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Protecting rare pollinators:

Northern Colletes

All-Ireland Pollinator Plan
www.pollinators.ie

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How-to-guide 8

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Documenting Ireland's Wildlife

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An Agency within the Department of Agriculture, Environment and Rural Affairs

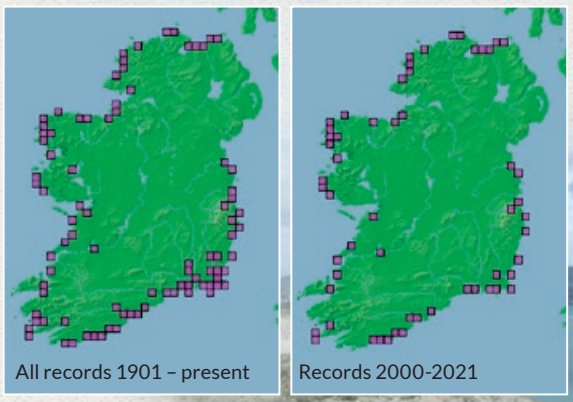
About the Northern Colletes

The Northern Colletes (*Colletes floralis*) is a ground-nesting solitary bee that is restricted to flower-rich coastal habitats such as dunes and machair. It is facing severe decline in Northern Europe, with Ireland currently holding up to 90% of the remaining populations of the bee in the Atlantic zone[1]. Under-grazing, agricultural intensification and development has resulted in reduction and fragmentation of its habitat.

Distribution

The Northern Colletes has a highly fragmented range encompassing flower-rich dunes and grasslands along the coasts of Ireland, Britain; the coasts of the Baltic Sea especially southern Sweden and Finland; the Alps and, eastwards into Siberia[2].

In Ireland, it is almost exclusively coastal and found around the entire coast apart from a gap in the northeast between White Park Bay, Co Antrim and Baltray, Co Louth. The species remains relatively widespread, with around 70 populations recorded since 2000.



All records 1901 – present

Records 2000-2021

Source: https://maps.biodiversityireland.ie/Species/56212

Within Northern Ireland, the Northern Colletes has been recorded in four main locations: Magilligan/The Umbra, Portstewart strand, Burnfoot strand and White Park Bay.

In Britain, the species occurs on the coasts of western Scotland (notably the islands of the Outer Hebrides), and the Cumbrian coast. In Scotland, it is most strongly associated with machair grassland, but also occasionally occurs within sand dunes. It is the only wild bee species that is more widespread in Ireland than in Britain[3].

Conservation status

The Northern Colletes is listed as Vulnerable in the Irish Regional Red List of Bees (2006)[1] and as Vulnerable in the European Red List of Bees (2014)[4]. It is listed as an NI Priority Species under the Wildlife and Natural Environment Act (Northern Ireland) 2011. Globally, Irish populations are extremely important, as they represent a significant proportion of the world population.

Genetic diversity

Given the importance of the Irish populations, a 2010 study carried out a genetic analysis of populations of *Colletes floralis* in Ireland and Scotland. Genetic variability was surprisingly high within populations and there was a high differentiation between populations. There was evidence for substantial barriers to gene flow between populations. Conservation measures need to consider site-specific management, so the species is not lost from sites where healthy and diverse populations occur[5].

Flower-rich sand dune

How to recognise the Northern Colletes

The Northern Colletes is a medium-sized, slender bee, with a black abdomen with each segment containing a white band. The upper thorax and face have fox-coloured hairs. The males and females tend to be similar in appearance, with females typically being larger and more robust.

When searching for the bee it is best to check on White Umbellifers and to look for the distinctive white bands on the abdomen.

Confusion species

There are two other *Colletes* species with which the Northern Colletes could be superficially confused. The Bare-saddled Colletes (*Colletes similis*) occurs on a wide range of habitats in Britain, but in Ireland is largely confined to sand dunes, where it has been recorded on the east and south-east coasts. Current coastal records (since 2000) are known from counties Louth, Dublin, Wicklow, Wexford, Waterford, and Cork. Within those counties, the species flies with the Northern Colletes, the two often visiting the same flowers. Another is, Davies' Colletes (*Colletes daviesanus*), which is very rare in Ireland and is currently only known from one site in Co. Down where it occurs on soft rock cliffs.

Where their ranges overlap, reliably distinguishing the Northern Colletes from the Bare-saddled Colletes and Davies' Colletes requires lethal sampling so that microscopic features can be observed.

