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

Fourth Report by the United Kingdom under Article 17

on the implementation of the Directive
from January 2013 to December 2018

Supporting documentation for the
conservation status assessment for the species:

S1092 - White-clawed crayfish (*Austropotamobius pallipes*)

ENGLAND

IMPORTANT NOTE - PLEASE READ

- The information in this document is a country-level contribution to the UK Report on the conservation status of this species, submitted to the European Commission as part of the 2019 UK Reporting under Article 17 of the EU Habitats Directive.
- The 2019 Article 17 UK Approach document provides details on how this supporting information was used to produce the UK Report.
- The UK Report on the conservation status of this species is provided in a separate document.
- The reporting fields and options used are aligned to those set out in the European Commission guidance.
- Explanatory notes (where provided) by the country are included at the end. These provide an audit trail of relevant supporting information.
- Some of the reporting fields have been left blank because either: (i) there was insufficient information to complete the field; (ii) completion of the field was not obligatory; (iii) the field was not relevant to this species (section 12 Natura 2000 coverage for Annex II species) and/or (iv) the field was only relevant at UK-level (sections 9 Future prospects and 10 Conclusions).
- For technical reasons, the country-level future trends for Range, Population and Habitat for the species are only available in a separate spreadsheet that contains all the country-level supporting information.
- The country-level reporting information for all habitats and species is also available in spreadsheet format.

Visit the JNCC website, https://jncc.gov.uk/article17, for further information on UK Article 17 reporting.

Report on the main results of the surveillance under Article 11 for Annex II, IV and V species (Annex B)

NATIONAL LEVEL

1. General information

1.1 Member State	**UK (England information only)**
1.2 Species code	**1092**
1.3 Species scientific name	**Austropotamobius pallipes**
1.4 Alternative species scientific name	
1.5 Common name (in national language)	White-clawed crayfish

2. Maps

2.1 Sensitive species	No
2.2 Year or period	
2.3 Distribution map	Yes
2.4 Distribution map Method used	
2.5 Additional maps	No

3. Information related to Annex V Species (Art. 14)

3.1 Is the species taken in the wild/exploited?	No	
3.2 Which of the measures in Art. 14 have been taken?	a) regulations regarding access to property	No
	b) temporary or local prohibition of the taking of specimens in the wild and exploitation	No
	c) regulation of the periods and/or methods of taking specimens	No
	d) application of hunting and fishing rules which take account of the conservation of such populations	No
	e) establishment of a system of licences for taking specimens or of quotas	No
	f) regulation of the purchase, sale, offering for sale, keeping for sale or transport for sale of specimens	No
	g) breeding in captivity of animal species as well as artificial propagation of plant species	No
	h) other measures	No

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3.3 Hunting bag or quantity taken in the wild for Mammals and Acipenseridae (Fish)

a) Unit

b) Statistics/ quantity taken	Provide statistics/quantity per hunting season or per year (where season is not used) over the reporting period					
	Season/ year 1	Season/ year 2	Season/ year 3	Season/ year 4	Season/ year 5	Season/ year 6
Min. (raw, ie. not rounded)						
Max. (raw, ie. not rounded)						
Unknown	No	No	No	No	No	No

3.4. Hunting bag or quantity taken in the wild Method used

3.5. Additional information

BIOGEOGRAPHICAL LEVEL

4. Biogeographical and marine regions

4.1 Biogeographical or marine region where the species occurs

Atlantic (ATL)

4.2 Sources of information

Environment agency crayfish records, 2013-2017
Natural England Schedule 5 licence application data files, submissions and reports in support of applications. Abstracted by Ph.D student Daniel Chadwick from Natural England files.
Stebbing P. D, Longshaw, M.;. Taylor. N; Norman. R.; Lintott, R; Pearce, F; A. Scott. Review of methods for the control of invasive crayfish in Great Britain. Cefas Contract - Final Report C5471. 2012.
Kouba A, Petrusek. A, Kozak P (2014).Continental-wide distribution of crayfish species in Europe: update and maps. Knowledge and Management of Aquatic Ecosystems (2014) 413, 05.
James J, Nutbeam-Tuffs. S, Cable. J & Mrugala. A. (2017) The prevalence of Aphanomyces astaci in invasive signal crayfish from the UK and implications for native crayfish conservation. Parasitology Volume 144, Issue 4
April 2017 , pp. 411-418
Rogers, D. & Watson, E. (2011) Distribution database for crayfish in England and Wales. In Species Survival Conference, Securing White-clawed Crayfish in a Changing Environment. Bristol, November 2010
Mott, N 2015. 'White-clawed Crayfish Austropotamobius pallipes Survey of the River Dove between Hollinsclough and Beresford Dale, Peak District National Park. July-September 2014'.
www.gov.uk/government/publications/improvement-programme-for-englands-natura-2000-sites-ipens.
https://www.surreywildlifetrust.org/blog/riversearch/2017/07/12/native-crayfish-are-feeling-pinch
http://www.gazetteandherald.co.uk/news/14937862.Deadly_plague_killing_hun

