby, 1802).

*Andrena rosae* Panzer, 1801.

*Andrena barbilabris* (Kirby, 1802).

*Andrena scotica* Perkins, R.C.L., 1916.

*Andrena humilis* Imhoff, 1832.

*Andrena stragulata* Illiger, 1806.

*Andrena marginata* Fabricius, 1777.

*Andrena trimmerana* (Kirby, 1802)

*Andrena minutula* (Kirby, 1802).

*Andrena bicolor* Fabricius, 1775.

*Andrena semilaevis* Pérez 1903.

*Andrena angustior* (Kirby, 1802).

*Andrena subopaca* Nylander, 1848.

*Andrena cineraria* (Linnaeus, 1758).

*Andrena wilkella* (Kirby, 1802).

*Andrena nigroaenea* (Kirby, 1802).



Fitzpatrick et al (2006) have added *Andrena helvola* and *Andrena ovatula* to the Irish list but these have yet to be confirmed

### Halictinae (19+ Species)

**Halictinae (#).** The Halictinae (known as 'sweat bees' in America) are a diverse group of bees. In Ireland we have three genera of Halictinae, *Halictus*, *Lasioglossum* and *Sphecodes*. The *Sphecodes* are brood parasites (cuckoos) in the nests of both *Halictus* and *Lasioglossum*. Some species of *Halictus* and *Lasioglossum* are primitively social, with division of labour, where a single female is the sole egg layer, with other members of the nest performing the foraging and colony maintenance tasks. A majority of the Irish species are solitary.

*Halictus rubicundus* (Christ, 1791).

*Halictus tumulorum* (Linnaeus, 1758).

*Lasioglossum lativentre* (Schenck, 1853).

*Lasioglossum albipes* (Fabricius, 1781).

*Lasioglossum calceatum* (Scopoli, 1763).

*Lasioglossum fratellum* (Perez, 1903).

*Lasioglossum nitidiusculum* (Kirby, 1802).

*Lasioglossum punctatissimum* (Schenck, 1853).

*Lasioglossum rufitarse* (Zetterstedt, 1838).

(Fitzpatrick et al. (2006) have added *Sphecodes crassus* to the Irish list but this has yet to be confirmed.)

*Lasioglossum villosulum* (Kirby, 1802).

*Lasioglossum cupromicans* (Perez, 1903).

*Lasioglossum leucopus* (Kirby, 1802).

*Sphecodes ephippius* (Linnaeus, 1767).

*Sphecodes geoffrellus* (Kirby 1802).

*Sphecodes ferruginatus* von Hagens, 1882.

*Sphecodes gibbus* (Linnaeus, 1758).

*Sphecodes hyalinatus* von Hagens, 1882.

*Sphecodes monilicornis* (Kirby, 1802).

*Sphecodes pellucidus* Smith, F., 1845.

### Megachilinae (9+ Species and 2 sub-species)

There are two species of *Osmia* bees in Ireland.

*Osmia aurulenta*, the golden osmia is unique among Irish bees because it nests exclusively in empty snail shells. In Ireland this species appears to be restricted to coastal sites in the east and south-east of the country, especially on sand dune systems.

*Osmia rufa*, the red osmia. A common and widespread species in Britain, this is a recent arrival in Ireland. It had been promoted extensively in Britain as an alternative pollinator to the honey bee, so its arrival here is either an accidental or a deliberate introduction. With only a few sightings so far (from the Dublin region, including one from Skerries), it is too early to say what impact the arrival of this species will have on our native bees.

**Megachile (#)** leaf-cutter bees.

The *Megachile* bees use sections of plant leaves to form cylindrical cells in which they place nectar and pollen, they lay an egg and then close the cell with circular pieces of leaf. These cells are often found in dead wood and hollow plant stems, looking a bit like pieces of narrow cigars. Two unique sub-species occur in Ireland, that differ from the British and continental forms in their coloration.

*Megachile centuncularis* (Linnaeus, 1758).

*Megachile ligniseca* (Kirby, 1802).

*Megachile versicolor* Smith, F., 1844.

*Megachile versicolor s. hiberniae* Perkins, R.C.L. 1925.

