# 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:

**S1831 - Floating water-plantain (*Luronium natans*)**

WALES

## 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 (Wales information only)** |
| 1.2 Species code | **1831** |
| 1.3 Species scientific name | **Luronium natans** |
| 1.4 Alternative species scientific name | |
| 1.5 Common name (in national language) | Floating water-plantain |

## 2. Maps

| | |
|---|---|
| 2.1 Sensitive species | No |
| 2.2 Year or period | 2007-2018 |
| 2.3 Distribution map | Yes |
| 2.4 Distribution map Method used | Complete survey or a statistically robust estimate |
| 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

Baxter E, Stewart N. 2015. Macrophyte Survey of Welsh Lakes for Habitats Directive and Water Framework Directive Monitoring, 2014. NRW Evidence Report No: 52, 78pp. Bangor: Natural Resources Wales.
Botanical Society of the British Isles. 2018. BSBI Distribution Database. Accessed June 2018.
Burgess A, Goldsmith B, Hatton-Ellis T. 2006. Site Condition Assessments of Welsh SAC and SSSI Standing Water Features. CCW Contract Science Report 705. Bangor: Countryside Council for Wales.
Burgess A, Goldsmith B, Hatton-Ellis T, Hughes M, Shilland E. 2009. CCW Standing Waters SSSI Monitoring 2007-08. CCW Contract Science Report 855. Bangor, Countryside Council for Wales.
Burgess A, Goldsmith B, Hatton-Ellis TW. 2013. Site Condition Assessments of Welsh SAC and SSSI Standing Water Features, 2007-2012. CCW Contract Science Report No. 983. Bangor: Countryside Council for Wales.
Dines T. (2008) A Vascular Plant Red Data List for Wales. 80pp. Salisbury, Plantlife Wales.
Goldsmith B, Bennion H, Hughes M, Jones V, Rose C, Simpson G. 2006. Integrating Habitats Directive and Water Framework Directive Monitoring: Baseline Survey of Natura 2000 Standing Water Habitats in Wales. CCW Contract Science Report 704. Bangor, Countryside Council for Wales.
Goldsmith B, Salgado J, Shilland J, Bennion H, Yang H, Turner SD. 2014a. Biodiversity Action Plan Lakes Survey 2012-14. NRW Evidence Report No: 27, 171pp. Bangor: Natural Resources Wales.
Goldsmith B, Salgado J, Bennion H, Goodrich S. 2014b. Lake Ecological Surveys (Wales) 2013 NRW Evidence Report No: 28.19 pp, Bangor: Natural Resources

