

Report under The Conservation of Habitats and
Species Regulations 2017 (as amended),
Regulation 9A

2019-2024

Conservation status assessment for the species:

S1831 - Floating water-plantain

(Luronium natans)

England



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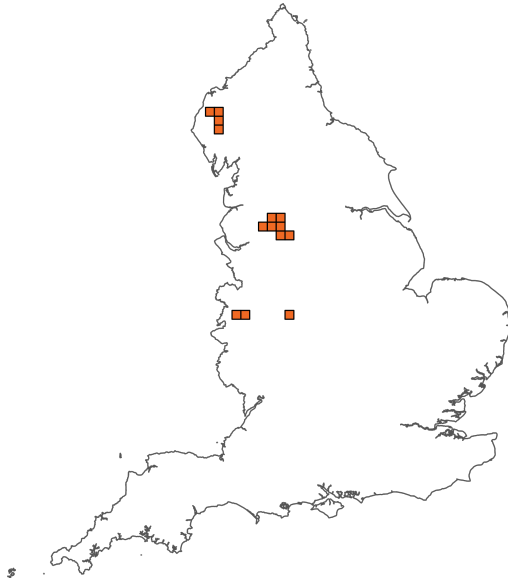
Important note - Please read

- The information in this document represents the England Report under The Conservation of Habitats and Species Regulations 2017 (as amended), Regulation 9A, for the period 2019-2024.
- It is based on supporting information provided by Natural England, which is documented separately.
- The Habitats Regulations reporting 2019-2024 Approach Document provides details on how this supporting information contributed to the UK Report and the fields that were completed for each parameter.
- Maps showing the distribution and range of the species are included.
- Explanatory notes (where provided) are included at the end. These provide additional audit trail information to that included within the assessments. Further underpinning explanatory notes are available in the related country 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 National Site Network coverage for Annex II species).

Further details on the approach to the Habitats Regulations Reporting 2019-2024 are available on the [JNCC website](#).

Assessment Summary: Floating water-plantain

Distribution Map



Range Map

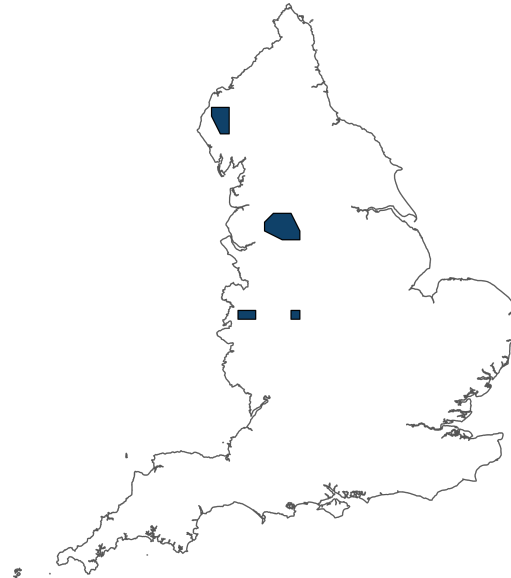


Figure 1: England distribution and range map for S1831 - Floating water-plantain (*Luronium natans*). Coastline boundary derived from the Oil and Gas Authority's OGA and Lloyd's Register SNS Regional Geological Maps (Open Source). Open Government Licence v3 (OGL). Contains data © 2017 Oil and Gas Authority. The 10km grid square distribution map is based on available species records within the current reporting period.

Table 1: Table summarising the conservation status for S1831 - Floating water-plantain (*Luronium natans*). Overall conservation status for species is based on assessments of range, population, habitat for the species, and future prospects.

Overall Conservation Status (see section 11)

Unfavourable-inadequate (U1)

Breakdown of Overall Conservation Status

Range (see section 5)

Unfavourable-inadequate (U1)

Population (see section 6)

Unfavourable-inadequate (U1)

Habitat for the species (see section 7)

Unfavourable-inadequate (U1)

Future prospects (see section 10)

Unfavourable-inadequate (U1)

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National Level

1. General information

| | |
|---|-------------------------|
| 1.1 Country | England |
| 1.2 Species code | S1831 |
| 1.3 Species scientific name | <i>Luronium natans</i> |
| 1.4 Alternative species scientific name | |
| 1.5 Common name | Floating water-plantain |
| Annex(es) | II, IV |

2. Maps

| | |
|-----------------------------------|--|
| 2.1 Sensitive species | No |
| 2.2 Year or period | 2010-2024 |
| 2.3 Distribution map | Yes |
| 2.4 Distribution map; Method used | Complete survey or a statistically robust estimate |

2.5 Additional information

The time period 2010-2024 has been used to provide a more representative current distribution for all plant species in this reporting round. This is because the national dataset of botanical records (BSBI) could show a dip in records post 2019 for many species, which is an artefact of the relaxation in recording effort post production of the Plant Atlas 2020.

