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

Conservation status assessment for the species:

S1029 - Freshwater pearl mussel (*Margaritifera margaritifera*)

UNITED KINGDOM
IMPORTANT NOTE - PLEASE READ

- The information in this document represents 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.

- It is based on supporting information provided by the geographically-relevant Statutory Nature Conservation Bodies, which is documented separately.

- The 2019 Article 17 UK Approach document provides details on how this supporting information contributed to the UK Report and the fields that were completed for each parameter.

- The reporting fields and options used are aligned to those set out in the European Commission guidance.

- Maps showing the distribution and range of the species are included (where available).

- Explanatory notes (where provided) are included at the end. These provide additional audit trail information to that included within the UK assessments. Further underpinning explanatory notes are available in the related country-level reports.

- 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; and/or (iii) the field was not relevant to this species (section 12 Natura 2000 coverage for Annex II species).

- The UK-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

<table>
<thead>
<tr>
<th>1. General information</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1 Member State</td>
<td>UK</td>
</tr>
<tr>
<td>1.2 Species code</td>
<td>1029</td>
</tr>
<tr>
<td>1.3 Species scientific name</td>
<td><em>Margaritifera margaritifera</em></td>
</tr>
<tr>
<td>1.4 Alternative species scientific name</td>
<td></td>
</tr>
<tr>
<td>1.5 Common name (in national language)</td>
<td>Freshwater pearl mussel</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2. Maps</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>2.1 Sensitive species</td>
<td>No</td>
</tr>
<tr>
<td>2.2 Year or period</td>
<td>1999-2018</td>
</tr>
<tr>
<td>2.3 Distribution map</td>
<td>Yes</td>
</tr>
<tr>
<td>2.4 Distribution map Method used</td>
<td>Based mainly on extrapolation from a limited amount of data</td>
</tr>
<tr>
<td>2.5 Additional maps</td>
<td>No</td>
</tr>
</tbody>
</table>

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

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

<table>
<thead>
<tr>
<th>a) Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>b) Statistics/quantity taken</td>
</tr>
<tr>
<td>Provide statistics/quantity per hunting season or per year (where season is not used) over the reporting period</td>
</tr>
<tr>
<td>Season/year 1</td>
</tr>
<tr>
<td>Min. (raw, ie. not rounded)</td>
</tr>
<tr>
<td>Max. (raw, ie. not rounded)</td>
</tr>
<tr>
<td>Unknown</td>
</tr>
</tbody>
</table>

3.4 Hunting bag or quantity taken in the wild Method used

3.5 Additional information

4. Biogeographical and marine regions

4.1 Biogeographical or marine region where the species occurs

Atlantic (ATL)

England


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


http://publications.naturalengland.org.uk/publication/6203335036108800?category=6329101765836800


http://publications.naturalengland.org.uk/publication/6050544158244864?category=6329101765836800


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

September 2015. South Cumbria Rivers Trust.
Scotland
Pearls in Peril 2017. Final project report.
Scottish Natural Heritage 2018. Unpublished Site Condition Monitoring survey, Rannoch Moor SAC.
Irene Tierney, IMTECO Ltd. Freshwater Pearl Mussel Survey, October 2015.
COSGROVE, P. 2017. FRESHWATER PEARL MUSSEL SURVEY, 2017. CNPA COMMISSIONED REPORT.
Report on the main results of the surveillance under Article 11 for Annex II, IV and V species (Annex B)

COSGROVE, P. & SHIELDS, D. 2016. FRESHWATER PEARL MUSSEL SURVEY. JBA COMMISSIONED REPORT.

HEL Ltd 2016. Freshwater pearl mussel survey & species protection plan.
Galloway Fisheries Trust. 2016. Survey to determine presence of freshwater pearl mussels in Galloway. Report to SNH.
COSGROVE, P., FARQUHAR, J. AND COSGROVE, C. 2013 RVER XX FRESHWATER PEARL MUSSEL SURVEY. ALBA ECOLOGY.
Baum, 2013 Assessment of the Ardnamurchan Burns Special Area of Conservation. Report to SNH.
Wales
Report on the main results of the surveillance under Article 11 for Annex II, IV and V species (Annex B)


Killeen IJ. 2015. A redox potential survey of the Afon Eden SAC and associated tributaries, North Wales. Report to NRW.


Marple H. 2017 An assessment of water quality in Brynteg Forest settlement


N.Ireland


5. Range

<table>
<thead>
<tr>
<th>5.1 Surface area (km²)</th>
<th>46571.2</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.2 Short-term trend Period</td>
<td>2007-2018</td>
</tr>
<tr>
<td>5.3 Short-term trend Direction</td>
<td>Decreasing (-)</td>
</tr>
<tr>
<td>5.4 Short-term trend Magnitude</td>
<td>a) Minimum</td>
</tr>
<tr>
<td>5.5 Short-term trend Method used</td>
<td>Complete survey or a statistically robust estimate</td>
</tr>
<tr>
<td>5.6 Long-term trend Period</td>
<td></td>
</tr>
<tr>
<td>5.7 Long-term trend Direction</td>
<td></td>
</tr>
<tr>
<td>5.8 Long-term trend Magnitude</td>
<td>a) Minimum</td>
</tr>
<tr>
<td>5.9 Long-term trend Method used</td>
<td></td>
</tr>
<tr>
<td>5.10 Favourable reference range</td>
<td>56389</td>
</tr>
<tr>
<td>a) Area (km²)</td>
<td></td>
</tr>
<tr>
<td>b) Operator</td>
<td></td>
</tr>
<tr>
<td>c) Unknown</td>
<td></td>
</tr>
<tr>
<td>d) Method</td>
<td></td>
</tr>
</tbody>
</table>