Wales.
Goldsmith B, Shilland EM, Yang H, Shilland J, Salgado J, Turner SD. 2014c. Condition Assessment of Eight Standing Waters in Sites of Special Scientific Interest (SSSIs). NRW Evidence Report No: 29, 147pp, Bangor: Natural Resources Wales.
Goldsmith B, Shilland E, Shilland J, Turner S. 2014d. Floating water-plantain Luronium natans (L.) Raf.: current distribution and status in Llyn Padarn and Llyn Cwellyn, Wales. NRW Evidence Report No. 73. Natural Resources Wales, Bangor.
Goldsmith B, Turner S, Shilland E, Goodrich S. 2016. Ecological Surveys of Welsh Lakes 2015. NRW Evidence Report No 145. 25 pp, Bangor: Natural Resources Wales.
Hatton-Ellis TW. 2011. Condition Assessment: Afon Gwyrfai a Llyn Cwellyn SAC. Feature: 3130 Oligotrophic to mesotrophic standing waters with vegetation of the Littorelletea uniflorae and/or of the Isoeto-Nanojuncetea. CCW Internal Report, stored on electronic document management system.
Hatton-Ellis TW. 2014. Lake BAP Priority Areas in Wales - a strategic overview. Cardiff: Wales Biodiversity Partnership. Available online at http://www.biodiversitywales.org.uk/File/340/en-GB
Hatton-Ellis TW. 2018. Supporting Evidence Pack for Annex B & D feature report. Oligotrophic to mesotrophic standing waters with vegetation of the Littorelletea uniflorae and/or of the Isoeto-Nanojuncetea. Bangor, Natural Resources Wales.
Hudson J, Morgan G. 2013. Ramsey Island Luronium natans SAC feature monitoring 2013. Unpublished NRW file note.
Hughes M, Hornby DD, Bennion H, Kernan M, Hilton J, Phillips G, Thomas R. 2004. The development of a GIS-based inventory of standing waters in Great Britain together with a risk-based prioritisation protocol. Water, Air and Soil Pollution: Focus 4:73-84.
Interagency Freshwater Group. 2015. Common Standards Monitoring Guidance for Freshwater Lakes. JNCC, Peterborough. Available online at http://jncc.defra.gov.uk/pdf/0315_CSM_Freshwater_lakes.pdf
Joint Nature Conservation Committee (JNCC) 2005. Common Standards Monitoring Guidance for Standing Waters. Version March 2005. JNCC, Peterborough. 80 pp. ISSN 1743-8160.
Joint Nature Conservation Committee. 2007. Second Report by the UK under Article 17 on the implementation of the Habitats Directive from January 2001 to December 2006. Peterborough: JNCC. Available from: www.jncc.gov.uk/article17
Kay QOF, John RV, Jones RA. 1999. Biology, genetic variation and conservation of Luronium natans (L.) Raf. in Britain and Ireland. Watsonia, 22, 301-315.
Kernan M, Battarbee RW, Curtis CJ, Monteith DT, Shilland EM. 2010. Recovery of lakes and streams in the UK from the effects of acid rain. UK Acid Waters Monitoring Network 20 Year Interpretative Report. Report to Defra. ISSN: 1366-7300. http://awmn.defra.gov.uk/resources/interpreports/20yearInterpRpt.pdf
Lansdown RV, Wade PM. 2003. Ecology of the Floating Water-plantain, Luronium natans. Conserving Natura 2000 Rivers Ecology Series No. 9. English Nature, Peterborough.
Lockton AJ. 2018. Species account: Luronium natans. Botanical Society of the British Isles, www.bsbi.org.uk.
Natural Resources Wales. 2013. Supporting documentation for the Third Report by the United Kingdom under Article 17. S1831 - Floating water-plantain (Luronium natans). Available online at http://jncc.defra.gov.uk/pdf/Article17Consult_20131010/S1831_WALES.pdf
Stewart NF. 2014. Montgomery Canal Common Standards Monitoring 2014. Report to the Canal & Rivers Trust.

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

Wilkinson K. in prep. North West Pembrokeshire Commons Luronium natans. SAC Monitoring Audit Report: Monitoring Round 2013 to 2018. NRW unpublished report.
Willby NJ, Pitt J-A, Phillips G. 2009. The ecological classification of UK lakes using aquatic macrophytes. SC010080/SR. Bristol: Environment Agency.
Willby NJ, Eaton JW. 1993. The distribution, ecology and conservation of Luronium natans (L.) Raf. in Britain. Journal of Aquatic Plant Management, 31: 70-76.

## 5. Range

| | | |
|---|---|---|
| 5.1 Surface area (km²) | | |
| 5.2 Short-term trend Period | | |
| 5.3 Short-term trend Direction | Decreasing (-) | |
| 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)<br>b) Operator<br>c) Unknown<br>d) Method | |
| 5.11 Change and reason for change in surface area of range | Genuine change<br>Improved knowledge/more accurate data<br>The change is mainly due to: | Genuine change |
| 5.12 Additional information | | |

## 6. Population

| | | |
|---|---|---|
| 6.1 Year or period | 2007-2018 | |
| 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 | 123 |
| 6.3 Type of estimate | Best estimate | |
| 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 | | |

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| | | |
|---|---|---|
| 6.6 Population size Method used | Complete survey or a statistically robust estimate | |
| 6.7 Short-term trend Period | 2007-2018 | |
| 6.8 Short-term trend Direction | Stable (0) | |
| 6.9 Short-term trend Magnitude | a) Minimum<br>b) Maximum<br>c) Confidence interval | |
| 6.10 Short-term trend Method used | Complete survey or a statistically robust estimate | |
| 6.11 Long-term trend Period | 1992-2018 | |
| 6.12 Long-term trend Direction | Decreasing (-) | |
| 6.13 Long-term trend Magnitude | a) Minimum<br>b) Maximum<br>c) Confidence interval | 0.11<br>0.13 |
| 6.14 Long-term trend Method used | Based mainly on extrapolation from a limited amount of data | |
| 6.15 Favourable reference population (using the unit in 6.2 or 6.4) | a) Population size<br>b) Operator<br>c) Unknown<br>d) Method | |
| 6.16 Change and reason for change in population size | Genuine change<br>Improved knowledge/more accurate data<br>Use of different method<br>The change is mainly due to: | <br><br><br>Improved knowledge/more accurate data |
| 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)? | No |
| | b) Is there a sufficiently large area of occupied AND unoccupied habitat of suitable quality (to maintain the species at FCS)? | Unknown |
| 7.2 Sufficiency of area and quality of occupied habitat Method used | Complete survey or a statistically robust estimate | |
| 7.3 Short-term trend Period | 2007-2018 | |
| 7.4 Short-term trend Direction | Stable (0) | |
| 7.5 Short-term trend Method used | Complete survey or a statistically robust estimate | |
| 7.6 Long-term trend Period | | |
| 7.7 Long-term trend Direction | | |
| 7.8 Long-term trend Method used | | |
| 7.9 Additional information | | |