3. Information related to Annex V Species

3.1 Is the species taken in the wild / exploited?

3.2 What measures have been taken?

a) Regulations regarding access to property

b) Temporary or local prohibition on the taking of specimens in the wild and exploitation

c) Regulation of the periods and/or methods of taking specimens

d) Application of hunting and fishing rules which take account of the conservation of such populations

e) Establishment of a system of licences for taking specimens or of quotas

f) Regulation of the purchase, sale, offering for sale, keeping for sale, or transport for sale of specimens

g) Breeding in captivity of animal species as well as artificial propagation of plant species

Other measures

Other measures description

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

a) Unit

Table 2: Quantity taken from the wild during the reporting period (see 3.3a for units). For species with defined hunting seasons, Season 1 refers to 2018/2019 (autumn 2018 to spring 2019), and Season 6 to 2023/2024. For species without hunting seasons, data are reported by calendar year: Year 1 is 2019, and Year 6 is 2024.

| | Season/ year 1 | Season/ year 2 | Season/ year 3 | Season/ year 4 | Season/ year 5 | Season/ year 6 |
|-----------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| b) Minimum | - | - | - | - | - | - |
| c) Maximum | - | - | - | - | - | - |
| d) Unknown | - | - | - | - | - | - |

3.4: Hunting bag or quantity taken in the wild; Method used

3.5: Additional information

No additional information

Biogeographical Level

4. Biogeographical and marine regions

4.1 Biogeographical or marine region where the species occurs ATL

4.2 Sources of information

See section 14 References

5. Range

| | |
|-------------------------------------|---|
| 5.1 Surface area (km ²) | 1,750 |
| 5.2 Short-term trend; Period | 2013-2024 |
| 5.3 Short-term trend; Direction | Decreasing |
| 5.4 Short-term trend; Magnitude | |
| a) Estimated minimum | |
| b) Estimated maximum | |
| c) Pre-defined range | |
| d) Unknown | |
| e) Type of estimate | |
| f) Rate of decrease | Decreasing <=1% (one percent or less) per year on average |
| 5.5 Short-term trend; Method used | Based mainly on extrapolation from a limited amount of data |
| 5.6 Long-term trend; Period | 2000-2024 |
| 5.7 Long-term trend; Direction | Decreasing |
| 5.8 Long-term trend; Magnitude | |
| a) Minimum | |

b) Maximum

| | |
|----------------------------|---|
| c) Rate of decrease | Decreasing $\leq 1\%$ (one percent or less) per year on average |
|----------------------------|---|

| | |
|---|---|
| 5.9 Long-term trend; Method used | Based mainly on extrapolation from a limited amount of data |
|---|---|

5.10 Favourable Reference Range (FRR)**a) Area (km²)**

| | |
|---------------------------------|---|
| b) Pre-defined increment | Current range is between 11% and 50% smaller than the FRR |
|---------------------------------|---|

| | |
|-------------------|----|
| c) Unknown | No |
|-------------------|----|

| | |
|-----------------------|--------------------------|
| d) Method used | Reference-based approach |
|-----------------------|--------------------------|

| | |
|----------------------------------|----------|
| e) Quality of information | moderate |
|----------------------------------|----------|

5.11 Change and reason for change in surface area of range

| | |
|------------------|-----|
| a) Change | Yes |
|------------------|-----|

| | |
|--------------------------|----|
| b) Genuine change | No |
|--------------------------|----|

| | |
|--|-----|
| c) Improved knowledge or more accurate data | Yes |
|--|-----|

| | |
|----------------------------|-----|
| d) Different method | Yes |
|----------------------------|-----|

| | |
|--------------------------|----|
| e) No information | No |
|--------------------------|----|

| | |
|------------------------|----|
| f) Other reason | No |
|------------------------|----|

| | |
|-----------------------|-------------------------|
| g) Main reason | Use of different method |
|-----------------------|-------------------------|

