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*)

NORTHERN IRELAND

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 (Northern Ireland 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	1994-2018
2.3 Distribution map	Yes
2.4 Distribution map Method used	Based mainly on extrapolation from a limited amount of data
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

AERC (1998). Surveys of the distribution of freshwater crayfish (Austropotamobius pallipes) in Northern Ireland.
Unpublished report to Environment and Heritage Service (DoE Northern Ireland) (now NIEA), May 1998. AERC ref. B8202
Favaro, L., Tirelli, T. & Pessani, D. (2011) Modelling habitat requirements of white-clawed crayfish (Austropotamobius pallipes) using support vector machines, Knowledge and Management of Aquatic Ecosystems, 401, 21
Gallagher, M.B., Dick, J.T.A., Elwood, R.W. (2006) Riverine habitat requirements of the white-clawed crayfish, Austropotamobius pallipes. Biology and Environment: Proceedings of the Royal Irish Academy 106(1):1 - 8
Haddaway, N.R., Mortimer, R.J.G., Christmas, M. & Dunn, A.M. (2015) Water chemistry and endangered white-clawed Crayfish: a literature review and field study of water chemistry Association in Austropotamobius pallipes, Knowledge and Management of Aquatic Ecosystems, 416, 01
Horton, M., Keys, A., and Wilson, N. 2017 Northern Ireland White-clawed Crayfish (Austropotamobius pallipes) Survey 2017. River Care Ltd. Report commissioned by The Centre for Environmental Data and Recording (CEDaR), Department of Natural Sciences, National Museums Northern Ireland (NMNI)
Northern Ireland Environment Agency. Unpublished survey and monitoring data. Various years
Peay, S. 2002. Guidance on Habitat for White-clawed Crayfish and its Restoration. Environment Agency Technical Report W1-067/TR
Peay, S. (2003) Monitoring the White-clawed Crayfish, Conserving Natura 2000 Rivers, Monitoring Series No. 1
Reynolds, J.D., O'Connor, W., O'Keeffe, C. & Lynn, D. (2010) A technical manual

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for monitoring white-clawed crayfish Austropotamobius pallipes in Irish lakes. Irish Wildlife Manuals, No 45, National Parks and Wildlife Service, Department of the Environment, Heritage and Local Government, Dublin.
Robinson, C.A., Thom, T.J., & Lucas, M.C. (2000) Ranging behaviour of a large freshwater invertebrate, the
white-clawed crayfish Austropotamobius pallipes, Freshwater Biology, 44, 509-521
Souty-Grosset, C. & Raimond, R. (2010) Land use in headwaters and the distribution of native white-clawed crayfish, Austropotamobius pallipes (Lereboullet), in a stream from the Poitou-Charentes Region, France, International Association of Astacology, 17:129-134
UK Technical Advisory Group On the Water Framework Directive (2007) UK Technical Advisory Group, 9 (25/5/07)
Wilson, N. (2008) Assessing the Riparian Habitat Requirements of the White-clawed Crayfish, Austropotamobius pallipes (Lereboullet, 1858) in Northern Ireland. Crayfish News Vol 30 Issue 4 Pg. 1. Part of PhD Thesis for QUB

5. Range

5.1 Surface area (km²)		
5.2 Short-term trend Period		
5.3 Short-term trend Direction	Stable (0)	
5.4 Short-term trend Magnitude	a) Minimum	b) Maximum
5.5 Short-term trend Method used		
5.6 Long-term trend Period		
5.7 Long-term trend Direction		
5.8 Long-term trend Magnitude	a) Minimum	b) Maximum
5.9 Long-term trend Method used		
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	No change The change is mainly due to:	
5.12 Additional information		

