

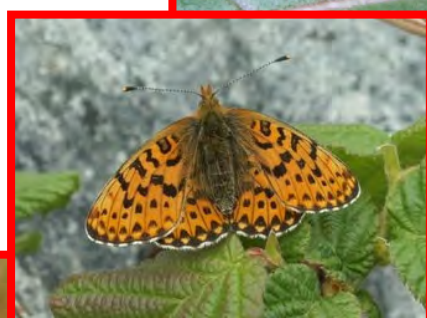
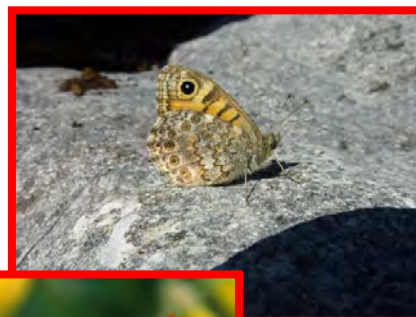
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# Ireland

## Red List No. 4



# Butterflies







## Ireland Red List No. 4:

### Butterflies

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Cover images from top: Wall *Lasiommata megera* (© Jesmond Harding); Marsh fritillary *Euphydryas aurinia* (© Chris Wilson); Marsh fritillary *Euphydryas aurinia* (© Áine O Connor); Pearl-Bordered Fritillary *Boloria euphrosyne* (© David Nixon); Small blue *Cupido minimus* (© Chris Wilson).

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## **ACKNOWLEDGEMENTS**

Firstly, we would like to record our gratitude to all those who have contributed butterfly records to the various recording schemes both in the Republic of Ireland and in Northern Ireland. This red list is underpinned by tens of thousands of records contributed by hundreds of recorders and could not have been undertaken without this data. We are grateful to National Parks and Wildlife Service, Northern Ireland Environment Agency, and the National Biodiversity Data Centre for their support of this project and wish to especially thank Naomi Kingston, Ferdia Marnell, Liam Lysaght and Úna Fitzpatrick. Thanks are also due to Maurice Hughes for releasing the butterfly records from Northern Ireland. We would like to thank Richard Fox, Surveys Manager, Butterfly Conservation for his input as external advisor.

## EXECUTIVE SUMMARY

All 33 resident and regular migrant species of Irish butterflies are evaluated for their conservation status using the International Union for Conservation of Nature (IUCN) regional criteria. The Red List assessment was carried out using best expert opinion and data from the authors, the Dublin Naturalists' Field Club Butterfly Ireland survey, from Northern Ireland data gathered by Butterfly Conservation, and from the NBN Gateway.

Eighteen percent of the native Irish butterfly fauna is under threat of extinction. A further 15 percent is Near Threatened. The results show that one species is extinct (Mountain Ringlet), six species are threatened (Endangered or Vulnerable) and five species are Near Threatened. This situation is due to population declines and range reductions caused in the main by decline in habitat quality.

The six threatened species are:

- Pearl-Bordered Fritillary (*Boloria euphrosyne*) – Endangered
- Small Blue (*Cupido minimus*) – Endangered
- Wall (*Lasiomata megera*) – Endangered
- Dark Green Fritillary (*Argynnis aglaja*) – Vulnerable
- Large Heath (*Coenonympha tullia*) – Vulnerable
- Marsh Fritillary (*Euphydryas aurinia*) – Vulnerable

The five Near Threatened species are:

- Dingy Skipper (*Erynnis tages*)
- Gatekeeper (*Pyronia tithonus*)
- Grayling (*Hipparchia semele*)
- Small Heath (*Coenonympha pamphilus*)
- Wood White (*Leptidea sinapis*)

No Irish butterfly species is listed as threatened on the IUCN global red list ([www.iucnredlist.org](http://www.iucnredlist.org)) but one species is listed as threatened on the European Red List: Large Heath *Coenonympha tullia* (Vulnerable, A2c; van Swaay *et al.*, 2010). The Marsh Fritillary *Euphydryas aurinia* is listed in Annex II of the European Union Habitats Directive.

## INTRODUCTION

Insects make up a large proportion of Ireland's biodiversity (Regan *et al.*, 2010) and are essential to ecosystem functioning. In spite of this, they are an under-studied and under-appreciated component of our wildlife. Butterflies are the exception to this statement. They are a popular, charismatic group of insects that capture the imagination of scientists and the public alike.

Butterflies are important indicators of biodiversity and they can be used to monitor the health of ecosystems and the impact of land management. Being insects with mostly short generation times, their populations react quickly (positively or negatively) in response to alterations in their environment and so they have great potential for monitoring change. In Europe, many butterflies declined severely in range and population in the 20<sup>th</sup> century. This downward trend is still continuing as shown by the recent European Red List of Butterflies which determined that a third of butterflies had declined during the first decade of the 21<sup>st</sup> century (van Swaay *et al.*, 2010). In Great Britain, the recent regional red list has shown that 39% of British butterflies are classified as regionally extinct or under threat of extinction (Fox *et al.*, 2009).

The principal causes of the decline in the butterfly populations throughout Europe are related to changes in land management. The most significant are the agricultural intensification of productive land and the abandonment of traditional farming practices especially grazing on marginal land. Although different in outcome, these changes in the landscape have particularly reduced the extent and quality of flower-rich habitats that support the most species-rich European butterfly communities (van Swaay *et al.*, 2010).

Ireland is not rich in butterflies. The species richness of the island is the lowest of any European Union country (van Swaay *et al.*, 2010). In common with all other elements of biodiversity, the reasons for this are related to the recent climatological history together with habitat and foodplant availability. Nevertheless, and although most of our species are widespread throughout Europe, the Irish butterfly fauna does exhibit some interesting features and holds important populations of certain species. The composition of the butterfly fauna of Ireland differs from that of the neighbouring island of Great Britain somewhat, most conspicuously demonstrated by the species of wood white *Leptidea* spp. Morphological differences are apparent in some species relative to the forms found in Great Britain and elsewhere which have been described as separate subspecies (Bond *et al.*, 2006). Few studies of the Irish populations have gone beyond this superficial level, but there is potential for more detailed ecological and genetic research.

## LEGAL PROTECTION

The Marsh Fritillary *Euphydryas aurinia* is protected under the EU Habitats Directive [92/43/EEC]. The Dingy Skipper *Erynnis tages*, Brimstone *Gonepteryx rhamni*, Holly Blue *Celastrina argiolus*, Large Heath *Coenonympha tullia*, Marsh Fritillary *Euphydryas aurinia*, Purple Hairstreak *Neozephyrus quercus*, and Small Blue *Cupido minimus* are legally protected under the Wildlife (Northern Ireland) Order 1985, while no butterfly species is legally protected in the Republic of Ireland under the Wildlife Act, 1976 or the Wildlife (Amendment) Act, 2000. The only Irish species on the European Red List of Butterflies is the Large Heath *Coenonympha tullia* (van Swaay *et al.*, 2010).

## NOMENCLATURE

Nomenclature follows Bond *et al.* (2006) and Bradley (2000).

## DEVELOPMENT OF THE RED LIST

### Methodology used

The butterfly list is the fourth in a series of regional red lists for the island of Ireland being developed by the National Parks and Wildlife Service and the Northern Ireland Environment Agency in conjunction with the National Biodiversity Data Centre. The data gathered by the Butterfly Monitoring Scheme (run by the National Biodiversity Data Centre in the Republic of Ireland and Butterfly Conservation in Northern Ireland), Butterfly Ireland (the recording scheme run by The Dublin Naturalists' Field Club covering the Republic of Ireland) and the Northern Ireland Branch of Butterfly Conservation has made it possible to evaluate the conservation status of Irish butterflies.

