

**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:

S1029 - Freshwater pearl mussel. (*Margaritifera margaritifera*)

IMPORTANT NOTE – PLEASE READ

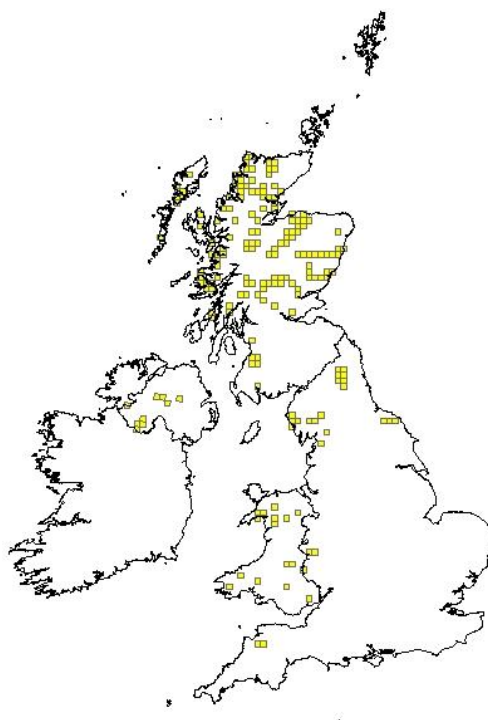
- The country-level reporting information contained in this document is a contribution to the Article 17 UK report for the habitat/species concerned.
- It has been provided by **Northern Ireland Environment Agency** and refers only to the state of the habitat/species in **Northern Ireland** - it does 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.

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

<i>Field name</i>	<i>Brief explanations</i>	
0.2 Species	0.2.1 Species code	S1029
	0.2.2 Species scientific name	<i>Margaritifera margaritifera</i>
	0.2.3 Alternative species scientific name Optional	
	0.2.4 Common name Optional	Fresh water pearl mussel

1.1 Maps

1.1.1 Distribution map		Sensitive	True
	Species distribution on NBN is based on pos-2006 records from ecological assessments and monitoring of known colonies / populations.		



1.1.2 Method used - map	Estimate based on partial data with some extrapolation and/or modelling
	The Northern Ireland distribution as shown on the NBN is derived from BEASLEY, C.R. & ROBERTS, D.1999. Assessing the conservation status of the freshwater pearl mussel in the north of Ireland - relevance of growth and age characteristics. Journal of Conchology, 36, 53-61. This poorly represents the actual distribution as shown by more recent surveys including JANE PRESTON, JOHN KELLY, OISIN SWEENEY & ROBBIE MC DONALD Isolated populations of freshwater pearl mussel <i>Margaritifera margaritifera</i> in Northern Ireland. Quercus project QU05-13, IAN

	KILLEEN D 2007. The Freshwater Pearl Mussel <i>Margaritifera margaritifera</i> (L., 1758) in three Northern Ireland SAC Rivers, NEIL REID, JANE PRESTON & ALAN KEYS D 2011. Freshwater pearl mussel survey of Northern Ireland 2011. Quercus Project QU11-01
1.1.3 Year or period	2006-2012
	Species distribution on NBN is based on pos-2006 records from ecological assessments and monitoring of known colonies / populations.
1.1.4 Additional distribution map	False
1.1.5 Range map	

2.1 Biogeographical region & marine regions	ATL
2.2 Published sources	<p>"ATKINS (2005) Hands off flows for cSAC Rivers Study, Chapter 4 River Ehen. Report for the Environment Agency.</p> <p>BAUER, G .1992. Variation in the life span and size of the freshwater pearl mussel. Journal of Animal Ecology, 61, 425-436</p> <p>COSGROVE, P.J. & HASTIE, L.C. 2000. National survey of the freshwater pearl mussel <i>M. margaritifera</i> – Phase II. Confidential report to Scottish Natural Heritage, Edinburgh.</p> <p>COSGROVE, P.J & YOUNG, M.R. 1998. The status of the freshwater pearl mussel <i>M. margaritifera</i> (L.) in Scotland. Confidential report to Scottish Natural Heritage, Edinburgh.</p> <p>COSGROVE, P.J., YOUNG, M.R., HASTIE, L.C., GAYWOOD, M. AND BOON P.J. 2000. The status of the freshwater pearl mussel <i>Margaritifera margaritifera</i> Linn. In Scotland. Aquatic Conservation: Marine and Freshwater Ecosystems, 10(3), 197-208.</p> <p>GIBBONS, C., YOUNG, M., HASTIE. L., SOULSBY, C., POKRAJAC, D. & CAMBELL, L. (2004). River Ehen Freshwater Pearl Mussel Project, Aberdeen University, Contract No JB128, Unpublished report to English Nature and the Environment Agency.</p> <p>HASTIE. L., (2003) Setting a compensation flow for Dubbs Beck. Report to Environment Agency.</p> <p>HASTIE, L.C. & COSGROVE, P.J. 2002. Intensive searching for mussels in a fast-flowing river: an estimation of sampling bias. Journal of Conchology, 37, 309-316</p> <p>JACKSON, D.L. & MCLEOD, C.R. (eds.). 2000. Report 312 - Handbook on the UK status of EC Habitats Directive interest features: provisional data on the UK distribution and extent of Annex I habitats and the UK distribution and population size</p>