Colletes similis

Colletes daviesanus

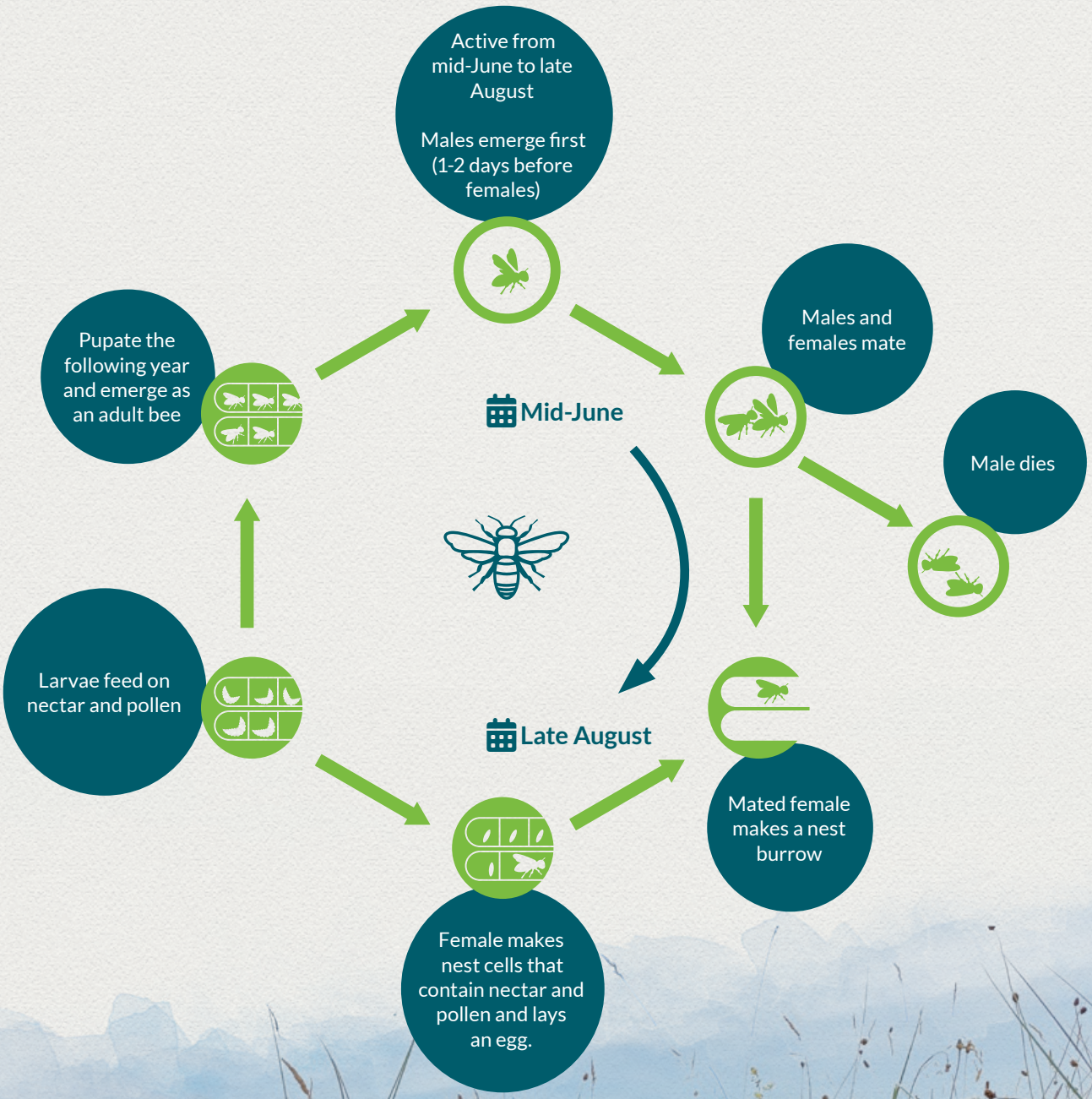
Ecology & lifecycle of the Northern Colletes

