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

Supporting documentation for the Third Report by the United Kingdom under Article 17

on the implementation of the Directive
from January 2007 to December 2012
Conservation status assessment for

Species:

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

IMPORTANT NOTE – PLEASE READ

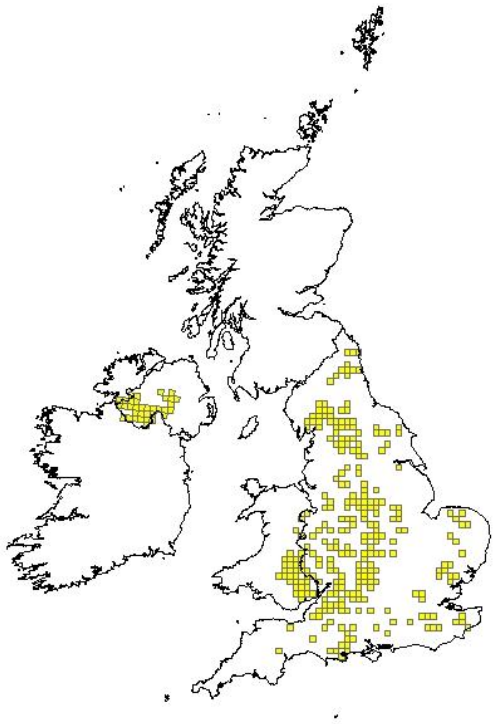
- The country-level reporting information contained in this document is a contribution to the Article 17 UK report for the habitat/species concerned.
- It has been provided by **Natural Resources Wales** and refers only to the state of the habitat/species in **Wales** - it does not constitute an assessment for the whole of the UK.
- The Article 17 UK Approach document provides details on how this information has been used and, combined with information supplied by other Statutory Nature Conservation Bodies
- The format of the document is closely aligned to that set out by the European Commission for Member State reporting – as a result, some of the fields are not applicable at a country-level and have deliberately been left blank – in addition, the content of most fields is constrained by the EC reporting categories.

As of 1 April 2013, the Countryside Council for Wales, Environment Agency Wales and Forestry Commission Wales became Natural Resources Wales/Cyfoeth Naturiol Cymru

Reporting format on the 'main results of the surveillance under Article 11' for Annex II, IV & V species

Field name	*Brief explanations*	
0.2 Species	**0.2.1 Species code**	**S1092**
	0.2.2 Species scientific name	***Austropotamobius pallipes***
	0.2.3 Alternative species scientific name Optional	
	0.2.4 Common name Optional	**White-clawed crayfish**

1.1 Maps			
1.1.1 Distribution map		**Sensitive**	**False**



1.1.2 Method used - map	**Estimate based on partial data with some extrapolation and/or modelling**
	The last major assessment of status within the SAC was in 2002 and 2003 (Rogers & Watson, 2003 & 2004). Since then, Welsh records have been generated from small-scale surveys, ad hoc recording by CCW and EA staff, by ecological consultants or gleaned from W&CA licence returns.
1.1.3 Year or period	**2001-2012**
	Most survey work and records relating to white-clawed crayfish in the 2007-2012 reporting period are ad hoc. A major assessment of the Wye SAC was made in 2002 and 2003 (Rogers & Watson, 2003 & 2004) and

	these should be used to determine the status of the crayfish.
1.1.4 Additional distribution map	**False**
	A UK map showing the current range of both white-clawed crayfish and the signal crayfish Pacifastacus leniusculus is included in this report.
1.1.5 Range map	