The FRR is the same as in 2013. The value is considered to be large enough to support a viable population and no lower than the range estimate when the Habitats Directive came into force in the UK. For further information see the 2019 Article 17 UK Approach document.

5.11 Change and reason for change in surface area of range

Genuine change
Improved knowledge/more accurate data
Use of different method

The change is mainly due to:  Genuine change

5.12 Additional information

The short term trend direction is considered most likely to be 'decreasing <=1% (one percent or less) per year on average', based on the reported declines in Scotland and Wales. Several known populations have been lost in the reporting period and therefore the number of sites, and the species range in northeast Scotland and southern Wales has particularly decreased.

6. Population

6.1 Year or period

1999-2018

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

6.3 Type of estimate

Minimum

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

1999-2018

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

Based mainly on extrapolation from a limited amount of data

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

Improved knowledge/more accurate data
Use of different method

The change is mainly due to:  Genuine change

6.15 Favourable reference population (using the unit in 6.2 or 6.4)

a) Population size
b) Operator
   - More than (>)
c) Unknown
d) Method

The FRP has changed since 2013. An FRP operator has been used because it has not been possible to
calculate the exact FRP value. This is partly because the population unit has changed from 'localities' in the 2013 reporting to 'number of 1x1 km grids' in the 2019 reporting. The FRP is considered to be no more than 25% above the current population. For further information see the 2019 Article 17 UK Approach document.

6.16 Change and reason for change in population size

Genuine change
Improved knowledge/more accurate data
Use of different method
The change is mainly due to: Improved knowledge/more accurate data

6.17 Additional information

The short term trend direction is considered most likely to be decreasing >1% (more than one percent) per year on average, based on the reported declines in Scotland, England, Wales and Northern Ireland. At the UK-level it is considered most likely that the FRP is no more than 25% above the current population, even though there are severe declines reported in Wales. In terms of age-structure, mortality and reproduction, there are severe juvenile recruitment problems reported in Scotland, England, Wales and Northern Ireland, resulting in ageing populations. Therefore age-structure and reproduction is strongly deviating from normal.

7. Habitat for the species

7.1 Sufficiency of area and quality of occupied habitat

a) Are area and quality of occupied habitat sufficient (for long-term survival)? No

b) Is there a sufficiently large area of unoccupied habitat of suitable quality (for long-term survival)? No

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

1999-2018

7.4 Short-term trend Direction

Uncertain (u)

Based mainly on expert opinion with very limited data

7.5 Short-term trend Method used

7.6 Long-term trend Period

7.7 Long-term trend Direction

7.8 Long-term trend Method used

7.9 Additional information

Poor river habitat quality (e.g. water quality, riparian and instream habitat including the interstitial substrate quality) and host fish populations) remains the serious limiting factor in juvenile recruitment. The sufficiency of the area of occupied and unoccupied habitat is less of a problem. There have been some habitat improvements within the Natura 2000 network, with some populations now recovering, but not at a sufficiently wide scale to provide an overall improving short-term trend. There are long-term declines elsewhere.
Report on the main results of the surveillance under Article 11 for Annex II, IV and V species (Annex B)

8. Main pressures and threats

8.1 Characterisation of pressures/threats

<table>
<thead>
<tr>
<th>Pressure</th>
<th>Ranking</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intensive grazing or overgrazing by livestock (A09)</td>
<td>M</td>
</tr>
<tr>
<td>Agricultural activities generating diffuse pollution to surface or ground waters (A26)</td>
<td>H</td>
</tr>
<tr>
<td>Forestry activities generating pollution to surface or ground waters (B23)</td>
<td>H</td>
</tr>
<tr>
<td>Illegal harvesting, collecting and taking (G11)</td>
<td>H</td>
</tr>
<tr>
<td>Other impacts from marine aquaculture, including infrastructure (G19)</td>
<td>M</td>
</tr>
<tr>
<td>Modification of hydrological flow (K04)</td>
<td>M</td>
</tr>
<tr>
<td>Physical alteration of water bodies (K05)</td>
<td>H</td>
</tr>
<tr>
<td>Increases or changes in precipitation due to climate change (N03)</td>
<td>M</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Threat</th>
<th>Ranking</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intensive grazing or overgrazing by livestock (A09)</td>
<td>M</td>
</tr>
<tr>
<td>Agricultural activities generating diffuse pollution to surface or ground waters (A26)</td>
<td>H</td>
</tr>
<tr>
<td>Forestry activities generating pollution to surface or ground waters (B23)</td>
<td>H</td>
</tr>
<tr>
<td>Illegal harvesting, collecting and taking (G11)</td>
<td>H</td>
</tr>
<tr>
<td>Introduction and spread of species (including alien species and GMOs) in freshwater aquaculture (G24)</td>
<td>M</td>
</tr>
<tr>
<td>Modification of hydrological flow (K04)</td>
<td>M</td>
</tr>
<tr>
<td>Physical alteration of water bodies (K05)</td>
<td>M</td>
</tr>
<tr>
<td>Temperature changes (e.g. rise of temperature &amp; extremes) due to climate change (N01)</td>
<td>M</td>
</tr>
<tr>
<td>Increases or changes in precipitation due to climate change (N03)</td>
<td>M</td>
</tr>
</tbody>
</table>

