

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

**2019-2024**

Conservation status assessment for the habitat:

**H3150 - Natural eutrophic lakes with  
*Magnopotamion* or *Hydrocharition*-type  
vegetation**

**Wales**



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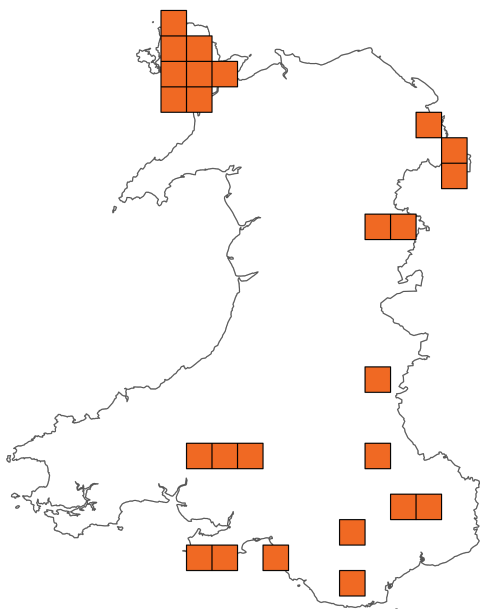
**Important note - Please read**

- The information in this document represents Wales 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 Resources Wales, 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 habitat 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 habitat (section 11 National Site Network coverage for Annex I habitats).

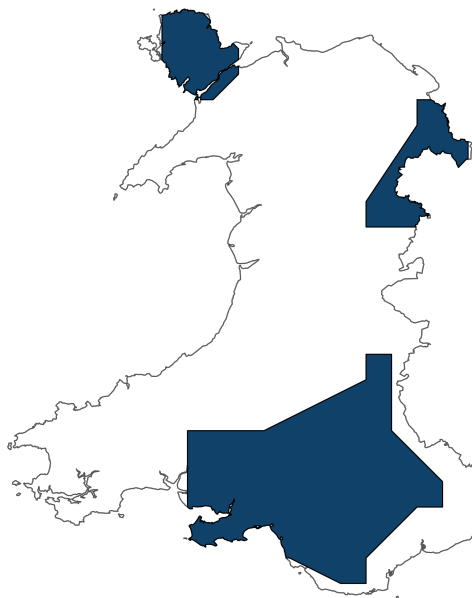
Further details on the approach to the Habitats Regulations Reporting 2019-2024 are available on the [JNCC website](#).

## Assessment Summary: Natural eutrophic lakes with *Magnopotamion* or *Hydrocharition*-type vegetation

### Distribution Map



### Range Map



**Figure 1:** Wales distribution and range map for H3150 - Natural eutrophic lakes with *Magnopotamion* or *Hydrocharition*-type vegetation. 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 habitat records within the current reporting period.

**Table 1:** Table summarising the conservation status for H3150 - Natural eutrophic lakes with *Magnopotamion* or *Hydrocharition*-type vegetation. Overall conservation status for habitat is based on assessments of range, area covered by habitat, structure and functions, and future prospects.

### Overall Conservation Status (see section 10)

**Unfavourable-bad (U2)**

### Breakdown of Overall Conservation Status

**Range** (see section 4)

**Favourable (FV)**

**Area covered by habitat** (see section 5)

**Favourable (FV)**

**Structure and functions** (see section 6)

**Unfavourable-bad (U2)**

**Future prospects** (see section 9)

**Unfavourable-bad (U2)**

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## National Level

### 1. General information

|                  |   |
|------------------|---|
| 1.1 Country      | Wales   |
| 1.2 Habitat code | H3150 - Natural eutrophic lakes with <i>Magnopotamion</i> or <i>Hydrocharition</i> -type vegetation |

### 2. Maps

|                                   |   |
|-----------------------------------|---|
| 2.1 Year or period                | 2001-2024   |
| 2.2 Distribution map              | Yes   |
| 2.3 Distribution map; Method used | Based mainly on extrapolation from a limited amount of data |