The International Union for the Conservation of Nature (IUCN) provides guidelines for using the red list categories at a regional level (IUCN, 2003). This guidance was used alongside the IUCN categories and criteria (IUCN, 2001) and guidelines for their application (IUCN, 2008; see Appendix 1) in the production of this red list.

### Data sources

Butterflies have been recorded in Ireland since the 1800s and the first Provisional Distribution Atlas of Butterflies in Ireland was produced by the Irish Biological Records Centre in 1975 (Crichton & Ní Lamhna, 1975) and the last edition in 1980 (Ní Lamhna, 1980). Since then three publications on the butterflies of Britain and Ireland have included distribution maps (Heath *et al.*, 1984, Asher *et al.*, 2001 and Fox *et al.*, 2006). These have been consulted in the assessment of the Irish species together with the maps available on the Butterfly Ireland website ([www.butterflyireland.com](http://www.butterflyireland.com) maintained by Dublin Naturalists' Field Club) and the Butterflies and Moths of N. Ireland ([www.habitas.org.uk/moths](http://www.habitas.org.uk/moths) maintained by Northern Ireland Branch of Butterfly Conservation and CEDaR). The mapped data was available at the hectad (10 km x 10 km) level.

Although the distribution data for butterflies are more comprehensive than any other invertebrate group in Ireland, the data sources have limitations. This was given appropriate consideration in the assessment process and the distributional data has been supplemented by expert opinion. The only IUCN criteria used were A and B in the absence of any population level data.

### Regionally determined settings

The time frame for assessing change was set at 1995-2009 (to 31 December 2009) and pre-1995 (prior to 31 December 1994). There is reasonable distribution coverage for these time periods and it is also consistent with other recent regional red list assessments for other groups of Irish invertebrate: bees (Fitzpatrick *et al.*, 2006), water beetles (Foster *et al.*, 2009) and non-marine molluscs (Byrne *et al.*, 2009).

A species was considered extinct if it had not been recorded in over 100 years. No species was considered data deficient, i.e. little or no information on the abundance and distribution of the species.



The IUCN advise that red lists are re-evaluated every five years if possible, or at least every ten years. The Irish Butterfly Monitoring Scheme will hopefully provide more detailed population assessments for the next full red list assessment of Irish butterflies, which should take place no later than 2020.

The assessment was carried out on an all-Ireland basis. However, for two species, Small Blue and Wall, a separate assessment was made for the population in Northern Ireland. This was at the request of the local experts to emphasize the decline and poor conservation status of these species in Northern Ireland.

The IUCN regional guidelines recommend that regional assessments should be carried out in a two-step process (IUCN, 2003). Step one is the initial assessment of the regional population. Step two can be applied if there are any conspecific populations outside the region that may affect the risk of extinction within the region. This was determined not to apply to the Irish butterfly populations and the Red List Categories defined by the criteria were adopted unaltered.

### Species coverage

A total of 33 species were assessed including resident and regular migrants (Table 1). All taxa were assessed at the species level. Rare migrant, vagrant and adventive species and those which have been established in Ireland for less than 10 years were not assessed. These species are listed in Table 2.

### Assessment group

The assessment was undertaken at a meeting on 20 August 2010 at National Parks and Wildlife Service offices in Dublin. Those in attendance were; Bob Aldwell, Ken Bond, Jesmond Harding, Naomi Kingston, Ferdia Marnell, David Nash, Brian Nelson, David Nixon, Eugenie Regan, and Chris Wilson.

### Species accounts

There is a wealth of publications from elsewhere on the identification, ecology and conservation of the butterfly species which are found in Ireland and so only brief species accounts are given. This information is derived from published and unpublished sources mentioned above and also Bond & Gittings (2008), Harding (2008) and Thompson & Nelson (2006) which are not cited in the accounts. Other information can be accessed by consulting the bibliographies of these publications. The species accounts are presented in alphabetical order by common name.

The maps presented in this Red List for the Threatened and Near Threatened species have been generated using published sources, including Heath *et al.* (1984), Asher *et al.* (2001), Fox *et al.* (2006), and the Dublin Naturalists' Field Club website, [www.butterflyireland.com](http://www.butterflyireland.com). A full copy of the Northern Ireland data was supplied by the Northern Ireland branch of Butterfly Conservation.

Table 1 lists all the Irish species with their red list assessment for Ireland. One species, the mountain ringlet, was evaluated as Regionally Extinct and has not been recorded in Ireland for over 100 years. Three species (Pearl-bordered Fritillary, Small Blue and Wall) were evaluated as Endangered, three species (Dark Green Fritillary, Large Heath and Marsh Fritillary) as Vulnerable, and five species as Near Threatened (Dingy Skipper, Gatekeeper, Grayling, Small Heath and Wood White). This is a total of 11 species out of 33 resident and regular migrant species. Therefore 18 percent of our native Irish

butterfly fauna is under threat of extinction and 15 percent is Near Threatened (Figure 1). Separate threat statuses were determined for the Northern Ireland populations of the Small Blue and Wall.

**Table 1:** Red List of Irish Butterflies.

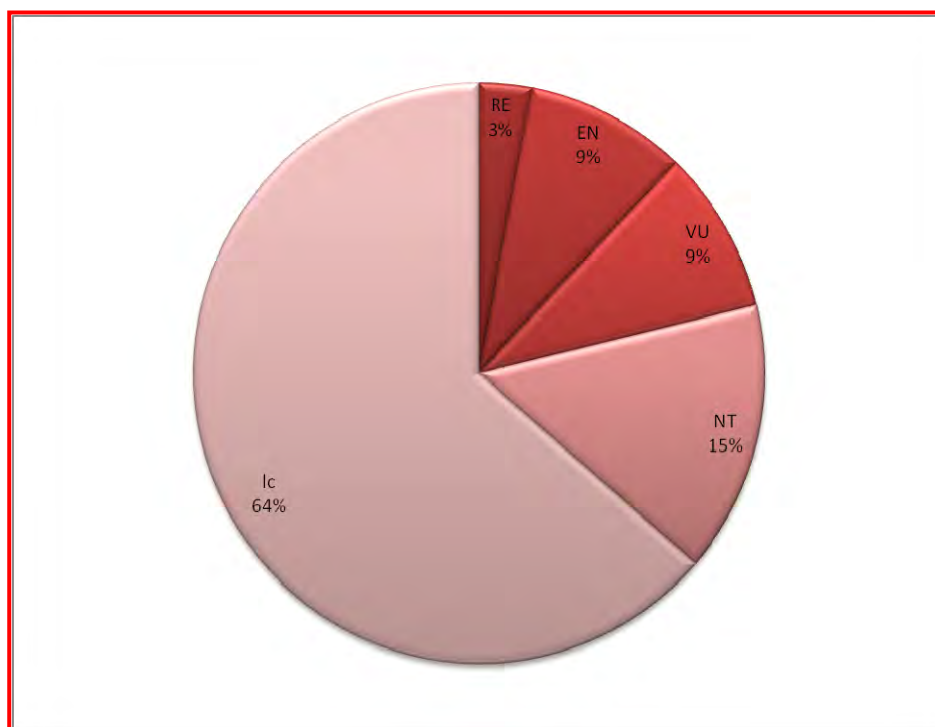
Species	Criteria	All-Ireland assessment	Northern Ireland assessment
Mountain Ringlet <i>Erebia epiphron</i> (Knoch, 1783)		RE	
Pearl-bordered Fritillary <i>Boloria euphrosyne</i> (L., 1758)	<b>B2ab(ii, iii, iv)</b>	EN	
Small Blue <i>Cupido minimus</i> (Fuessly, 1775)	<b>B2ab(ii, iii, iv)</b>	EN	<b>CR (A2c, B2ab(i,ii,iii))</b>
Wall <i>Lasiommata megera</i> (L., 1767)	<b>A2c</b>	EN	<b>CR (A2ac, B2ab(i,ii,iii))</b>
Dark Green Fritillary <i>Argynnis aglaja</i> (L., 1758)	<b>A3c</b>	VU	
Large Heath <i>Coenonympha tullia</i> (Müller, 1764)	<b>A3c</b>	VU	
Marsh Fritillary <i>Euphydryas aurinia</i> (Rottemburg, 1775)	<b>A2c</b>	VU	
Dingy Skipper <i>Erynnis tages</i> (L., 1758)	<b>A3c</b>	NT	
Gatekeeper <i>Pyronia tithonus</i> (L., 1767)	<b>A2ac</b>	NT	
Grayling <i>Hipparchia semele</i> (L., 1758)	<b>A3c</b>	NT	
Small Heath <i>Coenonympha pamphilus</i> (L., 1758)	<b>A2c</b>	NT	
Wood White <i>Leptidea sinapis</i> (L., 1758).	<b>A3c</b>	NT	
Brimstone <i>Gonepteryx rhamni</i> (L., 1758)		lc	
Brown Hairstreak <i>Thecla betulae</i> (L., 1758)		lc	
Common Blue <i>Polyommatus icarus</i> (Rottemburg, 1775)		lc	
Clouded Yellow <i>Colias croceus</i> (Fourcroy, 1785)		lc	
Green Hairstreak <i>Callophrys rubi</i> (L., 1758)		lc	
Green-veined White <i>Pieris napi</i> (L., 1758)		lc	
Holly Blue <i>Celastrina argiolus</i> (L., 1758)		lc	
Large White <i>Pieris brassicae</i> (L., 1758)		lc	
Meadow Brown <i>Maniola jurtina</i> (L., 1758)		lc	
Orange Tip <i>Anthocharis cardamines</i> (L., 1758)		lc	
Painted Lady <i>Vanessa cardui</i> (L., 1758)		lc	
Peacock <i>Inachis io</i> (L., 1758)		lc	
Purple Hairstreak <i>Neozephyrus quercus</i> (L., 1758)		lc	
Réal's Wood White <i>Leptidea reali</i> Reissinger, 1989		lc	
Red Admiral <i>Vanessa atalanta</i> (L., 1758)		lc	
Ringlet <i>Aphantopus hyperantus</i> (L., 1758)		lc	
Small Copper <i>Lycaena phlaeas</i> (L., 1758)		lc	
Small Tortoiseshell <i>Aglais urticae</i> (L., 1758)		lc	
Small White <i>Pieris rapae</i> (L., 1758)		lc	
Silver-washed Fritillary <i>Argynnis paphia</i> (L., 1758)		lc	
Speckled Wood <i>Pararge aegeria</i> (L., 1758)		lc	