2.1 Biogeographical region & marine regions	**ATL**
2.2 Published sources	**"ADAS. 2007. South Sebastopol white-clawed crayfish survey report 2007.** **Buglife. undated. Ark sites for crayfish. Leaflet published by Buglife - The Invertebrate Conservation Trust.** **Buglife (undated). Criteria for selecting ark sites for white-clawed crayfish weblink: http://www.buglife.org.uk/Resources/Buglife/criteria%20for%20whiteclaw%20ark%20site%20v1a%2005April2009.xls** **Holdich, D. 2003. Ecology of the white-clawed crayfish. Conserving Natura 2000 Rivers Ecology Series. No. 1. English Nature.** **Howells, M. 2003. Conservation of the native white-clawed crayfish, Austropotamobius pallipes in the uplands of mid-Wales. Unpublished 2nd year report for PhD thesis. Cardiff University.** **Howells, M., Slater, F.M., Gaweda, A., Lee, R., Jenkins, R. & Smith, J. 2004. Measurement of siltation levels in the Afon Edw. CCW Contract Science. 622. Countryside Council for Wales & Cardiff University.** **Jones, C. 2008. Draft mitigation report white-clawed crayfish South Sebastopol. ADAS.** **Rogers, D. & Watson, E. 2003. The status of the white-clawed crayfish Austropotamobius pallipes in the mid-Wye catchment, 2002. CCW Contract Science. 543. Countryside Council for Wales.** **Rogers, D. & Watson, E. 2004. Assessment of the condition of the white-clawed crayfish Austropotamobius pallipes in the River Wye candidate Special Area of Conservation. CCW Environmental Monitoring Report. 2. Countryside Council for Wales.** **Rogers, D. & Watson, E. 2005. Scoping study for a 5-year project to bring the River Wye SAC into favourable conservation status for white-clawed crayfish. CCW Regional Report. CCW/SEW/05/05. Countryside Council for Wales.** **Rogers, W.D. 2005a. Painscastle: recommendations for the prevention of transfer of crayfish plague. CCW Regional Report. Countryside Council for Wales.** **Rogers, W.D. 2005b. Painscastle: results of trapping and recommendations for further management to eradicate signal crayfish. CCW Regional Report. Countryside Council for Wales.** **RPS. 2005. Native white-clawed crayfish survey report South Sebastopol, Cwmbran. RPS Chepstow.** **Slater, F.M. 2012. The status and distribution of the white-**

	clawed crayfish Austropotamobius pallipesin the Mounton Brook catchment, Chepstow in 2011. A report for the Countryside Council for Wales. Countryside Council for Wales. **Slater, F.M., Davidson, K., James, C., Ross, F., Sherrard-Smith, E., Chen, J., Phillips, A. & Tombs, V. 2007a. The status and distribution of the white-clawed crayfish Austropotamobius pallipes in water courses in Torfaen County Borough Council in 2005 & 2006. CCW Contract Science. 724. Countryside Council for Wales & Environment Agency Wales.** **Slater, F.M., Davidson, K., James, C., Sherrard-Smith, E., Ross, F., Chen, J., Phillips, A. & Tombs, V. 2007b. The status of the white-clawed crayfish Austropotamobius pallipes in tributaries of the River Usk on Mynydd Eppynt in Breconshire in 2005 & 2006. CCW Contract Science. 725. Countryside Council for Wales.** **Slater, F.M. & House, E.V. 2001. The current status of the white-clawed crayfish Austropotamobius pallipes in the Afon Edw and the impact of recent land use change on populations. CCW Contract Science. 454. Countryside Council for Wales.** **Slater, F.M. & Howells, M. 2003. The causes of decline of the white-clawed crayfish Austropotamobius pallipes on the Afon Edw: preliminary report into the effects of sedimentation. CCW Contract Science. 551. Countryside Council for Wales.** **Slater, F.M., Howells, M., Gaweda, A., Jenkins, R., Lee, R., Smith, J. & Smith, R. 2003. Crayfish survey of watercourses in Torfaen, Sept - Oct 2003. Phase 1. Llysdinam Field Centre, Cardiff University.** **Slater, F.M., Mallindine, K. & Cesarini, S. 2001. The status of the white-clawed crayfish Austropotamobius pallipes in the Brecon & Monmouthshire Canal and associated stretches and tributaries of the River Usk. CCW Contract Science. 495. Countryside Council for Wales.** **Whitehouse, A.T., Peay, S. & Kindemba, V. 2009. Ark sites for white-clawed crayfish - guidance for the aggregates industry. Buglife - The Invertebrate Conservation Trust.** **Wilkins, C. 1998. An investigation of the Sgithwen Brook to assess recovery of the fauna following a sheep dip pollution incident on 24 October 1996. Unpublished report. EASE/YM/98/19. Environment Agency."**