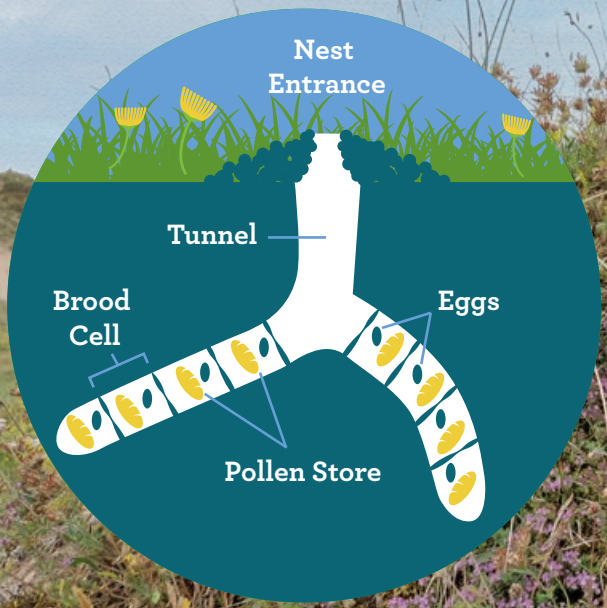
The Northern Colletes is a solitary bee. This means it does not form colonies with a queen and workers. Each female excavates her own nest by making a small burrow into stable sand. A secretion from glands in their mouths is used to coat the inside of the burrow before the eggs are laid in sealed cells. The burrow is then closed with consolidated sand. Within each cell, the female lays a fertilised egg and leaves a food reserve comprised of regurgitated nectar and pollen. The larvae feed on the provisioned food before pupating and spending the winter hibernating as dormant adults.

Adults normally emerge from mid-June onwards and remain active until late August. Mating occurs from mid-June through July after which the males die. Pollen is gathered from a wide variety of plants. Studies within Ireland have shown that the bee has a strong preference for flowers of umbellifers (Apiaceae family)[6].

The Northern Colletes nests in aggregations where suitable nesting substrate is found. This can appear like a large colony, but each nest is separate, and the bees do not help each other in nest building or provisioning.

Studies within Ireland have shown that the bee has a strong preference for flowers of umbellifers.


Active from mid-June to late August
Males emerge first (1-2 days before females)
Males and females mate
Male dies
Mid-June
Pupate the following year and emerge as an adult bee
Larvae feed on nectar and pollen
Late August
Mated female makes a nest burrow
Female makes nest cells that contain nectar and pollen and lays an egg.


Nest Entrance
Tunnel
Brood Cell
Eggs
Pollen Store

What it needs

Suitable nest sites

Suitable nest sites for the Northern Colletes are bare patches of firm sandy soil, or south-facing slopes and banks where the vegetation is short and sparse. Typically, these are areas of firm sand structured with vegetation such as thyme, moss or grasses.

Northern Colletes nesting burrow

In nature, solitary bees are very dynamic. They will make use of new nest sites where suitable conditions appear, assuming these lie close to both necessary food resources and existing nest aggregations to provide a source of bees. Dunes are dynamic features and blowouts are a natural and desirable feature of large dune systems, maintaining open conditions amongst areas of grassland and heath. These natural sand movements which create bare or sparsely vegetated sand essential for nesting should be encouraged.

It is essential to consider nest sites and forage sources in parallel. The Northern Colletes is likely to be able to fly only short distances (<500m) between nesting sites and foraging areas[7] and so requires flower-rich areas to be close to their nest sites.

A supply of pollen and nectar throughout the season

The Northern Colletes is polylectic, which means it gathers pollen from a wide variety of plants within areas of flower-rich grassland adjacent to their nesting sites[8].

Studies within Ireland have shown that the bee has a strong preference for flowers of umbellifers (Apiaceae)[6]. The most important forage species are Wild Carrot and Wild Angelica. Outside this, it is known to feed on a range of available plants within coastal systems, but particularly yellow composites (Asteraceae).

Coastal habitat with umbellifers

Native plants that provide food for the Northern Colletes

The table below lists the ten most common plants that Northern Colletes have been observed foraging on in Ireland. This is based on data collated from various sources by the National Biodiversity Data Centre.