Nomenclature follows Bond *et al.* (2006) and Bradley (2000). RE = regionally extinct, CR = critically endangered, EN = endangered, VU = vulnerable, NT = Near Threatened, lc = least concern. Separate Northern Ireland assessments were made for only two species, Small Blue and Wall.

**Table 2:** Species included in the Irish checklist (Bond *et al.*, 2006) or added subsequently, which were not assessed.

Species	Status	Reason for non assessment
American Painted Lady <i>Vanessa virginiensis</i> (Drury, 1773)	Vagrant	Vagrant/never established
Bath White <i>Pontia daplidice</i> (L.,1758)	Vagrant	Vagrant/never established
Camberwell Beauty <i>Aglais antiopa</i> (L., 1758)	Migrant and adventive	Vagrant/never established
Comma <i>Polygonia c-album</i> (L., 1758)	Likely to be resident, but not proven	Not established for more than 10 years
Essex Skipper <i>Thymelicus lineola</i> (Ochsenheimer, 1808)	Resident, recently established	Not established for more than 10 years
Large Copper <i>Lycaena dispar</i> (Haworth, 1803)	Introduced, but now extinct	Known introduction
Monarch <i>Danaus plexippus</i> (L., 1758)	Vagrant	Vagrant/never established
Queen of Spain Fritillary <i>Issoria lathonia</i> (L., 1758)	Vagrant	Vagrant/never established
Swallowtail <i>Papilio machaon</i> L., 1758	Accidental	Vagrant/never established
Tiger Swallowtail <i>Papilio glaucus</i> L., 1758	Adventive	Vagrant/never established

Those species under threat are mainly experiencing population reductions rather than having limited geographic ranges (Table 3), with nine of the eleven threatened and Near Threatened species evaluated under IUCN criterion A. Table 4 lists the occurrence of all the red listed and Near Threatened species in the Annex I habitats of the European Union Habitats Directive [92/43/EEC]. This also gives the conservation assessment for these habitats (NPWS, 2008). This only covers the habitat resource in the Republic of Ireland. Similar data are not available for Northern Ireland, as the assessments of the Northern Ireland resource of these habitats were considered as part of the UK assessment.



**Figure 1:** Percentage of the native Irish butterfly fauna within each of the IUCN regional red list categories.

**Table 3:** Summary of evaluations and breakdown of main IUCN criteria

	No. spp.	IUCN criteria		
		A2	A3	B2
Critically endangered	0			
Endangered	3	1		2
Vulnerable	3	1	2	
Near Threatened	5	2	3	

**Table 4:** Summary table showing associations of the threatened and Near Threatened Irish butterflies with the habitats listed on Annex I of the Habitats Directive. The habitat associations are from Bond & Gittings (2008) and expert opinion. The habitat assessments are from NPWS (2008) and cover the Republic of Ireland only.

Annex I Habitat	Future prospects	Overall	Threatened Irish butterflies associated with this habitat
1230 Vegetated sea cliffs	Poor	Poor	Wall (EN); Grayling (NT)
2130 Fixed dunes (grey dunes)	Bad	Bad	Dark Green Fritillary (VU); Small Blue (EN); Wall (EN); Marsh fritillary (VU); Grayling (NT); Small Heath (NT)
2150 Decalcified dune heath	Poor	Bad	Grayling (NT)
2190 Humid dune slacks	Bad	Bad	Dark Green Fritillary (VU); Marsh Fritillary (VU)
21A0 Machair	Bad	Bad	Dark Green Fritillary (VU); Small Blue (EN); Wall (EN); Marsh Fritillary (VU); Small Heath (NT)
4010 Wet heath	Bad	Bad	Marsh Fritillary (VU)
4030 Dry heath	Poor	Poor	Dark Green Fritillary (VU); Wall (EN); Grayling (NT)
6210 Orchid rich/calcareous grassland	Bad	Bad	Dark Green Fritillary (VU); Pearl-bordered Fritillary (EN); Small Blue (EN); Wall (EN); Marsh Fritillary (VU); Dingy Skipper (NT); Grayling (NT); Small Heath (NT); Wood White (NT)
6230 Species-rich <i>Nardus</i> upland grassland	Bad	Bad	Mountain Ringlet (RE)
6410 <i>Molinia</i> meadows	Bad	Bad	Marsh Fritillary (VU)
7110 Raised bog (active)	Bad	Bad	Large Heath (VU)
7120 Degraded raised bogs	Poor	Poor	Wall (EN); Large Heath (VU); Marsh Fritillary (VU)
7130 Blanket bog (active)	Poor	Bad	Large Heath (VU)
7140 Transition mires	Bad	Bad	Marsh Fritillary (VU)
7230 Alkaline fens	Bad	Bad	Marsh Fritillary (VU)
8240 Limestone pavement	Poor	Poor	Dark Green Fritillary (VU); Pearl-bordered Fritillary (EN); Small Blue (EN); Wall (EN); Dingy Skipper (NT); Grayling (NT); Wood White (NT)

## SPECIES NOTES

### Brimstone *Gonepteryx rhamni*

**IUCN least concern**

The main habitat of the Brimstone is scrub and open woodland often close to wetlands and usually on limestone. It also occurs in woodland on bogs, especially in the east of its range. Its Irish distribution is largely restricted to the limestone areas of the west and in the midlands, reflecting the distribution of its larval foodplants, Purging Buckthorn *Rhamnus cathartica* and Alder Buckthorn *Frangula alnus*. It has been assessed as least concern in Ireland. In Northern Ireland breeding has only been confirmed from the Lough Erne area, Co. Fermanagh. The habitat is still present and apparently suitable, but there have been no breeding records for over 20 years. There has been no change in status in Northern Ireland in the period covered by this assessment so a separate threat status is not justified.