2.3 Range	
2.3.1 Surface area Range	
	A Wales Surface Area Range of 6160 square km has been calculated using the 48 10km squares with contemporary or historic records within the core area and ignoring introduced populations in Pembrokeshire and the Cardiff area. The measure includes all land within a line drawn to connect these 10km squares snapped to the Welsh border. The calculation of range is obscured by a lack of up-to-date information and past introductions of white-clawed crayfish outside its 'natural' range.
2.3.2 Method used Surface area of Range	**Estimate based on partial data with some extrapolation and/or modelling**

	The last major assessment of status within the SAC was in 2002 and 2003 (Rogers & Watson, 2003 & 2004). Since then, Welsh records have been generated from small-scale surveys, ad hoc recording by CCW and EA staff, by ecological consultants or gleaned from W&CA licence returns.
2.3.3 Short-term trend Period	
	Because of a lack of up-to-date information, the two reporting periods i.e. 2001-2012 are used.
2.3.4 Short term trend Trend direction	**decrease**
	The short-term range trend is likely to be one of decline. There has been a historic range decline (records from 48 10km squares, with only 17 10km squares with post-2001 records - although this is obscured by a lack of survey data and past introductions). Surveys in 2002 and 2003 (Rogers & Watson, 2003 & 2004) showed marked declines in mid-Wye tributaries with complete losses from some tributaries and much reduced ranges in others. The continued presence of signal crayfish in the River Bachawy and associated ponds and in fish pools adjacent to the main Wye channel at Llyswen is a further threat to the status and range of white-clawed crayfish.
2.3.5 Short-term trend Magnitude	**a) Minimum**
	The short-term range trend is likely to be one of decline. There has been a historic range decline (records from 48 10km squares, with only 17 10km squares with post-2001 records - although this is obscured by a lack of survey data and past introductions). Surveys in 2002 and 2003 (Rogers & Watson, 2003 & 2004) showed marked declines in mid-Wye tributaries with complete losses from some tributaries and much reduced ranges in others. The continued presence of signal crayfish in the River Bachawy and associated ponds and in fish pools adjacent to the main Wye channel at Llyswen is a further threat to the status and range of white-clawed crayfish.
	b) Maximum
	The short-term range trend is likely to be one of decline. There has been a historic range decline (records from 48 10km squares, with only 17 10km squares with post-2001 records - although this is obscured by a lack of survey data and past introductions). Surveys in 2002 and 2003 (Rogers & Watson, 2003 & 2004) showed marked declines in mid-Wye tributaries with complete losses from some tributaries and much reduced ranges in others. The continued presence of signal crayfish in the River Bachawy and associated ponds and in fish pools adjacent to the main Wye channel at Llyswen is a further threat to the status and range of white-clawed crayfish.
2.3.6 Long-term trend Period	
	With incomplete data, it is not possible to determine long-term range trend for the 1989-2012 period. However, it is possible if all Welsh data, including pre-1989 data, is used.
2.3.7 Long-term trend Trend direction	**decrease**
	The long-term range trend is one of decline. Ignoring introductions, white-clawed crayfish have been recorded from 48 10km squares but

