

White-clawed crayfish

(comprehensive revision of SAP in 2004)

1. A Definition

The white-clawed crayfish (*Austropotamobius pallipes*) is the only native species of crayfish in the UK. Although widely distributed throughout England and Wales it is in serious decline due to an introduced disease, the crayfish plague.

The species grows to about 10 or 12 cm in length and gets its name from the pale undersides to its claws that contrast with the upper side of the animal, which is dark greenish brown. Crayfish have fearsome-looking claws but in fact rarely use them in anger.



In Devon few rivers have suitable conditions for the species' survival. The only known population, found in the Creedy-Yeo sub-catchment of the Exe, is thought to be free of the crayfish plague *Aphanomyces astaci*. Historical records show populations once occurred on the Culm, Clyst and Otter.

Some quarries, however, may also provide an important refuge for native white-clawed crayfish, isolated from potential competition with or contamination by diseases spread by introduced species.

Crayfish are active mainly at night, hiding by day under stones or in crevices in the riverbank.

2. Why an Action Plan?

The white-clawed crayfish was once widespread across many parts of Europe, but now is confined to a diminishing number of areas due to habitat modification, pollution and plague.

Many populations have been lost since the 1970's due to losses of habitat and decline in water quality. More recently the escape into river systems of farmed non-native American signal crayfish *Pacifastacus leniusculus* have weakened

populations of the native species by predation and by passing on the crayfish plague, *Aphanomyces astaci* which they carry.

An action plan helps identify the measures needed to overcome the threats to the native populations in Devon, and to plan for white-clawed crayfish survival in a county which is believed to be plague free at present.

3. Relevant ecology

The Life in UK Rivers project was established to develop methods for conserving the wildlife and habitats of rivers within the Natura 2000 network of protected European rivers. A series of published reports collate the best available information on the ecological requirements, monitoring and re-introducing of the species. These can be read on the website at: www.riverlife.org.uk.

The distribution of white-clawed crayfish in the British Isles is largely determined by geology and water quality. They occur in watercourses with relatively hard mineral-rich water (pH 6.5-9.0 and calcium 5mg l⁻¹ minimum) with gravel-bottomed or pebbled stream beds, where they live under larger stones in pools or riffles, in undermined, overhanging banks, amongst stonework, roots of woody vegetation, saturated logs and accumulations of fallen leaves. Vertical bank, exposed tree roots and overhanging vegetation are important features in determining their abundance.