# 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

| Pressure | Ranking |
|---|---|
| Agricultural activities generating point source pollution to surface or ground waters (A25) | M |
| Agricultural activities generating diffuse pollution to surface or ground waters (A26) | M |
| Invasive alien species of Union concern (I01) | M |
| Other invasive alien species (other then species of Union concern) (I02) | M |
| Problematic native species (I04) | M |
| Development and operation of dams (K03) | M |
| Modification of hydrological flow (K04) | M |
| Natural succession resulting in species composition change (other than by direct changes of agricultural or forestry practices) (L02) | M |

| Threat | Ranking |
|---|---|
| Agricultural activities generating diffuse pollution to surface or ground waters (A26) | M |
| Land, water and air transport activities generating pollution to surface or ground waters (E05) | M |
| Management of fishing stocks and game (G08) | M |
| Invasive alien species of Union concern (I01) | H |
| Other invasive alien species (other then species of Union concern) (I02) | H |
| Problematic native species (I04) | M |
| Development and operation of dams (K03) | M |
| Modification of hydrological flow (K04) | M |
| Natural succession resulting in species composition change (other than by direct changes of agricultural or forestry practices) (L02) | M |

### 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 |
| 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) |

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9.5 List of main conservation measures

| |
|---|
| Reduce diffuse pollution to surface or ground waters from agricultural activities (CA11) |
| Reduce/eliminate point pollution to surface or ground waters from agricultural activities (CA10) |
| Reduce impact of transport operation and infrastructure (CE01) |
| 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) |
| Management, control or eradication of other invasive alien species (CI03) |
| Management of problematic native species (CI05) |
| Reduce impact of multi-purpose hydrological changes (CJ02) |
| Management of habitats (others than agriculture and forest) to slow, stop or reverse natural processes (CL01) |

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:

11.8 Additional information

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

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

| | | |
|---|---|---|
| 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 | |
| | c) Maximum | |
| | d) Best single value | 97 |
| 12.2 Type of estimate | | Best estimate |
| 12.3 Population size inside the network Method used | | Complete survey or a statistically robust estimate |
| 12.4 Short-term trend of population size within the network Direction | | Stable (0) |
| 12.5 Short-term trend of population size within the network Method used | | Complete survey or a statistically robust estimate |
| 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