	since 2001 has been recorded from just 17 10km squares. In addition, there have been marked declines in range on the mid-Wye tributaries with complete losses from some tributaries and much reduced ranges in others (Rogers & Watson, 2003 & 2004). The continued presence of signal crayfish in the River Bachawy and associated ponds and in fish pools adjacent to the main Wye channel at Llyswen is a further threat to the status and range of white-clawed crayfish.	
2.3.8 Long-term trend Magnitude Optional	**a) Minimum**	
	The long-term range trend is one of decline. Ignoring introductions, white-clawed crayfish have been recorded from 48 10km squares but since 2001 has been recorded from just 17 10km squares. In addition, there have been marked declines in range on the mid-Wye tributaries with complete losses from some tributaries and much reduced ranges in others (Rogers & Watson, 2003 & 2004). The continued presence of signal crayfish in the River Bachawy and associated ponds and in fish pools adjacent to the main Wye channel at Llyswen is a further threat to the status and range of white-clawed crayfish.	
	b) Maximum	
	The long-term range trend is one of decline. Ignoring introductions, white-clawed crayfish have been recorded from 48 10km squares but since 2001 has been recorded from just 17 10km squares. In addition, there have been marked declines in range on the mid-Wye tributaries with complete losses from some tributaries and much reduced ranges in others (Rogers & Watson, 2003 & 2004). The continued presence of signal crayfish in the River Bachawy and associated ponds and in fish pools adjacent to the main Wye channel at Llyswen is a further threat to the status and range of white-clawed crayfish.	
2.3.9 Favourable reference range	**a) Value in km²**	
	Based on the 1989 map of white-clawed crayfish distribution, which mostly pre-dates the spread of signal crayfish and subsequent white-clawed crayfish declines, the favourable range (in terms of occupied 10km squares was 350 10km squares, with Wales contributing 48 occupied 10km squares and 6160 square kilometres to this range.	
	b) Operator for FRR	
	c) FRR is unknown (indicated by "true")	**False**
	d) Method used to set FRR	
2.3.10 Reason for change Is the difference between the	**a) Genuine change?**	**True**

reported value in 2.3.1 and the previous reporting round mainly due to…	There has been a genuine decline in range since the previous reporting round. This is most pronounced in England and is the result of the spread of signal crayfish and crayfish plague. It is difficult to determine such short-term range change in Wales because of a lack of recording effort and targeted surveys. However, populations have been lost in at least the short term as a consequence of sheep dip and other pollution incidents (Wilkins, 1998), siltation in river channels (Howells et al., 2004; Slater & House, 2001; Slater & Howells, 2003) and the presence of signal crayfish populations (Rogers, 2005a & b; Rogers & Watson, 2005). Given the presence of signal crayfish populations in the mid-Wye catchement and elsewhere in south Wales, the long-term prospects for white-clawed crayfish in Wales are rather bleak.	
	b) Improved knowledge/more accurate data?	**False**
	c) Use of different method (e.g. "Range tool")?	**False**

2.4 Population		
2.4.1 Population size estimation (using individuals or agreed exceptions where possible)	**a) Unit**	
	b) Minimum	
	c) Maximum	
2.4.2 Population size estimation (using population unit other than individuals) Optional *(if 2.4.1 filled in)*	**a) Unit**	**number of map 10x10 km grid cells**
	This measure for population size has been agreed by NE and CCW. The widespread nature of populations in both running and standing water (of varying size) and a lack of direct population data makes this the most appropriate unit of measure.	
	b) Minimum	**17**
	The lower population estimate has been set at 17 10km squares, representing the the number with post-2001 records.	
	c) Maximum	**48**
	The upper population estimate is based upon the all 10km squares with records of white-clawed crayfish, past or present and does not imply occupation at or immediately prior to 2001 (see 2.4.2b). This figure ignores introductions to Pembrokeshire and to other 10km on the periphery of 'natural' distribution.	
2.4.3 Additional information on population estimates / conversion Optional	**a) Definition of "locality"**	