5.12 Additional information

JNCC recommended an FRR operator for England: 'between 2% and 10% smaller than the FRR' in line with UK operator deployed in 2019. This operator was based on the UK FRR 2019 value not being a calculated figure but was reported as the same as for 2013 (JNCC, 2019b) and estimated as no more than 10% above current range which was 9371.25km² at that time, and maximum 10% more would be 10,308.25km²). There is no England-only calculated range value from 2019 and so JNCC recommended that the current England range can be represented by the same operator limits, however there is justification in changing the England operator to between 11-50% smaller. Just by

looking at the 2019 range map it can be seen that Wales holds more than 50% of the range than for England. It would be possible to use the Wales range figure for 2024 to acquire the current total range for UK and therefore calculate the proportion held in England, but this figure is not available. Even without knowing a more precise proportion of the total UK FRR attributed to England, the current value for England 1750km² appears to be much less than what an estimated FRR for England would be. The UK surface area of range was reported as 9371.25km² in 2019 but since there was no surface area range value for England-only in the 2019 reporting round, assessing England-only change in range is problematic. If JNCC's bespoke alpha hull model was run on the country distribution data of that time, separately for England and Wales, it would provide a baseline to more definitively compare the change in range between 2019 and 2024, other than by comparing the maps. The current surface area of range for England at 1750km² does contain some uncertainty due to the difficulty of surveying for this species, but despite the uncertainty and the lack of actual value for range in 2019 it is still possible to compare the distribution and range maps in the last reporting round (2019) with 2024 and see that there has only been a small change in the extant polygon shapes but there is now one less polygon. This is because in 2019 populations in East Norfolk and Hampshire were included, whereas in the reference dataset (BSBI, 2024) in this reporting round these outlying populations although still extant, were considered non native in Plant Atlas 2020 (Stroh et al, 2023) and therefore were not included for the distribution map or range calculation here, resulting in an apparent range reduction.

6. Population

6.1 Year or period 2010-2024

6.2 Population size (in reporting unit)

a) Unit number of map 1x1 km grid cells

b) Minimum

| | |
|---|---|
| c) Maximum | |
| d) Best single value | 41 |
| 6.3 Type of estimate | Best estimate |
| 6.4 Quality of extrapolation to reporting unit | moderate |
| 6.5 Additional population size (using population unit other than reporting unit) | |
| a) Unit | |
| b) Minimum | |
| c) Maximum | |
| d) Best single value | |
| e) 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 | 2013-2024 |
| 6.8 Short-term trend; Direction | Decreasing |
| 6.9 Short-term trend; Magnitude | |
| a) Estimated minimum | |
| b) Estimated maximum | |
| c) Pre-defined range | Decreasing 0 - 12% |
| d) Unknown | No |
| e) Type of estimate | Best estimate |
| f) Rate of decrease | Decreasing $\leq 1\%$ (one percent or less) per year on average |
| 6.10 Short-term trend; Method used | Based mainly on extrapolation from a limited amount of data |
| 6.11 Long-term trend; Period | 2000-2024 |
| 6.12 Long-term trend; Direction | Decreasing |

**6.13 Long-term trend;
Magnitude****a) Minimum****b) Maximum****c) Confidence interval****d) Rate of decrease**

6.14 Long-term trend; Method used Based mainly on extrapolation from a limited amount of data**6.15 Favourable Reference Population (FRP)****ai) Population size****a ii) Unit** number of map 1x1 km grid cells**b) Pre-defined increment** Current population is between 5% and 25% smaller than the FRP**c) Unknown** No**d) Method used** Reference-based approach**e) Quality of information** moderate**6.16 Change and reason for change in population size****a) Change** Yes**b) Genuine change** No**c) Improved knowledge or more accurate data** Yes**d) Different method** Yes**e) No information** Yes**f) Other reason** No**g) Main reason** Use of different method**6.17 Additional information**

