Some notes on White-clawed Crayfish *Austropotamobius pallipes* surviving in Malvern Hills District

Keith Falconer, Team Leader Malvern Hills Crayfish Group

01. Whippets Brook - a section holding White-clawed Crayfish *Austropotamobius pallipes.* Keith Falconer.

This report should be read in conjunction with Worcestershire Biodiversity Action Plan S11 (2018) for this species which has a full list of relevant scientific references on this species

Introduction

In 2018, a three year project looking at aspects of invasive Signal Crayfish *Pacifastacus leniusculus* in the Suckley Hills was concluded by a group of people and the results published privately (Falconer *et al* 2016) – 'referred to hereafter as the 'Group.

At that time, it seemed that no possible preventative action could be taken to halt the onward spread of Signal Crayfish along the Leigh Brook and into the river Teme at Leigh (both Sites of Special Scientific Interest; SSSIs) and so it has proved. Signal Crayfish populations now exist as several points along the course of the Teme and in many local fisheries. They present a threat to any surviving and increasingly rare White-clawed Crayfish *Austropotamobius pallipes* wherever connections exist between the river and its tributaries.

It has been known for some time that White-clawed Crayfish survived in a small stream that rises on the northern end of the Malvern Hills and joins the Severn near Worcester. The Group made the decision to check whether this population had survived since it was discovered in 2000 and last monitored in 2002, and to see how likely it was that Signal Crayfish would colonise the stream, known as Careys Brook.

From 2018 until present (2022), annual surveys have been made along the catchments of Careys and Whippets Brooks (01 and map 01) to look for White-clawed Crayfish and try to determine how it is that the species survives in this particular catchment and whether they are under any imminent threat.

These surveys have always been carried out under licence from the Environment Agency. -Senior members of the survey team possess the appropriate licences from English Nature to handle the species, since it is stated in the Worcestershire Biodiversity Action Plan (BAP) that White-clawed Crayfish are a listed protected species and cannot be captured or even studied in their habitat without a suitable licence.

The work of the Group has been carried out with the full knowledge and support of the Environment Agency Biodiversity team based in Shrewsbury, helped by Severn Rivers Trust, and the Malvern Hills Area of Outstanding Natural Beauty (AONB) Management Committee have been outstanding in their support of the group.

Results of Surveys

Surveys were made by laying artificial refugia (panpipes) at intervals along suitable parts of the stream. Torchlight surveys were also used as a non-invasive method to discover those parts of the stream that held crayfish and a baited net trap was occasionally placed in deeper water overnight. The baits used were cat food pouches pierced to allow the contents to come into contact with the water - crayfish respond to many baits and experiments are being made with salmon oil from a Scottish processing plant, which one of our Group is associated with.

It became immediately obvious that White-clawed Crayfish were still present and the presence of small juvenile crayfish indicated they were in fact breeding in the upper part of Whippets Brook. This is where the first surveys had revealed their presence during building development of the North Malvern site of Royal Signals

and Radar Establishment (RSRE) in the years 1997 - 2005, now Malvern Vale Housing development.

The focus of the Group's work then shifted to seeing how far the population extended down-stream from the reported site, and to look at potential threats to the known population. Careys Brook meets Whippets brook at Braces Leigh, a farm near Leigh Sinton.

In 2021, a long term survey made at Bastonford along a stretch owned by Ridgeway Farm showed there were no crayfish of either species present in this stretch, although water quality was excellent with a large biodiverse population of aquatic invertebrate species and good numbers of fish.

Another survey in 2021 on a stretch of stream in a catchment adjacent to Careys brook but running down to the Teme near Bransford revealed extremely low biodiversity and no crayfish. This was thought to be related to stream dredging and perhaps pesticides and/or herbicides used in the management of arable and sheep farming in adjacent fields. Some chemical pollution may enter local water from drainage off the large Golf Course at Bransford,

Also in 2021, it was discovered that there are no obstacles to the movement of Signal Crayfish upstream from the confluence of Careys Brook with the Severn until a small dam and weirs are encountered at Ridgeway Farm, Bastonford, about halfway along the length of the brook. Suitable pools of deeper water and rocky substrates exist in the lower part of the brook and there seems no obvious reason why crayfish of either species are not found there. More surveys are required.