#### 2.4 Additional information

No additional information

## Biogeographical Level

### 3. Biogeographical and marine regions

|   |     |
|---|-----|
| 3.1 Biogeographical or marine region where the habitat occurs | ATL |
|---|-----|

#### 3.2 Sources of information

See section 13 References

### 4. Range

|                                     |           |
|-------------------------------------|-----------|
| 4.1 Surface area (km <sup>2</sup> ) | 6,328.57  |
| 4.2 Short-term trend; Period        | 2014-2024 |
| 4.3 Short-term trend; Direction     | Stable    |
| 4.4 Short-term trend; Magnitude     |           |

a) Estimated minimum

b) Estimated maximum

c) Pre-defined range

d) Unknown

e) Type of estimate

f) Rate of decrease

|  |   |
|--|---|
| <b>4.5 Short-term trend; Method used</b> | Based mainly on extrapolation from a limited amount of data |
|--|---|

**4.6 Long-term trend; Period**

|                                       |         |
|---------------------------------------|---------|
| <b>4.7 Long-term trend; Direction</b> | Unknown |
|---------------------------------------|---------|

**4.8 Long-term trend; Magnitude**

a) Minimum

b) Maximum

c) Rate of decrease

|   |                                   |
|---|-----------------------------------|
| <b>4.9 Long-term trend; Method used</b> | Insufficient or no data available |
|---|-----------------------------------|

**4.10 Favourable Reference Range (FRR)**

a) Area (km<sup>2</sup>)

|                                 |  |
|---------------------------------|--|
| <b>b) Pre-defined increment</b> | Current range is less than 2% smaller than the FRR |
|---------------------------------|--|

|                   |    |
|-------------------|----|
| <b>c) Unknown</b> | No |
|-------------------|----|

|                       |                          |
|-----------------------|--------------------------|
| <b>d) Method used</b> | Reference-based approach |
|-----------------------|--------------------------|

|                                  |          |
|----------------------------------|----------|
| <b>e) Quality of information</b> | moderate |
|----------------------------------|----------|

**4.11 Change and reason for change in surface area of range**

|                  |    |
|------------------|----|
| <b>a) Change</b> | No |
|------------------|----|

**b) Genuine change**

---

**c) Improved knowledge or more accurate data**

---

**d) Different method**

---

**e) No information**

---

**f) Other reason**

---

**g) Main reason**

#### **4.12 Additional information**

No additional information

### **5. Area covered by habitat**

---

**5.1 Year or period** 2014-2024

---

**5.2 Surface area (km<sup>2</sup>)**

---

**a) Minimum**

---

**b) Maximum**

---

**c) Best single value** 8.64

---

**5.3 Type of estimate** Best estimate

---

**5.4 Surface area; Method used** Complete survey or a statistically robust estimate

---

**5.5 Short-term trend; Period** 2007-2024

---

**5.6 Short-term trend; Direction** Stable

---

**5.7 Short-term trend; Magnitude**

---

**a) Estimated minimum**

---

**b) Estimated maximum**

---

**c) Pre-defined range**

---

**d) Unknown**

---

**e) Type of estimate**

---

**f) Rate of decrease**

---

**5.8 Short-term trend; Method used** Complete survey or a statistically robust estimate



|   |   |
|---|---|
| <b>5.9 Long-term trend; Period</b>                                | 1995-2024   |
| <b>5.10 Long-term trend; Direction</b>                            | Stable  |
| <b>5.11 Long-term trend; Magnitude</b>                            |   |
| <b>a) Minimum</b>   |   |
| <b>b) Maximum</b>   |   |
| <b>c) Confidence interval</b>                                     |   |
| <b>d) Rate of decrease</b>  |   |
| <b>5.12 Long-term trend; Method used</b>                          | Based mainly on extrapolation from a limited amount of data |
| <b>5.13 Favourable Reference Area (FRA)</b>                       |   |
| <b>a) Area (km<sup>2</sup>)</b>                                   |   |
| <b>b) Pre-defined increment</b>                                   | Current area is less than 2% smaller than the FRA           |
| <b>c) Unknown</b>   | No  |
| <b>d) Method used</b>   | Expert opinion  |
| <b>e) Quality of information</b>                                  |   |
| <b>5.14 Change and reason for change in surface area of range</b> |   |
| <b>a) Change</b>  | No  |
| <b>b) Genuine change</b>  |   |
| <b>c) Improved knowledge or more accurate data</b>                |   |
| <b>d) Different method</b>  |   |
| <b>e) No information</b>  |   |
| <b>f) Other reason</b>  |   |
| <b>g) Main reason</b>   |   |
| <b>5.15 Additional information</b>                                |   |

