



**Suffolk Biodiversity
Partnership**



White-clawed Crayfish Conservation Strategy

Essex, Norfolk and Suffolk Area

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Foreword

The white-clawed crayfish *Austropotamobius pallipes* was once widespread across Britain and is native to rivers across Norfolk, Suffolk and Essex. In Essex, Norfolk and Suffolk we have seen a marked reduction in their range, they are classed as an endangered species on the International Union for Nature Conservation's red list and we believe that they could become locally extinct. White-clawed crayfish are protected by law and recognised in Biodiversity Action Plans.

The greatest threat to white-clawed crayfish is from the non-native invasive signal crayfish *Pacifastacus leniusculus*. They were farmed for food in lakes but they were not well contained and escaped into the wild. Signal crayfish are larger, more voracious and aggressive so they out compete our native crayfish. They also carry a disease called crayfish plague, which is *Aphanomyces astaci*; a water mould. Signal crayfish are unharmed by this but the disease is fatal to our native white-clawed crayfish.

Currently, there are no methods that have been found to successfully eradicate or control signal crayfish or crayfish plague. Various methods have been tested including trapping, electric fishing, barriers, de-watering, habitat destruction and disease. The feasibility of using non-specific biocides is still being investigated but this is likely only to be practical on ponds, lakes or reservoirs that are not connected to the river system (Peay, 2001).

White-clawed crayfish have also been wiped out by pollution incidents, as suspected on the River Stiffkey in the 1980s. Habitat modification is also a threat, dredging can remove refuges and increase sedimentation.

A new technique to conserve white-clawed crayfish is to create ark sites - rivers or lakes that are suitable for the species to thrive but safe from invasion by alien species. These can be sites where they are known to have been present in the past or new sites.

The aspiration of this group is to increase populations to safe levels so that they are self-sustaining and to expand the range so that the populations in the three counties are more resilient and viable in the long term.

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What we are trying to achieve

- Conserve populations of native white-clawed crayfish in-situ as far as possible.
- Create ark sites where white-clawed crayfish are safe and populations are self sustaining.
- Educate local people, recreational users and anglers about crayfish conservation and biosecurity.

How we are going to achieve it

Conserve populations of native white-clawed crayfish.

- Retain barriers such as weirs and sluices where this would prevent the upstream colonisation of invasive signal crayfish.
- Seek to improve habitat for white-clawed crayfish where they are present.
- Educate general public about crayfish conservation, promote biosecurity* and encourage reporting of suspicious and illegal activities.
- Take action to rescue and move populations that are faced with an imminent threat (pollution incidents, crayfish plague outbreaks, movement of signals)
- Monitor and collate records of crayfish. Encourage staff of partner organisations and general public to report sightings to angeastfrb@environment-agency.gov.uk. Keep a log of outbreaks of crayfish plague.
- Protect white-clawed crayfish from trapping and consumption (contact an Environment Agency fisheries officer).

Create ark sites for white-clawed crayfish

- Find and establish new ark sites to expand the network of sites
- Survey ark sites regularly to establish if populations are self sustaining and to identify necessary actions
- Educate local people, recreational users and anglers about crayfish conservation, promote biosecurity* and encourage to report suspicious and illegal activities. We would like to empower local people to become custodians or guardians of their local white-clawed crayfish.
- Take action to rescue ark site populations that are faced with an imminent threat (pollution incidents, crayfish plague outbreaks, introduction of signal crayfish).
- Assess impacts of activities within an ark site on conservation of white-clawed crayfish. Seek opportunities to improve habitat and water quality.

Sharing knowledge

- Share reports and case studies to show successes and how we could improve our methods
- Seek information from other ark projects around the country.

What we have done so far

We have set up seven ark sites across Essex, Norfolk and Suffolk including rivers and still waters. The ark sites were set up in accordance with Buglife guidance (Whitehouse *et al.*, 2009; Peay, 2009). Natural England Protected Species licences and Environment Agency licences to move fish (FR2) were obtained. Many partner organisations and volunteers were involved in setting them up.

Numerous white-clawed crayfish were translocated into these ark sites. The number transferred depended on how many we could 'harvest' from the donor population and how many we thought the ark site could support.