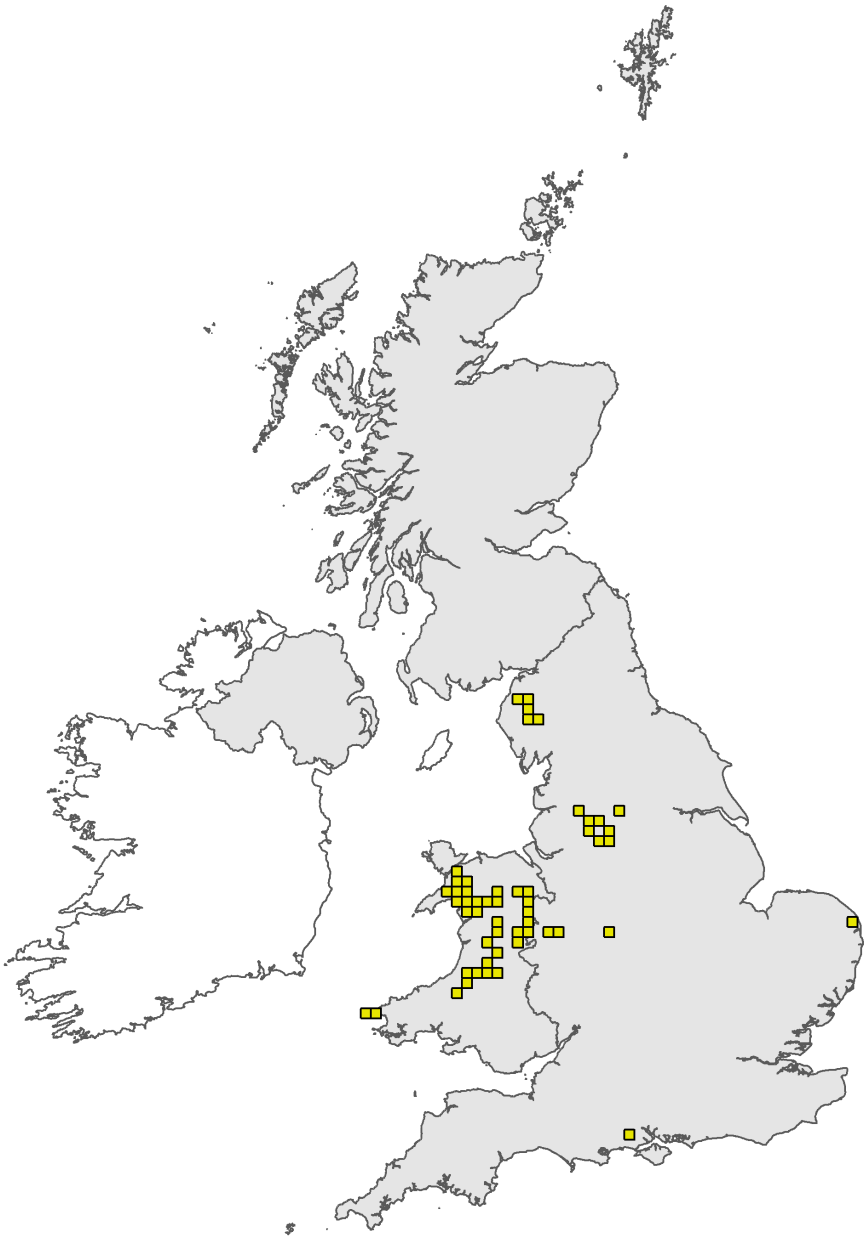

Figure 1: UK distribution map for S1831 - Floating water-plantain (*Luronium natans*). Coastline boundary derived from the Oil and Gas Authority's OGA and Lloyd's Register SNS Regional Geological Maps (Open Source). Open Government Licence v3 (OGL). Contains data © 2017 Oil and Gas Authority.