Northern Colletes flight period	June	July	August	September
Wild Carrot ★ *Daucus carota* (Apiaceae)				
Wild Angelica ★ *Angelica sylvestris* (Apiaceae)				
Hogweed *Heracleum sphondylium* (Apiaceae)				
Cat's-Ear *Hypochaeris radicata* (Asteraceae)				
Hawkbits *Leontodon species* (Asteraceae)				
Common Ragwort *Jacobaea vulgaris* (Asteraceae)				
Yarrow *Achillea millefolium* (Asteraceae)				
Wild Thyme *Thymus drucei* (Lamiaceae)				
Lady's Bedstraw *Galium verum* (Rubiaceae)				
Buttercups *Ranunculus species* (Ranunculaceae)				

★ Most important forage plants based on experiences in Ireland

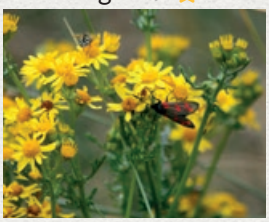

Wild Carrot ★


Wild Angelica ★


Hogweed


Cat's-Ear

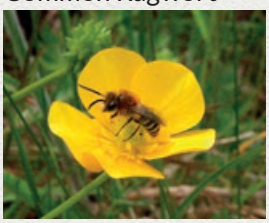

Hawkbits


Common Ragwort


Yarrow


Wild Thyme


Lady's Bedstraw


Buttercups

Threats

The Northern Colletes has a widespread but fragmented distribution, restricted by the amount of suitable flower-rich coastal sites available. Because of its fragmented distribution, any damage to its coastal habitat is likely to be detrimental.

Loss of habitat

The main threats to the bees' habitat come from agricultural expansion and intensification, in particular inappropriate grazing regimes, which can cause loss of the flower-rich habitats. Coastal developments such as housing, caravan parks, golf courses, and coastal defences as well as sand and shingle extraction also damage habitat. Recreational activities can negatively impact the bee, although low intensity, and controlled recreational use can help by creating bare areas for nesting. Active management of sand dunes and grassland is generally required to retain flower-richness. Under grazing and abandonment tends to lead to an increase in grasses/scrub and reduction in wildflowers.

Climate change

A changing climate will create challenges for the Northern Colletes. Like many solitary bees, wetter, warmer weather during the flight period could affect the abundance and distribution of this species in Ireland. Coastal systems, and particularly dune slacks, are likely to be particularly susceptible to climate change[9]. Extreme weather events that damage dune systems could also have serious negative consequences. On sites where the species is nesting primarily in the foredunes e.g., White Park Bay in Co. Antrim[10], it will be particularly susceptible to winter storms.

Management recommendations

The Northern Colletes does not have complex requirements. At the site level, it requires stable flower-rich coastal grassland sites - dunes and machair.

Attempt to retain the Northern Colletes where it occurs

This recommendation is key. On sites where it occurs, the species appears to be genetically healthy. However, once lost from a site it will be very difficult to naturally return given that populations are currently very fragmented. Given the importance of the Irish populations in a global context, it is essential that currently known sites continue to be managed to protect the bee. This means that they remain flower-rich during its flight period (mid-June until late-August). Within this, priority should be given to sites with large populations.

Retain stable coastal grasslands that are flower-rich

- ✓ **Ensure natural dune zonation** to provide a varied habitat. The Northern Colletes needs areas of short sward for nesting, close to areas of longer herb-rich sward that includes species like Wild Carrot. Large dune systems should ideally have a full range of the successive stages of sand stabilisation: mobile fore-dunes, progressively stabilised young yellow and grey dunes, more established dunes with varied vegetation; stable sandy grassland or dune heath and dune slacks. Any established management (e.g., grazing or cutting) or disturbance that contributes towards the overall character and stability of the sites, and holding back succession should remain.

- Low intensity cattle-based farming, allowing **appropriate autumn and winter grazing of dune grasslands** appears to be the most effective method of maintaining the bees' habitat[11]. Winter cattle grazing produces short-cropped banks and poached areas suitable for use by nesting bees, but at the same time the summer break from grazing allows flowers to bloom and set seed, providing a diverse nectar and pollen source for the bees throughout their flight period (mid-June to late-August). Heavy and prolonged grazing would significantly reduce the diversity of the flowering plants, meaning that the pollen and nectar source would be at risk. Dosing of livestock with broad-spectrum de-wormers which are damaging to insect development should be avoided. Where grazing cannot be introduced, e.g., in caravan parks, annual mowing or strimming can help to support a flower-rich sward.