6. Population

6.1 Year or period	1994-2018	
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	257
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 b) Minimum c) Maximum d) Best single value
6.5 Type of estimate	
6.6 Population size Method used	Based mainly on extrapolation from a limited amount of data
6.7 Short-term trend Period	2007-2018
6.8 Short-term trend Direction	Unknown (x)
6.9 Short-term trend Magnitude	a) Minimum b) Maximum c) Confidence interval
6.10 Short-term trend Method used	Insufficient or no data available
6.11 Long-term trend Period	
6.12 Long-term trend Direction	
6.13 Long-term trend Magnitude	a) Minimum b) Maximum c) Confidence interval
6.14 Long-term trend Method used	
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	No change The change is mainly due to:
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)?	Unknown
	b) Is there a sufficiently large area of occupied AND unoccupied habitat of suitable quality (to maintain the species at FCS)?	
7.2 Sufficiency of area and quality of occupied habitat Method used	Insufficient or no data available	
7.3 Short-term trend Period	2007-2018	
7.4 Short-term trend Direction	Unknown (x)	
7.5 Short-term trend Method used	Insufficient or no data available	
7.6 Long-term trend Period		
7.7 Long-term trend Direction		
7.8 Long-term trend Method used		

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7.9 Additional information

8. Main pressures and threats

8.1 Characterisation of pressures/threats

Pressure	Ranking
Conversion from one type of agricultural land use to another (excluding drainage and burning) (A02)	M
Freshwater fish and shellfish harvesting (recreational) (G06)	H
Introduction and spread of species (including alien species and GMOs) in freshwater aquaculture (G24)	M
Invasive alien species of Union concern (I01)	M
Mixed source pollution to surface and ground waters (limnic and terrestrial) (J01)	H
Abstraction from groundwater, surface water or mixed water (K01)	M
Drainage (K02)	H
Modification of hydrological flow (K04)	H
Physical alteration of water bodies (K05)	H
Change of habitat location, size, and / or quality due to climate change (N05)	M

Threat	Ranking
Conversion from one type of agricultural land use to another (excluding drainage and burning) (A02)	M
Freshwater fish and shellfish harvesting (recreational) (G06)	H
Introduction and spread of species (including alien species and GMOs) in freshwater aquaculture (G24)	H
Invasive alien species of Union concern (I01)	H
Mixed source pollution to surface and ground waters (limnic and terrestrial) (J01)	H
Abstraction from groundwater, surface water or mixed water (K01)	M
Drainage (K02)	M
Modification of hydrological flow (K04)	M
Physical alteration of water bodies (K05)	M
Change of habitat location, size, and / or quality due to climate change (N05)	H

8.2 Sources of information

8.3 Additional information

9. Conservation measures

9.1 Status of measures

a) Are measures needed?	Yes
b) Indicate the status of measures	Measures identified and taken

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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	Medium-term results (within the next two reporting periods, 2019-2030)

9.5 List of main conservation measures

Prevent conversion of natural and semi-natural habitats, and habitats of species into agricultural land (CA01)
Manage the use of natural fertilisers and chemicals in agricultural (plant and animal) production (CA09)
Reduce impact of hydropower operation and infrastructure (CC04)
Management of hunting, recreational fishing and recreational or commercial harvesting or collection of plants (CG02)
Reduce impact of mixed source pollution (CJ01)
Early detection and rapid eradication of invasive alien species of Union concern (CI01)
Management, control or eradication of established invasive alien species of Union concern (CI02)
Reduce impact of multi-purpose hydrological changes (CJ02)
Adopt climate change mitigation measures (CN01)
Implement climate change adaptation measures (CN02)

9.6 Additional information

10. Future prospects

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:

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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 1x1 km grid cells (grids1x1)
	b) Minimum	1
	c) Maximum	2
	d) Best single value	1
12.2 Type of estimate		Minimum
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