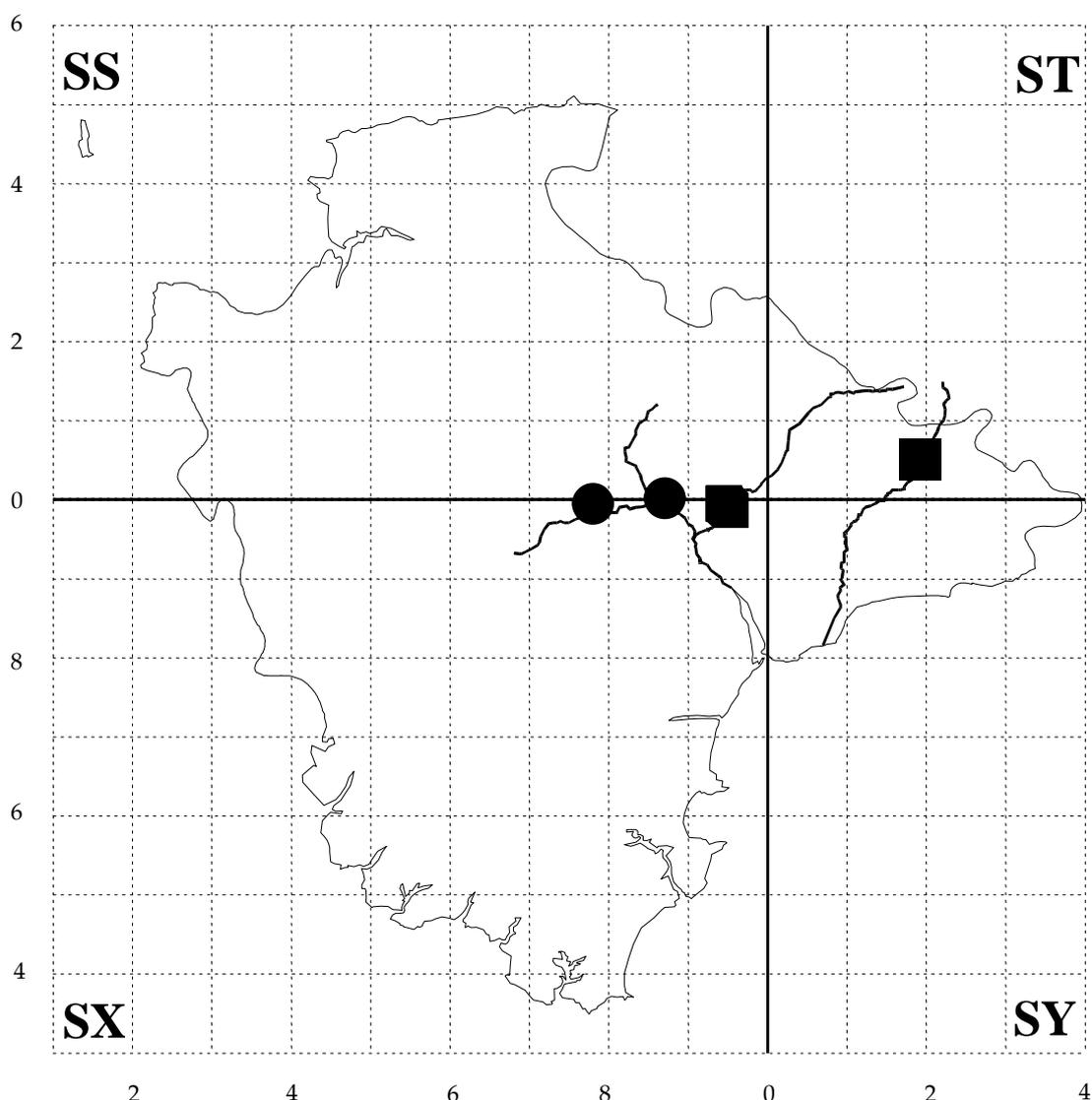
High summer temperatures may cause stress or mortality to crayfish when oxygen levels drop below 5 mg l⁻¹.

This native crayfish is one of the UK's largest mobile freshwater invertebrates, growing to over 10 cm in length, taking up to six years to reach this size. During this time they go through several moults, when they shed their outer skeleton. For the first few days their new skeleton is soft, making them vulnerable to predation. This is when the hiding places found between stones are particularly important as they can fall easy prey to otters, eels and herons.

White-clawed crayfish require good water quality to support their prey species. They are omnivores with worms, insect larvae, snails, small fish, macrophytes and algae as the main components of their diet. Crayfish are susceptible to acute pollution incidents where high ammonia levels and reduced oxygen can cause mortality. Sediment can clog their gills and silting and turbidity can cause problems. For these reasons they are not normally found in mud or silt substrates. The prey species found in silted channels also change and can be unsuitable for crayfish.

At three to four years they become sexually mature and mate in October and November. The females over-winter with a clutch of eggs held under her tail, and they hatch the following May/June. Newly hatched crayfish take two to three weeks to become fully developed and independent. Individuals have been known to live for 12 years.

4. Distribution of white-clawed crayfish in Devon



● Rivers where native crayfish currently are found

■ Rivers with historic populations of native crayfish; now absent (but see below)

(Data supplied by Environment Agency 2004)

5. Current population

In Devon: Environment Agency surveys in 1999, 2000 and 2003 confirmed a small but healthy population on the Creedy Yeo and Creedy below the Yeo confluence. This population lives naturally at low densities. Further survey work in 2004 should identify the full extent of the distribution in the Creedy system. Spot checks on the Otter, Culm and Clyst at historic sites did not find any evidence of surviving populations.

2009 update: In 2007, a population of white-clawed crayfish was re-discovered in the middle reaches of the River Culm.

Elsewhere in Britain: Formerly widespread in Britain where conditions were suitable, many populations have been eliminated by crayfish plague and most are now concentrated in northern and central England. Before the 1980's large populations were known from central Ireland, the Welsh Borders and throughout England except the extreme south west. The species does not naturally occur in western Wales or Scotland. The populations in the British Isles represent the greatest concentration of the species in Europe.