Other small scale surveys show that White-clawed Crayfish are present in small numbers in the headwaters of Careys brook, including a small Worcestershire Wildlife Trust Reserve near Leigh Sinton

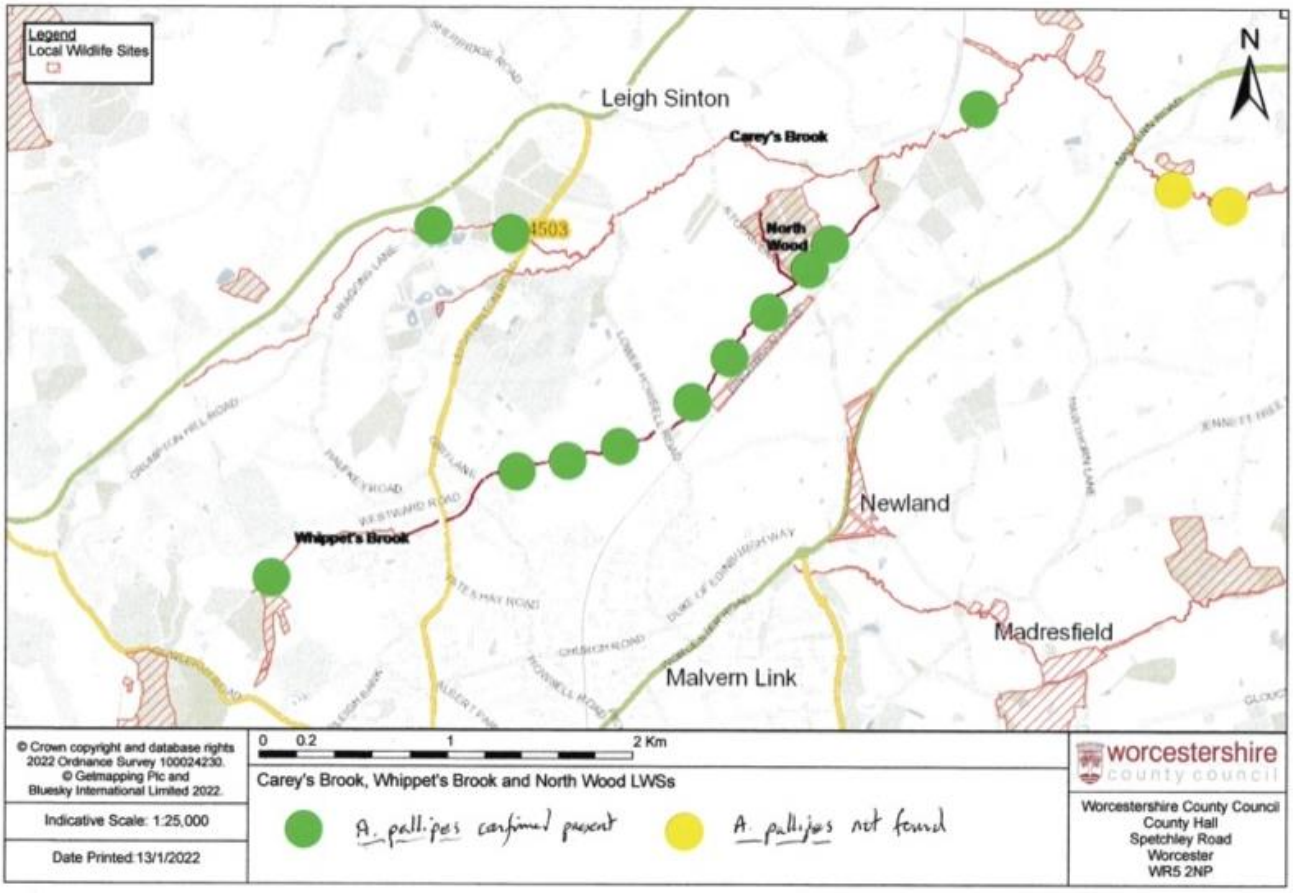
Surveys in 2022 are still underway to try to discover the point at which White-clawed Crayfish are no longer present in the watercourses. This is likely to be below Braces Leigh but above Stockend Farm, where the brook begins to run through arable land and where runoff of toxic chemicals is likely.

Ideal conditions for White-clawed Crayfish have been described by Holdich (2003) and are present in some places along the length of Careys/Whippets Brooks. These include clean unpolluted mineral rich water, refugia along the bed (such as rocks and tree roots) and undercut banks of soft clay to burrow into. Of particular importance during this period of rapid climate change is the presence of shade from large trees and deeper pools that do not warm up or dry out during periods of hot weather.

Our latest survey was by torchlight to estimate the number of crayfish in the section of Whippets Brook at Buckmans Farm. Six similar sized pools were selected to search for 20 minutes and all were shown to hold crayfish of varying sizes. The number seen in 20 minutes varied from two to seven animals.

During this last survey evidence of predation was seen and otters and possibly mink are probably occasional visitors along the brooks.

Note that it is a condition of holding a licence for White-clawed Crayfish that an annual return of the specimens recorded (or negative results) are sent to the National Biological Records Centre for inclusion in their database. All records to date have been submitted.



Map 01 of White-clawed Crayfish *Austropotamobius pallipes* records in the Malvern Hills survey area.