BSBI data indicates a continuing decrease since 2000, possibly stabilising in the short term, and pressures on the habitat are ongoing. However, there is some uncertainty as

to whether the decrease in occupied monads (41 in 2024, 45 in 2018) is a genuine change in population between reporting rounds 2019 and 2024. As for the 2019 report, an FRP operator has been used because it had not been possible to calculate the exact FRP value (JNCC 2019a,b). The FRP is considered to be no more than 25% above the current population. The species is difficult to survey accurately due to habitat conditions (large/linear water bodies often with turbid water), the different life stages of the plant (vegetative forms small, mobile and cryptic), understanding the role of metapopulations in sustaining viable populations and the tendency for conservation translocations as mitigation for the continuing pressures within or near to known locations. In addition, the time periods in the data overlap between the 45 occupied monads (reported in 2018) and the 41 occupied monads derived from the period 2010-2024 reported here (this time frame was selected to provide a more representative distribution accounting for the reduction in recording effort post Plant Atlas 2020).

6.18 Age structure, mortality and reproduction deviation Yes, strongly deviating from normal

7. Habitat for the species

7.1 Sufficiency of area and quality of occupied habitat (for long-term survival)

| | |
|---|---------|
| a) Is area of occupied habitat sufficient? | Unknown |
| b) Is quality of occupied habitat sufficient? | No |
| c) If No or Unknown, is there a sufficiently large area of unoccupied habitat of suitable quality? | Unknown |

7.2 Sufficiency of area and quality of occupied habitat; Method used

| | |
|---|---|
| a) Sufficiency of area of occupied habitat; Method used | Based mainly on extrapolation from a limited amount of data |
| b) Sufficiency of quality of occupied habitat; Method used | Based mainly on extrapolation from a limited amount of data |

7.3 Short-term trend; Period 2013-2024

| | |
|--|---|
| 7.4 Short-term trend; Direction | Decreasing |
| 7.5 Short-term trend; Method used | Based mainly on extrapolation from a limited amount of data |
| 7.6 Long-term trend; Period | |
| 7.7 Long-term trend; Direction | |
| 7.8 Long-term trend; Method used | |
| 7.9 Additional information | |

The area of habitat may not have diminished significantly but some aspects of quality will have changed on some sites, due to invasive species such as *Crassula helmsii*, *Azolla filiculoides* and *Hydrocotyle ranunculoides*; recreational disturbance on canal sites from boat traffic causing increased turbidity, also diffuse pollution of water supply to the canal network affecting the balance of other macrophytes and algae; at natural ponds and lakes, the influence of waterfowl aggregations, recreation, and changes in habitat management, leading to overshadowing and competition from bankside vegetation, hydrological changes and climatic factors.

8. Main pressures

8.1 Characterisation of pressures

Table 3: Pressures affecting the species, including timing and importance/impact ranking. Pressures are defined as factors acting currently and/or during the reporting period (2019–2024). Rankings are: High (direct/immediate influence and/or large spatial extent) and Medium (moderate direct/immediate influence, mainly indirect and/or regional extent).

| Pressure | Timing | Ranking |
|--|--|------------|
| PE09: Land, water and air transport activities not referred to above | Ongoing and likely to be in the future | High (H) |
| PK01: Mixed source pollution to surface and ground waters (limnic and terrestrial) | Ongoing and likely to be in the future | High (H) |
| PF05: Sports, tourism and leisure activities | Ongoing and likely to be in the future | High (H) |
| PI01: Invasive alien species of Union concern | Ongoing and likely to be in the future | Medium (M) |

| | | |
|--|--|------------|
| PG20: Freshwater aquaculture generating pollution to surface or ground waters (including marine) | Ongoing and likely to be in the future | Medium (M) |
|--|--|------------|

8.2 Sources of information

See section 14 References

8.3 Additional information

No 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

Restore the habitat of the species (related to 'Habitat for the species')

9.3 Location of the measures taken

Only inside National Site Network

9.4 Response to measures

Long-term results (after 2036)

9.5 List of main conservation measures

Table 4: Key conservation measures addressing current pressures and/or anticipated threats during the next two reporting periods (2025–2036). Measures are ranked by importance/impact: High (direct/immediate influence and/or large spatial extent) and Medium (moderate direct/immediate influence, mainly indirect and/or regional extent).

| Conservation measure | Ranking |
|--|----------|
| MS03: Restoration of habitat of species from the directives | High (H) |
| MF03: Reduce impact of outdoor sports, leisure and recreational activities (incl. restoration of habitats) | High (H) |
| MF04: Reduce/eliminate pollution to surface or ground waters from commercial, residential and recreational areas and activities, and from industrial activities and structures | High (H) |

| | |
|--|------------|
| MA10: Reduce/eliminate point or diffuse source pollution to surface or ground waters (including marine) from agricultural activities | High (H) |
| MI03: Management, control or eradication of other invasive alien species | Medium (M) |

