Keeled skimmer

Keeled skimmer *Orthetrum coerulescens* F.

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

Summary

The impact of climate change on the keeled skimmer is likely to result from changes in rainfall and a lowering of water tables, leading to the loss and degradation of its habitat in the south and east of England. The keeled skimmer responds well to management interventions that maintain water levels and manage vegetation, especially where this sustains shallow, largely unshaded areas of open water. Where climate change will adversely affect water levels, the restoration of natural hydrology to secure water levels, or intervention to secure greater control of water levels, including the creation or restoration of ponds, are likely to be the most effective forms of adaptation.

Description

The keeled skimmer is the smallest of the four blue skimmers and chasers. Its wings are characteristically forward facing when perched. Males have a pastel blue abdomen, without a dark tip. Juveniles lack the blue colouration of the adults. Females are yellow and have tinted yellow wings. The lack of a black tip to the abdomen and the coloured wing segment (pterostigma) can be used to differentiate between similar species. It has a rapid and unpredictable flight pattern, usually near the edge of the water, where the pond side vegetation grows.

Ecology and distribution

In the UK, the keeled skimmer is a specialist of wet heathland and bog, especially in areas where *sphagnum* mosses thrive. It breeds in flushes, the boggy margins of streams, and in ditches and pools, in areas of moorland, heath and mire.

The keeled skimmer is territorial, and the males settle on perches to monitor activity on their patch. Eggs are laid by the female dipping the tip of the abdomen beneath the water whilst in flight. The male can be seen in close proximity guarding the female and ready to chase off other male intruders. The larvae live in the peaty detritus and silt, taking two years to develop (Merritt, Moore & Eversham 1996). Adults emerge from larvae hanging from the underside of emergent vegetation.

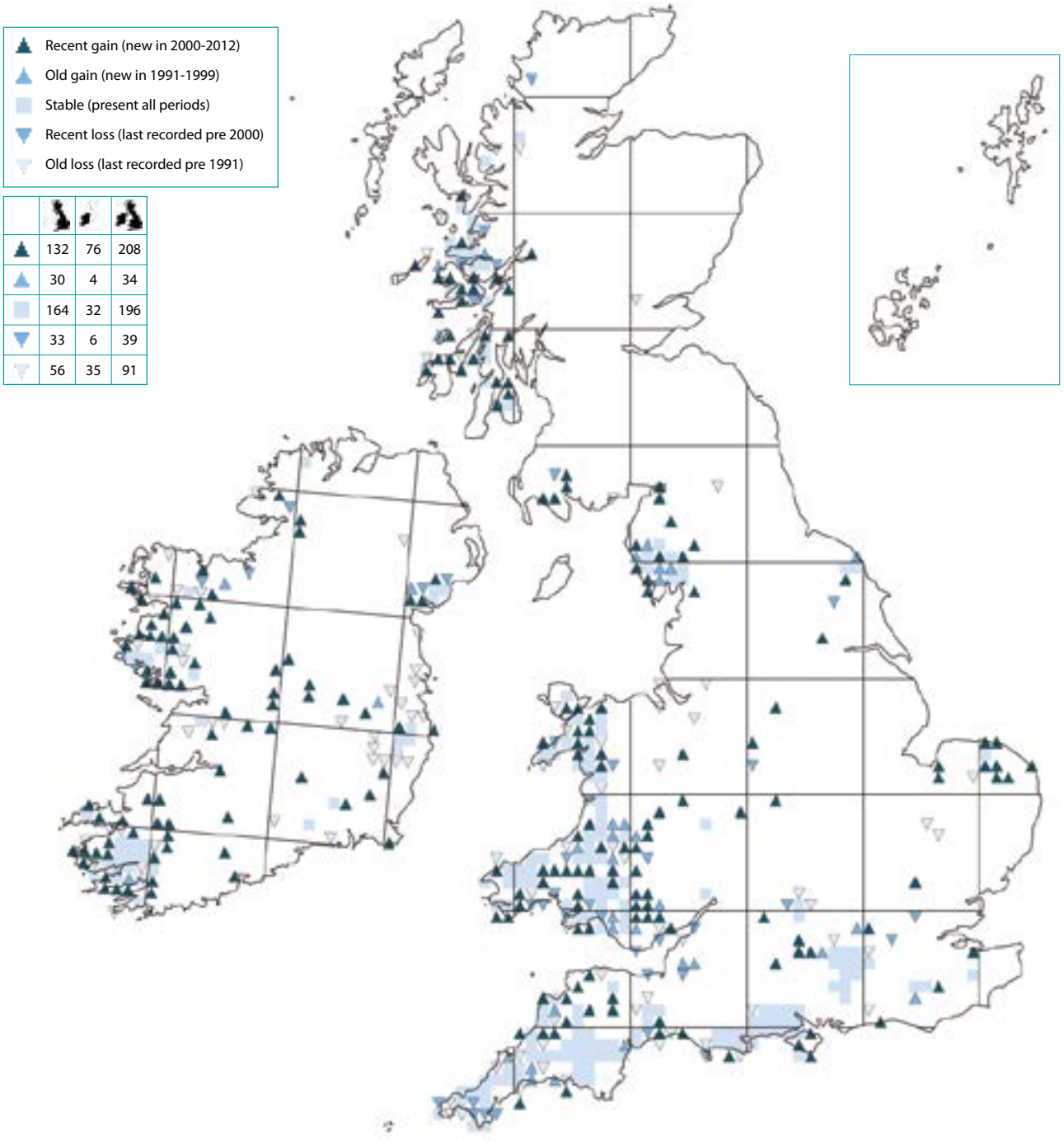
Nationally, the keeled skimmer is quite rare, but it has a patchy distribution and can be locally common. In England, it is found mainly in western areas, being abundant in Cornwall and Devon and the Surrey heaths, with the heathland areas of Dorset and the Lake District also strongholds.