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

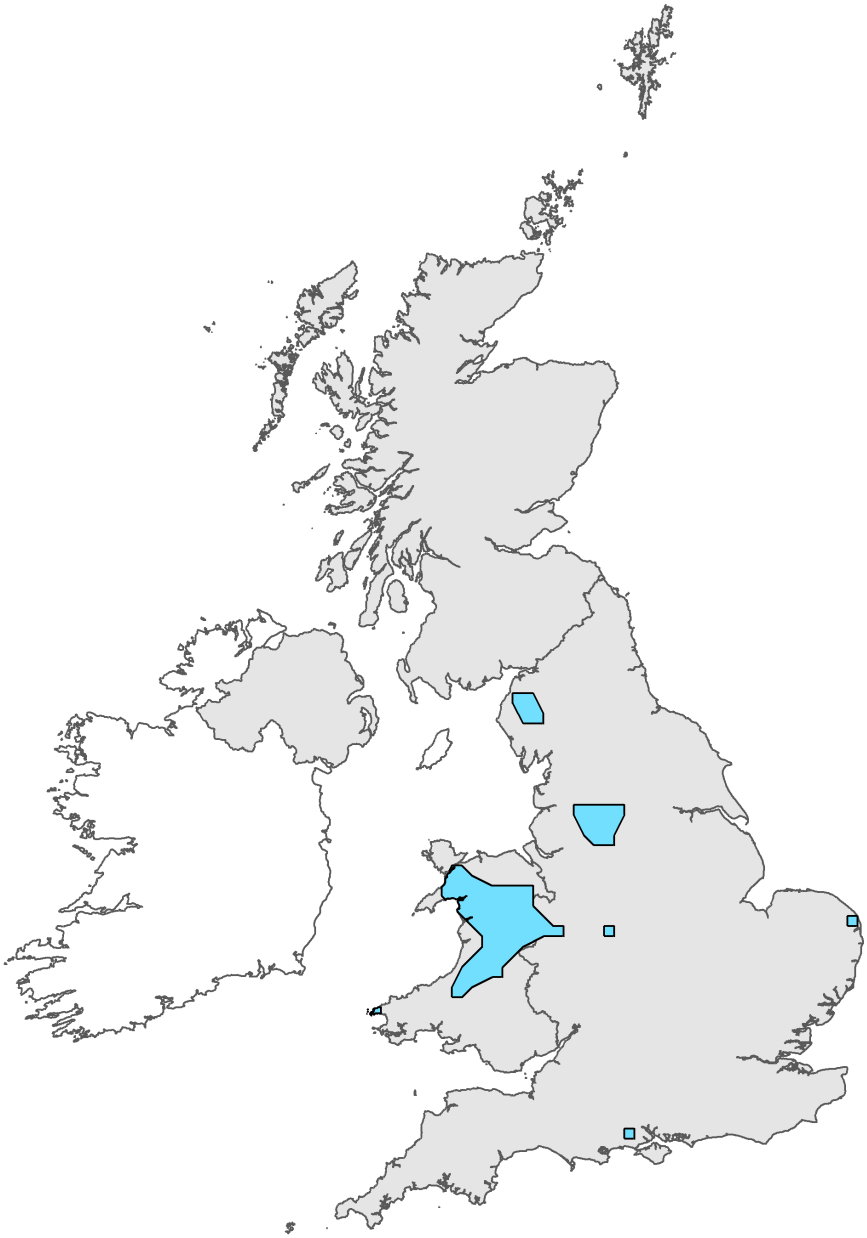

Figure 2: UK range map for S1831 - Floating water-plantain (*Luronium natans*). Coastline boundary derived from the Oil and Gas Authority's OGA and Lloyd's Register SNS Regional Geological Maps (Open Source). Open Government Licence v3 (OGL). Contains data © 2017 Oil and Gas Authority.

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 20km. For further details see the 2019 Article 17 UK Approach document.

# Explanatory Notes

**Species name: Luronium natans (1831)**

| Field label | Note |
|---|---|
| 2.4 Distribution map; Method used | The available records are thought to provide a robust overview of the distribution of this species in Wales. |

**Species name: Luronium natans (1831) Region code: ATL**

| Field label | Note |
|---|---|
| 5.3 Short term trend; Direction | See 5.11 |
| 5.11 Change and reason for change in surface area of range | Since the last monitoring cycle, L. natans has been lost from four 10km squares, all in lowland areas. Three of these are in northeast Wales, along the Llangollen Canal. Due to uncertainties inherent in monitoring, especially where records data rather than a structured monitoring programme is involved, it is likely that these losses actually occurred around or before the turn of the century. At present, floating water-plantain occurs in 30 of 35 favourable reference squares in Wales (86%). This is an apparent decline on the previous cycle when the species was reported as present in 37 squares (NRW 2013). However, the previous assessment has been revisited. Two cross-border squares have been removed because there are no Welsh records, and another because the identification on which it was based is considered likely to be erroneous. The remaining five squares are considered genuine declines, but records suggest these occurred mainly in the 1980s and 1990s. This possibility was also acknowledged as an area of uncertainty by NRW (2013), but at that time these records were more recent. It should be noted that the Llangollen Canal sites are not well monitored and further data from these squares is needed |
| 6.1 Year or Period | The standard period has been used. |
| 6.2 Population size | L. natans was positively recorded in 110 1km squares over the relevant time period, with an additional 13 interpolated (Figure 4). This represents 85% of the favourable reference number of 1km squares (Figure 3). 45 (31%) of these reference squares are in the Montgomery Canal, highlighting the suitability of this location for Luronium. However, it should be noted that the Montgomery Canal population of L. natans has low genetic diversity (Kay et al. 1999). Losses have been in Pembrokeshire (Dowrog Common: NRW Unpublished data), Gwynedd (Llyn Glasfryn), Snowdonia (Llyn Cwmffynnon) and the Llangollen Canal. There has also been some evidence of contraction in Llyn Tegid and the Montgomery Canal (measured in terms of 1km square occupancy), though in both cases this is not considered a threat to the population. Most of these losses probably occurred in the last decade of the 20th Century. The LEAFPACS / CSM method (Willby et al. 2009; JNCC 2015) provides a standardised method for assessing relative macrophyte cover in lakes. Although not an official measure of population, cover scores calculated from LEAFPACS / CSM lake survey data (Baxter & Stewart 2015; Burgess et al. 2006, 2009, 2013; Goldsmith et al. 2006, 2014a, b, 2016; Hatton-Ellis 2011), river LEAFPACS surveys (NRW unpublished data) and SCUBA / snorkel surveys (Goldsmith et al. 2014d; Lomas et al. unpublished) suggest that Luronium populations are stable in most sites. |
| 6.4 Additional population size | No alternative population unit has been used. The previous unit was number of sites. |
| 6.6 Population size; Method used | The number of occupied 1km squares has been estimated, using interpolation where appropriate to smooth the effects of recorder effort. Of 123 records, only thirteen were interpolated. While the existence of undetected populations cannot be discounted, the records are considered to provide a near complete estimate of the species' 1km square distribution |