13.2 Trans-boundary assessment

13.3 Other relevant Information

Distribution Map

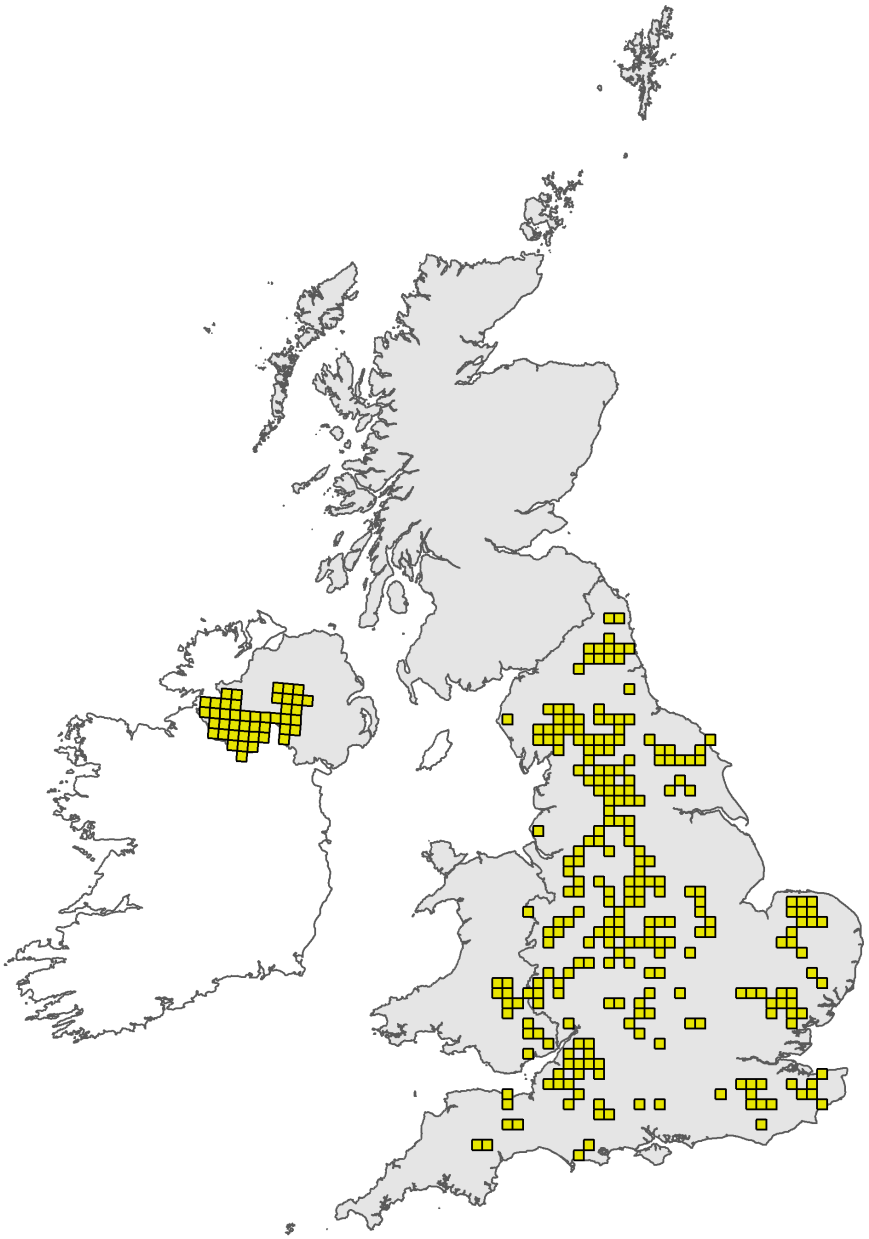

Figure 1: UK distribution map for S1092 - White-clawed crayfish (*Austropotamobius pallipes*). Coastline boundary derived from the Oil and Gas Authority's OGA and Lloyd's Register SNS Regional Geological Maps (Open Source). Open Government Licence v3 (OGL). Contains data © 2017 Oil and Gas Authority.