Historically, declines have been related to land use change, particularly the cessation of peat digging (Moore 1986), and the loss or degradation of its habitat (Harzog & Hadrys 2017). Lowering of the water table has been implicated in its localised extinction at several sites (Merritt, Moore & Eversham 1996). Elsewhere in Europe, climate change related summer warming has been implicated in its expansion at its northern margins (Termaat, Kalkman & Bouwman 2010).

Although it is sensitive to inappropriate management such as dredging (Hadrys *et al* 2007), the keeled skimmer has been shown to be tolerant of management intervention as long as the entire meta-population is not impacted (Harzog & Hadrys 2017). In mainland Europe, the species utilises a wider range of habitats, including artificial water bodies such as canals (Harzog & Hadrys 2017), reservoirs (Fulan *et al* 2010) and ditches (Wildermuth 2008). The presence of vegetation in these artificial waterbodies appears to be important (Scher & Thièry 2005). Populations in sub-optimal areas can be maintained by relatively simple habitat maintenance (Wildermuth 2008).

The British Dragonfly Society records for keeled skimmer are shown on the map below (10km grid scale).

Presence of keeled skimmer records, 10km².



▲	132	76	208
▲	30	4	34
■	164	32	196
▼	33	6	39
▼	56	35	91

Confidence in climate change impacts[27]

