

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

**Second Report by the United Kingdom under
Article 17
on the implementation of the Directive
from January 2001 to December 2006**

**Conservation status assessment for :
S1831: *Luronium natans* - Floating water-
plantain**

Please note that this is a section of the report. For the complete report visit <http://www.jncc.gov.uk/article17>

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S1831 *Luronium natans* Floating water-plantain

Audit trail compiled and edited by JNCC and the Plant Conservation Working Group

This document is an audit of the data and judgements on conservation status in the UK's report on the implementation of the Habitats Directive (January 2001 to December 2006) for this species. Superscript numbers accompanying the headings below, cross-reference to headings in the corresponding Annex B reporting form. This supporting information should be read in conjunction with the UK approach for species (see 'Assessing Conservation Status: UK Approach').

1. Range Information^{2.3}

The distribution of this plant is localised in the UK, with recent records from Wales, the West Midlands and northern England. Introduced populations exist in the New Forest, the Norfolk Broads and areas of west Scotland.

1.1 Surface area of range^{2.3.1}

10,195km²

The above estimate was calculated within Alpha Hull software, using extent of occurrence as a proxy measure for range (as shown in the Map 1.1 below). Alpha was set at 20 km to reflect the dispersal capability of this species. The alpha hull (range area) was clipped to include terrestrial and freshwater habitats only. None of the introduced sites have been included in the range calculation. The recently-discovered sites in Scotland may be native, but have not been mapped here.

1.2 Date of range determination^{2.3.2}

1987 – 1999

The range estimate was calculated using records from Preston *et al.* (2002). The most recent date class from this dataset is 1987-1999. Records from this time period provide the best representation of current range as it is understood by species specialists.

1.3 Quality of range data^{2.3.3}

Good

Preston *et al.* (2002) represents a complete survey of 10-km squares.

1.4 Range trend^{2.3.4} & Range trend magnitude^{2.3.5}

Unknown

Information regarding the magnitude of the ongoing trend is lacking. However, sites continue to be lost, and hence it is likely (though uncertain) that the range trend continues to be negative (as it has been since 1930).

1.5 Range trend period^{2.3.6}

1994 - 2006

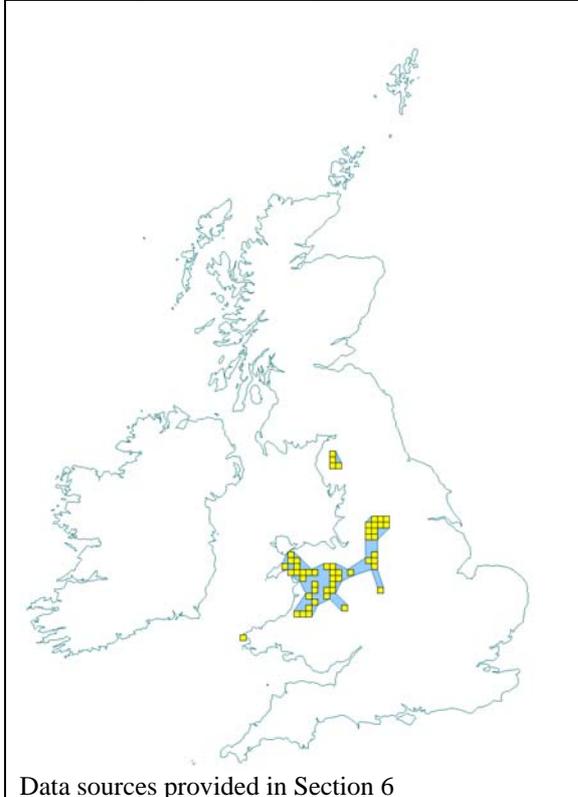
1.6 Reasons for reported trend in range^{2.3.7}

- 1. Improved knowledge/more accurate data**
- 3. Direct human influence (restoration, deterioration, destruction)**
- 4. Indirect anthropo(zoo)genic influence**

5. Natural processes

Several lowland populations have been lost due to eutrophication, causing the most significant contractions in range (since 1930).