6. Current problems for white-clawed crayfish in Devon

Disease: In 2004 Devon rivers are thought to be free from the diseases that can debilitate or kill native crayfish. Crayfish plague (*Aphanomyces astaci*) is a serious contributory factor to the national decline of the white-clawed crayfish, and possibly increases the importance of the plague free Devon population. The risk cannot be overstated, as the plague is lethal to native crayfish and causes mass mortality. Porcelain disease, caused by a protozoan *Thelohania contejeani*, has to be present in 10% of a population before causing harm.

Non-native crayfish: The displacement of native crayfish by three commercially farmed, non-native species (including the American signal crayfish) is a national phenomenon that until recently it was thought Devon populations had escaped, again increasing their importance. However, unconsidered introductions of non-native species into ornamental and amenity ponds have occurred in Devon, and escapes from these now pose a threat. In 2002 there was an anecdotal record of American signal crayfish (*Pacifastacus*

leniusculus) in a tributary of the Creedy Yeo that was confirmed during the 2004 survey for the native species. The native population now faces the risk of plague and the threat of displacement and predation by these larger crayfish.

Pollution: Pollution poses another serious threat to Devon's white-clawed crayfish populations. Cypermethrin, a synthetic pyrethroid insecticide used in sheep dip is highly toxic to freshwater organisms and can cause high mortality. An Environmental Quality Standard of 0.1mg l^{-1} (Annual Average) and 1mg l^{-1} (Maximum Allowable Concentration) have been proposed to protect freshwater life (UK Life in Rivers). The species is susceptible to sewage, silage and pesticide pollutions, particularly those that lower the oxygen concentrations in water.

Site management: Stream bed and bank management can destroy or damage habitat, and high sediment loads from soil erosion throughout a river catchment can clog the river bed making it unsuitable for the crayfish.

7. Recent changes in population

It is unclear whether there has been a change in the species' distribution in Devon. Certainly before 1980 elsewhere in the southwest populations were found in most river catchments in Wiltshire, Gloucestershire, Dorset and parts of Somerset, but on classic calcareous rivers which are far more suitable for the species than Devon's mostly acidic rivers.

By the 1990s in Devon, known populations were restricted to seven known extant populations on the Exe catchment and its sub-catchments - the rivers Culm, Clyst, Creedy and the Creedy Yeo, and a possible population on the River Otter. These are the most westerly native crayfish populations in Britain.

During the 2003 and 2004 Environment Agency surveys the size of crayfish found suggested that the population was breeding successfully. The carapace lengths of the crayfish were between 1.2 and 3.9cm, usually considered to be age classes between about one and seven years old (Lowery 1988). However, crayfish growth might be slow in the Creedy Yeo due to environmental conditions in the river.

8. Current protection

- Appendix II of the Bern Convention.
- Annexes II and V of the EU Habitats Directive.
- Schedule 5 of the Wildlife and Countryside Act (1981) that prohibits the taking of any native crayfish for any purpose except under licence.
- The Import of Live Fish Act through the Prohibition of Keeping of Live Fish (Crayfish) Order 1996.

9. Current positive initiatives for white-clawed crayfish in Devon

Conservation status:

At a national level JNCC published a Species Action Plan in 1994.

'No go' areas:

DEFRA is regulating the keeping of non-native crayfish to protect native crayfish and their habitats. In the Environment Agency South West Region all catchments east of the River Taw have been declared a 'no go' area for keeping non-native species in an attempt to prevent these species escaping into the wild.

Species protection:

- It is a priority species under the UK Biodiversity Action Plan, and a Species Action Plan has been prepared to encourage measures for its survival.
- Three non-native crayfish species (*Astacus astacus*, *Astacus leptodactylus* and *Pacifastacus leniusculus*) are now on Schedule 9 of the Wildlife and Countryside Act. It is therefore an offence under Schedule 14 of the Act to release these or allow them to escape into the wild without a licence, unless 'reasonable steps' are taken to avoid escape.
- The Import of Live Fish Act through the Prohibition of Keeping of Live Fish (Crayfish) Order 1996. These are implemented through SFFA Section 30 Work Instructions that regulate the stocking of fish into the wild.
- Classed as globally threatened by the IUCN/WCMC.