No additional information

## 6. Structure and functions

### 6.1 Condition of habitat (km<sup>2</sup>)

#### Area in good condition

ai) Minimum 0

aii) Maximum 0

#### Area not in good condition

bi) Minimum 8.28

bii) Maximum 8.28

#### Area where condition is unknown

ci) Minimum 0.36

cii) Maximum 0.36

**6.2 Condition of habitat; Method used** Complete survey or a statistically robust estimate

**6.3 Short-term trend of habitat area in good condition; Period** 2014-2024

**6.4 Short-term trend of habitat area in good condition; Direction** Stable

**6.5 Short-term trend of habitat area in good condition; Method used** Complete survey or a statistically robust estimate

### 6.6 Typical species

**Has the list of typical species changed in comparison to the previous reporting period?** No

**6.7 Typical species; Method used**

### 6.8 Additional information

Typical species were not used directly in the assessment of conservation status for habitat structure and function as a comprehensive list of typical species for each habitat was not available. However, the status of typical species was considered when the

condition of individual sites was assessed using Common Standards Monitoring Guidance. Common Standards Monitoring (CSM) data was used to assess the area of habitat in 'good' and 'not good' condition (field 6.1). Species were a component of the attributes assessed under CSM. Therefore, an assessment of species is considered to have formed part of the reporting under field 6.1 which supported the Habitats Structure and Function assessment (field 10.3).

## 7. Main pressures

### 7.1 Characterisation of pressures

**Table 2:** Pressures affecting the habitat, 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    |
|---|--|------------|
| PA17: Agricultural activities generating pollution to surface or ground waters (including marine)           | Ongoing and likely to be in the future | High (H)   |
| PF07: Residential and commercial activities and structures generating pollution to surface or ground waters | Ongoing and likely to be in the future | Medium (M) |
| PF17: Active abstraction of water for built-up areas  | Ongoing and likely to be in the future | Medium (M) |
| PG09: Management of fishing stocks and game   | 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 | High (H)   |
| PI02: Other invasive alien species (other than species of Union concern)                                    | 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)   |
| PJ01: Temperature changes and extremes due to climate change  | Ongoing and likely to be in the future | High (H)   |
| PJ10: Change of habitat location, size, and / or quality due to climate change                              | Ongoing and likely to be in the future | High (H)   |

### 7.2 Sources of information

See section 13 References

### 7.3 Additional information

No additional information

## 8. Conservation measures

### 8.1: Status of measures

#### a) Are measures needed?

Yes

#### b) Indicate the status of measures

Measures identified and taken

### 8.2 Main purpose of the measures taken

Restore the structure and functions, including the status of typical species (related to 'Specific structure and functions')

### 8.3 Location of the measures taken

Both inside and outside National Site Network

### 8.4 Response to measures

Long-term results (after 2036)

### 8.5 List of main conservation measures

**Table 3:** 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    |
|--|------------|
| MA10: Reduce/eliminate point or diffuse source pollution to surface or ground waters (including marine) from agricultural activities   | High (H)   |
| MF03: Reduce impact of outdoor sports, leisure and recreational activities (incl. restoration of habitats)   | Medium (M) |
| MF04: Reduce/eliminate pollution to surface or ground waters from commercial, residential and recreational areas and activities, and from industrial activities and structures | Medium (M) |
| MG03: Reducing the impact of (re-) stocking for fishing and hunting, of artificial feeding and predator control  | Medium (M) |
| MI01: Early detection and rapid eradication of invasive alien species of Union concern   | High (H)   |

|   |            |
|---|------------|
| MI02: Management, control or eradication of established invasive alien species of Union concern | High (H)   |
| MI03: Management, control or eradication of other invasive alien species                        | High (H)   |
| MK01: Reduce impact of mixed source pollution   | High (H)   |
| MK03: Restoration of habitats impacted by multi-purpose hydrological changes                    | Medium (M) |
| MJ01: Implement climate change mitigation measures  | High (H)   |
| MJ02: Implement climate change adaptation measures  | High (H)   |

