

European Community Directive
on the Conservation of Natural Habitats
and of Wild Fauna and Flora
(92/43/EEC)

**Second Report by the United Kingdom under
Article 17
on the implementation of the Directive
from January 2001 to December 2006**

Conservation status assessment for :
**S1092: *Austropotamobius pallipes* - White-clawed
crayfish.**

Please note that this is a section of the report. For the complete report visit <http://www.jncc.gov.uk/article17>

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S1092 *Austropotamobius pallipes* White-clawed crayfish

Audit trail compiled and edited by JNCC

This document is an audit of the data and judgements on conservation status in the UK's report on the implementation of the Habitats Directive (January 2001 to December 2006) for this species. Superscript numbers accompanying the headings below, cross-reference to headings in the corresponding Annex B reporting form. This supporting information should be read in conjunction with the UK approach for species (see 'Assessing Conservation Status: UK Approach').

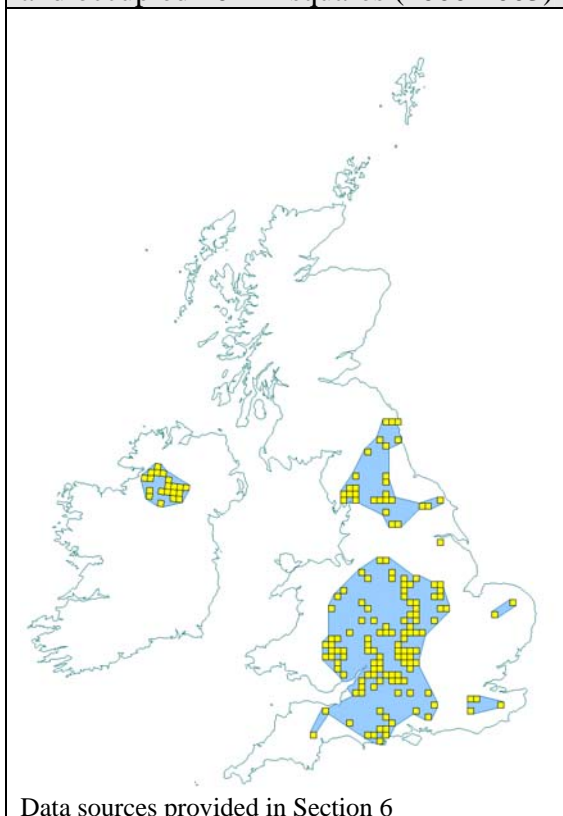
1. Range Information^{2.3}

Austropotamobius pallipes is widespread in most parts of England and is common in parts of eastern Wales. It is present in south-west Northern Ireland.

1.1 Surface area of range^{2.3.1} 59,049km²

The above estimate was calculated within Alpha Hull software, using extent of occurrence as a proxy measure for range (as shown in the map below), at a resolution of 10km. Alpha was set at 25km to reflect the mobility of this species. The alpha hull (range area) was clipped to exclude marine habitat.

Map 1.1. Current extent of occurrence and occupied 10 km-squares (2000-2003)



1.2 Date of range determination^{2.3.2}

2000 – 2003

Surface area was calculated using records available via the NBN Gateway from 2000 onwards; the most recent was 2003.

1.3 Quality of range data^{2.3.3}

Good

Most of the data used to calculate current surface area has come from the crayfish dataset (managed by the Biological Records Centre). This dataset incorporates records collated by Nottingham University for an English Nature/Environment Agency funded project; records from Environment Agency crayfish surveys, and also form the Environment Agency macro-invertebrate database. All records from this dataset have been verified by Agency staff and subject to routine validation by Biological Records Centre

1.4 Range trend^{2.3.4} and range trend magnitude^{2.3.5}

Decreasing

Although it is not possible to quantify the post-1994 range trend with the available data, recent population trends (www.ukbap-reporting.org.uk 'National Biodiversity Action Plan - Trend) indicate that there has been no halt in this deterioration. Further, the rate of decline may be accelerating.

Based on this, it can be reported with a relative high degree of confidence that there has been a decline in range since the Habitat Directive came into force.