*Biosecurity is the term used to describe actions that must be taken to prevent people carrying animals, plants and diseases to new locations. You must check, clean and dry equipment, clothing and shoes (for 48 hours) before visiting a new site. See the check, clean dry campaign poster at <http://www.nonnativespecies.org/checkcleandry/documents/check-clean-dry-poster.pdf>

We have been monitoring these populations to determine whether the population is persisting and if they have been breeding. After reintroduction it is thought that it may take crayfish five years to become established. In this period there is a greater risk of dying out so it is important to monitor the population and take action when necessary.

Monitoring has involved using a variety of methods but they have usually only captured low numbers. This is to be expected at this stage and needs to continue in order to determine populations trends.

One of the lessons learned from reintroductions and creations of ark sites has been to only use one donor site because this reduces chances of spreading disease.

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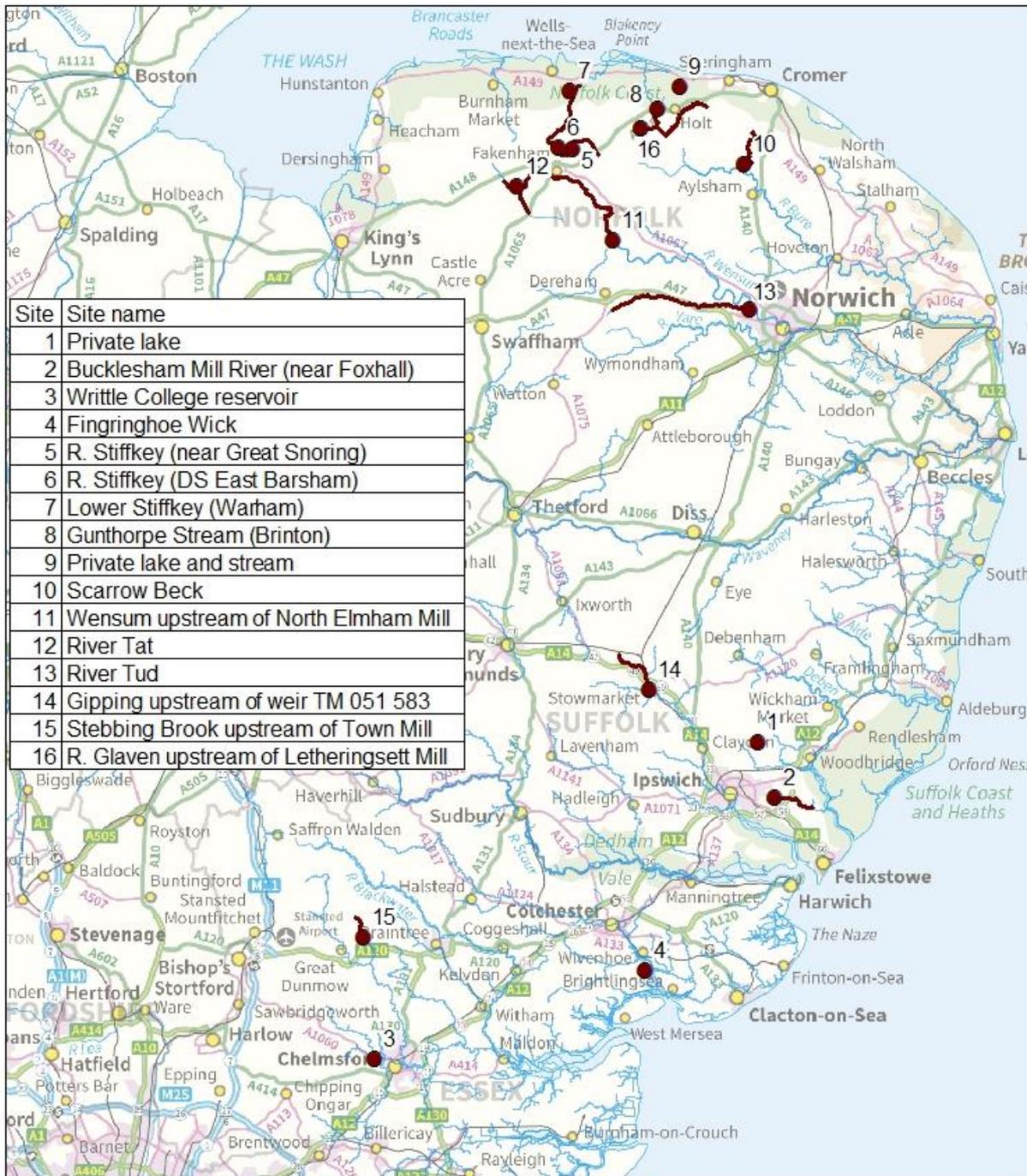
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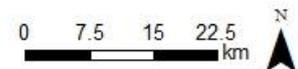
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Essex, Norfolk and Suffolk
White-clawed crayfish sites 2014



Legend

- Native crayfish sites
- Native crayfish reaches
- Main rivers



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Figure 1 Map of white-clawed crayfish refuges or ark sites

Appendix 1

Evaluation of white-clawed crayfish in each catchment

River Hun

No crayfish records. Very short river. Habitat may not be suitable for Ark site.