## 8.6 Additional information

No additional information

## 9. Future prospects

### 9.1a Future trends of parameters

|                             |  |
|-----------------------------|--|
| ai) Range                   | Overall stable                           |
| bi) Area                    | Overall stable                           |
| ci) Structure and functions | Negative - slight/moderate deterioration |

### 9.1b Future prospects of parameters

|                              |      |
|------------------------------|------|
| aii) Range                   | Good |
| bii) Area                    | Good |
| cii) Structure and functions | Bad  |

## 9.2 Additional information

No additional information

## 10. Conclusions

|   |                       |
|---|-----------------------|
| 10.1 Range  | Favourable (FV)       |
| 10.2 Area   | Favourable (FV)       |
| 10.3 Specific structure and functions (incl. typical species) | Unfavourable-bad (U2) |

|   |                       |
|---|-----------------------|
| <b>10.4 Future prospects</b>                          | Unfavourable-bad (U2) |
| <b>10.5 Overall assessment of Conservation Status</b> | Unfavourable-bad (U2) |
| <b>10.6 Overall trend in Conservation Status</b>      | Stable                |

#### **10.7 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.

#### **10.7 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.

#### **10.8 Additional information**

No additional information

### **11. UK National Site Network (pSCIs, SCIs, SACs) coverage for Annex I habitat types**

#### **11.1 Surface area of the habitat type inside the pSCIs, SCIs and SACs network (km<sup>2</sup>)**

**a) Minimum**

**b) Maximum**

|                             |     |
|-----------------------------|-----|
| <b>c) Best single value</b> | 1.8 |
|-----------------------------|-----|

|                              |               |
|------------------------------|---------------|
| <b>11.2 Type of estimate</b> | Best estimate |
|------------------------------|---------------|

|  |  |
|--|--|
| <b>11.3 Habitat area inside the network; Method used</b> | Complete survey or a statistically robust estimate |
|--|--|