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dreds_of_crayfish/
https://www.staffs-wildlife.org.uk/news/2013/10/01/call-public-help-stop-spread-deadly-crayfish-disease
Eden Crayfish Project Funded by the Catchment Restoration Fund Project reference no: CRF0039 (ST002)
July 2012-March 2015 .Final Report.
Strategy for the management of white-clawed crayfish (Austropotamobius pallipes) populations in England and Wales. A report produced under Environment Agency R&D Project-640, Dr D. M. Holdich & DCW. D. Rogers Department of Life Science, The University of Nottingham, Nottingham NG7 XI3. June. 1997
Eden Rivers trust. Crayfish surveys 2017. Unpublished report.
Eden Rivers Trust 2017 Monitoring Summary. Unpublished report.

5. Range

5.1 Surface area (km²)		
5.2 Short-term trend Period	2007-2018	
5.3 Short-term trend Direction	Decreasing (-)	
5.4 Short-term trend Magnitude	a) Minimum	b) Maximum
5.5 Short-term trend Method used	Complete survey or a statistically robust estimate	
5.6 Long-term trend Period	1994-2018	
5.7 Long-term trend Direction	Decreasing (-)	
5.8 Long-term trend Magnitude	a) Minimum	b) Maximum
5.9 Long-term trend Method used	Complete survey or a statistically robust estimate	
5.10 Favourable reference range	a) Area (km²) b) Operator c) Unknown d) Method	
5.11 Change and reason for change in surface area of range	Genuine change The change is mainly due to:	Genuine change
5.12 Additional information	Loss of sub-catchment occupation through crayfish plague extinctions	

6. Population

6.1 Year or period	2005-2018	
6.2 Population size (in reporting unit)	a) Unit	number of map 1x1 km grid cells (grids1x1)
	b) Minimum	
	c) Maximum	
	d) Best single value	629
6.3 Type of estimate	Best estimate	

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6.4 Additional population size (using population unit other than reporting unit)	a) Unit	number of map 10x10 km grid cells (grids10x10)
	b) Minimum	
	c) Maximum	
	d) Best single value	239
6.5 Type of estimate	Best estimate	
6.6 Population size Method used	Complete survey or a statistically robust estimate	
6.7 Short-term trend Period	2007-2018	
6.8 Short-term trend Direction	Decreasing (-)	
6.9 Short-term trend Magnitude	a) Minimum	
	b) Maximum	
	c) Confidence interval	
6.10 Short-term trend Method used	Complete survey or a statistically robust estimate	
6.11 Long-term trend Period	1995-2018	
6.12 Long-term trend Direction	Decreasing (-)	
6.13 Long-term trend Magnitude	a) Minimum	32
	b) Maximum	
	c) Confidence interval	
6.14 Long-term trend Method used	Based mainly on extrapolation from a limited amount of data	
6.15 Favourable reference population (using the unit in 6.2 or 6.4)	a) Population size	
	b) Operator	
	c) Unknown	
	d) Method	
6.16 Change and reason for change in population size	Genuine change Improved knowledge/more accurate data	
	The change is mainly due to:	Genuine change
6.17 Additional information		

7. Habitat for the species

7.1 Sufficiency of area and quality of occupied habitat	a) Are area and quality of occupied habitat sufficient (to maintain the species at FCS)?	Yes
	b) Is there a sufficiently large area of occupied AND unoccupied habitat of suitable quality (to maintain the species at FCS)?	Yes
7.2 Sufficiency of area and quality of occupied habitat Method used	Based mainly on extrapolation from a limited amount of data	
7.3 Short-term trend Period	2007-2018	
7.4 Short-term trend Direction	Stable (0)	
7.5 Short-term trend Method used	Based mainly on extrapolation from a limited amount of data	
7.6 Long-term trend Period	1994-2018	
7.7 Long-term trend Direction	Increasing (+)	

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7.8 Long-term trend Method used	Based mainly on extrapolation from a limited amount of data
7.9 Additional information	With water quality improvements, more of the habitat network ought to be available to them, though increasingly this was denied by crayfish plague and signal crayfish invasion.