Distribution change: **MEDIUM CONFIDENCE** Mechanism: **MEDIUM CONFIDENCE**

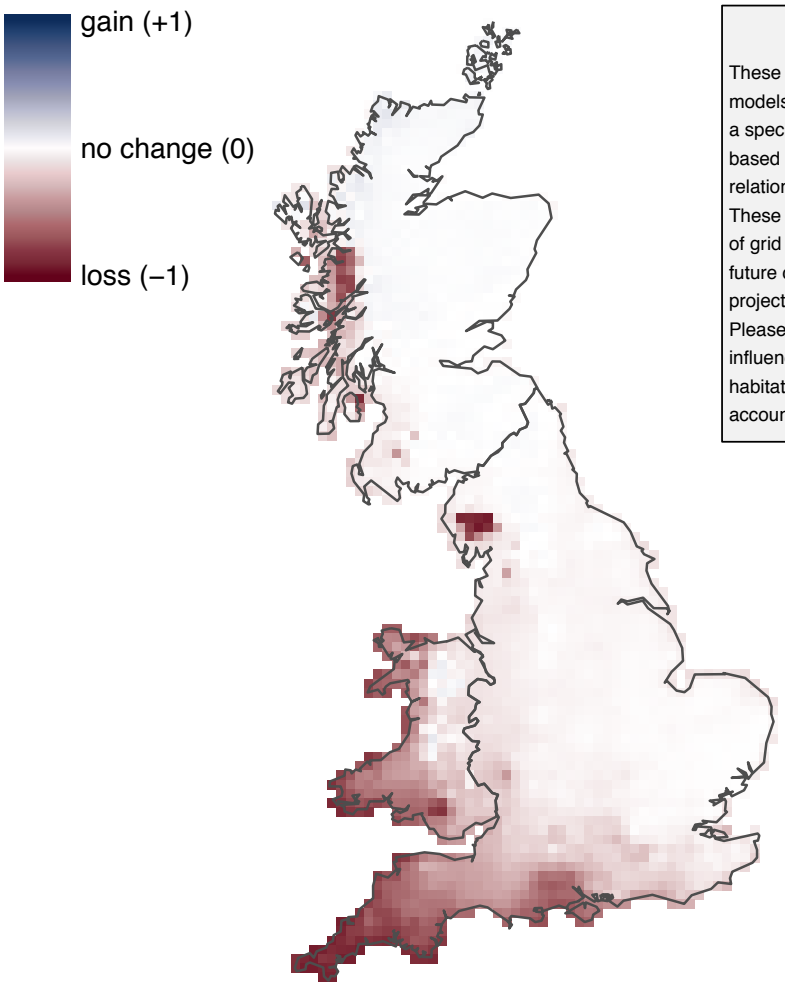
The keeled skimmer has been shown to be susceptible to drought (Harzog & Hadrys 2017) and lowering of the water table (Merritt, Moore & Eversham 1996), although it is able to persist in climatically challenging areas if water bodies are maintained artificially (Harzog & Hadrys 2017). Larval development occurs over a relatively wide temperature range compared to other species, although the growth rate is slower than for species that utilise more ephemeral habitats (Suhling, Suhling & Richter 2015). This suggests that changes to temperature will have a lesser impact, although the slow growth rate makes it more susceptible to occasional extreme events such as drought.

In the southern part of its range it has been shown to utilise shady sites (Fulan, Raimundo & Figueiredo 2008), the suggestion being that it uses shade to help it tolerate hot conditions. Such a behaviour is unlikely to be required in England. Strong wind has been shown to increase the mortality at emergence (Jakob & Suhling 1999), so the projected increase in extreme weather events may have a detrimental impact at this stage.

The direct and indirect impact of changing patterns of rainfall and abstraction on water tables, especially in the south and east of England, are likely to be the main adverse effects of climate change.

27 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.

Projected change in potential distribution of keeled skimmer in the UK with a temperature rise of 2°C (Pearce-Higgins *et al* 2015).



Climate suitability

These maps are created using statistical models which describe the probability that a species will be found in a 10 km grid square, based on its current distribution and its relationship to a number of climatic variables. These can be used to model the suitability of grid squares for a species under possible future climates when climate change projections are taken into account.
Please note that other variables that influence species distributions, such as habitat and land–use change, are not accounted for in the modelling process.