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

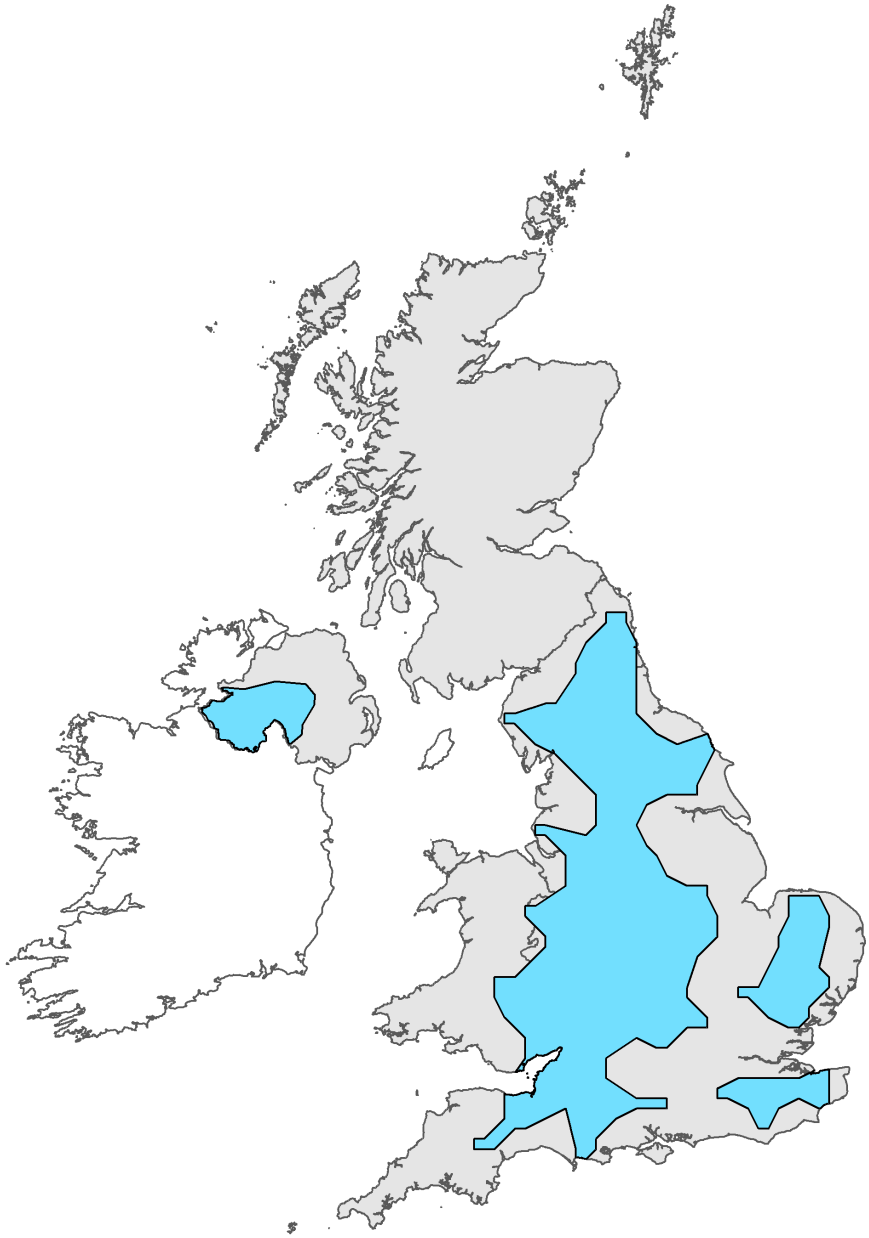

Figure 2: UK range map for S1092 - White-clawed crayfish (*Austropotamobius pallipes*). Coastline boundary derived from the Oil and Gas Authority's OGA and Lloyd's Register SNS Regional Geological Maps (Open Source). Open Government Licence v3 (OGL). Contains data © 2017 Oil and Gas Authority.

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)

Field label	Note
2.2 Year or Period	Range data based upon records from 1994 to 2018.

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

Field label	Note
5.3 Short term trend; Direction	The short-term trend direction for the range has been reported as 'stable'. A comparison of White-clawed Crayfish records for the 4 periods - 1994-2000, 2001-2006, 2007-2012 and 2013-2018 - show variations in the overall distribution and number of actual records, which is probably largely due to variation in recording effort. However, the general pattern of the species' distribution has remained consistent, with virtually all the records confined to the south-west of NI.
5.11 Change and reason for change in surface area of range	We have stated that there has been 'no' change in the surface area of this species' range - still widely distributed across Counties Tyrone and Fermanagh.
6.1 Year or Period	Population estimates based upon occupied 1x1km squares for the period 1994 to 2018.
6.8 Short term trend; Direction	Records of the species during the 4 time periods since 1994 show considerable variation, with 734 records for 1994-2000, compared to 225 records in 2001-2006, 181 records in 2007-2012 and 155 records for 2013-2018. However, it is believed that this variation is - in large part - the result of recording effort, rather than a genuine indication of population trends. More systematic survey would be required to provide a reliable indication of population trends. Such a survey has now been initiated (Horton, et al, 2017) using Common Standards Monitoring. As part of this work, a total of 71 (83.5%) sites were surveyed in 2017, with White-clawed crayfish detected at 31 (43.7%). A total of 169 individuals were observed (51 (50%) female, 43 (42.2%) male, 8 (7.8%) sex unidentified) and 102 crayfish of these were captured for disease and morphology assessment. Until this survey is repeated in the future, the short-term trend direction for the population is reported as 'unknown'.
6.16 Change and reason for change in population size	We have stated that there has been 'no' genuine change in population size because there is insufficient monitoring data available to determine whether an actual change in population size has occurred within this reporting period. Future surveys using the same methodology as the 2017 survey (Horton, et al, 2017), should allow more informed assessments of population size and trends to be made in subsequent reports.
7.1 Sufficiency of area and quality of occupied habitat	In the absence of white-clawed crayfish habitat surveys, invasive species information, drainage and water quality data were used as proxies. Water quality was assessed using data on pollution incidents, industrial consents, abstraction licensing and surface water body monitoring sites, for river segments and river water bodies within the catchments in which white-clawed crayfish were recorded as present in. This data was last updated between August and November 2017.
7.4 Short term trend; Direction	The short-term trend direction for the habitat for the species has been reported as 'unknown' because there is insufficient monitoring data available to accurately interpret trends of habitat for the species. We cannot infer any directional trend between this period and the last with confidence, due to the quality and amount of data available to us for all reporting periods.