1.5 Range trend period^{2.3.6}

1994 – 2006

1.6 Reasons for reported trend in range^{2.3.7}

3. Direct human influence (restoration, deterioration, destruction);

4. Indirect anthropo(zoo)genic influence

5. Natural processes

6. Other (specify)

Non-native crayfish species were introduced into Britain for farming in the late 1970s. Soon after this, crayfish plague (a virulent disease caused by the fungus *Aphanomyces astaci*) broke out and spread rapidly. This caused drastic losses of native crayfish in rivers across England. Further, because signal and other non-native crayfish are larger and more aggressive than the native species, there have been additional competition pressures for food and habitat.

In Britain, signal crayfish are now well-established in the wild. In Northern Ireland no crayfish farms have been established and crayfish plague is unknown, although it occurs in the Republic of Ireland (Holdich & Rogers 1997). It is only in areas free of disease that *A. pallipes* are likely to survive in the future.

Habitat modification and pollution (particularly pesticides and sewage) have also driven declines (Holdich & Reeve 2001).

1.7 Favourable reference range^{2.7.1}

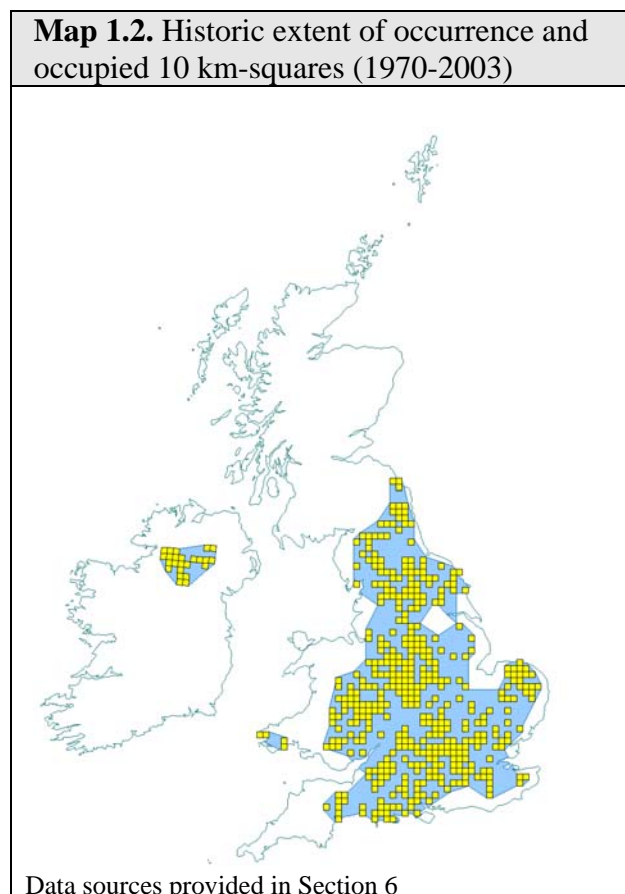
>65,610km² (Current is more than 10% below the favourable reference range)

The decision tree in Note 1 has been used as a guide in determining the favourable reference range estimate (see 'Assessing Conservation Status: UK Approach').

The 1994 range is not known; the nearest alternative is the current estimate (59,049km²). The current declining trend indicates that this value is not suitable for the long-term survival of the species. In the absence of a post-1994 trend magnitude, the only information that can be used to inform rate of decline is historic.

Map 1.2 shows the historic (1970-2003) extent of occurrence, calculated 109,705km² (using Alpha Hull software and an alpha value of 20km). Since current extent of occurrence (2000-2003) was 59,049km², this data suggests a decline of more than 40% between 1970 and 2003 (~1.25% decline per year). Informed by this, and UKBAP information that declines may be accelerating (see 1.4), it is probable that post-1994 trends were also greater than -1% per annum. In such case, based on the UK approach, the current (baseline) estimate will be more than 10% below favourable reference range, i.e. the favourable reference range is greater than 65,610km².

In the absence of detailed modelling, it is not possible to provide a meaningful upper threshold to this value at present.



1.8 Range conclusion^{2.8}

Unfavourable – Bad and deteriorating

The current range is more than 10% below the favourable reference value and continuing to decline. Based on the Commission's guidance, range has therefore been concluded as Unfavourable-Bad.