Research:

The Environment Agency has a three year research and development project to assess the effects of non-native crayfish on freshwater systems and to develop a conservation strategy for the native species. This will have local application in Devon.

Public Awareness:

- A leaflet produced by the Environment Agency covering their South West Region is available with a guide to identifying both native and introduced species. This informs people of the dangers of spreading crayfish plague, and how to help avoid this.

- A specific leaflet raising awareness of crayfish plague has been published by the Environment Agency in the south west. This gives information on ways to reduce the risk of spreading plague. Awareness raising campaigns are taking place with riparian owners, anglers and still water fishery owners, to again reduce this risk.
- 'Guidance on Works Affecting White-clawed Crayfish' published February 2000 by English Nature and the Environment Agency, contract reference English Nature FIN/CON/139, as part of the Species Recovery Programme.

10. Biodiversity planning context

National BAP Context

Species of principal importance in England (NERC Act, S.41):

- White-clawed crayfish

Current national BAP targets can be viewed on the [Biodiversity Action Reporting System](#) (BARS).

Associated Action Plans within the Devon BAP:

- Rivers, streams, flood plain and fluvial processes
- Otter
- Atlantic salmon

11. Biodiversity objectives and targets for white-clawed crayfish in Devon

Objective 1

Maintain the survival of current populations of native crayfish in Devon.

Target:

- Put management controls in place to reduce or eliminate threats to crayfish by 2006.
- Monitor the Creedy catchment population every three years.

12. Wider benefits from pursuing these objectives

The pursuit of the objective and targets set out above will not only benefit the white-clawed crayfish. Conservation has wider benefits and advantages for society, by providing a resource which is the basis of many aspects of the local economy, and by adding to the quality of life of the people of Devon in ways which are beyond financial measure. Thus enhancing the interests of biodiversity also enhances the interests of society as a whole. Some of these wider benefits are as follows:

- Promotion of land use management throughout river catchments that will help protect soil from erosion, to the long term benefit of farming.
- Benefits to other aquatic species dependent on good water quality and similar habitat conditions.

13. Priority or indicative actions for white-clawed crayfish in Devon

Action	Key Partners
1. Ensure appropriate River Quality Objectives (RE1 or RE) are met on catchments with existing populations.	EA
2. Ensure Environmental Quality Standards for biocides are met on catchments with existing populations.	EA
3. Ensure the continuation of the Prohibition of Keeping of Live Fish (Crayfish) Order, 1996.	DEFRA
4. Ensure the continuation of the 'no-go' area for the keeping of non-native crayfish on all catchments east of the Taw catchment.	DEFRA; EA
5. Provide information and advice to those involved in rivers, their management and crayfish conservation on threats from non-native species, prevention of crayfish plague and disinfection procedures. Develop risk assessment procedures to prevent the spread of signal crayfish and crayfish plague.	EA; DEFRA; DWT; EN; FWAG
6. Ensure work or projects carried out in the river or on banks do not harm crayfish and that opportunities for enhancements for crayfish are taken.	EA; LAs; Riparian owners; EN; Railtrack
7. Ensure that, where required, appropriate habitat management is undertaken where existing or potential future populations of white-clawed crayfish occur.	DEFRA; DWT; FWAG; Riparian owners
8. Identify whether there are areas where a re-introduction programme is appropriate to catchments with historic records of white-clawed crayfish.	EA; EN
9. Monitor existing and any future potential populations on a three-yearly programme on a catchment/sub-catchment basis.	EA; EN
10. Encourage and contribute to south-west regional data on white-clawed crayfish based with the Devon Biodiversity Records Centre and ensure that these records are fed into the national database.	DBRC; EA; DWT; EN

Action	Key Partners
11. Improve public awareness of the importance of the native crayfish populations, the threats to their existence and how the public can participate in reducing these.	EA; Angling Assoc.; FWAG; EN; DWT

White-Clawed Crayfish Action Plan Champion - Environment Agency

Abbreviations used in text and table

DBRC	Devon Biological Records Centre
DEFRA	Department of Environment, Food and Rural Affairs
DWT	Devon Wildlife Trust
EA	Environment Agency
EN	English Nature
EU	European Union
FWAG	Farming and Wildlife Advisory Group
IUCN	International Union for the Conservation of Nature
JNCC	Joint Nature Conservation Committee
LAs	Local Authorities