of Annex II species. Revised 2002. Peterborough: Joint Nature Conservation Committee. Available online at: www.jncc.gov.uk/page-2447

KILLEEN, I. (2006) Freshwater pearl mussel *Margaritifera margaritifera* (L.,1758) In the Dubbs Beck, Cumbria: Report on the 2006 survey. Report to English Nature.

KILLEEN, I. (2006) The Freshwater pearl mussel *Margaritifera margaritifera* (L.,1758) In the River Irt, Cumbria: Report on the 2005 survey and desktop study on prospects for recovery of the mussel population. Report to the Environment Agency.

KILLEEN, I. (2006) Freshwater pearl mussel *Margaritifera margaritifera* (L.,1758) In the River Ehen, Cumbria: Report on the 2006 survey. Report to the Environment Agency.

KILLEEN, I.J. & OLIVER, P.G., 2000. A survey of rivers in Cumbria and North Lancashire for the freshwater pearl mussel *Margaritifera margaritifera*. Report to the Environment Agency & English Nature.

KILLEEN, I.J. & OLIVER, P.G., 1998. A comparison of the populations of the freshwater pearl mussel [*Margaritifera margaritifera* (L., 1758)] in the Rivers Ehen and Irt. English Nature Research Reports Series No. 272.

KILLEEN, I.J. & OLIVER, P.G., 1997b. The freshwater pearl mussel [*Margaritifera margaritifera* (L., 1758)] in the River Ehen. Part 2. Distribution maps. English Nature Research Reports Series No. 226.

KILLEEN, I.J. & OLIVER, P.G., 1997a. The freshwater pearl mussel [*Margaritifera margaritifera* (L., 1758)] in the River Ehen. Part 1. Report on the 1996 survey. English Nature Research Reports Series No. 226.

SKINNER, A., YOUNG, M. & HASTIE, L. 2003. Ecology of the Freshwater Pearl Mussel. Conserving Natura 2000 Rivers Ecology Series No. 2 English Nature, Peterborough. www.english-nature.org.uk/LIFEinUKRivers/publications/mussel.pdf

YOUNG, M.R., COSGROVE, P.J. & HASTIE, L.C. 2001. The extent of, and causes for, the decline of a highly threatened naiad: *Margaritifera margaritifera*. In: Ecology and evolutionary biology of the freshwater mussels Unionoida (eds. G. Bauer & K. Wächtler), pp 337-357. Springer-Verlag, Berlin (Ecological studies, Vol. 145).

ZAHNER-MEIKE, E. & HANSON, J.M. 2001. Effect of muskrat predation on naiads. In: Ecology and evolutionary biology of the freshwater mussels Unionoida (eds. G. Bauer & K. Wächtler), pp 163-184. Springer-Verlag, Berlin (Ecological