2. Population of the Species^{2.4}

2.1 Population estimate^{2.4.1}

166 occupied 10-km squares

Survey data suggests that *A. pallipes* can be abundant in Favourable situations, with some populations numbered in many thousands. However, no population estimate currently exists for this species. Area of occupancy (number of occupied 10km-squares) has therefore been used as a proxy (see Map 1.1). More recent information from the 2005 BAP report gives an estimate of 241 occupied 10km squares (www.ukbap-reporting.org.uk)

2.2 Date of population estimate^{2.4.2}

2000 – 2003

Area of occupancy was calculated using records provided on the NBN Gateway from 2000 onwards; the most recent was 2003.

2.3 Method of population estimate^{2.4.3}

2 = Extrapolation from surveys of part of the population, sampling

Data used to calculate the current area of occurrence came mostly from the crayfish dataset (managed by the Biological Records Centre). Records in this dataset were collated from Environment Agency files by Peter Sibley in 2003. Included are Environment Agency crayfish survey data and data from Environment Agency macro-invertebrate database, and records from other sources.

2.4 Quality of population data^{2.4.4}

Poor

Although the estimate is derived from recent survey data collected across England, Wales and Northern Ireland, for the purpose of assessing population status, data at a 10km resolution can only be assessed as Poor.

2.5 Population trend^{2.4.5} and population trend magnitude^{2.4.6}

Decreasing

Large populations were previously known from central Ireland, the Welsh Borderland and England, except for the extreme south west. Since the early 1980s, many populations have been eliminated by crayfish plague (Holdich, 2003).

Available data does not facilitate the assessment of changes in population density and population size at a local scale, or across a more recent time class (for instance, post-1994). However, results of the last Biodiversity Action reporting round suggest that not only are populations continuing to decline, but that the rate of this change is accelerating. This can be illustrated by comparing the 2002 BAP report figure of 260 occupied 10 km sqs with the 2005 BAP report figure of 241 occupied 10 km sqs; a decline figure of circa 7%, equivalent to more than 25% decline over 25 years (www.ukbap-reporting.org.uk 'National Biodiversity Action Plan - Trend').

This trend is further corroborated by a detailed assessment of the River Wye population done as part of the latest SAC assessment round which reported the Ap population to be in Unfavourable condition (Rogers & Watson, 2004).

On this basis, the post 1994-trends have been reported as declining.

2.6 Population trend period^{2.4.7} **1994 – 2006**

2.7 Reasons for reported trend in population^{2.4.8}

3. Direct human influence (restoration, deterioration, destruction);

4. Indirect anthropo(zoo)genic influence

5. Natural processes

6. Other (specify)

Non-native crayfish species were introduced into Britain for farming in the late 1970s. Soon after this, crayfish plague (a virulent disease caused by the fungus *Aphanomyces astaci*) broke out and spread rapidly. This caused drastic losses of native crayfish in rivers across England. Further, because signal and other non-native crayfish are larger and more aggressive than the native species, there have been additional competition pressures for food and habitat.

In Britain, signal crayfish are now well-established in the wild. In Northern Ireland no crayfish farms have been established and crayfish plague is unknown, although it occurs in the Republic of Ireland (Holdich & Rogers 1997). It is only in areas free of disease that *A. pallipes* are likely to survive in the future.

Habitat modification and management of waterbodies, and pollution (particularly pesticides and sewage) are also thought to have driven declines.

2.8 Justification of % thresholds for trends^{2.4.9}

Not applicable

2.9 Main pressures^{2.4.10}

701 Water pollution

852 Modifying structures of inland water courses

963 Introduction of disease

971 Competition

2.10 Threats^{2.4.11}

701 Water pollution

852 Modifying structures of inland water courses

963 Introduction of disease

971 Competition

2.11 Favourable reference population^{2.7.2}

>222 occupied 10-km squares (Current more than 25% below favourable reference population)

The decision tree in Note 1 has been used as a guide in determining the favourable reference population estimate (see 'Assessing Conservation Status: UK Approach').