	b) Method to convert data	
	c) Problems encountered to provide population size estimation	
2.4.4 Year or period	**2001-2012**	
	This equates to the two reporting rounds. Whilst there has been no comprehensive survey during this period, surveys of the Wye SAC have been made (Rogers & Watson, 2003 & 2004) as well as surveys of smaller populations and smaller river systems and water courses (ADAS, 2007; Howells, 2003; Jones, 2008; RPS, 2005; Slater, 2012; Slater & House, 2001; Slater et al., 2001, 2003, 2007a & b).	
2.4.5 Method used Population size	**Estimate based on partial data with some extrapolation and/or modelling**	
	Whilst there has been no comprehensive survey during this period, surveys of the Wye SAC have been undertaken (Rogers & Watson, 2003 & 2004) as well as surveys of smaller populations and smaller river systems and water courses (ADAS, 2007; Howells, 2003; Jones, 2008; RPS, 2005; Slater, 2012; Slater & House, 2001; Slater et al., 2001, 2003, 2007a & b).	
2.4.6 Short-term trend Period	**2001-2012**	
2.4.7 Short-term trend Trend direction	**decrease**	
	Whilst there has been no comprehensive survey during this period, surveys of the Wye SAC (Rogers & Watson, 2003 & 2004) and of smaller river systems and water courses (ADAS, 2007; Howells, 2003; Jones, 2008; RPS, 2005; Slater, 2012; Slater & House, 2001; Slater et al., 2001, 2003, 2007a & b) suggest that the short-term population trend is one of decline, mostly as a consequence of sheep dip and other pollution incidents (Wilkins, 1998) and siltation (Howells et al., 2004).	
2.4.8 Short-term trend Magnitude	**a) Minimum**	
	The lack of a comprehensive survey over this period precludes the ability to provide a short-term trend magnitude, although it is clear that there has been a decline.	
	b) Maximum	
	The lack of a comprehensive survey over this period precludes the ability to provide a short-term trend magnitude, although it is clear that there has been a decline.	
	c) Confidence interval	

2.4.9 Short-term trend Method used	**Estimate based on partial data with some extrapolation and/or modelling**	
	The lack of a comprehensive survey over this period precludes the ability to provide a short-term trend magnitude, although it is clear that there has been a decline.	
2.4.10 Long-term trend – Period	**1989-2012**	
2.4.11 Long-term trend Trend direction	**decrease**	
	During the period 1989-2012, white-clawed crayfish have been recorded from 26 10km squares out of the 48 10km squares where it was recorded historically. This shows a marked decline although it is not possible to state categorically that apparent losses in the 22 10km squares without records occurred during this time frame.	
2.4.12 Long-term trend Magnitude Optional	**a) Minimum**	
	The lack of comparable, comprehensive survey data precludes the ability to provide a long-term trend magnitude, although it is clear that there has been a decline.	
	b) Maximum	
	The lack of comparable, comprehensive survey data precludes the ability to provide a long-term trend magnitude, although it is clear that there has been a decline.	
	c) Confidence interval	
2.4.13 Long term trend Method used	**2**	
2.4.14 Favourable reference population	**a) Number of individuals/agreed exceptions/other units**	
	b) Operator	
	c) FRP is unknown indicated by "true"	**False**
	d) Method used to set FRP	
2.4.15 Reason for change	**a) Genuine**	**True**

Is the difference between the value reported at 2.4.1 or 2.4.2 and the previous reporting round mainly due to:	**change?**	
	There has been a genuine decline in population size since the previous reporting round. This is most pronounced in England and is the result of the spread of signal crayfish and crayfish plague. It is difficult to determine such short-term range change in Wales because of a lack of recording effort and targeted surveys. However, populations have been lost in at least the short term as a consequence of sheep dip and other pollution incidents (Wilkins, 1998), siltation in river channels (Howells et al., 2004; Slater & House, 2001; Slater & Howells, 2003) and the presence of signal crayfish populations (Rogers, 2005a & b; Rogers & Watson, 2005). Given the presence of signal crayfish populations in the mid-Wye catchement and elsewhere in south Wales, the long-term prospects for white-clawed crayfish in Wales are rather bleak.	
	b) Improved knowledge/more accurate data?	**False**
	c) Use of different method (e.g. "Range tool")?	**False**

