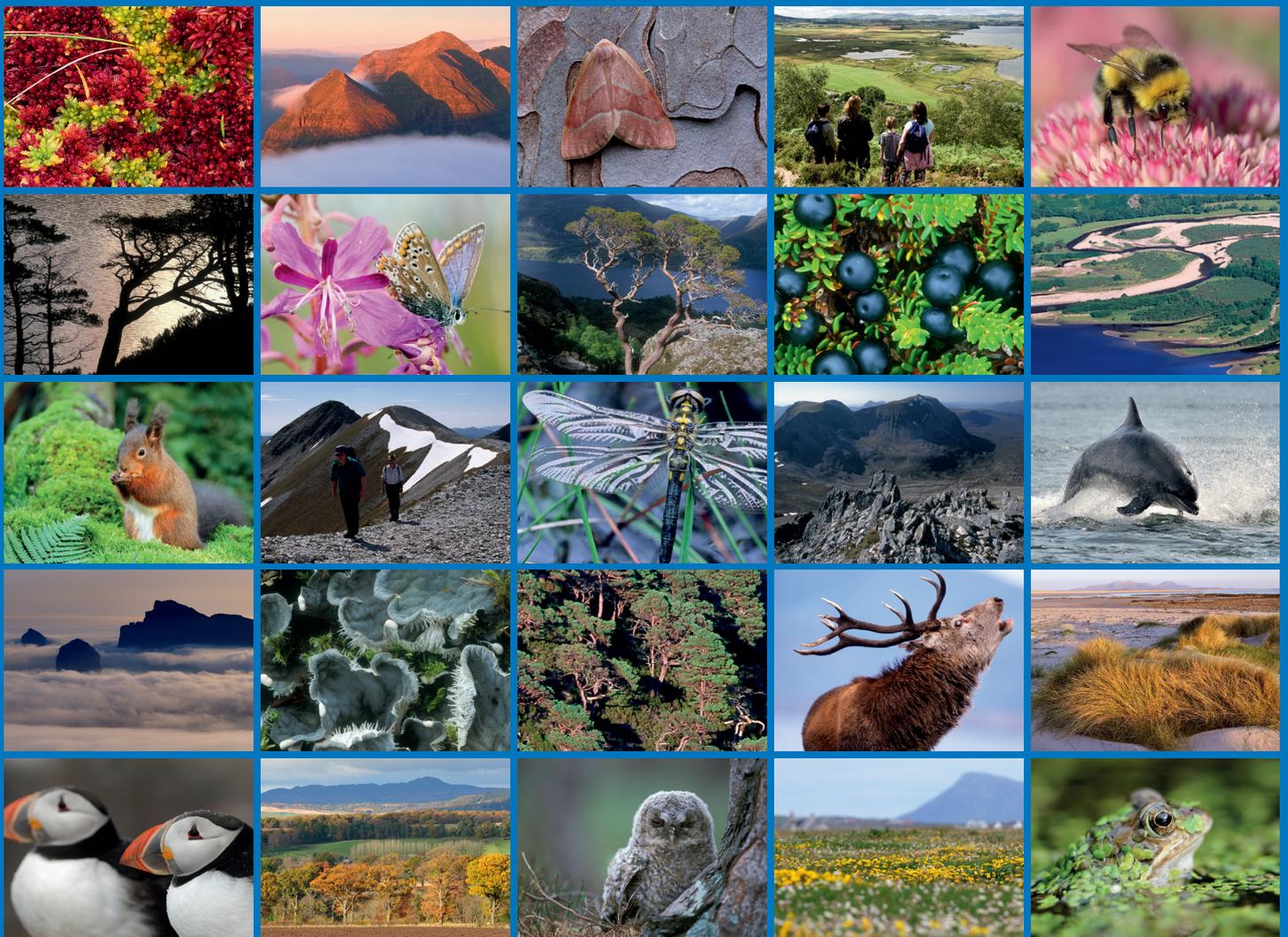


Understanding the impact of the 2018 drought on key freshwater pearl mussel populations in Scotland



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RESEARCH REPORT

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Keywords

Freshwater pearl mussel; *Margaritifera margaritifera*; mortality; drought; climate change; Scotland.

Background

The freshwater pearl mussel *Margaritifera margaritifera* (hereafter 'pearl mussel') is threatened throughout its Holarctic range and is classified by the International Union for the Conservation of Nature as Critically Endangered in Europe having declined by 95% in central Europe. The largest remaining populations in Scotland, Ireland, Norway, Finland, Sweden and northwest Russia are of international importance. It faces a number of pressures and threats. One of those is from climate change. A prolonged period of high temperatures, low rainfall and low river levels was experienced across much of Scotland during 2018. There is anecdotal evidence that this caused significant ecological harm in many locations, including watercourses that support internationally important pearl mussel populations.

There has recently been evidence published of both the impact of a drought in the Iberian peninsula on pearl mussel populations and that climate warming may be a possible trigger for decline in pearl mussel populations more widely. The current project aims to quantify, wherever possible, the impact of the prolonged period of dry weather in 2018 on selected pearl mussel populations in Scotland.

Main findings

- This survey evaluated the status of pearl mussels in 6 rivers in Scotland.
- There is clear evidence of large-scale detrimental impacts (pearl mussel mortalities) from the 2018 drought on several of these Scottish rivers.
- Larger scale impacts might have been expected on some of the more shallow watercourses, however, a localised drought in 2013 killed the shallow-water mussels in these watercourses. As such, the 2018 drought appeared to cause few additional mortalities in some of these catchments.
- Much of the assessment of direct impact is speculative, because systematic before, during and after studies only took place on one watercourse. This river, which was studied in

detail, showed clear evidence of severe impacts from the 2018 drought. Other rivers which were not rigorously studied at the time of the drought do not show such clear evidence of direct, quantifiable impacts attributable to the 2018 drought, although overall pearl mussel population decline was evident in some/all watercourses studied.

- Regular monitoring work needs to be conducted on more pearl mussel rivers, if the required before, during and after studies are going to be available to provide the much needed evidence in future drought years.
 - The selection of water courses investigated was based around ad hoc and, in some cases, anecdotal reports, rather than any systematic assessment of all pearl mussel watercourses. As a consequence, the impacts of the 2018 drought were likely to be much more widespread and detrimental than were able to be shown from the limited sample of watercourses in the present study.
 - Local community groups could play an important role in moving pearl mussels likely to be stranded under similar future extreme low flow events to avoid mass mortalities, as evidenced by the local volunteer actions on one river.
 - Where pools containing pearl mussels appear to be likely to dry out or be isolated during very low flows, it may be possible to direct modest flows into these as evidenced by the actions of surveyors on one river.
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