9.6 Additional information

SAC and SSSI canal sites affected by restoration plans (Canal and Rivers Trust) are subject to conservation efforts (mitigation) to safeguard populations through augmentation and reintroduction into offline and inline reserves but managing boat traffic (boat pass numbers) to control turbidity due to propellor action has not been sufficiently implemented, nor the habitat structure and hydrology of mitigation areas established and maintained in a suitable state. Diffuse water pollution of the water supply to both artificial and natural sites, habitat and recreational management are also ongoing impacts.

10. Future prospects

10.1a Future trends of parameters

| | |
|------------------------------------|--|
| ai) Range | Negative - decreasing $\leq 1\%$ (one percent or less) per year on average |
| bi) Population | Negative - decreasing $\leq 1\%$ (one percent or less) per year on average |
| ci) Habitat for the species | Negative - slight/moderate deterioration |

10.1b Future prospects of parameters

| | |
|-------------------------------------|------|
| aii) Range | Poor |
| bii) Population | Poor |
| cii) Habitat for the species | Poor |

10.2 Additional information

There are known difficulties of restoring an active canal network whilst maintaining aquatic macrophyte populations and there has been limited success in establishing self sustaining populations in mitigation areas for this species, however techniques could continue to improve aided by the fact that the species propagates well ex-situ providing propagules for augmentation and reintroduction. Semi-natural habitat in more naturally functioning floodplains is still very restricted with inherent difficulties in re-establishment

in the future, although there is more impetus behind natural flood management so this could also improve.

11. Conclusions

11.1 Range Unfavourable-inadequate (U1)

11.2 Population Unfavourable-inadequate (U1)

11.3 Habitat for the species Unfavourable-inadequate (U1)

11.4 Future prospects Unfavourable-inadequate (U1)

11.5 Overall assessment of Conservation Status Unfavourable-inadequate (U1)

11.6 Overall trend in Conservation Status Deteriorating

11.7 Change and reason for change in conservation status

This field is not reported as the period 2019-2024 marks the first instance in which conservation status has been assessed at the national level, meaning no comparisons to previous reports can be drawn.

11.7 Change and reason for change in conservation status trend

This field is not reported as the period 2019-2024 marks the first instance in which conservation status has been assessed at the national level, meaning no comparisons to previous reports can be drawn.

11.8 Additional information

The parameters for this species are difficult to quantify definitively but overall the national dataset (BSBI, 2024) indicates a declining trend in occupancy in the longer term with some more recent stability, or at least much more gently decline, which can be attributed primarily due to losses being offset by deliberate conservation actions. Therefore with the ongoing environmental pressures and uncertainty over the success of mitigation measures, the status of the species can only be assessed as currently unfavourable inadequate with a slight deteriorating trend.

12. UK National Site Network (pSCIs, SCIs, SACs) coverage for Annex II species

12.1 Population size inside the pSCIs, SCIs and SACs network

| | |
|---|---|
| a) Unit | number of map 1x1 km grid cells |
| b) Minimum | |
| c) Maximum | |
| d) Best single value | 12 |
| 12.2 Type of estimate | Best estimate |
| 12.3 Population size inside the network; Method used | Based mainly on extrapolation from a limited amount of data |
| 12.4 Short-term trend of population size within the network; Direction | Decreasing |
| 12.5 Short-term trend of population size within the network; Method used | Based mainly on extrapolation from a limited amount of data |
| 12.6 Short-term trend of habitat for the species inside the pSCIs, SCIs and SACs network; Direction | Decreasing |
| 12.7 Short-term trend of habitat for the species inside the pSCIs, SCIs and SACs network; Method used | Based mainly on extrapolation from a limited amount of data |

12.8 Additional information

For the time period 2010-2024 data from BSBI indicates 54 occupied monads of which 32 (59%) were within Natura 2000 sites. There are records from 12 monads in the reporting period 2019-2024 within SAC sites, a decrease from 25 in 2019, primarily due to there being no records in this dataset from Cannock Extension Canal. However condition assessment survey by Natural England in 2017 at this site, reported the species as relatively widespread at that time. It is possible that the species persists there even now, even if in reduced abundance. However, it should be noted that the same

pressures exist on SAC sites as elsewhere so it is reasonable to assume there has been a decline at SAC sites as for outside the Natura 2000 network.