2.5 Habitat for the species		
2.5.1 Area estimation	**27.16**	
	This value has been calculated by summing the length of rivers within the 17 10km squares occupied by crayfish from 2001 onwards within its 'natural' range in a GIS layer supplied by Environment Agency Wales and assuming an average width of such rivers as 10m. There is thought to be a sufficient amount of habitat in the UK to support a viable population of the species.	
2.5.2 Year or period	**2007-2012**	
2.5.3 Method used Habitat for the species	**Estimate based on partial data with some extrapolation and/or modelling**	
	The measure has been calculated by summing the length of rivers within the 48 10km squares occupied by crayfish within its 'natural' range in a GIS layer supplied by Environment Agency Wales. This will be an under-estimate as, other than the River Usk, the GIS layer gives information for the main river channel and major tributaries only.	
2.5.4 Quality of the habitat	**a) Habitat quality**	**Moderate**
	Welsh rivers and streams currently or previously supporting crayfish have suffered from chronic and acute siltation (Howells et al, 2004; Slater & House, 2001; Slater & Howells, 2003),and episodic sheep dip pollution incidents (e.g. Wilkins, 1998). Rates of siltation have not been investigated during the current reporting period but the banning of SP sheep dip use will have had a positive impact on habitat quality. The	

	presence of signals within the mid-Wye catchment (Rogers, 2005a & b; Rogers & Watson, 2005) is a worrying development and significantly reduces habitat 'quality'.	
	b) Assessment method	**Welsh rivers and streams currently or previously supporting crayfish have suffered from chronic and acute siltation (Howells et al, 2004; Slater & House, 2001; Slater & Howells, 2003),and episodic sheep dip pollution incidents (e.g. Wilkins, 1998). Rates of siltation have not been investigated during the current reporting period but the banning of SP sheep dip use will have had a positive impact of habitat quality. The presence of signals within the mid-Wye catchment (Rogers, 2005a & b; Rogers & Watson, 2005) is a worrying development and significant reduces habitat 'quality'.**
2.5.5 Short-term trend Period	**2001-2012**	
2.5.6 Short-term trend Trend direction	**decrease**	
	Whilst there will have been an improvement in water quality following the ban on SP sheep dip usage, habitat quality has declined as a consequence of signal crayfish presence.	
2.5.7 Long-term trend Period	**1989-2012**	
2.5.8 Long-term trend Trend direction	**decrease**	
	Whilst there will have been an improvement in water quality following the ban on SP sheep dip usage, habitat quality has declined as a consequence of signal crayfish presence.	
2.5.9 Area of suitable habitat for the species	**a) Value in km²**	**51.79**
	This measure has been calculated by the length of rivers within the 48 10km squares occupied by crayfish within its 'natural' range in a GIS layer supplied by Environment Agency Wales and assuming an average width of such rivers as 10m. This will be an under-estimate as, other than the River Usk, the GIS layer gives information for the main river channel and major tributaries only. It is assumed the water courses and water bodies outside the 'natural' range of the species are unsuitable e.g. most water courses in west and north Wales will be too acidic.	
	b) Absence of data indicated as '0'	
2.5.10 Reason for change Is the difference between the value reported at 2.5.1 and the previous reporting round mainly due to	**a) Genuine change?**	**False**
	b) Improved knowledge/more	**False**

	accurate data?	
	c) Use of different method (e.g. "Range tool")?	**True**
	No estimate of habitat area was made in the previous reporting round.	

2.6 Main pressures		
a) Pressure	**b) Ranking**	**c) Pollution qualifier**
	H = high importance M = medium importance L = low importance	
F01: Marine and Freshwater Aquaculture	H	
I01: invasive non-native species	H	
K03: Interspecific faunal relations	H	
A07: use of biocides, hormones and chemicals	M	O
E03: Discharges	M	X
H01: Pollution to surface waters (limnic & terrestrial, marine & brackish)	M	X
H02: Pollution to groundwater (point sources and diffuse sources)	M	X
J02: human induced changes in hydraulic conditions	M	