Map 1.1 Current extent of occurrence and occupied 10-km squares (1987-1999)



1.7 Favourable reference range^{2.7.1} 10,195km² (Equal to current)

The decision tree in Note 1 has been used as a guide in determining the favourable reference range estimate (see 'Assessing Conservation Status: UK Approach').

The current range trend is unknown, and hence the favourable reference range has been set as the range in 1994 (reported as the current range), given that this range is sufficiently widespread not to be affected significantly by stochastic events.

1.8 Range conclusion^{2.8} Unknown

The range is assessed as Unknown since the current trend is unknown. The current range is equivalent to the favourable reference range, but unless the range is known to be stable or increasing, it cannot be concluded to be Favourable.

2. Population of the species^{2.4}

2.1 Population estimate^{2.4.1} 50 localities

The UK total (accounting for confirmed sites only) is 50 localities. The number of localities has been used as a proxy measure for population due to the difficulties in determining population size (population fluctuations, vegetative spread and need for specialised survey using deep-water diving).

In Wales there are 33 recently-recorded sites (counting the four or five separate colonies in the Montgomery Canal as one site and individual small lakes at the headwaters of the Teifi and river outflows – at Llyn Tegid, Llyn Padarn and Llyn Cwellyn - as separate from their adjacent water-bodies). A further four or five Welsh sites are indeterminate (*i.e.* they have not been re-found and are possibly erroneous).

In England there are 17 localities. This count of localities considers sites within a single canal as representing a single locality. Larger water bodies are counted separately. Series of pools within a complex site are counted as a single locality.

2.2 Date of population estimate^{2.4.2}

1987 – 1999

2.3 Method of population estimate^{2.4.3}

3 = from comprehensive inventory

With direct observation of submerged colonies (shoreline surveys and deep water diving) with grapnel/rake contacts or identification of detached fragments on shorelines at other sites.

2.4 Quality of population data^{2.4.4}

Good

At the locality level the quality of data is good (we can be confident of presence/absence), however information regarding population size is much more patchy. We can have considerable confidence in the records from canals, rivers and several upland lakes but detailed distribution/abundance measurements are particularly elusive with this plant and, at several larger sites, and for older, lowland records, there are only very partial data.

2.5 Population trend^{2.4.5} & Population trend magnitude^{2.4.6}

Decreasing

There has been a long-term and continuing decline in the number of localities, however this decline is difficult to quantify due to significant under-recording in the past, when the form occurring in upland lakes was poorly understood. The most significant trend (which has been somewhat masked by the decline in the canal system) is the loss of lowland sites, in Anglesey, Llyn, Pembrokeshire, mid-Wales and the West Midlands.

Populations fluctuate greatly in size, often increasing when water levels drop to expose the bottom of the water body. They also fluctuate from year to year, and at many sites records of *Luronium natans* have been infrequent, suggesting that only small populations occur, in some cases possibly as transitory colonists of the habitat. Populations tend to be more stable at natural sites than artificial ones, but approximately a quarter of recent (post-1980) records are from canals and similar artificial habitats. The long term decline of *L. natans* in its natural habitats (*i.e.* heath pools, lakes and meres) is particularly marked in the lowlands (Jackson and McLeod 2002).

2.6 Population trend period^{2.4.7}

1980 – 1999

2.7 Reasons for reported trend in population^{2.4.8}

- 1. Improved knowledge/more accurate data**
- 3. Direct human influence (restoration, deterioration, destruction);**
- 4. Indirect anthropo(zoo)genic influence**
- 5. Natural processes**

The canal populations are at risk from increasing boat traffic and bankside development associated with restoration activity. Lowland populations in heath pools, lakes, meres, rivers and canals are threatened by nutrient enrichment and smaller populations may be constrained (from functioning as parts of metapopulations) by the loss/fragmentation of habitat.

2.8 Justification of % thresholds for trends^{2.4.9}

Not applicable

2.9 Main pressures^{2.4.10}

621 nautical sports - high levels of motorised recreational boat traffic can directly suppress growth of the plant through increased turbidity of the water.

701 water pollution (water acidification)

2.10 Threats^{2.4.11}

621 nautical sports - high levels of motorised recreational boat traffic can directly suppress growth of the plant through increased turbidity of the water.