- **Manage wild grazing** (rabbits). Rabbit grazing can be positive as it tends to produce close-cropped lawns amongst taller vegetation and their scrapes provide areas of bare and disturbed ground that is required by other invertebrate species. However, if rabbit numbers are too high, it can threaten the stability of the dunes, eliminate the varied vegetation structure, or destroy important flower resources.
- **Avoid extensive scrub encroachment.** A cessation of grazing on previously grazed dunes risks an invasion of coarse grasses and scrub which outcompete the fixed dune vegetation communities. Scrub and natural scrub edges are important habitats within coastal systems and many insects and invertebrates need a mix of scrub and grassland. Coastal scrub provides shelter, can protect plants from grazing, and the litter (Bracken) is an important component, creating a warm microclimate. A small amount of scrub consisting of native species should be retained, but managed so that it does not spread over large areas. However, many species, such as Sea buckthorn can be aggressively invasive and need active management before their dense cover reduces the areas of bare sand and leads to drying of the site.

Manage activities that could be detrimental

Any activities which significantly reduce or accelerate the natural rates of erosion can be detrimental

- Avoid reseeding or the use of synthetic fertilisers and herbicide in dunes.
- Car-parking and use of off-road vehicles that cause high levels of erosion should be avoided.
- Preventing excessive damage by disturbance and overuse by trampling should be a priority. Note that low intensity controlled recreational use can help by creating bare areas for nesting.
- Fore-dunes are especially vulnerable to erosion and trampling, which should be kept to a minimum, if necessary, fencing off areas periodically to allow recovery.
- Where fencing and boardwalks are used in sand dune systems to allow dune fixation and reduce excessive disturbance from trampling, the necessary permissions should be in place. This should be done with care and ideally only as a temporary surface in peak season on heavily eroded tracks. Overstabilisation is an issue in dunes and the subsequent loss of open, bare sand may reduce nesting habitats for the bee.
- Avoid sand or shingle extraction.
- Sand boarding (which can take place in larger dune blowouts) can be detrimental as it creates exposed and unstable sand.
- Golf courses within dune systems can fragment the habitat and also severely modify the vegetation by re-seeding, fertilising and mowing of the fairways, greens and tees.

Increase connectivity

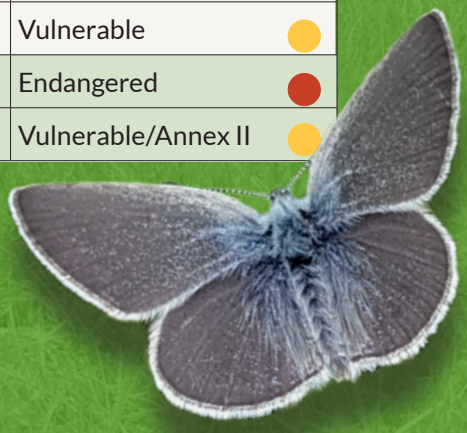
Where possible, flower-rich coastal sites should be enlarged and improved to create coastal habitat networks. While difficult, it may be possible in some areas by restoring agricultural land through appropriate management, and by sympathetic management of golf courses, caravan parks or amenity areas. This would allow species to move across the landscape more easily, giving them a better chance of survival, and is the best way to expand the range of rare species such as the Northern Colletes.

Other coastal species that will benefit from this management

Management of coastal sites for the Northern Colletes could potentially benefit various other threatened species, some of these are listed below:

Group	Common name	Species name	Conservation status
Birds	Meadow Pipit	*Anthus pratensis*	Red*
	Lapwing	*Vanellus vanellus*	Red*
	Redshank	*Tringa totanus*	Red*
	Skylark	*Alauda arvensis*	Amber*
Bees	Red-shanked Carder Bee	*Bombus ruderarius*	Vulnerable
	Great Yellow Bumblebee	*Bombus distinguendus*	Endangered
	Red-tailed Cuckoo Bee	*Bombus rupestris*	Endangered
	Shiny-margined Mini-mining Bee	*Andrena semilaevis*	Vulnerable
	Tufted Furrow Bee	*Lasioglossum nitidiusculum*	Vulnerable
Butterflies	Small Blue	*Cupido minimus*	Endangered
	Wall	*Lasiommata megera*	Endangered
	Marsh Fritillary	*Euphydryas aurinia*	Vulnerable/Annex II
	Dark Green Fritillary	*Argynnis aglaja*	Vulnerable
Moths	Portland Moth	*Actebia praecox*	Critically endangered
	Light Feathered Rustic	*Agrotis cinerea*	Critically endangered
	Forester	*Adscita statices*	Endangered
	Narrow-Bordered Five-spot Burnet	*Zygaena lonicerae*	Vulnerable
Snails	Sand Amber Snail	*Quickella arenaria*	Endangered
	Narrow-mouthed Whorl Snail	*Vertigo angustior*	Vulnerable/Annex II

* Birds of Conservation Concern Ireland; other conservation status from Nelson, B., et. al. (2019) Checklists of protected and threatened species in Ireland. Irish Wildlife Manuals, No. 116. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht, Ireland.