River Burn

The River Burn in Norfolk was last surveyed in 2009. There are no records of white-clawed crayfish. It is an isolated river so has been considered as a future ark site. It is a winterbourne stream with less than ideal habitat so this would have to be considered prior to any reintroductions.

It is not known if white-clawed crayfish lived in the River Burn historically.

There has been one unsubstantiated report of signal crayfish escaping from a fishery. We are not aware of any fisheries in the area and have yet to investigate the report. There was one record of a dead signal crayfish in 2006 at Roys Mill.

Brown trout are present in the river along with eel and stickleback. It is thought that a serious pollution incident wiped out all other fish species and they have not been able to re-colonise.

Actions

- Investigate reports of signal crayfish
- Investigate suitability for an ark site

River Stiffkey

The River Stiffkey was last surveyed in 2009, although local monitoring has also been carried out more recently. There were records of white-clawed crayfish in the 1980s and they were thought to have died out following a pollution incident.

In 2011 and 2012 white-clawed crayfish were reintroduced at several sites between Great Snoring and Warham. These sites are dispersed over a 12 km stretch of river. Surveys in 2013 of these sites suggest that white-clawed crayfish seem to still be low in number. This is expected at this stage because they will have dispersed. Progeny of the reintroduced animals have been found so they are breeding. The whole River Stiffkey is an ark site.

There are no known environmental impacts or habitat problems although improvements could be made.

Signal crayfish are not in this river. There is public access to this stretch and there is increased interest in trapping for consumption. No work has been done to publicise the location or raise awareness of the threat posed by signal crayfish.

Actions

- Continue to monitor reintroduced population.
- Consider stocking more individuals.
- Assess whether reintroduction was a success in 2016, five years after initial reintroduction.
- Provide maps of white-clawed crayfish populations to Environment Officers
- Carry out public education and encourage local guardianship of the population

River Glaven

The River Glaven is historically a stronghold for white-clawed crayfish. However, the River has recently been invaded by signal crayfish from a nearby lake. There is still a healthy population of white-clawed crayfish in the mid reaches above Letheringsett Mill. It is thought that Letheringsett

Mill is slowing the spread of signal crayfish upstream. **Upstream of Letheringsett Mill should be considered as an ark site.**

The habitat in the upper reaches would be suitable for white-clawed crayfish with a small amount of improvements. Introduction into the upper reaches could ensure the survival of white-clawed crayfish in this river in the medium term.

A trapping trial is currently being carried out by Robin Coombe, a volunteer and member of the River Glaven Conservation Group. The trapping is now in its third year and surveys will be carried out to find out whether there have been any ecological improvements. Signal crayfish are still being caught but the average size and number has been reduced.

White-clawed crayfish were reintroduced into the Gunthorpe Stream tributary in 2012 and habitat restoration work has been carried out. A survey in 2013 did not find any crayfish so we cannot say whether it was a success or not at this early stage.

White-clawed crayfish have also been introduced into a nearby small coastal catchment at a private site which has a stream and a lake.

Actions

- Monitor population in Gunthorpe Stream and at the private site
- No fish pass to be installed on Letheringsett Mill or Hempstead Mill
- Encourage write up of trapping project
- Provide maps of white-clawed crayfish populations to Environment Officers
- Consider introducing white-clawed crayfish into the upper reaches
- Encourage restoration of upper reaches
- Carry out public education and continue to encourage local guardianship of the population

River Mun

Signal crayfish have been found in the lower reaches. There are no records of white-clawed crayfish.

Action

- Prevent spread of non-native crayfish and plague – investigate if there are any fishing activities etc.