### Brown Hairstreak *Thecla betulae*

**IUCN least concern**

The Brown Hairstreak is restricted to the limestone districts of Clare and Galway with a small population in Tipperary. Its larval foodplant is Blackthorn *Prunus spinosa* and populations occur in warm south-facing, sheltered clearings, roadsides and scrub where this shrub occurs. In Great Britain, its red list status is Vulnerable based on population decline as a result of unfavourable hedgerow management (Fox *et al.*, 2006; 2009). It has been assessed as least concern for Ireland, but in light of its restricted geographic range, the populations should be monitored.

### Clouded Yellow *Colias croceus*

**IUCN least concern**

This is a migrant from southern Europe which is seen in Ireland in most years, although in variable numbers. Records are most common on south and east coastal sites, but in some years, it can be seen throughout Ireland. Adults can be seen in many open habitats that provide an abundance of nectar plants especially species of Clover (*Trifolium* species). In years with an early influx, a generation of locally-bred adults will be produced. There is some evidence that the Clouded Yellow is beginning to overwinter in Ireland as in Wexford during the winter of 2008/2009. It has been assessed as least concern.

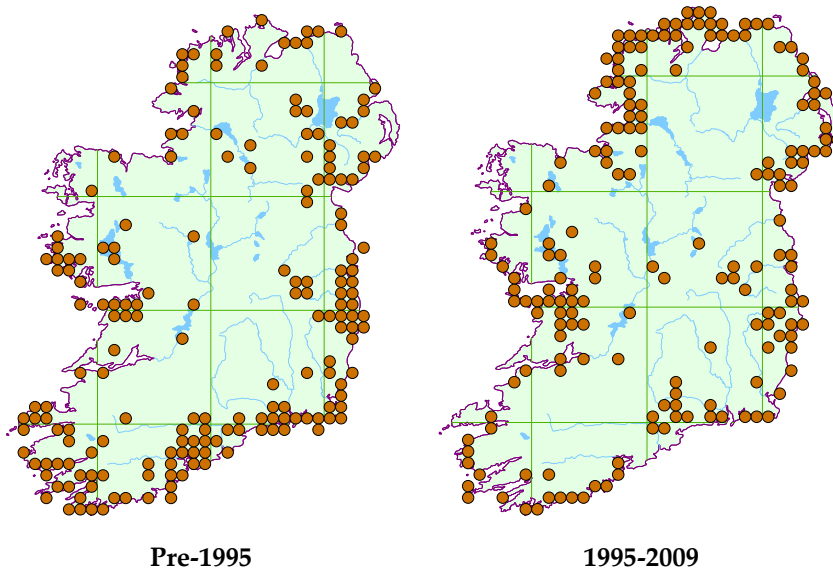
### Common Blue *Polyommatus icarus*

**IUCN least concern**

This species is widespread in Ireland. It is found mainly in dry, open habitats with the largest populations on sand dunes and extensive unimproved grasslands. Although its inland distribution is localised and fragmented it remains common in coastal localities and it has been assessed as least concern.

Dark Green Fritillary *Argynnis aglaja*

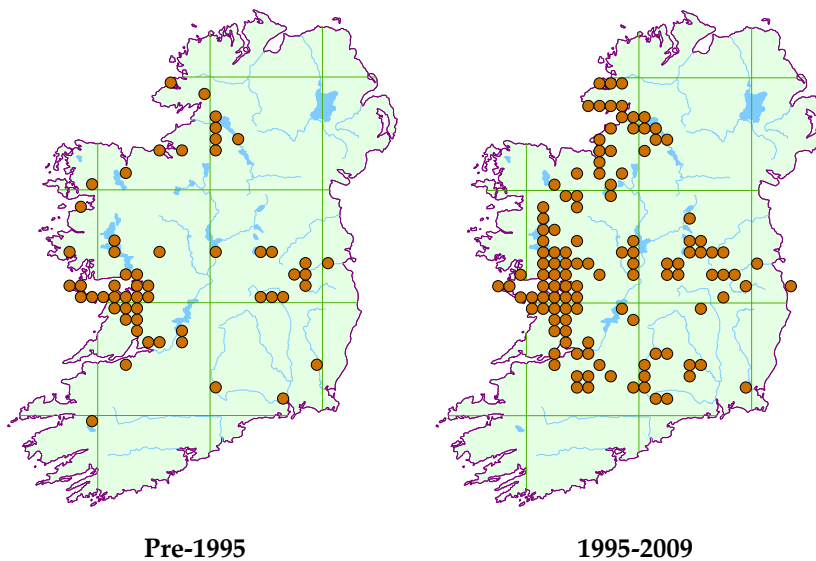
IUCN Vulnerable [A3c]



The main habitats for this species are coastal heaths and sand dunes, extensive calcareous grasslands and marginal heath and grasslands on open hillsides. The conservation status of all these habitats is poor both for current status and future prospects (Table 3). The distribution is mainly coastal but everywhere it is localised and fragmented. There has been extensive loss of colonies in the east and along the south coast (see above maps). A population reduction of greater than 30% in the past is suspected by the authors and this is projected to continue. This assessment is based on IUCN criterion A3c that a population reduction of >30% is suspected to be met in the future as a result of decline in habitat quality (Table 3; NPWS, 2008).

Dingy Skipper *Erynnis tages*

IUCN Near Threatened [A3c]

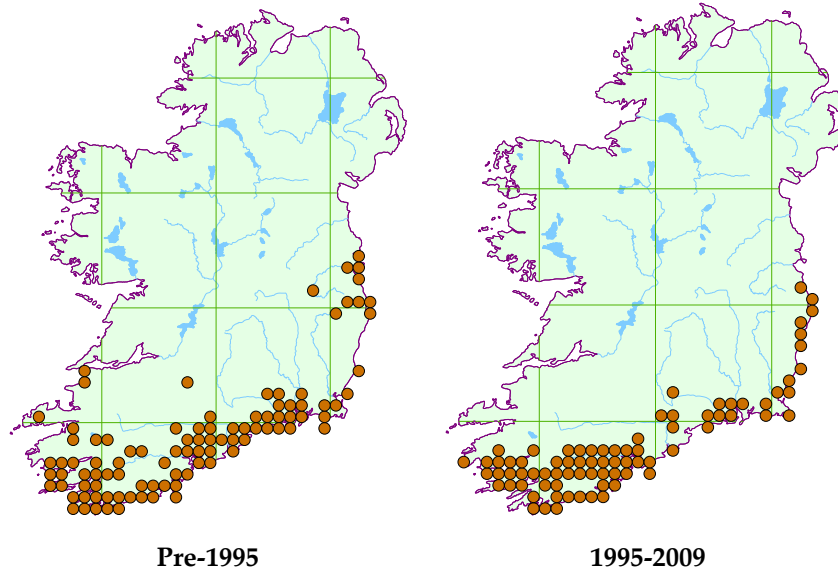


The small and inconspicuous dingy skipper requires sites with a warm microclimate, short vegetation and shallow soils. The foodplant is Common Bird's-foot Trefoil *Lotus corniculatus*. Many colonies exist on semi-natural habitats, principally unimproved dry calcareous grassland and limestone pavement. However populations of the butterfly also exist on a wide range of semi-natural and man-modified

situations ('brownfield' sites), including abandoned quarries and pits, woodland clearings, sunny sides of esker ridges and dunes, cutaway bogs, roadside verges and canal banks. The overall status and future prospects for the main semi-natural habitats are poor (Table 3; NPWS, 2008) and many of the occupied brownfield sites are considered to be marginally suitable and at risk, so a population reduction in the future is considered likely.