Actions

Overarching objectives:

1. Maintain key populations on current sites
2. Manage coastal sites for the Northern Colletes
3. Raise awareness of the Northern Colletes
4. Increase our knowledge of the Northern Colletes

POLLINATOR ACTION 1

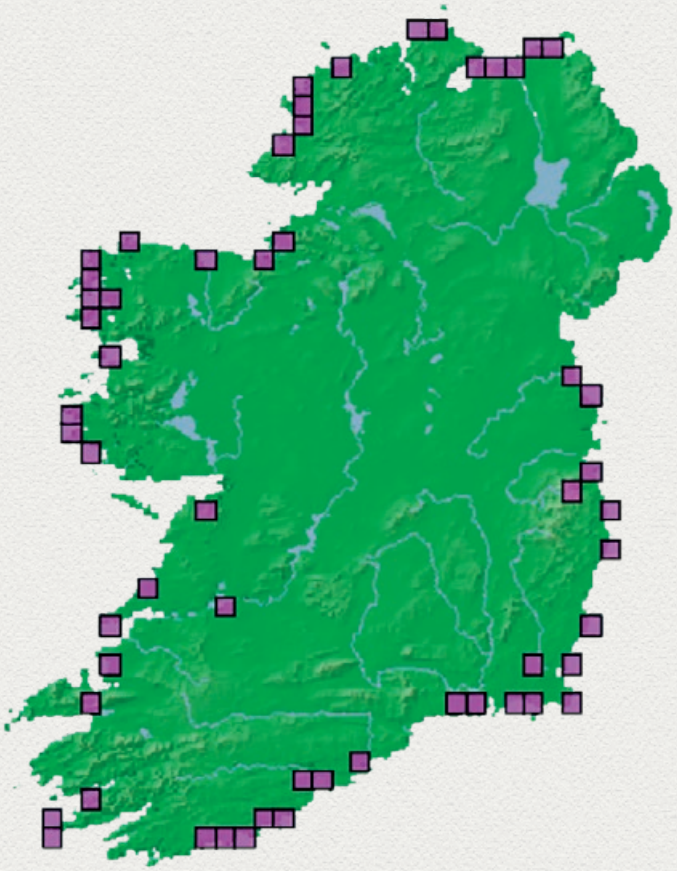
Maintain key populations on current sites

ACTION

A Maintain as many existing populations as possible

What is required

- Where known populations occur, this guideline document should be provided to site managers.
- Establishment of regular monitoring of the species on known sites, with data submitted to the National Biodiversity Data Centre and CEDaR.



Maps generated from https://maps.biodiversityireland.ie/

POLLINATOR ACTION 2

Manage coastal sites for the Northern Colletes

ACTION	What is required
A Adoption of positive land management for the Northern Colletes across Natura 2000 designated land in the Republic of Ireland	• Where appropriate, integration of appropriate measures within Conservation Objectives for Natura sites by the National Parks and Wildlife Service (NPWS). • Where appropriate, include measures for the Northern Colletes in NPWS farms plans for coastal habitats.
B Adoption of positive land management for the Northern Colletes across the National Site Network and designated land in Northern Ireland	• Where appropriate, integration of appropriate measures within Conservation Objectives for National Site Network sites by the Northern Ireland Environment Agency (NIEA).
C Adoption of positive land management for the Northern Colletes across coastal sites managed by the National Trust	• Continuation of positive land management for the Northern Colletes at White Park Bay and Portstewart Strand • Northern Colletes to remain within site management plans - White Park Bay and Portstewart Strand.
D Adoption of positive land management for the Northern Colletes across coastal sites managed by Ulster Wildlife	• Continuation of positive land management for the Northern Colletes at The Umbra. • Northern Colletes to remain within site management plans for The Umbra.
E Adoption of positive land management for the Northern Colletes across coastal sites managed by the Ministry of Defence (MoD)	• Species considered within site management plans, where appropriate – Magilligan.
F Adoption of positive land management for the Northern Colletes across coastal sites managed by BirdWatch Ireland	• Identification of all relevant reserves. • Species considered within conservation management plans, where updates are occurring and where it is appropriate.
G Adoption of positive land management for the Northern Colletes across coastal sites managed by the OPW	• Identification of all relevant coastal sites (e.g., Derrynane House). • Species considered within conservation management plans, where updates are occurring and where it is appropriate.
H Coastal golf courses close to existing populations to be encouraged to manage areas for the Northern Colletes	• Identification of all relevant courses. • Guide to be provided to Greenkeepers.
I Site specific management plans should be developed for some of the key Northern Colletes populations	• This has completed by the National Trust for White Park Bay and Portstewart Strand[10] • Other to be developed as appropriate and where funding allows.