River Wensum SSSI SAC

The upper reaches of the Wensum are still a stronghold for White-clawed crayfish, along with the Wendling Beck and Swannington Beck. Unfortunately there is Signal crayfish in the middle to lower reaches, they escaped from a fishery onto the Reepham Stream in the 1980s. There is anecdotal evidence that white-clawed crayfish have been living alongside signal crayfish for two decades on the main river e.g. at Lenwade. This indicates that the signal crayfish are free from crayfish plague, otherwise the white-clawed crayfish would not have persisted for this long.

In some areas of the Wensum signal crayfish are known to live at very high densities with few or no white-clawed crayfish left, e.g. at Swanton Morley.

There are several barriers that may slow the upstream spread of signal crayfish; (1) North Elmham Mill, (2) Bintree Mill, (3) Fakenham Mill and (4) Sculthorpe Mill, they may all be strategically important. **Consider Wensum and Tat upstream of North Elmham Mill as an ark site.**

Habitat in the upper reaches of the Wensum and Tat are poorer quality – some reaches are being improved through the River Wensum Restoration Strategy. This aims to improve the habitat within the River Wensum SSSI and SAC.

There is an unsubstantiated report of signal crayfish in East Dereham and at Pensthorpe.

Actions

- Raise awareness about illegal traps
- Follow up reports with enforcement action
- Do not seek to install fish passes on the structures identified above
- Continue to monitor crayfish at Pensthorpe
- Investigate report of signal crayfish in East Dereham
- Provide maps of white-clawed crayfish populations to Environment Officers
- Survey tributaries

River Tud

The River Tud is a tributary of the Wensum but it has a significant white-clawed crayfish population so it will be considered separately. White-clawed crayfish are only present in the lower reaches where the habitat is better quality. **Consider River Tud as an ark site.**

There are no barriers to stop the signal crayfish present in the Wensum from moving up into the River Tud.

Actions

- Habitat restoration in mid to upper reaches would benefit white-clawed crayfish

Bure, Ant and Thurne

There are white-clawed crayfish only populations in Scarrow Beck and may still persist in the Mermaid and the Blackwater. The habitat is not ideal in these tributaries and could be improved. The last time the whole catchment was surveyed was in 1996 and Scarrow Beck was re-surveyed in 2002. **Consider Scarrow Beck as an ark site.**

There are signal crayfish in the main river and white-clawed crayfish live amongst them.

The tidal reaches of the Bure, Ant and Thurne are likely to have signal and Turkish crayfish and perhaps Chinese mitten crab although this has not been confirmed by the EA.

Actions

- Promote habitat restoration in Scarrow Beck, The Mermaid and the Blackwater
- Provide maps of white-clawed crayfish populations to Environment Officers
- Crayfish survey of the Broads
- Survey tributaries

River Yare, Tas, Tiffey and Chet

In the past white-clawed crayfish have been found on the main river Yare, Intwood Stream and the Tas. There are unconfirmed reports of signal crayfish in the main river and it is known that there are Turkish crayfish in the tidal reaches. The main River Yare was last surveyed in 1996.

There are two unsubstantiated records of non-native crayfish in lakes within the catchment.

There are habitat problems along these rivers, in the past they have been over-deepened and modified.

There are barriers to upstream movement of non-native crayfish in the River Tas at Stoke Holy Cross and Shotesham.

Actions

- Survey of River Yare, Tas and Intwood Stream
- Seek habitat improvements where there are known populations of white-clawed crayfish

River Waveney

The crayfish in the River Waveney are mainly Turkish crayfish. The last confirmed record of white-clawed crayfish was from 2001. The River Waveney was last surveyed in 2005, during an outbreak of crayfish plague *A. astaci*. It is unlikely that any white-clawed crayfish remain in the main river. Turkish crayfish are reported to be recovering. There is an old record of white-clawed crayfish from its tributary, Starston Beck.

There is also one record of Signal crayfish from Flixton.

Action

- Survey Starston Beck for crayfish

Suffolk Coastal Rivers

Lothingland Hundred, Eastern Broad River, Blyth, Minsmere River, Thorpeness Hundred

These rivers are small isolated rivers along the Suffolk Coast. They do not have much gradient and are thought to be unsuitable habitat. There are no records of crayfish from these streams, crayfish were not found in EA fish surveys carried between 1987 and 2013 (with the exception of Eastern Broad River which we have not surveyed). These streams also do not support Brown Trout an indication that the habitat would be unsuitable for white-clawed crayfish.