*Megachile willughbiella* (Kirby, 1802).

*Megachile willughbiella s. hibernica* Perkins, R.C.L. 1925.

*Megachile maritima* (Kirby, 1802).

**Coelioxys** Both of the species *Coelioxys* are brood parasites or cuckoos of the *Megachile* species.

*Coelioxys elongata* Lepeletier, 1841.

*Coelioxys inermis* (Kirby, 1802).

Fitzpatrick et al (2006) have added *Megachile circumcincta* to the Irish list but this has yet to be confirmed.

### Apinae (33# Species)

**Nomada.** Nomad bees are brood parasites or 'cuckoos' of *Andrena* mining bees. While some have only one host species, most are associated with more than one host. Many *Nomada* have bands of warning colouration -yellow and black, red and black, making them look superficially like wasps.

*Nomada argentata* Herrich-Schaffer, 1839.

*Nomada fabriciana* (Linnaeus, 1767).

*Nomada flavoguttata* (Kirby, 1802).

*Nomada goodeniana* (Kirby, 1802).

*Nomada leucophthalma* (Kirby, 1802).

*Nomada marshamella* (Kirby, 1802).

*Nomada obtusifrons* Nylander, 1848.

*Nomada panzeri* Lepeletier, 1841.

*Nomada roberjeotiana* Panzer, 1799.

*Nomada ruficornis* (Linnaeus, 1758).

*Nomada rufipes* Fabricius, 1793.

*Nomada sheppardana* (Kirby, 1802).

*Nomada striata* Fabricius, 1793.

Two species *Nomada roberjeotiana* and *Nomada sheppardana* may already be extinct in Ireland.

**Bombus.** The bumble bees and the honey bee are social insects, with a queen, a worker caste and male drones. Bumble bees form annual colonies, which normally die out each autumn, leaving only the newly emerged young queens to hibernate over the winter and found new nests the following spring. Recently however, bumble bee workers have been seen flying in mid-winter, suggesting they are responding to the milder winters that have occurred in Ireland over the last decade or more. Many bumble bee species have undergone serious declines over the last century, disappearing from large areas of the Irish countryside. This is more critical when one considers that Ireland has some unique forms found nowhere else in the world. A unique Irish sub-species, *Bombus muscorum s. allenelus* occurs only on the Aran Islands in Co. Galway.

*Bombus lucorum* (Linnaeus, 1761).

*Bombus magnus* Vogt, 1911.

*Bombus terrestris s. audax* (Linnaeus, 1758).

*Bombus hortorum s. ibernicus* Sladen, 1912.

*Bombus lapidarius* (Linnaeus, 1758).

*Bombus jonellus s. jonellus* (Kirby, 1802).

*Bombus monticola* Smith, 1849.

*Bombus pratorum* (Linnaeus, 1761).

*Bombus distinguendus* Morawitz, F., 1869.

*Bombus muscorum s. celticus* Yarrow, 1978.

*Bombus muscorum s. allenelus* Stelfox, 1933

*Bombus pascuorum s. floralis* (Gmelin in L., 1790).

*Bombus ruderarius* (Muller, 1776).

*Bombus sylvarum s. distinctus* Vogt, 1909.

Cuckoo bumble bees. Six of the 19 species of bumble bee in Ireland are social parasites or cuckoo species. The queen of the cuckoo species enters the nests of the host bumble bee in late spring, fights and kills the queen, and then forces the host workers, by a combination of chemical suppressants and physical intimidation, to raise her own brood. Only male and female cuckoo bumble bees are reared, there being no worker caste in the cuckoo species.

*Bombus barbutellus* (Kirby, 1802).

*Bombus bohemicus* (Seidl, 1837).

*Bombus campestris* (Panzer, 1800).

*Bombus rupestris* (Fabricius, 1793).

*Bombus sylvestris* Lepeletier, 1833.

*Bombus vestalis* (Geoff. in Fourc., 1785).

**Apis.** The Irish 'black' honey bee was once the dominant form of honey bee on the island, but the Italian form, with a yellowish orange abdomen, is now the most commonly encountered since it was introduced by commercial apiarists to improve honey yields.

*Apis mellifera* Linnaeus, 1758. Honey bee.