8.1 Characterisation of pressures/ threats	POLLUTION - Pollution from point and diffuse sources (including the increasing impact from atmospheric nitrogen deposition) are constant pressures and threats to the freshwater environment. Although eutrophication has had relatively little physical effect on the species, the impact on the species' habitat and in particular refuges can be extreme (e.g. the recent catastrophic decline in the charophyte beds in Kilroosky Lough caused by a massive spike in phosphorous loading is mirrored by a population crash and potential future extinction of the species in the lough). Other pollutants such as biocides, hormones and chemicals (including sheep dip) will have a direct impact on the species' local survival. ALIEN - The release of invasive alien crayfish particularly Signal Crayfish (either intentional or accidental) is an ongoing threat, as they will out compete the native White-clayed Crayfish, as well as being a carrier of the deadly crayfish plague. Although no alien crayfish have yet to be recorded in the whole of Ireland, outbreaks of plague occur periodically, two outbreaks are currently being investigated in the Erne system, the most significant occurring in RoI. Crayfish Plague has been indentified very recently (Sept 2018) in the River Blackwater in County Tyrone. To date the source of these outbreaks have not being identified however other similar outbreaks have being linked back to the use of contaminated recreational fishing gear. The spread of established aliens such as Himalayan Balsam, Japanese Knotweed and Giant Hogweed will all have a negative impact on crayfish habitat due to their destabilising effect on river banks. PHYSICAL MODIFICATION - Man-made modification to the habitat used by the species is a continuing threat (e.g. changes in the hydrological regime from drainage, abstraction, construction of weirs or installation of small hydro-schemes, in addition to direct physical modification to shorelines and banks). CLIMATE CHANGE - Some of the potential impacts of climate change (i.e. increased water temperature and frequency of drought and flood events) will almost certainly have an impact on crayfish habitat and populations.
9.2 Main purpose of the measures taken	Conservation measures CA09 &CJ01 relate to pollution control from all human activity; Conservation measures CA01, CC04 & CJ02 relate reducing human impact on Crayfish habitat and to restoring where necessary; and Conservation measures CG02, CI01 & CI02 relate to the control and elimination of negative alien species and the prevention of outbreaks of crayfish plague.
10.1 Future prospects of parameters	The future prospects for range have been reported as stable (i.e. range does not appear to have changed since 1994); future prospects for population have been assessed as 'unknown' because there is insufficient systematically collected monitoring data available to accurately interpret range trends. Habitat for Species - future prospects assessed as unknown becuase the full extent and quality of the habitat required for the species is not known.
12.1 Population size inside the pSCIs, SCIs and SACs network	There are - in total - 6 lakes within the Magheraveely Marl Lakes SAC, four of which have recorded White-clawed Crayfish since 1994. Surveys suggest that the population has become extinct at Knockballymore Lough, despite an attempt at reintroduction. Another population has suffered a catastrophic decline and may face extinction in the near future (the recent dramatic loss of the charaphyte beds in Kilroosky Lough caused by a massive spike in phosphorous loading was mirrored by a population crash). The current health of the population in Drumacrittin Lough is unknown.
12.4 Short term trend of the population size within the network; Direction	See 12.1