High - F01, I01 and K03 are rated as High because of the impact of signal crayfish (and crayfish plague) upon the white-clawed crayfish. Previously introduced for commercial aquaculture purposes, signals escaped into the wild and are now widely distributed in the UK. They aggressively out-compete white-claws, carry crayfish plague and cause damage to the freshwater ecosystem. Medium - A07, E03, H01, H02, J02. Pollutants can cause both chronic and acute damage to freshwater ecosystems and to crayfish populations. Increased siltation levels as a consequence of land use practices, agricultural runoff and livestock access to waterways appears to have had a amjor impact upon declines in Welsh crayfish populations. SP sheep dip spills have caused localised extinctions, at least in the short term, although sheep dip practices are now more tightly regulated.	
2.6.1 Method used – Pressures	**based exclusively or to a larger extent on real data from sites/occurrences or other data sources**
	Welsh rivers and streams currently or previously supporting crayfish have suffered from chronic and acute siltation (Howells et al, 2004; Slater & House, 2001; Slater & Howells, 2003),and episodic sheep dip pollution incidents (e.g. Wilkins, 1998). Rates of siltation have not been investigated during the current reporting period but the banning of SP sheep dip use will have had a positive impact on habitat quality. The presence of signals within the mid-Wye catchment (Rogers, 2005a & b; Rogers & Watson, 2005) is a worrying development and significantly

	reduces habitat 'quality'.

2.7 Threats		
a) Threat	**b) Ranking**	**c) Pollution qualifier**
	H = high importance M = medium importance L = low importance	
F01: Marine and Freshwater Aquaculture	H	
I01: invasive non-native species	H	
K03: Interspecific faunal relations	H	
A07: use of biocides, hormones and chemicals	M	O
E03: Discharges	M	X
H01: Pollution to surface waters (limnic & terrestrial, marine & brackish)	M	X
H02: Pollution to groundwater (point sources and diffuse sources)	M	X
J02: human induced changes in hydraulic conditions	M	
M01: Changes in abiotic conditions	M	

High - F01, I01 and K03 are rated as High because of the impact of signal crayfish (and crayfish plague) upon the white-clawed crayfish. Previously introduced for commercial aquaculture purposes, signals escaped into the wild and are now widely distributed in the UK. They aggressively out-compete white-claws, carry crayfish plague and cause damage to the freshwater ecosystem.There are several other introduced crayfish species, currently confined to a small number of sites and at low population levels, which may cause similar problems in the future.

Medium - A07, E03, H01, H02, J02. Pollutants can cause both chronic and acute damage to freshwater ecosystems and to crayfish populations. Increased siltation levels as a consequence of land use practices, agricultural runoff and livestock access to waterways appears to have had a major impact upon declines in Welsh crayfish populations. SP sheep dip spills have caused localised extinctions, at least in the short term, although sheep dip practices are now more tightly regulated.

A future threat may include climate change (M01), with more regular drying up of shallow waterways and water bodies as a result of summer droughts.

2.7.1 Method used – Threats	**expert opinion**
	There has been no modelling of future threats to crayfish populations.

2.8 Complementary information	
2.8.1 Justification of % thresholds for trends	
2.8.2 Other relevant information	**The future prospects for white-clawed crayfish in Wales and the UK are not good. The spread of signal crayfish into waterways and water bodies occupied by white-clawed crayfish normally indicates the extinction of the latter as a consequence of competition and crayfish plague.** **The 2007 report suggested that 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".** **Whilst signals remain within a catchment - and there is still no way of effectively eradicating signals - there is little point in restocking contiguous waterways. One option may be the establishment of Ark sites -discrete, isolated water bodies free of signals and crayfish plague (Buglife, undated; Whitehouse et al., 2009) - for which Buglife has developed selection criteria (see Buglife weblink in 2.2). I have personal concerns about this approach in that sites are being selected outside the current UK range of the species (e.g. Welsh stock has recently been introduced into Cornwall; see http://www.environment-agency.gov.uk/news/130141.aspx?page= 3&month=5&year=201) and there seems to be a demand for a proliferation of ark sites, with receptor sites well away from donor sites. A better approach may be to identify or create a single ark site (or small number of ark sites) within close proximity of the main foci of populations (SACs), using the latter as the donor stock for that ark site. This reduces the risk of losing the papertrail of donor provenance and maintains a more 'natural' UK distribution.**
2.8.3 Trans-boundary assessment	

2.9 Conclusions *(assessment of conservation status at end of reporting period)*
Please refer to the United Kingdom assessment for this species.