701 water pollution (water acidification)

2.11 Favourable reference population^{2.7.2}

50 viable localities

The decision tree in Note 1 has been used as a guide in determining the favourable reference population estimate (see 'Assessing Conservation Status: UK Approach').

The trend is currently decreasing, although probably at less than 1% per annum, which implies that the 1994 population (50 localities) was not viable. However, the absolute number of localities is not considered to be a problem, what is needed is that the populations in these localities should be viable. In some cases this might require conservation measures to form metapopulations.

The populations within the Snowdonian and Cambrian Mountain areas are thought to be sufficiently large to be considered viable for the foreseeable future. However, the Welsh canal population is considered too small at present, as is the Pembroke Heaths population area (although this latter area is showing signs of improvement).

Professional opinion is that the area between Dowrog Pool, St David's Head and Ramsey Island should function once more as a metapopulation, and the upper Severn valley (Severn/Tanat confluence) should be linked with native sites in the Shropshire meres region. This would ensure long-term viability.

There are some proposed habitat restoration schemes which should assist in achieving the favourable reference population.

2.12 Population conclusion^{2.8}

Unfavourable – Inadequate

The assessment is Unfavourable – Inadequate since the species is below the favourable reference population and is declining. The current population is not greater than 25% below the favourable reference population, and the decline is not greater than 1% per year, hence Unfavourable – Inadequate is the appropriate assessment.

The population assessment also requires that reproduction, mortality and age structure are considered, and any deviations from normality would support an assessment of Unfavourable. The species displays different reproductive strategies in different habitats – annual flowering, perennial flowering and perennial vegetative. Consequently understanding and estimating population viability is difficult. Populations in upland lakes, rivers and canals appear to persist as perennial rosettes spreading by vegetative means and there is evidence that some of the canal populations are single clones. Fruiting populations of shallow heathland pools may be limited by lack of other nearby populations (not functioning as metapopulations). It is unclear whether these various strategies and resultant population structures deviate from normal, and hence this aspect of population biology has not been used in justifying the assessment.

3. Habitat for the species in the Biogeographic region or sea^{2.5}

Floating water-plantain occurs in a range of freshwater situations, including nutrient-poor lakes in the uplands and slowly-flowing lowland rivers, pools, ditches and canals that are moderately nutrient-rich. It thrives best in open situations with a moderate degree of disturbance, where the growth of emergent vegetation is held in check.

3.1 Surface area of habitat^{2.5.2}

Unknown

Luronium occurs in a range of freshwater habitats – oligotrophic and mesotrophic lakes, slow flowing rivers and associated floodplain pools and small pools in heathland. There are also large populations in a number of disused or recently restored canals. Upland oligotrophic lakes must be considered the most secure habitat but may be subject to acidification pressures and other catchment difficulties. The habitat area is very hard to estimate since many, apparently suitable ‘Littorelletean’ sites in upland north and west Britain remain unoccupied whilst other lowland sites are isolated and rare.

Luronium is a very locally abundant species, usually restricted to pools, rivers and lakes of <1 km² in extent and in a few larger sites of less than 5 km² (rarely <10 km²). The catchment (and perhaps, then, ‘functional habitat’) for these sites frequently, however, exceeds 10 km² per site and could be several times the area of actual occupancy, if *Luronium* functioned as a series of metapopulations and was actively moving into new habitat.

3.2 Date of estimation^{2.5.3}

Not applicable

3.3 Quality of data on habitat area^{2.5.4}

Poor

3.4 Habitat trend^{2.5.5}

Decreasing

Despite some new discoveries of previously overlooked sites, professional judgement is that, overall, habitat has decreased in recent years, particularly the lowland habitats. Habitat quality is also an issue, with problems of nutrient enrichment reducing the quantity of suitable habitat available to the species.

3.5 Habitat trend period^{2.5.6}

1980 – 2006

3.6 Reasons for reported trend in habitat^{2.5.7}

3 = Direct human influence (restoration, deterioration, destruction)

4 = Indirect anthropo(zoo)genic influence

Its habitat in rivers has been greatly reduced by channel-straightening, dredging and pollution, especially in lowland situations. The other habitats are all susceptible to nutrient enrichment as a result of point and diffuse pollution sources (*e.g.* Carvalho and Moss, 1998).