13. Complementary information

13.1 Justification of percentage thresholds for trends

No justification information

13.2 Trans-boundary assessment

No trans-boundary assessment information

13.2 Other relevant information

Main causes of the historic decline and disappearance of *L. natans* from most sites is loss and infill of the water bodies, and loss of natural floodplain wetlands (due to drainage and river canalisation) where it once occurred, also changes in surrounding land use such as agricultural intensification, changes to grazing regimes or other activities maintaining an open aspect, also increase in diffuse pollution, invasive species, waterfowl aggregations, siltation and recreational use, for example Brown Moss SAC in Shropshire where the species has not been seen for 20 years (Cousins, 2022). The canal network, paradoxically initially provided new habitat but this also declined due to canals falling to disrepair and infilling, and even where habitat persisted in canals retained for industrial and subsequently recreational use, the habitat quality declined due to increase in motorised boat traffic, turbidity and pollution, also then leading to losses such as Montgomery Canal SSSI, Shropshire, where reintroduction to offline reserves for the species was not successful. Future conservation efforts to restore more natural floodplains, manage existing sites and to mitigate for canal restoration projects may improve future prospects but this is uncertain.

14. References

Biogeographical and marine regions

4.2 Sources of information

BSBI Distribution database (Accessed January 2025)

Cousins, M., 2022 'Desilting trial for Luronium natans, Floating Water-plantain at Brown Moss SSSI SAC, Shropshire' unpublished report for Natural England.

JNCC, 2019a European Community Directive on the Conservation of Natural Habitats and of Wild Fauna and Flora (92/43/EEC) 2019 '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: S1831 - Floating water-plantain (Luronium natans) ENGLAND'. <https://jncc.gov.uk/jncc-assets/Art17/S1831-EN-Habitats-Directive-Art17-2019.pdf>

JNCC, 2019b European Community Directive on the Conservation of Natural Habitats and of Wild Fauna and Flora (92/43/EEC) 2019 '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: S1831 - Floating water-plantain (Luronium natans) UNITED KINGDOM'. <https://jncc.gov.uk/jncc-assets/Art17/S1831-UK-Habitats-Directive-Art17-2019.pdf>

Lansdown, R., 2022 'Design of a protocol to monitor the conservation condition of floating water-plantain (Luronium natans) March 2022', unpublished report for Natural England.

Stroh, P.A., Humphrey, T.A., Burkmar, R.J., Pescott, O.L., Roy, D.B., & Walker, K.J., 2023 Luronium natans (L.) Raf. in BSBI Online Plant Atlas 2020, <https://plantatlas2020.org/atlas/2cd4p9h.fff> (Accessed January 2025)

Main pressures

8.2 Sources of information

No sources of information

15. Explanatory Notes

| Field label | Note |
|---------------------------------------|---|
| 2.1: Sensitive species | Although scarce and localised this species is not known to have been targeted by collectors and, as in previous reporting rounds, is therefore not considered sensitive. |
| 2.2: Year or Period | The time period 2010-2024 has been used to provide a more representative current distribution for plant species. This is because the national dataset of botanical records (BSBI) could for many species show a dip in records post 2020, an artefact of the relaxation in recording effort post production of the Plant Atlas 2020. |
| 2.3: Distribution map | Records from artificial habitats (canals) have been included. The records from Norfolk and Hampshire of uncertain native/non native status) have been excluded from the distribution map in this reporting round. |
| 2.4: Distribution map; Method used | Artificial habitats (canals) were included in the distribution map as analysis of records appears to shows that the species expanded from a relatively small number of 'natural" sites into and along the canal network as it was built and expanded. Subsequently as disused canals have been restored to navigation, conservation translocations have taken place which obscures the pattern of this natural dispersal in the canal network, and being a mobile species, it was considered pragmatic to include all records within the canal network unless they are clearly differentiated and distinguished in the dataset as outwith the possibility of natural dispersal. |
| 6.2: Population size | 1km squares were used as the reporting unit as for last reporting round in 2018. Not all localities will have been systematically checked in the period 2019-2024, therefore a time frame of 2010-2024 was selected as providing a more representative interpretation of population size. Additionally, this species, like many water plants, can be easily overlooked and non flowering plants can be difficult to identify with certainty. |