3 Natura 2000 coverage & conservation measures - Annex II species
(only applies to species listed under Annex II of the Directive)

3.1 Population

3.1.1 Population size Estimation of population size included in the SAC network	**a) Unit**	**number of map 10x10 km grid cells**
	b) Minimum	**13**
	The two reporting periods (2001-1012) are used because of a lack of contemporary data. 13 10km squares have post-2001 records, with 7 10km squares from the Wye SAC (a SAC for crayfish) and 6 10km squares for the Usk SAC (not a SAC for crayfish).	
	c) Maximum	**26**
	The two reporting periods (2001-1012) are used because of a lack of contemporary data. 26 10km squares have contemporary or historic records, with 13 10km squares from the Wye SAC (a SAC for crayfish), 12 10km squares for the Usk SAC (not a SAC for crayfish) and 1 10km square from the Severn SAC (not a SAC for crayfish).	
3.1.2 Method used	**Estimate based on partial data with some extrapolation and/or modelling**	
3.1.3 Trend of population size within the network (short-term trend)	**decrease**	
	The baseline of white-clawed crayfish on the Wye SAC demonstrated a decline (Rogers & Watson, 2004). There are likely to have been similar declines in the Usk SAC and it has been lost from the Welsh part of the Severn SAC.	

3.2 Conservation measures

Conservation measures taken (i.e. already being implemented) within the reporting period and provided information about their importance, location and evaluation.

3.2.1 Measure	3.2.2 Type	3.2.3 Ranking H = high importance	3.2.4 Location where the measure is PRIMARILY applied	3.2.5 Broad evaluation of the measure

	a) Legal/statutory	b) Administrative	c) Contractual	d) Recurrent	e) One-off	M = medium importance L = low importance	a) Inside	b) Outside	c) Both inside & outside	a) Maintain	b) Enhance	c) Long term	d) No effect	e) Unknown	f) Not evaluated
2.0: Other agriculture-related measures	Y			Y		M			Y	Y					
4.1: Restoring/improving water quality	Y			Y		M			Y		Y	Y			
7.4: Specific single species or species group management measures	Y			Y		H			Y		Y	Y			

2.0 - Over the last few years, river banks on several major tributaries of the mid Wye have been fenced to exclude livestock access to reduce siltation episodes. Whilst this has been primarily for fisheries purposes, there has been a focus on important crayfish tributaries and such action will have benefitted crayfish populations.

4.1 - The banning in February 2006 by the Veterinary Medicines Directorate of the use of synthetic pyrethroids (SPs) in sheep dip has reduced the number of crayfish kill incidents and will have improved water quality.

7.4 - Attempts have been made to prevent the spread of signal crayfish into the mid-Wye catchment from the Afon Bachawy and associated pools. This has focussed on intensive trapping, with in excess of 50,000 signals removed to date. Recent efforts to undertake biocide treatments at Lane Farm pools on the Bachawy and at Y Dderw, Llyswen have stalled.
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7.4 - A captive-rearing programme of white-clawed crayfish has been established by Environment Agency Wales at its hatcheries near Brecon. The progeny of crayfish collected from a waterway in south Wales were released in Cornwall in 2011 (see http://www.environment-agency.gov.uk/news/130141.aspx?page=3&month=5&year=2011; http://www.bbc.co.uk/news/uk-wales-mid-wales-13426022). There has been a subsequent release of captive-reared crayfish into the Afon Chwefri as part of a LIFE project on the Afon Irfon, a tributary of the River Wye, and a second release is planned here.

It would be more appropriate to ensure that receptor sites are close to donor populations. Receptor sites should be few and isolated from waterways currently or likely to be populated by signal crayfish.