	<p>studies, Vol. 145).</p> <p>C.R. BEASLEY AND D.ROBERTS. D 1996. Survey of the distribution of Fresh-water Pearl Mussels <i>Margaritifera margaritifera</i> L. in Northern Ireland, pp 1-38. Research and Development Series, Environment and Heritage Service, Northern Ireland.</p> <p>BEASLEY, C.R. & ROBERTS, D.1999. Assessing the conservation status of the freshwater pearl mussel in the north of Ireland - relevance of growth and age characteristics. Journal of Conchology, 36, 53-61.</p> <p>DR JANE PRESTON, DR ALEX PORTIG & EMMA MUISE, A.T.E.C.. D 12/02/2000. The Freshwater Pearl Mussel <i>Margaritifera margaritifera</i> in Northern Ireland. Preliminary Research to identify targets for future monitoring and conservation. Report to The Environment and Heritage Service, Northern Ireland.</p> <p>JANE PRESTON, JOHN KELLY, OISIN SWEENEY & ROBBIE MC DONALD D 2006. Isolations populations of freshwater pearl mussel <i>Margaritifera margaritifera</i> in Northern Ireland, pp 1-20. Quercus project QU05-13. Report to Northern Ireland Environment Agency.</p> <p>IAN KILLEEN D 2007. The Freshwater Pearl Mussel <i>Margaritifera margaritifera</i> (L., 1758) in three Northern Ireland SAC Rivers, pp 1-46. Report to Northern Ireland Environment Agency.</p> <p>NEIL REID, JANE PRESTON & ALAN KEYS D 2011. Freshwater pearl mussel survey of Northern Ireland 2011, pp 1-75. Quercus Project QU11-01. Report to Northern Ireland Environment Agency.</p> <p>CONOR DAVID WILSON D 2011. Empirical approaches to the conservation of <i>Margaritifera margaritifera</i>, pp 2-32. A thesis submitted for the degree of Doctor of Philosophy, School of Biological Sciences, Faculty of Medicine, Health and Life Sciences, Queen's University Belfast.</p> <p>Northern Ireland Environment Agency unpublished survey and monitoring data 2000-2012.</p> <p>Environment and Heritage Service, A RIVER WATER QUALITY MONITORING STRATEGY FOR NORTHERN IRELAND, MAY 2001, http://www.doeni.gov.uk/niea/river_monitoring.pdf</p> <p>NIEA (2012) Water Quality – Rivers [online] Available at: http://www.doeni.gov.uk/niea/water-home/quality/rivers.htm (last update 27-06-12)."</p>
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2.3 Range	
2.3.1 Surface area Range	

2.3.2 Method used Surface area of Range	Estimate based on partial data with some extrapolation and/or modelling	
2.3.3 Short-term trend Period	2001-2012 A number of distribution surveys have been undertaken in Northern Ireland within the reporting period, refer to 2.2	
2.3.4 Short term trend Trend direction	decrease Margaritifera margaritifera was formerly widespread throughout western and northern parts of the UK. In Northern Ireland the species formerly occurred widely in several catchments, but is now restricted to only a few sites, none of whose populations are recruiting. Although there is no quantitative estimate for range trend since the Habitat Directive came into force, based on population studies and expert opinion, range has confidently been reported as decreasing in Northern Ireland.	
2.3.5 Short-term trend Magnitude	a) Minimum	
	b) Maximum	
2.3.6 Long-term trend Period	1988-2012	
2.3.7 Long-term trend Trend direction	decrease	
2.3.8 Long-term trend Magnitude Optional	a) Minimum	
	b) Maximum	
2.3.9 Favourable reference range	a) Value in km²	
	b) Operator for FRR	
	c) FRR is unknown (indicated by "true")	True

	d) Method used to set FRR	
2.3.10 Reason for change Is the difference between the reported value in 2.3.1 and the previous reporting round mainly due to...	a) Genuine change?	True
	b) Improved knowledge/ more accurate data?	True
	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	
	Based on Quercus project QU05-13 2006 report there are seven Northern Ireland rivers potentially supporting populations viable but none of which are deemed to be sustainable in the long term i.e. populations where mussels are still capable of reproducing but where there is little or no recruitment of juveniles due to a unsuitable habitat conditions.	
	b) Minimum	
	Quercus project QU05-13 report recorded live mussels in six Northern Ireland river.	
	c) Maximum	
Quercus project QU05-13 report recorded only dead mussels in one Northern Ireland river.		
2.4.2 Population size estimation (using population unit other than individuals) Optional (<i>if 2.4.1 filled in</i>)	a) Unit	number of localities
	Based on Quercus project QU05-13 2006 report there are seven Northern Ireland rivers potentially supporting populations viable but none of which are deemed to be sustainable in the long term i.e. populations where mussels are still capable of reproducing but where there is little or no recruitment of juveniles due to a unsuitable habitat conditions.	
	b) Minimum	2
	Quercus project QU05-13 report recorded live mussels in six Northern Ireland river.	
	c) Maximum	2
Quercus project QU05-13 report recorded live mussels in six Northern Ireland river.		