Gatekeeper *Pyronia tithonus*

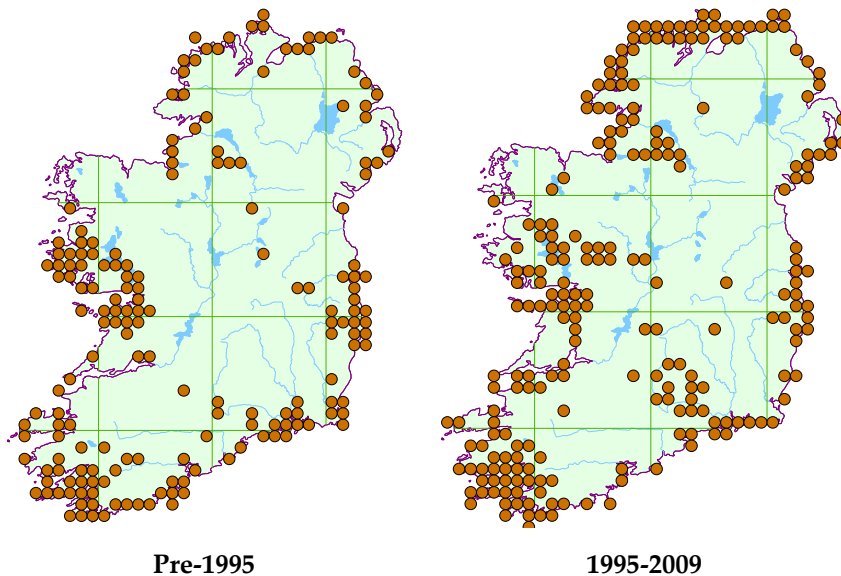
IUCN Near Threatened [A2ac]



The Gatekeeper is confined to the southern and eastern coasts in Ireland between west Kerry and Co. Wicklow. Records from the Dublin region which appear in early atlases (e.g. Heath *et al.* 1984 and in map above) are erroneous. It is found in warm sites with woody shrubs and rough grassland such as hedgerows and woodland rides and clearings. This species is abundant in Britain and expanding north (Fox *et al.*, 2006) and the situation in Ireland is a puzzling contrast. A population reduction has been directly observed in Wexford and mid Cork (although less than 30%) as well as a decline in the area of occupancy (see maps above). It has therefore been assessed as Near Threatened.

Grayling *Hipparchia semele*

IUCN Near Threatened [A3c]



Colonies of the Grayling are found in open, dry situations that combine bare ground (sand, gravel and rock outcrops), sparse vegetation containing fine-leaved grasses and a warm aspect. The principal habitats are limestone pavement, unimproved calcareous and acid grasslands, sand dunes and dry heaths on the coast and on warm inland slopes. It is widespread in coastal locations and in a few inland areas such as the granite uplands of Co. Down and Wicklow and in the Burren. It has been lost from some sites in the midlands and Wexford and has been assessed as Vulnerable in Great Britain with a population decline of 30-49% (Fox *et al.*, 2009). The overall status and future prospects for the main Grayling habitats are poor (Table 3). It has therefore been assessed as Near Threatened under IUCN criterion A3c, i.e. that a population reduction is projected to be met in the future based on a decline in habitat quality. Better monitoring of Irish populations is required.

Green Hairstreak *Callophrys rubi*

IUCN least concern

The Green Hairstreak is a widespread but local species and has been assessed as least concern. It is mainly found on the edges of bogs where there are stands of gorse, but colonies also exist in a range of other habitats, including woodland clearings, dunes and flowery sea cliffs. The species is inconspicuous, easily overlooked and considered still under-recorded.

Green-veined White *Pieris napi*

IUCN least concern

The Green-veined White is common and widespread in Ireland and has been assessed as least concern. It is found in many situations with the largest populations existing in damp, unimproved grasslands.

Holly Blue *Celastrina argiolus*

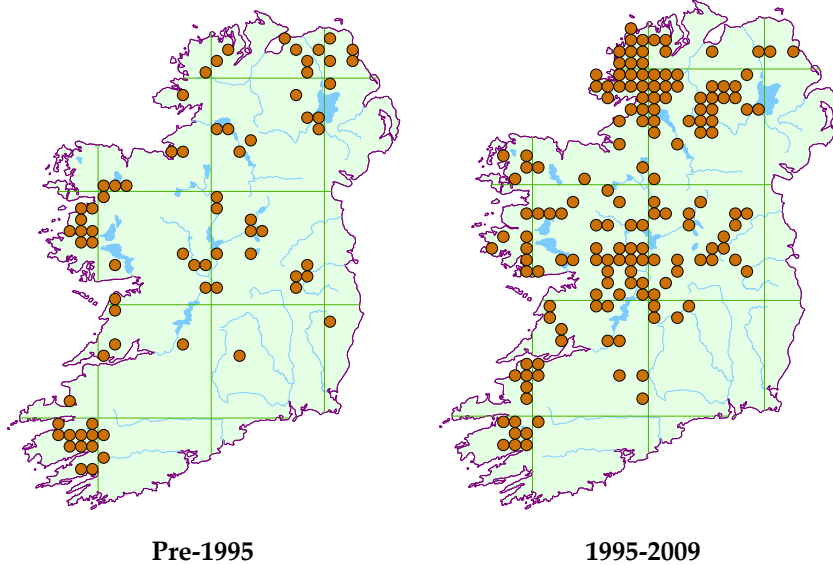
IUCN least concern

The Holly Blue is a common and widespread species in Ireland and has been assessed as least concern. There is good evidence that the species is spreading especially in suburban habitats in Co. Dublin (Aldwell & Nash 2005), but also in the south and east of Northern Ireland.



Large Heath *Coenonympha tullia*

IUCN Vulnerable [A3c]



The Large Heath is confined to extensive blanket bogs and raised bogs and has lost much of its habitat due to drainage, afforestation, and peat extraction. The assessment of the overall status and future prospects of its habitats is poor (Table 3; NPWS, 2008). A population reduction is suspected to be met in the future (>30%) based on a decline in habitat quality (A3c). The Large Heath is the only Irish butterfly with a threat status (Vulnerable) listed in the European Red List of Butterflies.

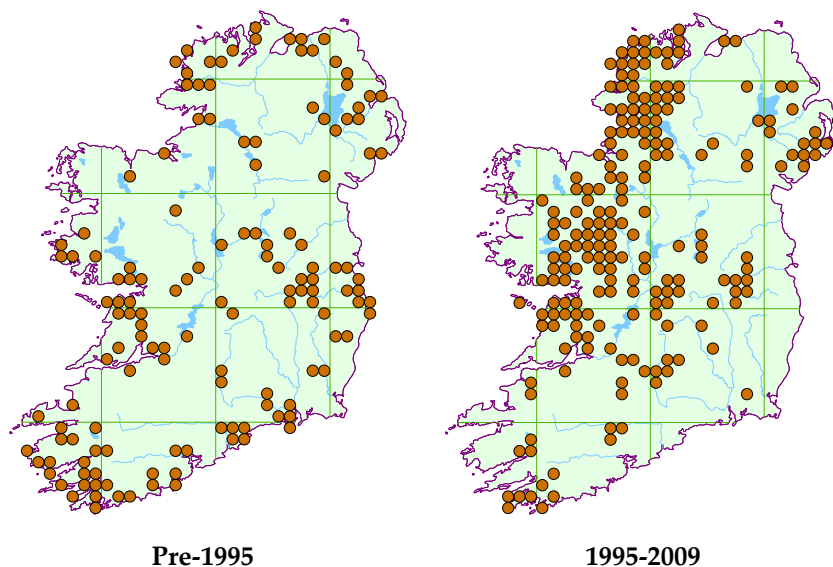
Large White *Pieris brassicae*

IUCN least concern

The Large White is widely distributed in Ireland and has been assessed as least concern. It feeds on wild and cultivated brassicas and its distribution largely reflects the availability of these.