**11.4 Short-term trend of habitat area within the network; Direction**

Stable

**11.5 Short-term trend of habitat area within the network; Method used**

Complete survey or a statistically robust estimate

**11.6 Short-term trend of habitat area in good condition within the network; Direction**

Stable

**11.7 Short-term trend of habitat area in good condition within the network; Method used**

Complete survey or a statistically robust estimate

#### **11.8 Additional information**

No additional information

## **12. Complementary information**

### **12.1 Justification of percentage thresholds for trends**

No justification information

### **12.2 Other relevant information**

No other relevant information

## 13. References

### Biogeographical and marine regions

#### 3.2 Sources of information

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## **Main pressures**

### **7.2 Sources of information**

No sources of information

## 14. Explanatory Notes

| Field label                           | Note   |
|---------------------------------------|--|
| 2.1: Year or period                   | Most of the data are post 2007. The status of this and other Habitats Directive habitats in Wales were reviewed by Hatton-Ellis (2014).  |
| 2.3: Distribution map;<br>Method used | <p>Based on data from the Welsh updated lakes inventory (Hatton-Ellis, 2014). Uncertainties reflect the difficulty of correctly assigning water bodies to a Habitats Directive type, and the close relationship between this habitat and 3140 (see the report for 3140 and also JNCC 2007).</p> <p>Although fairly widely distributed in Wales, many squares are represented only by an isolated pond or lake, often in poor condition. Only on Anglesey, where there are several examples close together, is the habitat network more robust (Hatton-Ellis, 2025 - Figure 1).</p> |
| 4.1: Surface area                     | This habitat type occurs locally but is widely distributed across lowland Wales. It is particularly frequent on Anglesey. There are no examples in upland areas (i.e. above the limit of enclosure).   |
| 4.2: Short-term trend;<br>Period      | The standard period has been used.   |
| 4.3: Short-term trend;<br>Direction   | We have no clear evidence of a trend in range over the period specified (Hatton-Ellis 2019) and there is no evidence of a decline in range over the last reporting period. Many potential opportunities to establish water bodies of this type in lowland areas (e.g. new ornamental lakes, gravel pits) are missed due to intentional or accidental planting of non-native invasive species such as <i>Elodea</i> spp. or <i>Lagarosiphon major</i> .   |
| 4.4: Short-term trend;<br>Magnitude   | There is no evidence of a decline in range for this habitat (Hatton-Ellis 2019).   |
| 4.5: Short-term trend;<br>Method used | The monitoring network focusses mainly on larger examples of this habitat and on the protected site series (both SACs and SSSIs). The status of smaller ponds is mainly unknown. Due to the clumped pattern of occurrence  |

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|   | of this habitat in Wales (Hatton-Ellis, 2025 - Fig. 1), there is considerable uncertainty in relation to range.   |
| 4.7: Long-term trend;<br>Direction                                | The range of this habitat in Wales was not well known at the start of the trend period.   |
| 4.8: Long-term trend;<br>Magnitude                                | Not applicable as the long term trend is unknown.   |
| 4.11: Change and<br>reason for change in<br>surface area of range | No change in range is evident.  |
| 5.1: Year or period   | This is based on Hatton-Ellis (2014). There is no evidence of a significant change in area since then, and it is considered unlikely that any change has occurred.  |
| 5.2: Surface area   | Three of the four largest examples are artificial and together these make up 68% of the total habitat area. The figure supplied is therefore highly sensitive to whether these artificial water bodies can be said to constitute natural eutrophic lakes or not and therefore would fit the habitat definition (Hatton-Ellis 2019).   |
| 5.4: Surface area;<br>Method used                                 | <p>Based on the assessment of Hatton-Ellis (2019) using area data from the GB Lakes inventory. Area has been calculated by summing the area of lakes assigned to the eutrophic category. Much of this habitat is in unfavourable condition as it is eutrophied and contains little Magnopotamion and therefore would not meet structure and function criteria (IAFG 2015).</p> <p>This is a minimum area as it contains only sites with survey data indicating the presence of this habitat, and where we can exclude the possibility of the habitat being degraded H3140. An unknown number of unsurveyed small water bodies may also be H3150: nevertheless, it is unlikely that the extent of this habitat type in Wales exceeds 10km<sup>2</sup>.</p> <p>A large number of water bodies in Wales are artificial, especially in South Wales. Most of these are likely to be eutrophic but are unsurveyed. This has led to an increase in the potential area available as H3150. Whilst duckweeds</p> |

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|  | <p>and fine-leaved pondweeds readily colonise new habitat, many of the typical species seem to colonise more slowly.</p> <p>Uncertainties reflect the difficulty of correctly assigning water bodies to a Habitats Directive type; this is most problematic for large lakes which have a correspondingly larger effect on the estimate of surface area.</p>   |
| 5.6: Short-term trend; Direction       | <p>No substantial eutrophic lakes have been filled in or have deteriorated so far that they do not meet the habitat description. Other changes are reported in structure and function (2.5). There has been no change in the distribution pattern within range since the previous reporting round.</p> <p>Higher levels of turnover may occur in smaller water bodies such as ponds and ornamental lakes. These do not contribute significantly to habitat area, however.</p>   |
| 5.7: Short-term trend; Magnitude       | There is no evidence of a short-term trend in area.   |
| 5.9: Long-term trend; Period           | The standard period has been used.  |
| 5.10: Long-term trend; Direction       | Available data do not indicate a clear trend in surface area over the trend period.   |
| 5.11: Long-term trend; Magnitude       | Not applicable as there is no evidence of a trend.  |
| 6.2: Condition of habitat; Method used | <p>Structure and function on protected sites (SACs and SSSIs) has been assessed using the Common Standards Monitoring approach (JNCC 2005, subsequently replaced by IAFG 2015), with appropriate modifications to take into account site-specific factors such as natural presence or absence of certain species. Information has also been collated from Water Framework Directive monitoring. Smaller water bodies not within the protected sites series will have been neglected using this approach and these constitute most of the 'Unknown' category.</p> <p>Monitoring results generally show that this habitat type in Wales is in poor condition, with elevated TP concentrations</p> |