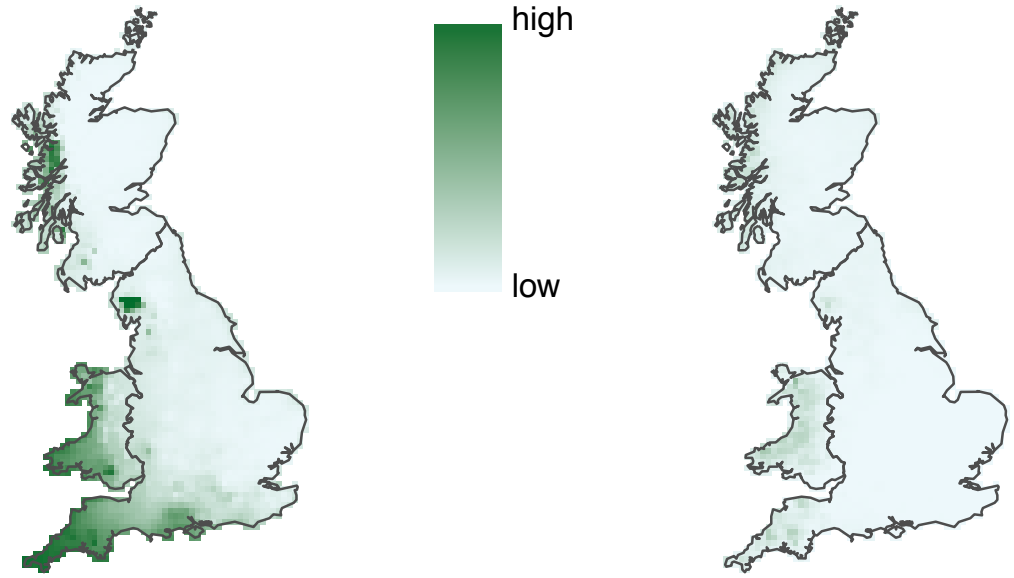
Confidence of change

An assessment of the available data and other factors, as part of Natural England's Research Report NECR175, suggests that our confidence in this projection is very high. N.B. many confidence assessments are rated as low because there is a lack of published information on the likely influence of climate on the species concerned.

Current climate scenario

Climate suitability

Low (2°C change) climate scenario



Created by:	University of York	Created for:	Natural England	Created on:	August 18 2016

Further information on these projections can be found in the introduction to the species section (Part A, Section 3 and Part B Section 5). Note that this is a guide to where a species may be able to survive, it does not capture other issues such as habitat availability and fragmentation – see text above for further details. Contains public sector information licensed under the Open Government Licence v3.0. Please also see acknowledgement and copyright at the beginning of this manual.

Please read this case study alongside the relevant habitat sheets.

Adaptation options

Adaptation should focus on maintaining and restoring the hydrology of suitable open water and wetland habitats through ensuring effective on-site management and addressing off-site impacts. Maintaining water levels through artificial measures is likely to play an important role, especially in areas of the country where changes in the patterns of rainfall will lead to lower water levels or habitats drying out.

- Manage wetlands to ensure suitable open water habitat for breeding and larval development. Priority for wetland restoration and creation should be given to locations where the availability or control of water is secure.
- Ensure off-site impacts on water quantity and quality such as abstraction, drainage and diffuse pollution are identified and addressed.
- Maintain and restore the natural hydrological function of sites to support water levels during periods of drought.
- In areas most likely to be impacted by drought and falling water tables, consider maintaining water levels artificially.
- Where suitably peaty, acidic conditions exist, create new open water habitat in areas close to existing sites to build resilience within meta-populations.
- Monitor populations in sites known to be susceptible to drought, and seek to determine the mechanism for any observed changes.
- Reintroduction should be considered in locations outside its dispersal range in locations where water quantity and quality is assured.
- If the projected changes in distribution occur, areas in the wetter west will become increasingly important for this species. Conservation priorities should be altered to reflect this change.

Relevant Countryside Stewardship options

WT1 Buffering in-field ponds and ditches in improved grassland

WT2 Buffering in-field ponds and ditches in arable land

WT3 Management of ditches of high environmental value

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

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

WT8 Management of fen

WT9 Creation of fen

WT10 Management of lowland raised bog

UP3 Management of moorland

UP5 Moorland re-wetting supplement

References and further reading

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