Marsh Fritillary *Euphydryas aurinia*

IUCN Vulnerable [A2c]



The Marsh Fritillary has a wide distribution across Ireland, but the distribution is patchy and it is still considered overlooked in some parts of its range. Colonies can be found in a variety of habitats including calcareous grassland, degraded bogs, wet heath, transition mires and fens up to 300m. The

overall status and future prospects of these habitats are either poor or bad (Table 3). The species has suffered regional extinction in some parts of Northern Ireland and the south east and a population reduction (>30%) has been observed in the past as a result of decline in habitat quality and habitat fragmentation and loss (the maps above are misleading and reflect increased recording effort since 1995). It has therefore been assessed as Vulnerable under criterion A2c, i.e. that a population reduction greater than 30% has been observed based on a decline in area of occupancy and decline in habitat quality. The Marsh Fritillary has been assessed as Vulnerable to extinction in Great Britain (Fox *et al.*, 2009). It is listed on Annex II of the Habitats Directive and has legal protection under Schedule 5 of the Wildlife Order (1985) Northern Ireland.

**Meadow Brown *Maniola jurtina***

**IUCN least concern**

The Meadow Brown is widespread and common in Ireland and has been assessed as least concern. It is a species of tall grassland and can persist in small pockets of habitat such as road verges and field margins and there are no concerns for this species.

**Mountain Ringlet *Erebia ephron***

**IUCN Regionally extinct**

The Mountain Ringlet was recorded in the nineteenth century from Croagh Patrick, Co. Mayo and Lough Gill, Co. Sligo and was last reported in 1901 from Nephin Mountain, Co. Mayo (Bond & Gittings, 2008). There is no information on the ecology and habitat of the Irish population and the cause of extinction cannot be determined. The likely habitat was species-rich *Nardus* grassland (Table 4).

**Orange Tip *Anthocharis cardamines***

**IUCN least concern**

This species is common and widespread in Ireland and under no threat of extinction at the present time. It is found in many habitats including fens, cutover bogs, wet grasslands, gardens and hedgerows.

**Painted Lady *Vanessa cardui***

**IUCN least concern**

The Painted Lady is a regular migrant in Ireland and has been assessed as least concern. Overwintering in Ireland does not occur in this species and occurrences are dependent on arrival of new immigrants from North Africa and continental Europe.

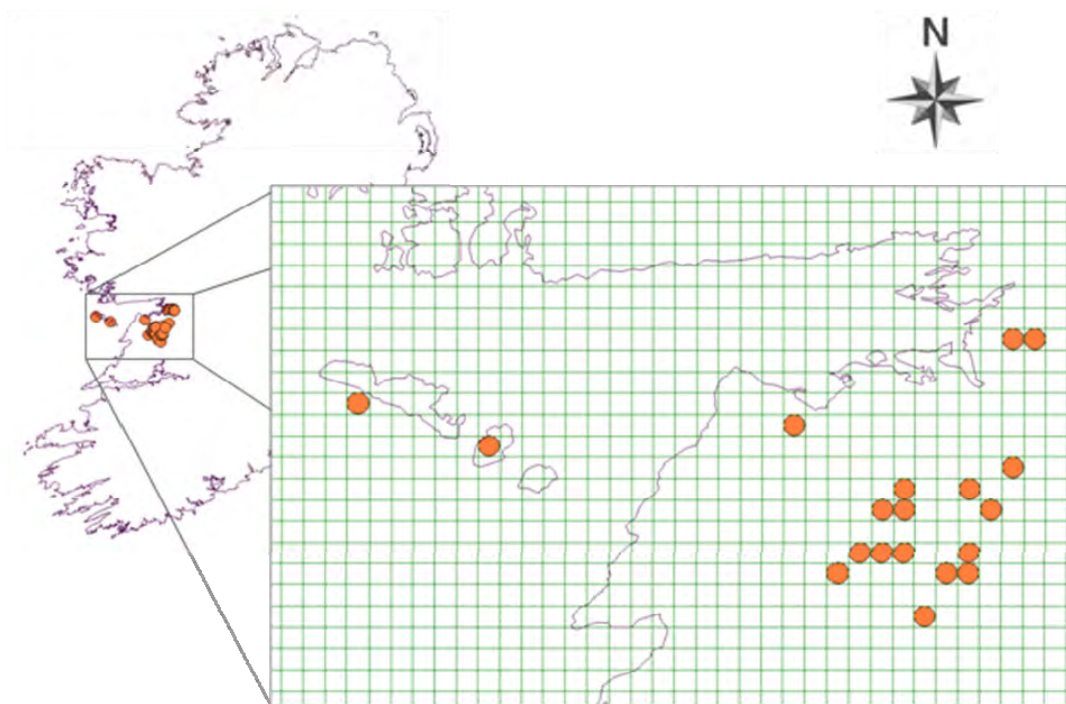
**Peacock *Inachis io***

**IUCN least concern**

This species has been prone to major fluctuations in abundance, but currently the Peacock is common and widespread in Ireland and has been assessed as least concern. Adults are mobile and can be seen in many flower-rich habitats in late summer. The main requirements for breeding are large patches of Stinging Nettle *Urtica dioica* in sunny sheltered sites such as woodland rides and open south-facing depressions.

Pearl-bordered Fritillary *Boloria euphrosyne*

IUCN Endangered [B2ab(ii,iii,iv)]

**Distribution of Pearl-bordered Fritillary *Boloria euphrosyne* in Ireland**

The Pearl-bordered Fritillary is confined to the karst landscapes of the Burren in Clare and southeast Galway and the Aran Islands (see map above). Where it occurs it is local and uncommon. The macrohabitats of this species are grassy forest clearings, unimproved dry calcareous grassland, and limestone pavement (Bond & Gittings, 2008). The rapid expansion of scrub in recent times is a real threat to species-rich calcareous grassland in the Burren (Dunford & Feehan, 2001; Heritage Council, 2006; Deenihan *et al.*, 2009; Parr *et al.*, 2009) and therefore reducing potential habitat for Pearl-bordered Fritillary. Thomas & Lewington (2010) describe this butterfly as very sensitive to its breeding area becoming overgrown. Also, females have been found to be extremely reluctant to fly over scrub to new habitat patches in Dartmoor (Thomas & Lewington, 2010). It is therefore sensitive to habitat fragmentation. Spring grazing is considered important for this butterfly in the Burren, inducing fresh growth and germination of the foodplants (Jesmond Harding, pers. comm.). The ecology and behaviour of the Pearl-bordered Fritillary in Ireland, however, needs to be studied in more detail.

The Pearl-bordered Fritillary is located in 19 tetrads and so the area of occupancy is 76 km<sup>2</sup>. Its habitat has become fragmented in the Burren due to scrub encroachment. It has been assessed as Endangered (EN) under criteria B2ab(ii, iii, iv).

Purple Hairstreak *Neozephyrus quercus*

IUCN least concern

The Purple Hairstreak in Ireland is associated with woodland containing mature, native oak (*Quercus* spp.). It is very local but widely distributed in Ireland with many new populations discovered in recent years with targeted survey. It is also easily overlooked because it spends much of its life at the top of mature oak trees. Whilst the Annex I habitat of old oak woodland is considered in poor condition in Ireland, there is no evidence that this is posing a significant threat to the Purple Hairstreak and it was assessed as least concern.