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|  | <p>usually well above the 50ug/l limit, episodic algal blooms (Hatton-Ellis, 2025 - Plate 1 a.), below expected transparency (Hatton-Ellis, 2025 - Plate 1 c, d.) and low cover of typical species (Baxter &amp; Stewart 2015, Burgess et al. 2006, 2009, Hatton-Ellis 2011, 2012 a, 2012 b, Goldsmith et al. 2014, 2016, 2019, Shilland et al. 2018, NRW unpublished data). However, few protected sites have deteriorated to the point where they are completely phytoplankton dominated.</p>   |
| 6.3: Short-term trend of habitat area in good condition; Period    | The standard period has been used.  |
| 6.4: Short-term trend of habitat area in good condition; Direction | <p>None of the habitat surveyed is in good condition. This was also the case in 2019 (Hatton-Ellis 2019).</p> <p>Llyn Coron is apparently still deteriorating due to agricultural intensification (Hatton-Ellis 2016), and has recently experienced a fish kill due to a severe algal bloom (NRW, unpublished). A cyanobacterial bloom was reported in 2021 at Llangorse Lake (NRW, 2021).</p>  |
| 6.6: Typical species   | <p>The typical species list was revised in 2015 during the Common Standards Monitoring Guidance review (IAFG 2015) in order to provide a more consistent approach to assessment and improve the relationship between monitoring data and pressures. The impact on conclusions for Welsh SAC and SSSI feature assessment is small.</p> <p>Several of the typical species of this habitat including <i>Potamogeton alpinus</i>, <i>P. praelongus</i> and <i>P. lucens</i> are on the Wales Red List of Vascular Plants (Dines 2008), and <i>P. alpinus</i> is no longer found in H3150 in Wales. The most widespread typical species is <i>P. perfoliatus</i>.</p> <p>Most Welsh examples of H3150 are dominated by the invasive non-native <i>Elodea</i> spp., as well as the nutrient-tolerant <i>Zannichellia palustris</i>, <i>Ceratophyllum demersum</i> and fine-leaved pondweeds, especially <i>P. pusillus</i> and <i>P. pectinatus</i> (Hatton-Ellis, 2025 - Plate 1 b.). There is</p> |



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however some evidence for a decrease in TP and an associated slight increase in *P. perfoliatus* and charophytes at several sites.

Hydrocharition communities are generally confined to smaller water bodies such as ponds and ditches, or sheltered bays such as at Llangorse Lake. Artificial water bodies such as the Gwent Levels ditch system and the Montgomery Canal are particularly important for Hydrocharition communities. These communities generally thrive in high nutrient conditions and are not considered threatened in Wales.

Welsh H3150 lakes also support several other vascular plant species of interest including *Eleocharis acicularis*, *Elatine hydropiper* and *Callitriche truncata*. Evidence from 19th century plant records in the Anglesey Lakes (Griffith 1895) indicates that they formerly supported a wider range of aquatic species.

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6.7: Typical species;  
Method used

Typical species community composition and structure are assessed against Common Standards Monitoring targets (JNCC 2005; IAFG 2015). This uses a structured survey approach. One or more typical species are required to be present at or above a certain proportion of sample points in order for the lake to reach favourable condition. For further details see IAFG (2015).