8. Main pressures and threats

8.1 Characterisation of pressures/threats

Pressure	Ranking
Invasive alien species of Union concern (I01)	H
Interspecific relations (competition, predation, parasitism, pathogens) (L06)	H

Threat	Ranking
Invasive alien species of Union concern (I01)	H
Interspecific relations (competition, predation, parasitism, pathogens) (L06)	H

8.2 Sources of information	
8.3 Additional information	Kouba et al (2014) note the extent of signal crayfish in the EU. James et al (2017) found that 56.5% of the 23 signal crayfish populations they tested were infected, with infection rate ranging from 3- 80% of animals in that population. James et al (2017) note that the Aphanomyces astaci strain in the UK is most likely to contain the virulent Group B strain.

9. Conservation measures

9.1 Status of measures	a) Are measures needed?	Yes
	b) Indicate the status of measures	Measures identified and taken
9.2 Main purpose of the measures taken	Maintain the current range, population and/or habitat for the species	
9.3 Location of the measures taken	Both inside and outside Natura 2000	
9.4 Response to the measures	Long-term results (after 2030)	

9.5 List of main conservation measures

Improvement of habitat of species from the directives (CS03)
Management, control or eradication of established invasive alien species of Union concern (CI02)
Reinforce populations of species from the directives (CS01)

9.6 Additional information

10. Future prospects

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10.1 Future prospects of parameters	a) Range b) Population c) Habitat of the species
10.2 Additional information	

11. Conclusions

11.1. Range	
11.2. Population	
11.3. Habitat for the species	
11.4. Future prospects	
11.5 Overall assessment of Conservation Status	
11.6 Overall trend in Conservation Status	
11.7 Change and reasons for change in conservation status and conservation status trend	a) Overall assessment of conservation status No change The change is mainly due to: b) Overall trend in conservation status No change The change is mainly due to:
11.8 Additional information	

12. Natura 2000 (pSCIs, SCIs and SACs) coverage for Annex II species

12.1 Population size inside the pSCIs, SCIs and SACs network (on the biogeographical/marine level including all sites where the species is present)	a) Unit	number of map 10x10 km grid cells (grids10x10)
	b) Minimum	17
	c) Maximum	26
	d) Best single value	20
12.2 Type of estimate	Best estimate	
12.3 Population size inside the network Method used	Based mainly on extrapolation from a limited amount of data	
12.4 Short-term trend of population size within the network Direction	Decreasing (-)	
12.5 Short-term trend of population size within the network Method used	Based mainly on extrapolation from a limited amount of data	
12.6 Additional information		