Réal's Wood White *Leptidea reali*

**IUCN least concern**

Only recently recognised as a distinct species in 1989, this is the commoner of the two very similar *Leptidea* species in Ireland. Réal's Wood White is widely distributed but local in Ireland and has been assessed as least concern. Nevertheless the status of this species should be kept under review as it is not present in Great Britain. It is found in open but sheltered flower-rich situations.

Red Admiral *Vanessa atalanta*

**IUCN least concern**

The Red Admiral is a regular migrant in Ireland which has recently been proven to successfully overwinter (Smyth & Nash, 2008). It has been assessed as least concern.

Ringlet *Aphantopus hyperantus*

**IUCN least concern**

Common and widespread in Ireland with no threat of extinction at the present time. Its habitat of humid grassland exists widely and is not considered under threat.

Silver-washed Fritillary *Argynnis paphia*

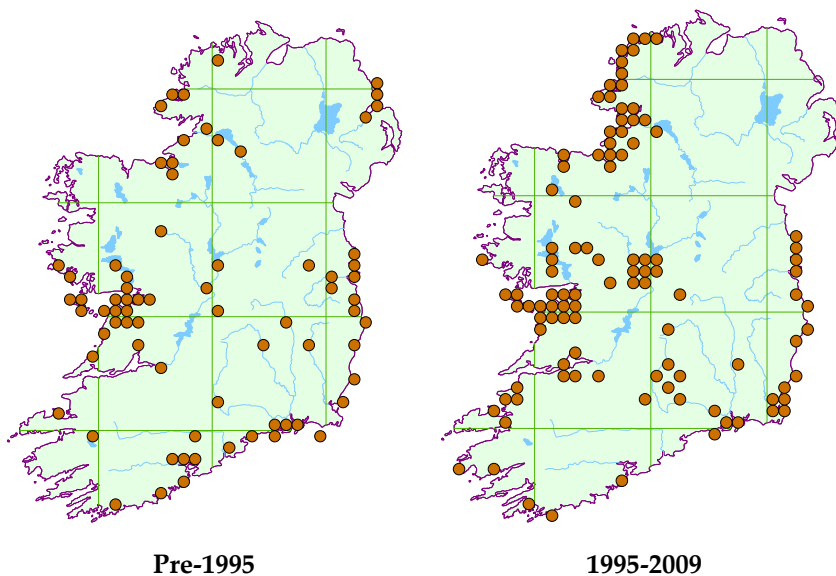
**IUCN least concern**

The Silver-washed Fritillary is widely distributed but local in Ireland and is considered under no threat of extinction at the present time. This species is expanding its range in some areas (e.g. counties Offaly and Kildare) by colonising maturing bog woodland. It also appears to be increasing in number in parts of the Burren where scrub is developing into woodland.

Small Blue *Cupido minimus*

**IUCN Endangered [B2ab(ii,iii,iv)]**

**Northern Ireland: Critically Endangered [A2c, B2ab(i,ii,iii)]**



The Small Blue is confined to coastal sand dunes and semi-natural calcareous grassland in Ireland. The only larval food plant is Kidney Vetch (*Anthyllis vulneraria*). It appears to have disappeared from colonies on the south coast and declined at many eastern sites. In Northern Ireland it has not been seen since 2001 at its last known site. This, combined with the assessment of the overall status and future prospects of its habitats (NPWS, 2008), meets the criteria for Endangered due to restricted extent of occurrence (B2ab(ii,ii,iv); i.e. the area of occupancy is less than 500km<sup>2</sup> based on tetrad distribution data, the populations are severely fragmented and there is continuing decline in area of



Speckled Wood *Pararge aegeria*

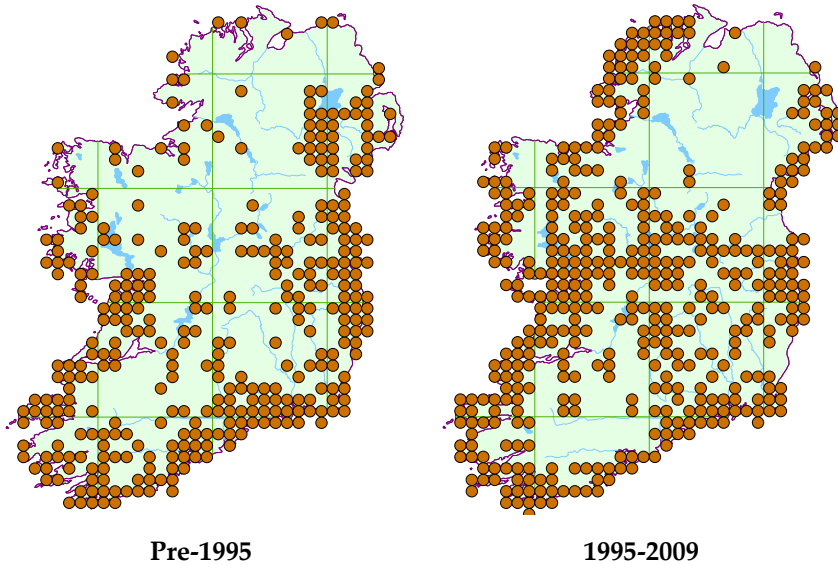
IUCN least concern

The Speckled Wood is widely distributed and common in Ireland and has been assessed as least concern. Trees and woody shrubs are a prerequisite for this butterfly. It is found at the margins of woodland and in gardens and parks and is absent only from large areas of treeless blanket bog, high uplands and exposed offshore islands.

Wall *Lasiommata megera*

IUCN Endangered [A2c]

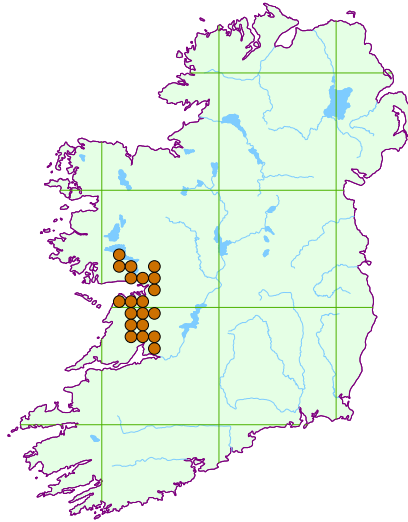
Northern Ireland: Critically Endangered [A2c, B2ab(i,ii,iii)]



The Wall has suffered a population reduction of over 50% in Ireland within the last 15 years and the causes of this reduction are not understood. The above maps are misleading and reflect increased recording effort since 1995, and Irish experts are in agreement that this species has suffered widespread decline in Ireland. It has therefore been assessed as Endangered. This species has suffered a dramatic decline in Northern Ireland and survives in just one coastal area of Co. Down. It is therefore assessed as Critically Endangered in Northern Ireland. However in coastal areas of the northwest, especially in much of west Donegal, it remains common and shows no signs of decline. The macrohabitats for the Wall in Ireland are unimproved dry calcareous grassland, coastal dunes, machair, vegetated sea-cliffs, limestone pavement and cutover bog. The current status and future prospects for these habitats are considered poor or bad (Table 3; NPWS, 2008). It has been assessed as Near Threatened in Britain (Fox *et al.*, 2009).

Wood White *Leptidea sinapis*

IUCN Near Threatened [A3c]



2000-2009

The Wood White is one of two very similar *Leptidea* species in Ireland. This is the rarer of the two with a restricted distribution covering the eastern part of the Burren and the similar habitat on the west side of Lough Corrib. Field observations would suggest that *L. sinapis* is a habitat specialist in Ireland. The typical situation in Ireland to encounter *sinapis* is on fractured limestone pavement with a complex and intricate mosaic of bare rock, calcareous herb-rich vegetation and low scrub. The current status and future prospects for limestone pavement in Ireland are assessed as poor (Table 3; NPWS 2008). This gives reason to assess this species as Near Threatened under IUCN criterion A3c.