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7.1: Characterisation of  
pressures

Pressures:

Nutrient runoff from agriculture (point and diffuse, PA17 – Hatton-Ellis, 2025 - Plate 1) is an important pressure on this habitat in Wales (Burgess et al. 2006; May et al. 2008; Hatton-Ellis 2016, 2019). Successful management of these pressures are key to achieving favourable conservation status of this nutrient sensitive habitat. Some lakes also have ongoing problems with other current or legacy nutrient sources (PK01).

Invasive non-native species (I01, I02) , especially *Elodea*

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spp. and *Dikerogammarus villosus* are the other most important pressure on this habitat type in Wales. These species also threaten other Habitats Directive lake types in particular H3140. *Elodea* spp. are a particular problem because they compete with native vegetation, substantially reducing its cover and thereby affecting structure and function (Hatton-Ellis, 2025 - Plate 1 d.). Reduction in nutrient pressures may help to reduce their impact.

The other major pressure on H3150 is climate change, which acts synergistically with nutrients and has similar effects (Whitehead et al. 2009). Due to relatively cool, windy summers, Welsh eutrophic lakes are generally in better ecological condition than their nutrient concentrations would suggest, but warmer conditions (PJ01) will enable phytoplankton to make more efficient use of nutrients (Mooij et al. 2007; Jeppesen et al. 2014) and thereby increase the duration and severity of algal blooms (PJ10), as was recently seen on Llyn Coron and Llangorse Lake during the exceptionally hot summer of 2021.

Similarly, altered temperature regimes will improve recruitment of coarse fish species such as roach (*Rutilus rutilus*) and bream (*Abramis brama*), causing negative changes to structure and function (PJ10). Heavier and more extreme rainfall events are also expected to increase nutrient transport into lakes.

Management of fish stocks (PG09) is a long-standing and important issue for eutrophic lakes. Many of the coarse fish favoured by anglers have a strong negative impact on lake ecology (Moss et al. 1996; Reynolds & Aldridge 2021). The current regulatory framework is generally effective for current practice, but management of situations where fish were introduced in lakes in the past is more problematic. This issue will become increasingly important with climate change (see above).

Various other pressures affecting habitat structure exist,

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particularly relating to hydromorphology. These are not considered to be serious in their own right, but in some cases there may be opportunities to manage these in such a way as to reduce other pressures (e.g. to increase flushing of nutrients out of a lake, render habitat less suitable for invasive species, or improve structure and function of the shoreline).

#### Threats:

Threats to this habitat are similar to the pressures. The severity of all of the most important pressures is predicted to increase with climate change, as outlined above.

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#### 8.5: List of main conservation measures

Eutrophic lakes occur mainly in intensively farmed landscapes, and as a result are vulnerable to agricultural nutrient pressures. The achievement of FCS for H3150 in Wales cannot occur without the implementation of targeted agrienvironment measures that deliver genuine improvements for this habitat. Wales is currently developing a new agrienvironment scheme, the Sustainable Farming Scheme, to replace the previous Glastir scheme that has lapsed following EU Exit.

Previous policy approaches did not succeed because (i) they frequently depend on most or all farmers implementing best practice; (ii) many important measures and schemes are voluntary and uptake is therefore patchy and not necessarily in suitable areas; (iii) schemes tend to try to deliver against a broad suite of environmental objectives, resulting in insufficiently focused measures and; (iv) there are financial or administrative rules which hamper the delivery of many important measures, such as upgrades to slurry stores. Additionally, many of the measures required for lake conservation cannot easily be delivered via large-scale project funding due to the need to secure permission from landowners in advance and for long-term management. Collaborative projects involving landowners may help in this respect.

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The adoption of Sustainable Management of Natural Resources under the Environment Act offers an opportunity for a revised policy approach based on a more resilient lake catchment incorporating landscape features that reduce the likelihood of nutrient-rich runoff reaching lakes. One or more individual, long-term projects are likely to be needed to deliver favourable outcomes in this area.