| | |
|---|---|
| 6.8 Short term trend; Direction | There is no evidence of widespread loss or gain of populations within this time frame, and LEAFPACS cover scores on lakes with multiple surveys show no clear trends. Documented losses probably occurred before 2007. See 5.11. |
| 6.12 Long term trend; Direction | There have been some losses since the early 1990s. See narrative in 5.11 and 6.2. |
| 6.13 Long term trend; Magnitude | a) 11%(15 1km squares) b) 13%(18 1km squares) c) Not available 6.13.1 Population decrease is estimated at 0.49% per year, and is thought to have been close to zero within the last 12 years. |
| 6.14 Long term trend; Method used | Our knowledge of the population of this species was limited at the start of the assessment period and this has in turn restricted opportunities for assesing long-term trends. |
| 6.15 Favourable reference population | The FRV population has been calculated as 145 1km squares. |
| 6.16 Change and reason for change in population size | Although the change in method has altered the results, the main difference is the reinterpretation of existing records and availability of new data. |
| 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)? NO - area = YES - quality = NO Overall = NO b) If NO, is there a sufficiently large area of occupied & unoccupied habitat of suitable quality (to maintain the species at FCS)? sufficient occupied = NO sufficient unoccupied = Unknown Overall = Unknown Population extinctions of Luronium natans are always linked to deteriorations in quality of the supporting habitat. Habitat area per se is not considered likely to be a factor in population extinctions. Although L. natans is not a good coloniser in comparison with many aquatic plants, it nevertheless does colonise suitable sites over time, as is clear from its wide distribution in northern and western Wales (Figure 1) and by its colonisation of the canal network (Willby & Eaton 1993). In Welsh rivers and canals, it appears to have a high occupancy of suitable habitat. In lakes and ponds, occupancy of L. natans is lower, with the species being found in about 40-50% of low alkalinity lakes in its Snowdonia and Cambrian Mountains heartland areas. It seems to have a distinct preference for fine substrates and in larger lakes such as Llyn Tegid or Llyn Cwellyn tends to occur on or near the alluvial fans of inflow rivers (NRW unpublished data). It is unclear whether its absence from the remaining lakes is because these lack suitable habitat, or because they are suitable but unoccupied. For this reason, the extent of unoccupied habitat is considered unknown. Floating water-plantain is very rare in ponds. Since the extent and quality of unoccupied habitat is not known, no conclusion can be reached regarding overall habitat sufficiency in relation to occupancy. |
| 7.2 Sufficiency of area and quality of occupied habitat; Method used | General condition assessments of habitats supporting L. natans have been used (for methods see JNCC 2015). |
| 7.3 Short term trend; Period | The standard period has been used. |
| 7.4 Short term trend; Direction | There has been no change to the extent of Luronium habitat in Wales. The quality of Luronium habitat in Wales is considered stable overall at present, with deteriorations in some sites being broadly balanced by improvements in others. A list of lake sites supporting Luronium and their current status is provided in Appendix 2. Sites of concern are the Montgomery Canal (Stewart 2014) and Dowrog Common (NRW unpublished). See section 8 for pressures and threats. |
| 7.5 Short term trend; Method used | The monitoring network generally has very good coverage of floating water-plantain sites. Better coverage of river populations, especially on the Afon Teifi, would be desirable. |