2.4.3 Additional information on population estimates / conversion Optional	a) Definition of "locality"	Number of rivers supporting a valid population. Valid is defined as one here there is evidence of recent recruitment.
	b) Method to convert data	
	c) Problems encountered to provide population size estimation	Accuracy of assessing a scattered population in a difficult environment in regards to visual clarity and accessibility.
2.4.4 Year or period	2006-2012 Data collected from 2006 onwards has been used to make an informal estimate of the 2012 population	
2.4.5 Method used Population size	Estimate based on partial data with some extrapolation and/or modelling Extrapolation from surveys of part of the population, sampling	
2.4.6 Short-term trend Period	2001-2012 Research into Freshwater Pearl Mussel distribution in Northern Ireland was initiated in 1996, as documented in 2.2 Surveys of all rivers with historical populations has been undertaken in Northern Ireland. Local extinction have been recorded since 1996 while all rivers have non-recruiting populations, as documented in 2.2	
2.4.7 Short-term trend Trend direction	decrease	
2.4.8 Short-term trend Magnitude	a) Minimum	
	b) Maximum	
	c) Confidence interval	
2.4.9 Short-term trend Method used	Estimate based on partial data with some extrapolation and/or modelling Extrapolation from surveys of part of the population, sampling	
2.4.10 Long-term trend – Period		
2.4.11 Long-term trend Trend direction		

2.4.12 Long-term trend Magnitude Optional	a) Minimum	
	b) Maximum	
	c) Confidence interval	
2.4.13 Long term trend Method used		
2.4.14 Favourable reference population	a) Number of individuals/agreed exceptions/other units	
	b) Operator	
	c) FRP is unknown indicated by "true"	True
	d) Method used to set FRP	
2.4.15 Reason for change Is the difference between the value reported at 2.4.1 or 2.4.2 and the previous reporting round mainly due to:	a) Genuine change?	False
	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	0
	The total area of rivers with the potential to support this species is unknown. It is unknown whether the amount of habitat in the UK is sufficient to support a viable population of the species.
2.5.2 Year or period	2008-2012
2.5.3 Method used Habitat for the species	Estimate based on partial data with some extrapolation and/or modelling
	WFD results 2008-2011 summary. An average of 0.9% of river water bodies achieved High surface water status in the period of 2008 – 2011. During the same time period, an average of 22% of river water bodies were assigned Good status. Just under half of river water bodies were classed as Moderate with an average of 48.4% from 2008 – 2011 falling into this class. Approximately a fourth of river water bodies were considered to be of Poor status as 24.4% of river water bodies were classified in this class. A relatively lower proportion of river water bodies were classified as Bad status with a total of 4% of river water bodies falling into this class from 2008 – 2011.
2.5.4 Quality of the habitat	a) Habitat quality Bad
	An average of 0.9% of Northern Ireland river water bodies achieved High surface water status in the period of 2008 – 2011. High status is assessed as being the minimum requirement for achieving the long term survival of this species.
	b) Assessment method Based on Water Framework Directive water quality assessment of NI rivers between 2008 - 2011
2.5.5 Short-term trend Period	2000-2012
	The WFD monitoring period started in 2008, prior to this water quality was assessed through the QUA methodology .
2.5.6 Short-term trend Trend direction	unknown
2.5.7 Long-term trend Period	
2.5.8 Long-term trend Trend direction	
2.5.9 Area of suitable habitat for the species	a) Value in km²
	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	a) Genuine change? False

due to	b) Improved knowledge/more accurate data?	False
	c) Use of different method (e.g. "Range tool")?	False

2.6 Main pressures		
a) Pressure	b) Ranking	c) Pollution qualifier
	H = high importance M = medium importance L = low importance	
A07: use of biocides, hormones and chemicals	H	OT
A08: Fertilisation	H	NP
A09: Irrigation	H	
B02: Forest and Plantation management & use	H	
B05: use of fertilizers (forestry)	H	NP
C03: Renewable abiotic energy use	H	
H01: Pollution to surface waters (limnic & terrestrial, marine & brackish)	H	X
M01: Changes in abiotic conditions	H	
A01: Cultivation	M	
B04: use of biocides, hormones and chemicals (forestry)	M	T
C01: Mining and quarrying	M	

2.6.1 Method used – Pressures	based exclusively or to a larger extent on real data from sites/occurrences or other data sources
	Documented evidence of the detrimental effect of the pressures and threats listed can be found in 2.2 and more recent domestic and international literature. Most of the above relate to pollution through elevated eutrophication and sedimentation.