The population size in 1994 is not known. However, on the basis that both historic and recent trends have both been identified as 'declining', it can be assumed that the 1994 population was larger than the current estimate. Since the Commission requires that the favourable reference population be at least equal to the population in 1994, it can confidently

be reported that the favourable reference value would be greater than 166 occupied 10-km squares.

Further, the number of occupied 10km squares declined by more than 60%, from 464 to 166, between 1970 and 2003 (see Maps 1.1 and 1.2). It is therefore probable that the post-1994 decline exceeds 1% per annum. Hence, in accordance with the UK approach, the 1994 population must be more than 25% below favourable reference population, i.e. the favourable reference population is greater than 222 occupied 10-km squares.

In the absence of detailed modelling, it is not possible to provide a meaningful upper threshold to this value at present.

2.12 Population conclusion^{2.8}

Unfavourable – Bad and deteriorating

Although there is insufficient data to provide a confident estimate of the favourable reference population, it is expected to exceed 25% the current estimate. A precautionary approach is therefore taken and population is reported as Unfavourable – Bad, and deteriorating to reflect continuing declines.

3. Habitat for the Species in the Biogeographic Region or Sea^{2.5}

Holdich (2003) states that “crayfish distribution in the British Isles is largely determined by geology and water quality. *A. pallipes* occurs in areas with relatively hard, mineral-rich waters on calcareous and rapidly weathering rocks. It is found in a wide variety of environments, including canals, streams, rivers, lakes, reservoirs and water-filled quarries.

A. pallipes is typically found in watercourses of 0.75 m to 1.25 m deep, but the species may occur in very shallow streams (about 5 cm of water) and in deeper, slow-flowing rivers (2.5 m). It may be more abundant in watercourses flowing north-south due to the increased shading this aspect provides (Holdich D, pers. obs.). It is not known to inhabit saline waters, although it has the capacity to survive in the short term in levels equivalent to 75% seawater.

A. pallipes typically occupies cryptic habitats under rocks and submerged logs, among tree roots, algae and macrophytes, although it usually emerges to forage for food. Juveniles in particular may also be found among cobbles and detritus such as leaf litter. Adults may burrow into suitable substrates, particularly in the winter months. In habitats with flowing water *A. pallipes* may be found associated with:

- Undermined, overhanging banks.
- Sections exhibiting heterogeneous flow patterns with refuges.
- Under cobbles (juveniles) and rocks in riffles, and under larger rocks in pools.
- Among roots of woody vegetation, accumulations of fallen leaves and boulder weirs.
- Under water-saturated logs.

3.1 Surface area of habitat^{2.5.2}

Unknown

3.2 Date of estimation^{2.5.3}

Not applicable

3.3 Quality of data on habitat area^{2.5.4}

Poor

Although *A. pallipes*'s habitat requirements have been well-documented, there is currently no estimate for the area of habitat currently used by this species.

3.4 Habitat trend^{2.5.5}

Decreasing

Historically, habitat modification and pollution (particularly pesticides and sewage) have driven declines (Holdich & Reeves 2001). Although pollution levels have been reduced in recent decades as a result of a decline in heavy industry and investment in the treatment of sewage effluent, actions to control diffuse sources of pollution are in their early stages. Further, improvements in water quality have been offset by the increasing presence of non-native crayfish and disease. Therefore, although generally freshwater habitat in the UK has shown signs of improvement, habitat for this species has continued to decline.

3.5 Habitat trend period^{2.5.6}

2002 – 2005

Due to limited data, habitat trends are reported over the last biodiversity action reporting round, based on expert opinion. (With the information available, it is difficult to comment on post-1994 trends with any degree of confidence, hence the shorter time period has been reported).

3.6 Reasons for reported trend in habitat^{2.5.7}

3 = Direct human influence (restoration, deterioration, destruction)

Historic declines resulted from organic and industrial pollution, and habitat modification. Improvements in more recent years are attributed to active conservation management.

3.7 Suitable habitat for the species (in km²)^{2.7.3}

Unknown

Not all areas considered suitable are currently occupied by *A. pallipes*. In Ireland the species may be restricted to the mouths of rivers flowing into large lakes (>2000 ha), possibly due to heavy predation pressure from fish such as eels.