8.2 Sources of information

8.3 Additional information

9. Conservation measures

9.1 Status of measures

<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) Are measures needed?</td>
<td>Yes</td>
</tr>
<tr>
<td>b) Indicate the status of measures</td>
<td>Measures identified and taken</td>
</tr>
</tbody>
</table>

9.2 Main purpose of the measures taken

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

9.5 List of main conservation measures

- Manage the use of natural fertilisers and chemicals in agricultural (plant and animal) production (CA09)
- Reduce/eliminate point pollution to surface or ground waters from agricultural activities (CA10)
- Reduce diffuse pollution to surface or ground waters from agricultural activities (CA11)
- Adapt/manage reforestation and forest regeneration (CB04)
- Reduce diffuse pollution to surface or ground waters from forestry activities (CB10)
- Control/eradication of illegal killing, fishing and harvesting (CG04)
- Other measures to reduce impacts from marine aquaculture infrastructures and operation (CG09)
- Other measures related to natural processes (CL04)
- Implement climate change adaptation measures (CN02)
- Reinforce populations of species from the directives (CS01)

9.6 Additional information

10. Future prospects

10.1 Future prospects of parameters

a) Range: Bad
b) Population: Bad
c) Habitat of the species: Bad

10.2 Additional information

Future trend of Range is Negative - decreasing <=1% (one percent or less) per year on average; Future trend of Population is Negative - decreasing <=1% (one percent or less) per year on average; and Future trend of Habitat for the species is Negative - slight/moderate deterioration. For further information on how future trends inform the Future Prospects conclusion see the 2019 Article 17 UK Approach document.

11. Conclusions

11.1. Range: Unfavourable - Bad (U2)

11.2. Population: Unfavourable - Bad (U2)

11.3. Habitat for the species: Unfavourable - Bad (U2)

11.4. Future prospects: Unfavourable - Bad (U2)

11.5 Overall assessment of Conservation Status: Deteriorating (-)

11.6 Overall trend in Conservation Status: No change

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

Conclusion on Range reached because: (i) the short-term trend direction in
Range surface area is decreasing by more than 1% per year; and (ii) the current Range surface area is more than 10% below the Favourable Reference Range. Conclusion on Population reached because: (i) the short-term trend direction in Population size is decreasing by more than 1% per year; (ii) the current Population size is not more than 25% below the Favourable Reference Population; and (iii) age structure, mortality and reproduction are strongly deviating from normal. Conclusion on Habitat for the species reached because: (i) the area of occupied and unoccupied habitat is sufficiently large and (ii) the habitat quality is not adequate for the long-term survival of the species; and (iii) the short-term trend in area of habitat is uncertain. Conclusion on Future prospects reached because: (i) the Future prospects for Range are bad; (ii) the Future prospects for Population are bad; and (iii) the Future prospects for Habitat for the species are bad. Overall assessment of Conservation Status is Unfavourable-bad because all of the conclusions are Unfavourable-bad. Overall trend in Conservation Status is based on the combination of the short-term trends for Range - decreasing, Population - decreasing, and Habitat for the species - uncertain. The Overall assessment of Conservation Status has not changed between 2013 and 2019. The Overall assessment is Unfavourable-bad. The Overall trend in Conservation Status has not changed between 2013 and 2019. The overall trend is declining.

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)

12.2 Type of estimate

12.3 Population size inside the network Method used

12.4 Short-term trend of population size within the network Direction

12.5 Short-term trend of population size within the network Method used

12.6 Additional information

13. Complementary information

13.1 Justification of % thresholds for trends

13.2 Trans-boundary assessment

England
The only trans-boundary population is the River Wye which flows from Wales into England. Historically, the Wye has supported a large mussel population in
the 1970s. The river was last surveyed between 1992-1994. Eighty sites were investigated but only six contained mussels and a total of only 21 individuals were found (four in England, 17 in Wales). Without any recent records, it is likely that the population has been lost in the England sections of the Wye.

**13.3 Other relevant Information**

**England**
Translocation protocol produced for the movement of mussels for conservation purposes (Killeen, I. & Moorkens, E., 2016). Freshwater pearl mussels are taken for conservation purposes and captive breeding.
Figure 1: UK distribution map for S1029 - Freshwater pearl mussel (*Margaritifera margaritifera*). 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.
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.