2.7 Threats		
a) Threat	b) Ranking	c) Pollution qualifier
	H = high importance M = medium importance	

	L = low importance	
A01: Cultivation	H	NPX
A09: Irrigation	H	
B02: Forest and Plantation management & use	H	NPX
C03: Renewable abiotic energy use	H	
C01: Mining and quarrying	M	
D01: Roads, paths and railroads	M	
I01: invasive non-native species	M	
J02: human induced changes in hydraulic conditions	M	
F03: Hunting and collection of wild animals (terrestrial)	L	

2.7.1 Method used – Threats	expert opinion
	Documented evidence of the detrimental effect of the pressures and threats listed can be found in 2.2 and more recent domestic and international literature.

2.8 Complementary information	
2.8.1 Justification of % thresholds for trends	
2.8.2 Other relevant information	
2.8.3 Trans-boundary assessment	

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

3 Natura 2000 coverage & conservation measures - Annex II species

Third Report by the United Kingdom under Article 17 on the implementation of the Directive from January 2007 to December 2012

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(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	<table border="1"> <tr> <th>a) Unit</th> <th>number of individuals</th> </tr> <tr> <td colspan="2">As recorded in the Northern Ireland SAC FWPM Condition Assessments of 2006 and 2012 as documented in 2.2</td> </tr> <tr> <th>b) Minimum</th> <td>0</td> </tr> <tr> <td colspan="2">The Northern Ireland SAC FWPM Condition Assessments of 2006 and 2012 as documented in 2.2, only provided approximate estimates of population sizes.</td> </tr> <tr> <th>c) Maximum</th> <td>0</td> </tr> <tr> <td colspan="2">The Northern Ireland SAC FWPM Condition Assessments of 2006 and 2012 as documented in 2.2, only provided approximate estimates of population sizes.</td> </tr> </table>	a) Unit	number of individuals	As recorded in the Northern Ireland SAC FWPM Condition Assessments of 2006 and 2012 as documented in 2.2		b) Minimum	0	The Northern Ireland SAC FWPM Condition Assessments of 2006 and 2012 as documented in 2.2, only provided approximate estimates of population sizes.		c) Maximum	0	The Northern Ireland SAC FWPM Condition Assessments of 2006 and 2012 as documented in 2.2, only provided approximate estimates of population sizes.	
	a) Unit	number of individuals											
	As recorded in the Northern Ireland SAC FWPM Condition Assessments of 2006 and 2012 as documented in 2.2												
	b) Minimum	0											
	The Northern Ireland SAC FWPM Condition Assessments of 2006 and 2012 as documented in 2.2, only provided approximate estimates of population sizes.												
c) Maximum	0												
The Northern Ireland SAC FWPM Condition Assessments of 2006 and 2012 as documented in 2.2, only provided approximate estimates of population sizes.													
3.1.2 Method used	<p>Estimate based on partial data with some extrapolation and/or modelling</p> <p>As recorded in the Northern Ireland SAC FWPM Condition Assessments of 2006 and 2012 as documented in 2.2</p>												
3.1.3 Trend of population size within the network (short-term trend)	<p>decrease</p>												
	<p>As recorded in the Northern Ireland SAC FWPM Condition Assessments of 2006 and 2012 as documented in 2.2</p>												

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 M = medium importance L = low 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		a) Inside	b) Outside	c) Both inside & outside	a) Maintain	b) Enhance	c) Long term	d) No effect	e) Unknown
:														

3.2: Adapt forest management	Y	Y		Y		H			Y		Y	Y			Y
4.1: Restoring/improving water quality	Y	Y		Y		H			Y		Y	Y		Y	
4.2: Restoring/improving the hydrological regime	Y	Y		Y		H			Y		Y	Y		Y	
4.3: Managing water abstraction	Y	Y		Y		H			Y		Y	Y		Y	
6.1: Establish protected areas/sites	Y	Y			Y	H			Y	Y		Y		Y	
6.3: Legal protection of habitats and species	Y				Y	H	Y			Y		Y			
7.4: Specific single species or species group management measures		Y	Y	Y		H			Y		Y	Y			

Abhearing to the new UK Forestry Standards - forestry and water (FC 2011), adopting proposals within the catchment management plans currently being developed by Interreg Project No. 003705.