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**APPENDIX 1 - SUMMARY OF THE FIVE CRITERIA (A-E) USED TO EVALUATE IF A TAXON BELONGS IN A THREATENED CATEGORY; CRITICALLY ENDANGERED, ENDANGERED OR VULNERABLE (IUCN, 2008).**

Use any of the criteria A-E	Critically Endangered	Endangered	Vulnerable
<b>A. Population reduction</b>	Declines measured over the longer of 10 years or 3 generations		
<b>A1</b>	> 90%	> 70%	> 50%
<b>A2, A3 &amp; A4</b>	> 80%	> 50%	> 30%
<p><b>A1.</b> Population reduction observed, estimated, inferred, or suspected in the past where the causes of the reduction are clearly reversible AND understood AND ceased based on and specifying any of the following:</p> <p>(a) direct observation</p> <p>(b) an index of abundance appropriate to the taxon</p> <p>(c) a decline in area of occupancy (AOO), extent of occurrence (EOO) and/or habitat quality</p> <p>(d) actual or potential levels of exploitation</p> <p>(e) effects of introduced taxa, hybridisation, pathogens, pollutants, competitors or parasites.</p> <p><b>A2.</b> Population reduction observed, estimated, inferred, or suspected in the past where the causes of reduction may not have ceased OR may not be understood OR may not be reversible, based on any of (a) to (e) under A1</p> <p><b>A3.</b> Population reduction projected or suspected to be met in the future (up to a maximum of 100 years) based on any of (b) to (e) under A1.</p> <p><b>A4.</b> An observed, estimated, inferred, projected or suspected population reduction (up to a maximum of 100 years) where the time period must include both the past and the future, and where the causes of reduction may not have ceased OR may not be understood OR may not be reversible, based on any of (a) to (e) under A1.</p>			
<b>B. Geographic range in the form of either B1 (extent of occurrence) OR B2 (area of occupancy)</b>			
<b>B1.</b> Either extent of occurrence	< 100 km <sup>2</sup>	< 5,000 km <sup>2</sup>	< 20,000 km <sup>2</sup>
<b>B2.</b> or area of occupancy	< 10 km <sup>2</sup>	< 500 km <sup>2</sup>	< 2,000 km <sup>2</sup>
and 2 of the following 3:			
(a) severely fragmented or # locations	= 1	≤ 5	≤ 10
(b) continuing decline in (i) extent of occurrence (ii) area of occupancy, (iii) area, extent and/or quality of habitat, (iv) number of locations or subpopulations and (v) number of mature individuals.			
(c) extreme fluctuations in any of (i) extent of occurrence, (ii) area of occupancy, (iii) number of locations or subpopulations and (iv) number of mature individuals.			
<b>C. Small population size and decline</b>			
Number of mature individuals	< 250	< 2,500	< 10,000
and either <b>C1</b> or <b>C2</b> :			
<b>C1.</b> An estimated continuing decline of at least up to a maximum of 100 years	25% in 3 years or 1 generation	20% in 5 years or 2 generations	10% in 10 years or 3 generations
<b>C2.</b> A continuing decline and (a) and/or (b)			
(a i) # mature individuals in largest subpopulation	< 50	< 250	< 1,000
(a ii) or % mature individuals in one subpopulation =	90-100%	95-100%	100%
(b) extreme fluctuations in the number of mature individuals			
<b>D. Very small or restricted population</b>			
Either (1) number of mature individuals	< 50	< 250	< 1,000
or (2) restricted area of occupancy	na	na	typically: AOO < 20km <sup>2</sup> or # locations ≤ 5
<b>E. Quantitative Analysis</b>			
Indicating the probability of extinction in the wild to be at least	50% in 10 years or 3 generations (100 years max)	20% in 20 years or 5 generations (100 years max)	10% in 100 years

## APPENDIX 2 – RED LIST OF IRISH BUTTERFLIES

**IRL 2010 Status** – Red list status for Ireland based on this assessment; RE - Regionally Extinct, VU – Vulnerable, NT - Near Threatened, dd - data deficient, lc – least concern, na – not assessed.

**British 2010 Status** – Red list status for Great Britain, taken from Fox *et al.* (2009). **Europe 2010 Status** – Red list status for Europe, taken from van Swaay *et al.* (2010).

Common name	Scientific name	Residency Status	IRL 2010 Status	IUCN criteria	British 2010 Status	Europe 2010 Status
Brimstone	<i>Gonepteryx rhamni</i>	Resident	lc		lc	lc
Brown Hairstreak	<i>Thecla betulae</i>	Resident	lc		VU (A2c)	lc
Clouded Yellow	<i>Colias croceus</i>	Migrant	lc		lc	lc
Common Blue	<i>Polyommatus icarus</i>	Resident	lc		lc	lc
Dark Green Fritillary	<i>Argynnis aglaja</i>	Resident	VU	A3c	lc	lc
Dingy Skipper	<i>Erynnis tages</i>	Resident	NT	A3c	VU (A2c)	lc
Gatekeeper	<i>Pyronia tithonus</i>	Resident	NT	A2ac	lc	lc
Grayling	<i>Hipparchia semele</i>	Resident	NT	A3c	VU (A2bc)	lc
Green Hairstreak	<i>Callophrys rubi</i>	Resident	lc		lc	lc
Green-veined White	<i>Pieris napi</i>	Resident	lc		lc	lc
Holly Blue	<i>Celastrina argiolus</i>	Resident	lc		lc	lc
Large Heath	<i>Coenonympha tullia</i>	Resident	VU	A3c	VU (A2c)	VU (A2c)
Large White	<i>Pieris brassicae</i>	Resident	lc		lc	lc
Marsh Fritillary	<i>Euphydryas aurinia</i>	Resident	VU	A2c	VU (A2c)	lc
Meadow Brown	<i>Maniola jurtina</i>	Resident	lc		lc	lc
Mountain Ringlet	<i>Erebia epiphron</i>	Extinct	RE		NT (B2b(ii))	lc
Orange Tip	<i>Anthocharis cardamines</i>	Resident	lc		lc	lc
Painted Lady	<i>Vanessa cardui</i>	Migrant	lc		lc	lc
Peacock	<i>Inachis io</i>	Resident	lc		lc	lc

Common name	Scientific name	Residency Status	IRL 2010 Status	IUCN criteria	British 2010 Status	Europe 2010 Status
Pearl-bordered Fritillary	<i>Boloria euphrosyne</i>	Resident	EN	B2ab(ii, iii, iv)	EN (A2b)	lc
Purple Hairstreak	<i>Neozephyrus quercus</i>	Resident	lc		lc	lc
Réal's Wood White	<i>Leptidea reali</i>	Resident	lc		-	lc
Red Admiral	<i>Vanessa atalanta</i>	Migrant	lc		lc	lc
Ringlet	<i>Aphantopus hyperantus</i>	Resident	lc		lc	lc
Silver-washed Fritillary	<i>Argynnis paphia</i>	Resident	lc		lc	lc
Small Blue	<i>Cupido minimus</i>	Resident	EN	B2ab(ii, iii, iv)	NT (A2c)	lc
Small Copper	<i>Lycaena phlaeas</i>	Resident	lc		lc	lc
Small Heath	<i>Coenonympha pamphilus</i>	Resident	NT	A2c	NT (A2b)	lc
Small Tortoiseshell	<i>Aglais urticae</i>	Resident	lc		lc	lc
Small White	<i>Pieris rapae</i>	Resident	lc		lc	lc
Speckled Wood	<i>Pararge aegeria</i>	Resident	lc		lc	lc
Wall	<i>Lasiommata megera</i>	Resident	EN	A2c	NT (A2c)	lc
Wood White	<i>Leptidea sinapis</i>	Resident	NT	A3c	EN (A2c)	lc