6.18: Age structure, mortality and reproduction

The species exhibits different growth forms depending on the conditions (Lansdown, 2023). Where permanently submerged in deep lakes, swards of strap-shaped leaves never produce floating leaves or flower (except for occasional cleistogamous flowers). In contrast, populations growing permanently in shallow water or in standing water up to approximately 1 metre deep and plants held near the water surface on stolons rising through the water column may only produce petiolate, floating leaves and flower abundantly. Where water depth varies through the summer, plants may initially only bear strap-shaped leaves early in the year but these gradually give way to petiolate floating leaves as water levels decline. Most reproduction in the UK appears to be vegetative via plantlets produced on stolons, to the extent that some canal populations show low genetic diversity. Since most canals are turbid, disturbed and nutrient rich with stabilised water levels this is considered to be modified hydrological conditions leading to deviation from normal population structure.

7.9: Additional information

The area and quality of the canal network is subject to change as new stretches of canal are restored and brought back into navigation. Conservation translocations (augmentation and reintroduction using propagated material) and provision of alternative habitat in offline or inline reserves associated with these canal restorations have had varying degrees of success, resulting in both losses and gains occurring for the species.

9.6: Additional information

SACs designated for this species are: Bassenthwaite Lake; Brown Moss, Cannock Extension Canal; River Derwent and tributaries. SSSIs designated for the species (i.e. where it is a notified feature): Brown Moss (in part); Cannock Extension Canal (in part); Chasewater & South Staffordshire Coalfield Heaths; Rochdale Canal. It is protected under the Wildlife and Countryside Act 1981 (Schedule 8) - plants which are protected from intentional picking, uprooting or destruction (Section 13 1a); selling, offering for sale, possessing or transporting for the purpose of sale (live or dead, part or derivative) (Section 13 2a);

advertising (any of these) for buying or selling (Section 13 2b). Source: Wildlife and Countryside Act Schedules 1,5 and 8 (protected birds, animals and plants). Threats of this kind are believed to be limited.

5.10: Favourable Reference Range (FRR)

JNCC recommended an FRR operator for England: 'between 2% and 10% smaller than the FRR' . This operator aligns with the UK FRR in 2019 but the value was not a calculated figure but was reported as the same as for 2013 (JNCC, 2019b) and estimated as no more than 10% above current range which was 9371.25km² at that time, therefore a maximum of 10% more would be 10,308.25km²). There is no England-only calculated range value from 2019 and JNCC have recommended that the current England range can be represented by the same operator limits. Just by looking at the 2019 range map it can be seen that Wales holds more than 50% of the range than for England. It would be possible to use the Wales range figure for 2024 to acquire the current total range for UK and therefore calculate the proportion held in England, but this figure is not available. Even without knowing a more precise proportion of the total UK FRR attributed to England, the current value for England 1750km² appears to be much less than what an estimated FRR for England ought to be and therefore the author has recommended an operator of between 11-50% smaller.

5.11: Change and reason for change in surface area of range

It is possible to compare the distribution and range maps in the last reporting round (2019) with 2024 and see that there has been a probably been a slight decrease based on the fact that extant polygons have changed shape slightly and could be smaller, but mainly because there is one less polygon in East Anglia. This is because in 2019 populations in East Norfolk and Hampshire were included, whereas in the reference dataset (BSBI, 2024) in this reporting round these outlying populations although still extant, were considered non native in Plant Atlas 2020 (Stroh et al, 2023) and therefore were not included for the distribution map or range calculation here, resulting in an apparent range reduction, this means that not all of the decline is

genuine. However due to the known pressures still exerted on the species, it is reasonable to assume that some of the small decline perceived from comparing polygons (value unknown but as perceived by comparing range maps), is genuine.

5.12: Additional information

The UK surface area of range was reported as 9371.25km² in 2019 but since there was no surface area range value for England-only in the 2019 reporting round, assessing England-only change in range is problematic. If JNCC's bespoke alpha hull model was run on the country data, separately for England and Wales using the distribution data at that time, it would provide a better baseline to more definitively compare the change in range between 2019 and 2024, other than comparing the maps.