3.8 Habitat conclusion^{2.8}

Unfavourable – Inadequate and deteriorating

Although water quality conditions are now considered to be improving in many UK rivers, the increasing presence of non-native crayfish and disease, mean that *A. pallipes* habitat is not currently suitable for the long-term survival of the species. However, habitat area and quality is not so bad that survival over the next 12 years is likely to be at risk. The conclusion is therefore Unfavourable-Inadequate, but deteriorating to reflect trends.

4. Future Prospects^{2.6}

Poor prospects

Species is likely to struggle unless conditions change.

In the UK, the *A. pallipes* is protected under Schedule 5 of the Wildlife & Countryside Act 1981 (as amended). Schedule 9 of this Act makes it an offence to release or allow to escape into the wild all three non-native species of crayfish in the UK. *A. pallipes* is also a priority

species under the UK Biodiversity Action Plan, and a Species Action Plan has been prepared to encourage measures for its survival.

8 SACs have been designated for *A. pallipes*, (plus two with *A. pallipes* as a secondary feature) providing representation over a wide geographical area. The sites selected are within parts of the country where the keeping of live non-native crayfish has (since 1996) been prohibited except under licence, and where there are high-quality aquatic habitats and recent (post-1990) records of healthy, recruiting *A. pallipes* populations free of crayfish plague. Although these SACs contain a relatively low proportion of the total UK population, this reflects the fact that many recorded populations are in areas vulnerable to crayfish plague.

The restocking of rivers previously infected by plague has been identified as a possibility (Holdich, 2003) as long as the source of infection is no longer present; recent research has shown that plague may persist in a river system for over a year. There is little evidence for natural re-colonisation. However a reintroduction protocol for *A. pallipes* has been published as part of the “Life in UK Rivers” project.

However, at present, although management and legislative measures have been put in place, populations continue to decline. Therefore over the next 12 years, it can only be expected that the species will struggle unless conditions change.

4.1 Future prospects conclusion^{2.8}

Unfavourable – Bad and deteriorating

Although good management and legislative measures are now being put in place, populations are still reported to be declining. Further, until these declines are halted, prospects can only be expected to worsen over the next 12 years.

5. Overall Conclusion^{2.8}

Unfavourable – Bad and deteriorating

Table 5.1. Summary of conclusions

Parameter	Judgement	Grounds for Judgement (in accordance with Annex C)	Reliability*
Range	Unfavourable – Bad and deteriorating	Current population is more than 10% below the favourable reference range and declining	2
Population	Unfavourable – Bad and deteriorating	Current population is more than 25% below the favourable reference population and continuing to decline	3
Habitat	Unfavourable – Inadequate and deteriorating	Any other combination Subsequent to historic declines, habitat quality may not yet be suitable for the long term survival of the species. However, there are signs of improvement.	3
Future Prospects	Unfavourable – Bad and deteriorating	Severe influence of pressures and threats to the species; very bad prospects for its future, long-term viability at risk.	2
Overall Assessment	Unfavourable – Bad and deteriorating	One or more Unfavourable-Bad	2

*1=High, 2=Moderate, 3=Low

High – Expert opinion is that the concluding judgement accurately reflects the current situation based on a professional understanding of the species. For range, population, and habitat, quality of data used to establish the current estimate has been identified as Good; data used to inform trends is comprehensive and up to date.

Moderate – A greater understanding of the feature, or the factors affecting it, is required before a confident concluding judgement can be made by experts. For range, population, and habitat, the current estimate and/or trend are based on recent, but incomplete or limited survey data; or alternately, a comprehensive, but outdated (pre-1994) review.

Low – Judgements, and comprising estimates, are based predominately on expert opinion.

N/A – Assessment conclusion is Unknown, on the basis of insufficient reliable information

6. References

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Map Data Sources

Biological Records Centre - Crayfish dataset; Natural England - Invertebrate Site Register for England; Environmental Heritage Service species datasets; Dorset Environmental Records Centre - Dorset SW Pilot species dataset; Bristol Regional Environmental Records Centre - SW Pilot Project BAP Species Inventory 2002; Wiltshire and Swindon Biological Records Centre - Wiltshire BAP Priority Species Distribution Records; Devon Biodiversity Records Centre - Devon incidental species records 1950-2002 (via the NBN Gateway)