White faced darter
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White faced darter
Leucorrhinia dubia Vander Linden

Climate Change Sensitivity:	HIGH	Ability to Manage:	MEDIUM
Non climatic threats:	MEDIUM	Vulnerability:	HIGH

Summary

The white faced darter has been lost from many sites in the south and midlands. Across its range, the loss and degradation of lowland peat bogs has been the main cause of its decline, but the loss from its southern sites suggests that the warming climate may be having an impact. The species has been well studied, and successfully reintroduced to sites where habitats have been restored. The restoration of former sites or the creation of new sites in parts of the country that will remain climatically suitable for the species will offer the best approach to building the resilience of the species within England.

Description

The white-faced darter is a small dragonfly with a characteristic white face that gives it its name. The male is mainly black with scarlet and orange markings. Females are also predominantly black but have pale yellow markings. Its dark colouration means that it is able to warm up quickly in the sun, and therefore is well adapted to cool conditions.

Ecology and Distribution

The white faced darter is a rare dragonfly found mainly in Scotland, but also in the north of England, it has now been lost from all of its southern sites (Pam Taylor pers. comm.).

It is a species of lowland peatbogs, and prefers relatively deep, low nutrient, acidic pools with marginal rafts of sphagnum in which to breed. It has also been found to use waterlogged sphagnum in depressions devoid of standing water (Beynon & Daguet 2005). In addition to aquatic habitats it also requires scrub or woodland, which provides important roosting and feeding sites.

The larvae are aquatic and spend two or three years among the sphagnum moss feeding on other aquatic invertebrates. Although found predominately in acidic waters, research suggests that acidity is important mainly because it reduces predation by fish (Henrickson 1988; Johansson & Brodin 2003). The larvae actively hunt during the day and are susceptible to predation. Acidic conditions prevent the presence of fish, resulting in reduced predation pressure on the larvae. Adults emerge in late May and fly for three to four weeks, up to the end of July. Research suggests that adults return to the site from which they emerged to breed.

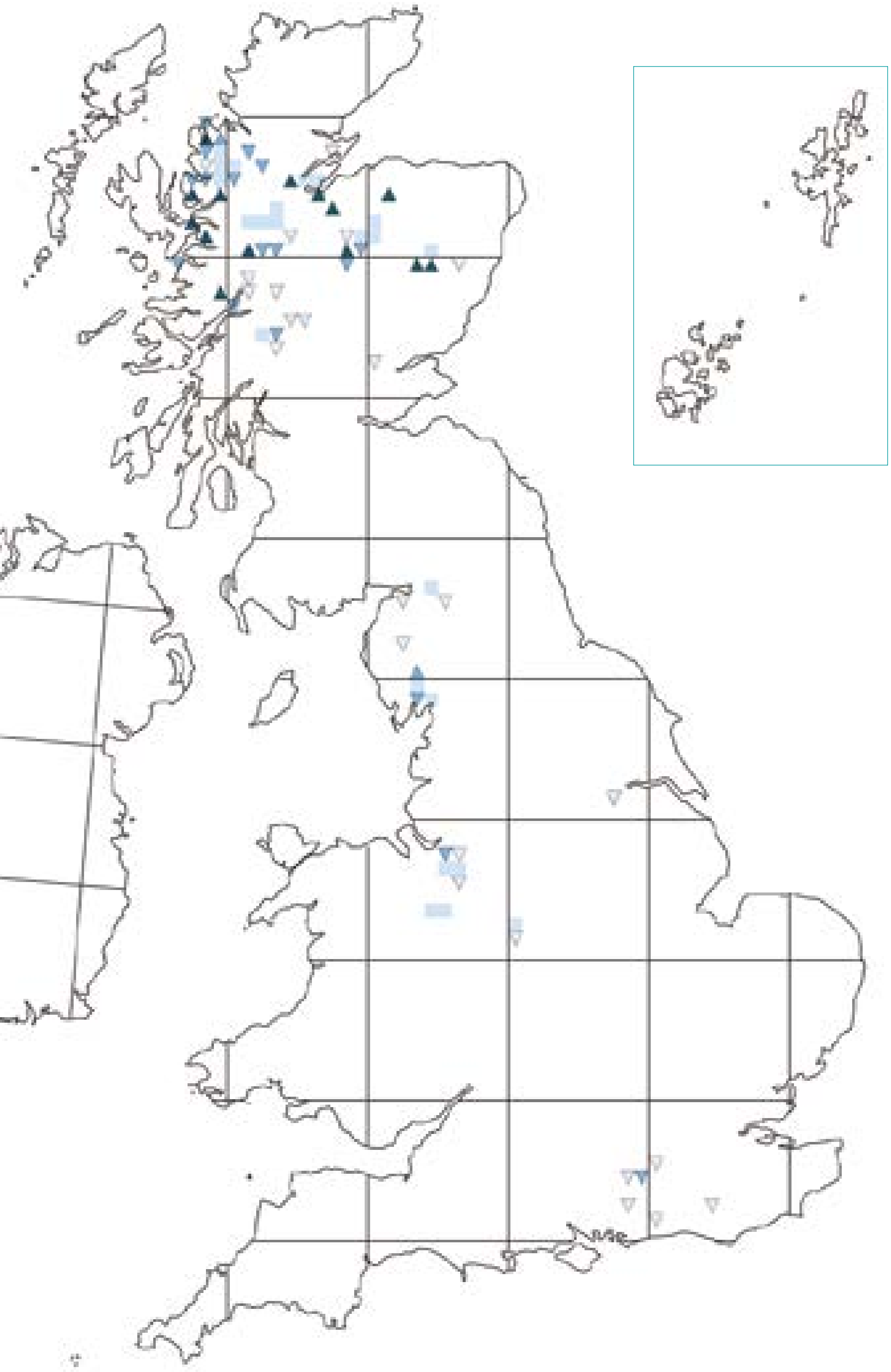
The white faced darter has declined significantly in England in the last 35 years (Powney *et al* 2014), and is now present at less than half the sites in which it occurred in the mid-20th century. Most of this decline is associated with the loss or degradation of lowland bog habitat, through activities such as land drainage, peat cutting and afforestation. More recently, it has been lost from most of its southern sites, a pattern of decline replicated across much of Europe (De Knijf 2008; Ott 2010). This is consistent with the impacts of climate change outlined below.