Rivers Alde and Ore

There is a record of signal crayfish in the Alde and Ore catchment but this is reported to be in a nearby pond. There are no records of white-clawed crayfish. Brown trout are breeding in one section of the Alde (Langham Bridge) so this indicates that the habitat could be suitable for white-clawed crayfish.

Action

- Investigate whether signal crayfish are present in pond or river
- Consider if suitable for an ark site in future

River Deben

There is an old record of white-clawed crayfish from the River Deben from 1973 and there are unsubstantiated records of signal crayfish in the same location from 1986. There are two ark sites for white-clawed crayfish in this catchment, one is on Bucklesham Mill Stream and the other is in a private still water.

The Bucklesham Mill Stream population has not done as well as expected. When the refuge traps were checked we found that they were covered in silt and the reach had become quite silty.

Actions

- Continue to monitor stillwater ark site and Bucklesham Mill Stream population
- Identify measures to reduce siltation and improve habitat in Bucklesham Mill Stream

River Gipping

White-clawed crayfish are present on the Haughley Watercourse a tributary of the Deben. Signal Crayfish are present in the main river and in a pond upstream of the white-clawed population. There are weirs at TM 051 583 and TM 046 598 that could protect some of the population from upstream colonisation of signal crayfish for some time. **Consider the population upstream of these weirs as an ark site.**

There is little value in attempting to control the population in the pond because signal crayfish are already in the main river.

Action

Do not put a fish pass on the weirs at TM 051 583 and TM 046 598

River Stour

The River Stour has three species of crayfish and several different populations of these species. This includes a section of the main river that has white-clawed crayfish from Higham to Stratford, this was last surveyed in 2007.

The stronghold was in Chad Brook but there was an outbreak of crayfish plague in 2010. It is not known whether the population is recovering or whether it has vanished. Signal crayfish are present upstream of the white-clawed population so it is unlikely that we can conserve the population in the long term.

Actions

- Resurvey Chad Brook to see if any white-clawed crayfish are persisting
- Resurvey main river

River Colne

The Colne also has a complicated distribution of crayfish with four species present. There is one location on the main river where white-clawed crayfish are present. They are also present in Pebmarsh Brook but there is a population signal crayfish upstream. There is a lake ark site (Fingringhoe Wick) in this catchment as well.

There are three species of invasive non-native crayfish present: signal crayfish, Turkish crayfish and spiny-cheeked crayfish.

Action

- Monitor ark site in 2014

Blackwater and Chelmer

There is a complicated distribution of crayfish species in this catchment. White-clawed populations are in Stebbing Brook, Mundon Brook, Pant, Brain (1 record, none found in survey), Chelmer, Can, and Robin's Brook. There is also an ark site at Writtle College.

Stebbing Brook has been a stronghold for white-clawed crayfish in this catchment but there is a record of signal crayfish near the B1057 road bridge. There is a barrier at Town Mill on Stebbing Brook which may protect a proportion of the population. **Consider upstream of Town Mill as an ark site.**

The Blackwater and Chelmer catchment seem to be a hotspot for invasive species, including Chinese mitten crab and the invasive shrimp *Gammarus tigrinus*. Habitat quality is also a problem.

Actions

- Do not facilitate access of signal crayfish over Town Mill on Stebbing Brook.

Essex Coastal Rivers

Latchingdon Brook, Bradwell Brook, Asheldham Brook, Crouch, Roach, Mardyke

These rivers are small isolated rivers along the Essex Coast. They do not have much gradient and are thought to be unsuitable habitat. There are no records of crayfish from these streams, crayfish were not found during EA fish surveys (1987 – 2013). This is with the exception of the Crouch which has records of signal crayfish and Chinese mitten crab and the Mardyke which also has Chinese mitten crab.

These streams do not support Brown Trout so this suggests that the habitat would be unsuitable for white-clawed crayfish.

The following rivers are within the counties of Essex, Norfolk and Suffolk but are the responsibility of Cambridgeshire and Bedfordshire Area Office of the Environment Agency.

River Nar SSSI

The River Nar SSSI in Norfolk was surveyed for crayfish in October 2013, a survey of key habitats throughout the length of the river. There are historical records of white-clawed crayfish in the upper Nar and signal crayfish are known to be present in the lower Nar.