13. Complementary information

13.1 Justification of % thresholds for trends	

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Distribution Map

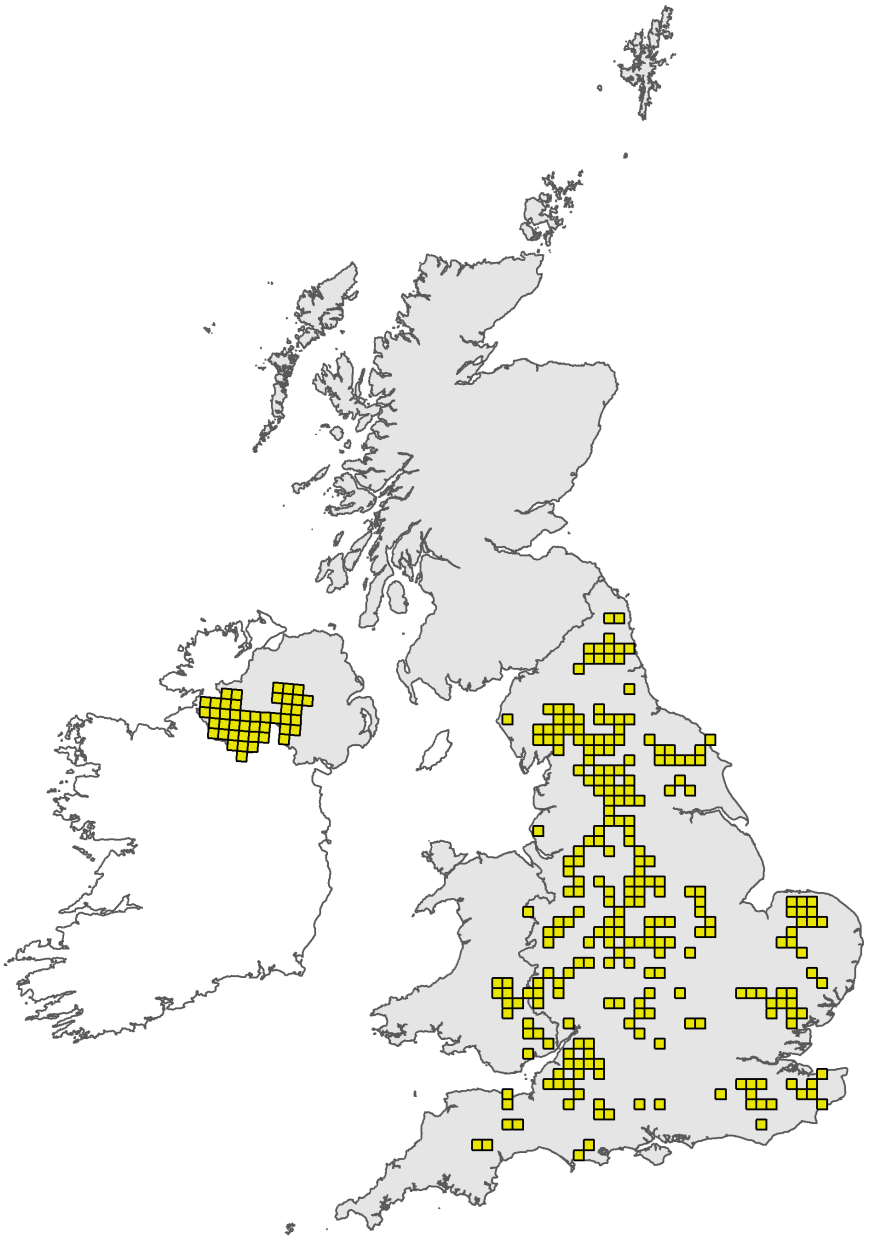

Figure 1: UK distribution map for S1092 - White-clawed crayfish (*Austropotamobius pallipes*). Coastline boundary derived from the Oil and Gas Authority's OGA and Lloyd's Register SNS Regional Geological Maps (Open Source). Open Government Licence v3 (OGL). Contains data © 2017 Oil and Gas Authority.

The 10km grid square distribution map is based on available species records within the current reporting period. For further details see the 2019 Article 17 UK Approach document.