02. Environment Agency staff transferring White-clawed Crayfish *Austropotamobius pallipies* to an ark site on the Malvern Hills

Conclusions

The group's work has been affected by the pandemic due to problems in meeting to organise the surveys. However it has now been proven that White-clawed Crayfish survive in several separate areas of the brooks and are breeding. It will now be possible to estimate the number of crayfish, given sufficient numbers of surveys on the day and an accurate determination of the downstream range of the species.

The remarkable survival of the Malvern Hills White-clawed Crayfish population may be a result of having a high quality water source originating in the Malvern Hills and being spring fed so as to maintain a flow at times of low rainfall, combined with lack of fishing interests.

There are two fisheries nearby - one has no crayfish (Leigh Sinton Farm) and the other has a dense population of Signal Crayfish *P. leniusculus* (Bransford Farm Fishery). In the end it seems a matter of luck as to whether Signal Crayfish gain access to a watercourse through natural dispersal or human transfer.

White-clawed Crayfish in the Malvern Hills will only survive if active measures such as education of landowners and anglers are combined with monitoring. Education seems central so that landowners and residents appreciate the value of having such a rare animal living in their locality.

Recommendations for Further Studies

Some areas for future studies would be :-

to check whether farm chemicals are present in the stream water in the lower reaches to a degree that is toxic to the White-clawed Crayfish, a species known to be less resistant to poor water quality than Signal Crayfish and whether this last invasive species is now living in the Severn local to where Careys Brook meets the river. If so, then upstream colonisation may occur and the native population will be threatened.

It has been noted that water quality is poor and litter is present in the area where Whippets Brook flows through the Vale housing development on the old RSRE North Site and regular monitoring is needed here by local ecologists and/or Environment Agency to ensure that households and runoff do not pollute the stream at this critical point high on the watercourse.

Agricultural activity has made some parts of the stream less favourable for crayfish through dredging and straightening the stream bed. This needs to be discouraged along the whole length of Careys Brook. Part of a protected woodland has recently been felled near the railway bridge in Malvern Link and as a result the stream has become less shaded. This unauthorised development is perhaps typical of the threats to the Malvern Hills population of native crayfish.

Some eDNA work has already been done to establish whether the ark site contained Great Crested Newts *Triturus cristatus* (it did not) and one possible extension of this would be to test whether the Leigh Brook, the River Teme and fisheries waters contain the crayfish plague pathogen *Aphanomyces astaci*. If the fungus is present then the outlook for White-clawed Crayfish in the Malvern Hills is bleak.

Finally **routine** annual monitoring needs to be established by County and District Ecologists and/or the Environment Agency along the Worcestershire streams still holding White-clawed Crayfish with a technique that gives some indication of population density and recruitment.

Acknowledgements

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The assistance and support of many must be recorded. The support of the Management Committee of Malvern Hills AONB and especially Paul Esrich and David Armitage has been much appreciated. The Earth Heritage Trust have supported the establishment of the ark site in a disused limestone quarry leased by them, and have modified the conditions of their lease to include conservation of wildlife species. Mark Baggott and Ann Hay have been very helpful. The Madresfield Estate, and its estate manager Jeremy Hill, made this ark site possible by renegotiating the lease during the pandemic when little progress seemed to be possible.

The assistance of Worcestershire Wildlife Trust officers, especially the Farming and Wildlife Officer Jasmine Walters, in extending the length of stream designated as a Local Wildlife Site (LWS) to include an area that was not in the original LWS (established when the Vale estate was built) has helped conservation efforts immensely

Mention must be made of the efforts of the owners of Buckmans Farm and Madresfield Estate who, between them, own much of the watercourses that are inhabited by these rare crayfish. Both landowners are committed to looking after their wildlife and encouraging biodiversity.

Finally, the support and encouragement of the Biodiversity Team at the Environment Agency has been essential to getting the ark established (02), and especially Caroline Savage, who has been a source of advice and support in all matters related to White-clawed Crayfish.

References

Holdich, D. 2003. *Ecology of the White-clawed Crayfish. Conserving Natura 2000 Rivers Ecology Series No. 1*. English Nature, Peterborough.

Marshall, I. & Nightingale, J. 2021. *Crayfish Conservation Manual 2021*, Rostra Publications.

Falconer, K. & Wood, L. 2018. Signal Crayfish in the Suckley Hills, published privately by the Suckley Hills Streams Improvement Group (SHIG)

Worcestershire Biodiversity partnership, Biodiversity Action Plan Species 11, White-clawed Crayfish, *Austropotamobius pallipes.* Available at: file:///C:/Users/garyl/Downloads/S11_White_clawed_Crayfish_Species_Action_Plan.pdf [Accessed 26.11.22]