The British Dragonfly Society records for white faced darter are shown on the map below (10km grid scale).

Presence of white faced darter records records, 10km².

- Recent gain (new in 2000-2012)
- Old gain (new in 1991-1999)
- Stable (present all periods)
- Recent loss (last recorded pre 2000)
- Old loss (last recorded pre 1991)

Recent gain	14	0	14
Old gain	2	0	2
Stable	23	0	23
Recent loss	17	0	17
Old loss	24	0	24



Map © Natural Environment Research Council and British Dragonfly Society (2014).

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Confidence in climate change impacts[40]

Distribution change: HIGH CONFIDENCE Mechanism: LOW CONFIDENCE

The emergence of the white faced darter has been shown to be sensitive to changes in temperature, and the average emergence of adults has advanced by over three weeks in the last twenty years (Parr 2010).

In Europe, competition from other dragonfly species expanding their range due to climate change may have played a role in its decline, while laboratory studies show that the white faced darter larvae have reduced growth rates in warmer conditions (Suhling & Suhling 2013).

The impact of climate change is likely to operate primarily through the effect on the extent and quality of suitable habitat (Elo, Penttinen & Kotiaho 2015). Projected changes in rainfall are likely to have adverse impacts on the hydrology of many lowland bogs, especially in the south of England. Summer warming and reduced rainfall are likely to lead to reduced water levels in summer, with a knock-on impact on the development of sphagnum. Lower water levels combined with warming will also adversely affect water quality, resulting in habitat degradation. Potential indirect impacts of climate change such as increased abstraction may exacerbate the situation. Periodic drying leading to habitat degradation has been shown to have caused the loss of the white faced darter from sites in Germany (Ott 2010). Looking ahead, it is likely that the area with climatic conditions suitable for the white faced darter will contract further, and many southern sites will increasingly lie outside its optimal climatic zone.

Please read this case study alongside the relevant habitat sheets.

40 An assessment of the strength of evidence that distributions are changing and the mechanisms causing change are understood. Refer to Part B, section 5 of the species section introduction for more information.

Adaptation options

Reversing the historic loss of suitable sites within its existing range is likely to be the most effective adaptation action in the UK. Restoration or creation should focus on areas likely to remain climatically suitable for the species, most likely in the north of the country. The long term viability of populations towards the south of its range may make successful re-establishment harder.

- Ensure optimum management of existing sites through the appropriate management of water levels and water quality to preserve oligotrophic acidic conditions; and control of scrub, trees and aquatic vegetation to maintain or create areas of open water with floating marginal sphagnum.
- Avoid introducing fish to sites, and ensure acidic conditions to prevent fish colonising sites naturally. If fish are present, the promotion of large sphagnum mats may help to reduce predation by providing cover for the dragonfly larvae (Henrikson 1993).
- In many cases, the removal of encroaching scrub and trees is required to ensure suitable open water and sphagnum habitat. However, in southern sites, some trees and cover may be beneficial in providing shade and reducing water temperature.
- Assisted reintroduction should be considered where restored sites are distant from existing colonies, as the species' preference for returning to its emergence site means it has relatively poor dispersal ability. The translocation of nymphs or the seeding of pools with egg-containing sphagnum from existing sites are the best approaches.
- In those sites where climate change related declines are expected, establish programmes to monitor population trends and the effectiveness of interventions.
- If it is suspected that climate change is responsible for losses, undertake research to identify the mechanisms driving these losses.

Relevant Countryside Stewardship options

WT4 Management of ponds of high wildlife value (100 m2 or less)

WT5 Management of ponds of high wildlife value (more than 100 m2)

WT10 Management of lowland raised bog

FM2: Major preparatory works for Priority Habitats (creation and restoration) and Priority Species.

Case Studies

Foulshaw Moss Nature Reserve

Cumbria Wildlife Trust and the British Dragonfly Society reintroduced the white-faced darter to Foulshaw Moss Nature Reserve in South Cumbria in 2010. This was the first attempt to reintroduce the white-faced darter dragonfly anywhere in the UK.

Delamere Forest

Cheshire Wildlife Trust, the British Dragonfly Society and partners reintroduced the white-faced darter to Delamere Forest in Cheshire, after an absence of more than a decade. The project has developed detailed methodologies for translocation and monitoring.

References and further reading

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