Range Map

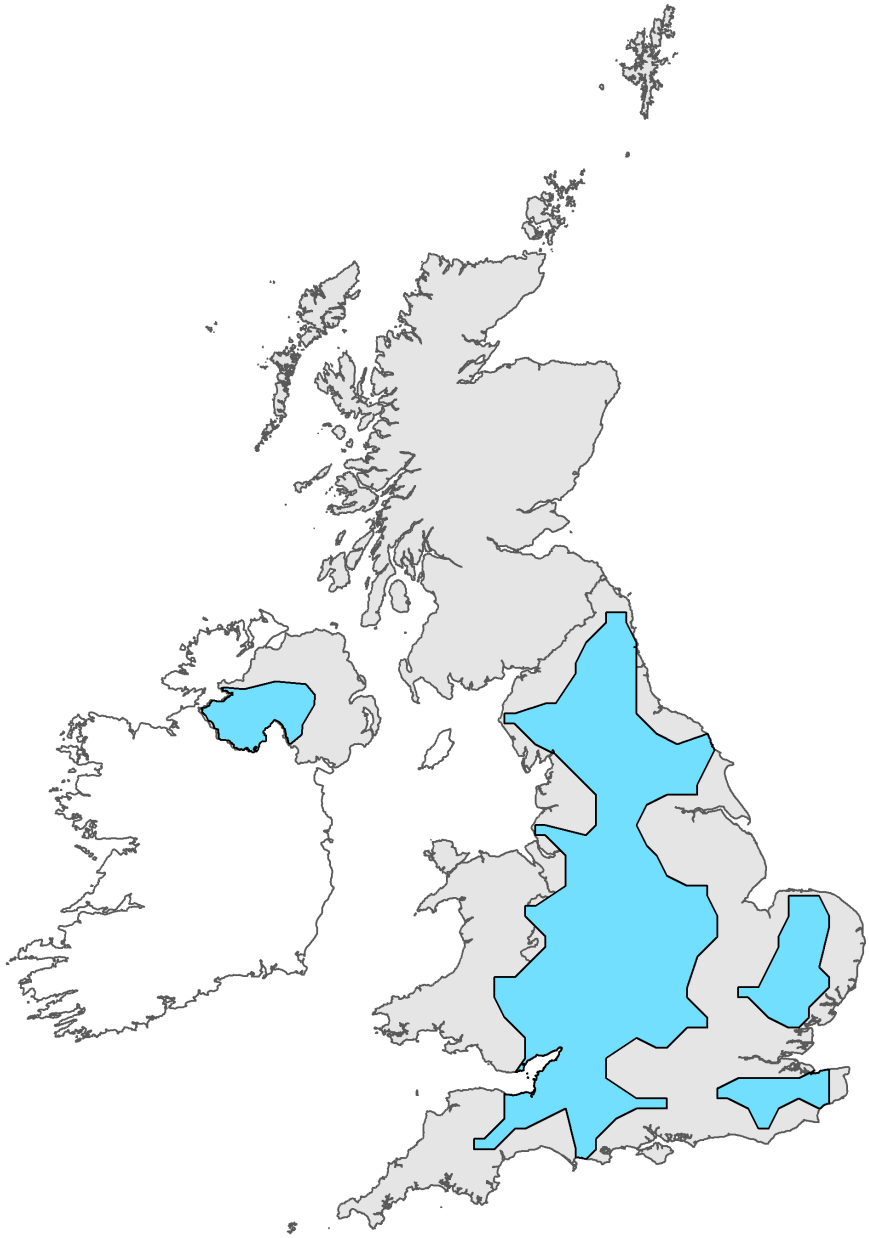

Figure 2: UK range map for S1092 - White-clawed crayfish (*Austropotamobius pallipes*). Coastline boundary derived from the Oil and Gas Authority's OGA and Lloyd's Register SNS Regional Geological Maps (Open Source). Open Government Licence v3 (OGL). Contains data © 2017 Oil and Gas Authority.

The range map has been produced by applying a bespoke range mapping tool for Article 17 reporting (produced by JNCC) to the 10km grid square distribution map presented in Figure 1. The alpha value for this species was 25km. For further details see the 2019 Article 17 UK Approach document.

Explanatory Notes

Species name: Austropotamobius pallipes (1092) Region code: ATL

Field label	Note
5.12 Additional information	England maintains the value of reporting on the occupied sub-catchment basis, using the same sub-catchment boundaries as a direct way of measurement of functional loss in this once common species. Since the maps created by Rogers & Watson (2010) used a sub-catchment basis, this allows direct comparison.
6.2 Population size	The losses continue throughout this period and from the 3rd report. Losses include Nailsworth Stream, Avening, Gloucestershire (over 4km), - Dowles Brook, Wyre Forest (extent tbc), and - Vron Farm on the Redlake, Shropshire (extent tbc) (Environment Agency). Losses reported from the River Allen, Dorset in 2014. A 2014 re-survey (Mott, 2015) of the River Dove, Derbyshire, itself subject to several plague outbreaks, did discover a relect wcc population to be still present. SWT (2017) report only 3 small sub-tributaries of the River Wey, Surrey, now hold the species. Late 2016 saw reports of 8kms of the Bybrook, Box Valley, part of the Bristol Avon sucumb to plague, with the River Swarborne in Staffordshire having become infected in 2013. Signal crayfish were confirmed in the Northumbrian River Blyth late in 2012. The losses within the SAC network are reported elsewhere.
6.13 Long term trend; Magnitude	For the longer term trend one can look back to Holditch & Reeve (1989) and roughly count the number of ten km squares occupied by native crayfish in England, arriving at about 350 (will include some Welsh sites as the boundary is not shown on the old map, neither are the source records revealed; the total white-clawed crayfish occupied 10km square count for both England & Wales in the period 1970-1996 was 493 from the figure in Holditch & Rodgers, 1997). The 2018 dataset shows that the species now occupies 239 hectads, this equating to a loss of 111 hectads in distribution over the long term. This figure is higher than the estimate derived for the 3rd report, but this new dataset is better, and is founded on more comprehensive data resources than that available for the 3rd report. More historic reports suffer from the species previously having been so common that it was under-recorded, and it was only in the presence of substantial and notceable declines that more recording focus was brought to bear. In sub-catchment terms it is more tricky as the boundaries do not easily equate to the national ones. Rogers & Watson (2011), based on the same catchment map basis as used for this report, noted that pre-1990, there were 187 sub-catchment in the UK with only white-clawed crayfish, this having declined to 81 sub-catchment in 2010. Based on the same sub-catchment map, the report for this 4th Article 17 report can demonstrate A.pallipes-only sub-catchments standing at 93, though this is just for England and is overall a more comprehensive assessment. The change in the 4th period for England shows that there was no change in status in 731 sub-catchments, with 28 new signal crayfish catchments being detected, and 26 sub-catchments where signal crayfish directly replaced white-clawed. Four new white-clawed sub-catchments were discovered through survey, though 23 others were lost. White-clawed crayfish now occupy only 11% of the sub-catchments in England. So, overall, the trend in both short and long term continues to be one of steep decline.
6.16 Change and reason for change in population size	Real change based on continued point and sub-catchment losses through crayfish plague and/ or signal crayfish incursion. The new UK sub-catchment map is based on a mixture of survey licence returns, Environment agency fieldwork, and other survey information, as well as ark site refuge information, and has been locally validated by a number of local Environment Agency officers. Derivation of the one and ten km square data are from the point data within this sub-catchment map.