| | |
|---|---|
| 8.1 Characterisation of pressures/ threats | Pressures: In general, pressures on L. natans are not considered to be particularly serious in comparison with those affecting many other aquatic habitats and species. The majority of these have therefore been ranked as Moderate or Low importance. Nutrient enrichment from agriculture (A25, A26) and other sources such as storm drains and sewage works (J01) damages Luronium habitat by promoting excessive growth of competitor plants, filamentous algae and phytoplankton. Due to its clonal habit, L. natans seems fairly resilient to fluctuations in water level and may even benefit from limited fluctuations by virtue of the growth of competitors such as Isoetes lacustris and Myriophyllum alterniflorum being suppressed. However, more extreme water level fluctuations (K03, K04, K05) result in large reductions or loss of populations. In canal habitats, boat movements (E05) stir up silt from the bottom, thereby causing high turbidity and often resulting in the extinction of all submerged aquatic plants within affected areas. Introduction of coarse fish for recreational fishing (G08) has a similar effect on turbidity and may also promote phytoplankton growth. However, most Welsh Luronium sites are unsuitable for coarse fish and so the impact of this is low. On the Montgomery Canal, water soldier Stratiotes aloides has been accidentally introduced, probably as a garden escape (I04). This species is native to eastern England but not to Wales, and is increasing rapidly, shading out other aquatic plants including L. natans (Stewart 2014). Glyceria maxima also requires frequent control at this site. Water quality (A25, A26) and invasive non-native species such as Elodea nuttallii (I02) are also problematic at this site. Australian swamp stonecrop Crassula helmsii is considered a particularly serious threat to L. natans as it has a similar ecological niche. The Montgomery canal also requires regular dredging to prevent silting up and succession to reedswamp and wet woodland (L02). Threats: These are similar to pressures, but the threat from invasive species (I01, I02) is expected to increase due to accidental or intentional spread. Proposals to increase boating use on the Montgomery Canal (E05) will increase this pressure and may necessitate the creation of mitigation or compensation habitat. |
| 9.5 List of main conservation measures | Agricultural pollution (CA10, CA11) has been addressed by various local projects where it is a problem. Key sites for this work are Llyn Tegid and the Montgomery Canal, but smaller lake SSSIs with scope for restoration such as Llyn Glasfryn should also be assessed. NRW is working with the Canal and Rivers Trust to manage transport operation (CE01) on the Montgomery Canal. Invasive Species Management is also a serious issue on the Montgomery Canal and to a lesser extent on other sites. It needs to be addressed by a system of early detection and rapid response (CI01), as well as by a broader package of measures where invasive species are established (CI02, CI03, CI05). The Montgomery Canal also requires regular management to repair leaks and prevent silting up and succession (CJ03, CL01). Two new pools for Luronium have been created on Dowrog Common. Although apparently suitable habitat, they have not been colonised (Wilkinson, in prep). |
| 10.1 Future prospects of parameters | 10.1a Future prospects of - range. Floating water-plantain is widespread in Wales and in the northern part is unlikely to decline in range as the sites where it occurs are numerous and have few pressures. In east and south-west Wales there is a higher risk of decline, however, as there are fewer sites and / or a larger number of pressures. Restoration of the Dowrog Pool site is of strategic importance in this context. 10.1b Future prospects of - Population The Montgomery Canal is the largest and most vulnerable site. Provided that this continues to be managed in a similar manner to the recent past, there is little risk of a dramatic change in population. 10.1c Future prospects of - Habitat of the species The most important habitat for this species is H3130, which was assessed as having stable prospects for range and area, and a negative trend for structure and function in Wales (Hatton-Ellis 2018). It should however be noted that the condition of lakes supporting Luronium (Appendix 2) is somewhat better than the overall H3130 resource. Heathland pools and canals are also threatened by succession, invasive species and eutrophication. |

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| 12.1 Population size inside the pSCIs, SCIs and SACs network | L. natans is well represented within the SAC network across Wales, with 79% of current Welsh Luronium 1km squares lying within the SAC network. Ironically, the one major gap is within the largest hotspot for the species in SH55 (Figure 1), where the current boundaries of the Eryri (UK0012946) and Afon Gwyrfai a Llyn Cwellyn (UK0030046) SACs do not protect several key floating water-plantain sites in this area. This reflects the considerably poorer quality of data when SACs were designated. |
| 12.4 Short term trend of the population size within the network; Direction | There is no evidence of systematic losses reflective of a declining population trend within the SAC network in the current time frame (2007-2018). However, some losses (Dowrog Common) or local declines (Montgomery Canal) are apparent. |