The survey found no white-clawed crayfish. 23 signal crayfish were found below Marham. At Marham there is a gauging weir which was being considered for installation of fish passage however it is considered to act as a barrier to the spread of signal crayfish so plans for fish passage have been put on hold. Signal crayfish are known to be present in Blackborough Drain, a tributary of the River Nar, downstream of Marham. A trapping programme was instigated in 2014 to determine the abundance and extent of signal crayfish below Marham. It is hoped that this programme may reduce the numbers of signal crayfish and slow down their spread. The lower River Nar SSSI unit is in unfavourable condition due to the presence of the invasive species.

Actions

- Continue the programme of trapping which was started in May 2014 with the aim of monitoring and removal.
- Change locations of traps in view of results obtained.
- Survey tributaries and nearby lakes and ditches below Marham.

Rivers Cam, Rhee and Granta

The River Cam catchment (including the Rhee and Granta) was thought to no longer support white-clawed crayfish, following plague incidents in the 1990s. However in recent years white-clawed crayfish have been identified.

A small, isolated population of white-clawed crayfish were found on the River Cam at Ickleton, Cambridgeshire in 2011. The Cam is known to support a large population of signal crayfish downstream of Hauxton, which is approximately 15km downstream of Ickleton. A significant barrier is present at Hauxton Mill which is believed to be preventing the upstream movement of the signal crayfish. In June 2014 an investigation was undertaken following reports of dead crayfish at Ickleton. A survey of the River revealed nine dead white-clawed crayfish which were sent to Cefas for examination but were too decayed to determine whether crayfish plague had caused the mortality. There was however, no evidence of pollution impact.

In 1999 an outbreak of crayfish plague *A. astaci* was confirmed on the River Shep in Cambridgeshire. Following this outbreak a survey showed that white-clawed crayfish were then absent from all but the headwaters of the Shep and in more recent years there have been no records either here or in the Mel.

On the River Rhee signal crayfish are now common in the river up to Barrington Mill, upstream of the confluence with the Shep. A trapping programme was set up in 2014 to determine whether signal crayfish were present above the Barrington Mill structure. To date a small number of signal crayfish have been found in the area directly above the Mill.

Another tributary of the River Rhee situated upstream of Barrington Mill, Orwell Brook was surveyed in 2014 in response to reports of a crayfish population. The survey revealed the presence of a small population of white-clawed crayfish. An ark site is being considered in the headwaters of the Orwell Brook dependent on sufficient white-clawed crayfish being located. In addition, an isolated population of white-clawed crayfish are known to be present in a farm reservoir near Wendy in the Rhee catchment.

A small, isolated population of white-clawed crayfish were found on the River Granta approximately 1km downstream of Great Abington in 2012. Signal crayfish are present upstream of this population and although they have not been recorded downstream, there are no significant barriers to prevent their movement from the Cam.

Actions

- Habitat improvements required at Wimpole lakes prior to potential translocation.
- Re-survey the Cam at Ickleton to determine whether white-clawed crayfish have survived.

Rivers Little Ouse, Thet and Wissey

There have been historic records of white-clawed crayfish in the River Little Ouse but in recent years none have been found. In 2014 signal crayfish were recorded at Knettshall Heath in the middle reaches of the Little Ouse. The River Sapiston, a significant tributary of the Little Ouse has supported a large population of signal crayfish since at least 2000.

A white-clawed crayfish mortality was investigated on the River Thet in August 2009. Dead crayfish were found from Thorpe Woodlands Caravan Park downstream to Brettenham. A number of crayfish were sent to Cefas for examination which revealed that the mortality was as a result of crayfish plague. White-clawed crayfish have not been identified subsequent to this incident.

A white-clawed crayfish mortality was investigated on the River Wissey in April 2010. Dead crayfish were found from the Buckenham Tofts Training Ground downstream to the A1065 Bridge at Ickburgh. A number of crayfish were sent to Cefas for examination which revealed that the mortality was as a result of crayfish plague. White-clawed crayfish have not been identified in this reach in subsequent surveys but a single individual was found upstream at Hilborough in 2010. In 2014 crayfish surveys were undertaken at Didlington (downstream of Ickburgh) to determine presence or absence prior to habitat and weir removal work. No crayfish were found during these surveys.

Actions

- Re-survey historic sites to determine if white-clawed crayfish are still present (resource dependant).
- Take all possible precautions to prevent the spread of signal crayfish, including considering leaving all barriers in place and/or not adding fish passage over barriers where there are signal crayfish populations downstream.

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