7.9 Additional information	There are 138,624 linear kilometres of rivers and canals in England, though not all of this would be capable of supporting crayfish. This is the same area estimate of the resource as given in the 3rd Article 17 report.
9.5 List of main conservation measures	An ex situ population was returned in 2018 to the River Itchen in an attempt to re-establish the species. There have been a number of ark site establishments over the 4th period.
9.5 List of main conservation measures	The role and eventual status of Ark sites for native crayfish is still unknown, though it is conceivable, given the trends, that native crayfish could well end up being confined to those sites in England. Buglife as an organisation has lead in the development of selection guidelines for Ark sites, this being through a spreadsheet-based matrix approach, and is widely adopted. The legislative and licensing framework around native crayfish may have secured best practice and consideration of native populations, and therefore will have reduced ancillary losses, but set against the overall losses caused by signal crayfish have effectively been neutralised.
12.1 Population size inside the pSCIs, SCIs and SACs network	The River kent catchment has signal invasion so that whilst there are 12 hectads of river coverage, a pragmatic figure might be 6 hectads. The occupied rivers in the Eden SAC cover 10 hectads, with 7 of those being surveyed in 2017, all showing healthy populations; an estimated 2 hectads left on the Wensum after the plague aboutbreak, with single hectads present on the Dove and at Malham Tarn. Given their location, the signal invaded catchments of ths River Mease and Itchen are considered not to have functionally viable wcc populations, and so yield no hectad count. As such, the hectad count for the 4th report is lower in the feature-only SAC than that of the 3rd, mirroring the national trend of decline for this species. It is bracketed to reflect the fact that the rest of the Eden sub-catchments not surveyed recently are probably in good condition and so the range for the Eden runs from ten to seven hectads. In terms of total SAC intersection the figure is actually 40 hectads, but this again as a better dataset and in no way reflects any upward trend or favourable status for SAC, which are as likely to fail as any other site in the UK in the face of advancing signal crayfish populations and vanguard assaults from crayfish plague.
12.3 Population size inside the network; Method used	A mapping approach based on a mixture of survey licence returns, Environment agency fieldwork, and other survey information, as well as ark site refuge survey. The SAC boundary layer for the selected and present within SAC were overlaid onto the new UK sub-catchment map, based on point data, and the co-incident mapping for white clawed or signal crayfish noted.
12.4 Short term trend of the population size within the network; Direction	The decrease is a direct reflection of the complete loss of Ensor's Pool SAC to crayfish plague, and the continuing spread of signal crayfish through many sub-catchments. Seven SAC were selected across England, with 2 other SAC having the species as noted present. As noted in the 3rd report, all but 3 of them were either free of signal crayfish or secure against plague. The loss of one of these three is thus significant, though in area terms it is small (3.7ha). Whilst the River Kent seems to have 12 hectads for wcc, the catchment is flagged as red with the presence of signal crayfish, so it is unclear how strong this site remains and what its future holds. The River Wensum SAC experienced a large scale infection in late 2015, with an estimated length from Fakenham downstream to Norwich of 51 kms. Malham Tarn continues to support wcc, though the numbers are reported as down. On the river Eden, signal crayfish were found in 2012, and although a trapping out programme was intiated in 2013 this was halted after 6 weeks. (Eden) It is likely that the signal persist in that system, though it is unclear if that is a plague carrying population. The catchment wide survey results (July 2012- March 2015, ERT 2015), shows that strong white-clawed populations remain within 9 of the river systems. This single SAC now effectively carries the bulk of the SAC population in England.