POLLINATOR ACTION 3

Raise awareness of the Northern Colletes

ACTION	What is required
A Develop and promote reference sites to illustrate best practice and as an educational resource	• Identify a suitable existing site that could be promoted in this context in both RoI and NI e.g., Portstewart Dunes, Raven Nature Reserve.
B Create an online webinar on management of dunes for the Northern Colletes aimed at site managers	• Creation of a freely available short webinar on the Northern Colletes and how to manage coastal sites to support the bee.
C Northern Colletes signage templates and information board templates developed for use on sites where it occurs	• These resources developed and made freely available.

Where possible, flower-rich coastal sites should be enlarged and improved to create coastal habitat networks.

POLLINATOR ACTION 4

Increase our knowledge of the Northern Colletes

ACTION	What is required
A Commission a survey of the current distribution of the Northern Colletes	• Funding for a re-survey of all known sites since 2000: over one third of the sites in RoI do not have data collected with the last ten years.
B Encourage the submission of casual Northern Colletes records by experienced recorders	• Bee promoted by the National Biodiversity Data Centre and the All-Ireland Pollinator Plan with record submission encouraged. • Sites that would be useful to be rechecked flagged to expert recorder networks where possible
C Expand a monitoring programme on known sites	• Investigate whether Northern Colletes sites are included within National Pollinator Monitoring Schemes in RoI and NI (due to commence 2022). • Identify other sites where monitoring would be valuable.
D Develop a spatial strategy for conservation of the species	• Using information on current distributions as well as existing land cover and land-use maps, identify areas for habitat creation as corridors for dispersal or stepping-stone habitats. Within N. Ireland, this to fall within the Buglife B-lines Initiative.
E Undertake detailed studies on the ecology of species in an Irish context	• MSc studies to be encouraged to carry out additional work to refine the nesting and foraging preferences in Ireland and to contribute towards periodic monitoring to assess the health of key sites.

6. Key References

[1] Fitzpatrick, Ú., Murray, T.E., Byrne, A.W., Paxton, R.J. and Brown, M.J.F. 2006. *Regional red list of Irish bees*. National Parks and Wildlife Service (Ireland) and Environment and Heritage Service (N. Ireland).

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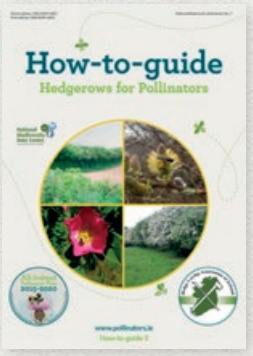
This booklet is one of a series of Guidelines produced to help different sectors take actions under the All-Ireland Pollinator Plan. For more information and other useful resources, please see **www.pollinators.ie**



National Biodiversity Data Centre
A Heritage Council Programme

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About the National Biodiversity Data Centre

The National Biodiversity Data Centre is a national organisation that collects and manages data to document Ireland's wildlife resource, and to track how it is changing. Find out what biodiversity has already been recorded in your local area: **maps.biodiversityireland.ie**

Help us to build up the knowledge of biodiversity in your local area by submitting sightings to **records.biodiversityireland.ie**

Text: Úna FitzPatrick (National Biodiversity Data Centre), Danielle Shortall & Melina Quinn (National Trust) & Anna Hart (Buglife). Thanks to Aoife Delaney & Brian Nelson (National Parks and Wildlife Service) and Niamh Carmichael (CEDaR) for input. Design: Vitamin Creative, Waterford.

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Department of Agriculture, Food and the Marine
An Roinn Talmhaíochta, Bia agus Mara
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