Management of pollution from other sources also requires consideration, and is often best delivered in conjunction with agricultural projects if possible to maximise the likelihood of recovery and avoid the perception that an individual sector is being unfairly targeted. In some cases there are legacy pollution issues resulting in the accumulation of large quantities of phosphorus in lake sediments that are then recycled each year. These nutrients can either be removed by dredging the lake, or deactivated using a chemical treatment product (e.g. Phoslock – Meis et al. 2013). In either case, detailed technical studies would be needed to determine the most effective approach. Due to the high cost of such approaches, this needs to be done with care, and appropriate lake-specific measures need to be identified (Tammeorg et al. 2023).

Detection, control and management of invasive alien species in freshwaters is exceedingly problematic. Whilst detection and monitoring of spread is comparatively straightforward, there are few effective options available for control and management that do not themselves have significant environmental impact. Further research in this area is urgently needed to identify effective technical solutions.

Continuing climate change is likely inevitable and is not a factor within the control of Wales. Climate mitigation measures are being delivered but are outside the scope of this assessment. Climate adaptation for lakes could include river restoration and renaturalisation of lake catchments,

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|  | thereby reducing the efficiency of nutrient delivery to the water body both by reducing peak flows and by uptake of nutrients before they reach the lake. Such actions can also help to reduce siltation and maintain water levels during droughts.  |
| 10.1: Range  | Conclusion on Range reached because: (i) the short-term trend direction in Range surface area is stable; and (ii) the current Range surface area is approximately equal to the Favourable Reference Range.   |
| 10.2: Area   | Conclusion on Area reached because: (i) the short-term trend direction in Area is stable; (ii) the current Area is approximately equal to the Favourable Reference Area; and iii) there has been no significant change in distribution pattern within range  |
| 10.3: Specific structure and functions   | Conclusion on Structure and function reached because: i) habitat condition data indicates that more than 25% of the habitat is in unfavourable (not good) condition; ii) short-term trend in area of habitat in good condition is stable; and iii) expert opinion determines that there are significant issues for this habitat. |
| 10.4: Future prospects   | Future Prospects are assessed as Unfavourable – Bad because Structure and Function in the Future is assessed as Unfavourable – Bad and likely to decline further due to Climate Change.  |
| 10.5: Overall assessment of Conservation Status                                | The overall conservation assessment is Unfavourable – Bad because Structure and Function (10.4), and Future Prospects (10.5) are both assessed as Unfavourable – Bad.  |
| 11.1: Surface area of the habitat type inside the pSCIs, SCIs and SACs network | From Hatton-Ellis (2019). All potentially eutrophic lakes within the SAC network have been surveyed. This therefore represents an exact figure, subject only to measurement error and natural fluctuations in water level.   |
| 11.4: Short-term trend of habitat area within the network; Direction           | There has been no change in the area of habitat within the protected sites network.  |

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| 11.5: Short-term trend of habitat area within the network; Method used                   | The Common Standards Monitoring approach (IAFG 2015) has been used on all important examples of the habitat within the network.  |
| 11.6: Short-term trend of habitat area in good condition within the network; Direction   | None of the habitat within the protected site series is in good condition, so no further deterioration is possible. However, sites protected under the SAC network are generally in better condition than water bodies of the same type in the wider countryside.  |
| 11.7: Short-term trend of habitat area in good condition within the network; Method used | The Common Standards Monitoring approach (IAFG 2015) has been used on all important examples of the habitat within the network.  |
| 5.13: Favourable Reference Area (FRA)  | The UK-level FRV for surface area was developed by JNCC using an audit trail based on the year the FRV was first established and any changes made in subsequent reporting rounds. The audit may draw from any combination of the 2007, 2013, or 2019 Habitats Directive reports and reflects the full rationale used for the 2019 Article 17 reporting. This FRV was reviewed by Welsh experts and considered appropriate for use in Wales based on current habitat extent and trends. |
| 4.10: Favourable Reference Range (FRR)   | The UK-level FRV for range was developed by JNCC using an audit trail based on the year the FRV was first established and any changes made in subsequent reporting rounds. The audit may draw from any combination of the 2007, 2013, or 2019 Habitats Directive reports and reflects the full rationale used for the 2019 Article 17 reporting. This FRV was reviewed by Welsh experts and considered appropriate for use in Wales based on current distribution and trends.          |