3.7 Suitable habitat for the species (in km²)^{2.7.3}

Unknown

The exact areas of suitable habitat have not yet been estimated for this species.

3.8 Habitat conclusion^{2.8}

Unfavourable – Inadequate

Habitat is assessed as Unfavourable – Inadequate due to its continuing decline and poor quality.

4. Future Prospects^{2.6}

Poor prospects

“Species expected to struggle unless conditions change.”

L. natans is listed on Annexes II and IV of the Habitats Directive and Appendix I of the Bern Convention. It is protected under Schedule 4 of the Conservation (Natural Habitats, etc.) Regulations 1994 and Schedule 8 of the WCA 1981. It is also the subject of a Species Action Plan under the UK Biodiversity Action Plan (and included on the revised UKBAP list.)

Populations in upland lakes appear to be reasonably secure at present but increasing pressures on other habitats are likely to threaten some populations and lead to reduction in range (particularly lowland populations). There are particular challenges associated with tackling nutrient enrichment of freshwater habitats especially where agricultural diffuse sources are significant. Although prospects for *Luronium* are “good” in the core upland areas (species expected to survive and prosper), they are considered “poor” in the lowland fringe (species likely to struggle unless conditions change). For this reason the UK assessment is reported as Poor.

4.1 Future prospects conclusion^{2.8}

Unfavourable – Inadequate but improving

The assessment is Unfavourable – Inadequate, due to difficulties maintaining and restoring habitats in the lowlands, but it is improving with conservation efforts on some rivers and upland lake sites.

5. Overall Conclusion ^{2.8}

Unfavourable – Inadequate but improving

The assessments for range, population, habitat and future prospects are all Unfavourable – Inadequate. The overall assessment therefore reflects this. The future prospects were considered to be improving due to conservation efforts on some rivers and upland sites; there are also some proposed habitat restoration schemes which in the future may lead to greater improvements.

Long-term viability depends upon catchment-scale initiatives to improve habitat condition and links between populations. The provision of new habitat linkages in the established areas of range decline or weakness (in west Wales heaths and the West Midlands/Welsh border area) would probably restore the favourable conservation status to the UK population as a whole.

Table 5.1. Summary of conclusions

Parameter	Judgement	Grounds for Judgement (in accordance with Annex C)	Reliability*
Range	Unknown	No or insufficient reliable information available	N/A
Population	Unfavourable – Inadequate	Any other combination Continuing decline in population, but at less than 1% per year, and population less than favourable reference population, but not more than 25% less.	2
Habitat	Unfavourable – Inadequate	Any other combination Area of suitable habitat declining and habitat quality poor.	3
Future Prospects	Unfavourable – Inadequate but improving	Any other combination Pressures and threats are significant but not severe. Prospects are improving with conservation efforts.	3
Overall Assessment	Unfavourable – Inadequate	One or more Unfavourable – Inadequate but no Unfavourable – Bad	2

*1=High, 2=Moderate, 3=Low

High – Expert opinion is that the concluding judgement accurately reflects the current situation based on a professional understanding of the species. For range, population, and habitat, quality of data used to establish the current estimate has been identified as “good”; data used to inform trends is comprehensive and up to date.

Moderate – A greater understanding of the feature, or the factors affecting it, is required before a confident concluding judgement can be made by experts. For range, population, and habitat, the current estimate and/or trend are based on recent, but incomplete or limited survey data; or alternately, a comprehensive, but outdated (pre-1994) review.

Low – Judgements, and comprising estimates, are based predominately on expert opinion.

N/A – Assessment conclusion is “unknown”, on the basis of insufficient reliable information

6. References

CARVALHO, L. & MOSS, B. 1998. Lake SSSIs subject to eutrophication – an environmental audit. *English Nature Freshwater Series*, No. 3

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PRESTON, C.D., PEARMAN, D.A. & DINES, T.D. 2002. *New Atlas of the British & Irish Flora*. Oxford University Press.

Map Data Source

Vascular Plant Database, Botanical Society of the British Isles, via the Biological Records Centre.