C1.2b Mesotrophic to eutrophic waterbody with angiosperms

Summary

This habitat includes permanent, standing or sluggish, mesotrophic to eutrophic waters in lakes, pools and mature rivers and slow streams, mainly now in central Europe. The sediments especially are nutrient-rich, sometimes partly organic and muddy, and the habitat supports dense beds of submerged and/or floating macrophytes. Diversity of all biota is relatively high. Anthropogenic hyper-eutrophication is the main threat. Restoration measures include the restoration of the hydrological regime and the prevention of nutrient inputs from agricultural and forestry activities through drainage of superficial and ground water.

Synthesis

This habitat reaches the qualification of Near Threatened both in EU 28 and EU 28+, because of its reduction in quality over the last 50 years on a relatively high extent of the habitat (Criterion C/D1). Also the reduction in quantity in historic time (criterion A3) results in Near Threatened. In this assessment data from Poland are missing, which is considered an important part data gap.

Overall Category & Criteria			
EU 28		EU 28+	
Red List Category	Red List Criteria	Red List Category	Red List Criteria
Near Threatened	C/D1	Near Threatened	C/D1

Sub-habitat types that may require further examination

For this habitat, no subtypes need to be considered in the assessment.

Habitat Type

Code and name

C1.2b Mesotrophic to eutrophic waterbody with angiosperms

Vegetation dominated by *Stratiotes aloides* and other small pleustophytes (*Lemna* spp.), natural pool near Czumów, Poland (Photo: Flavia Landucci).

Vegetation dominated by *Potamogeton lucens,* Trasimeno lake, Italy (Photo: Flavia Landucci).

Habitat description

This habitat type includes lakes, pools and stretches of rivers and broad streams with very slow-flowing water, which are naturally mesotrophic to eutrophic. The water is usually clear or brown (humic) with low to moderate concentration of chlorophyll and sediments suspended in the water column. The water is normally buffered to highly buffered and rich in basic ions with a pH typically circumneutral to basic. The sediment is rich in nutrients and might be partially organic and muddy. The habitat supports dense beds of

aquatic macrophytes more or less rich in species. Macrophytes can disappear when pollution causes nutrient levels to rise further and the system enters the hypertrophic state. Aquatic macrophyte growth forms include floating and submerged forms. Depending on the water depth, the successional stage and the trophic status these waters can be colonized by communities dominated by *nymphaeid* species (such as *Nymphaea* spp., *Nuphar lutea, Nymphoides peltata*), rooted hydrophytes (*Potamogeton* spp., *Myriphyllum* spp., *Najas spp., Vallisneria spiralis*), freely floating hydrophytes (*Ceratophyllum* spp., *Utricularia* spp., *Hydrocharis morsus-ranae, Stratiotes aloides* and *Lemna* spp.). Typical of pools and shallow waters are the communities dominated by aquatic species of the genus *Ranunculus* (syn. *Batrachium*) and *Callitriche*.

Most of the species populating this habitat type are critical to phosphorus concentrations in the water. Optimal conditions of this habitat are represented by a high nutrient content in the sediment (in the mesotrophic to eutrophic range) and a low nutrient content in the overlying water (with optimal values of phosphorus below 1 µmol/L over the growing season).

Beds of *Nymphaea lotus* var. *thermalis* in their natural distribution area are also part of this habitat. *Nymphaea lotus* is an East-African and Southeast-Asian species, however *N. lotus* var. *thermalis* is endemic to the thermal water of Peţa River in Transylvania, Romenia.

Temporary flooded shores and emergent macrophytes stands are excluded from this habitat type and are instead included in other habitats C3.5a (Periodically exposed shores with stable, mainly eutrophic sediments with pioneer and ephemeral vegetation), C3.5b (Periodically exposed shores with stable, mainly mesotrophic sediments with pioneer and ephemeral vegetation) and C5.1a (Tall helophyte dominated freshwater vegetation), C5.1b (Small helophyte dominated freshwater vegetation).

Indicators of good quality:

- Dense beds of submerged and floating macrophytes
- Relatively high species diversity of submerged and floating macrophytes
- Absence or very low abundance of floating and submerged algae beds (FLAB)
- Low abundance of emergent species indicators of a process of succession or eutrophication (e.g. *Phragmites australis*, *Typha* spp., *Sparganium* spp., *Glyceria* maxima, *Schoenoplectus* spp., etc.)
- Concentrations of nutrients and chlorophyll naturally in the range of mesotrophy and eutrophy (approximately P 20-100 µg/L and chlorophyll 5-40 µg/L)
- Absence or very low abundance of exotic invasive species
- Absence or very low abundance of species indicators of hypertrophic conditions (e.g. *Lemna gibba*, *L. minor, Spirodela polyrhiza,* etc.)
- Not excessive turbidity of the water due to high chlorophyll concentrations and suspended detritus and sediments in the water column
- pH weakly acid, to circumneutral to alkalinic (usually pH 6-8)
- No excessive accumulation of organic mud and sediments. Occasionally a layer of detritus may occur in stands with *Nymphaeid* plants.

Note: Chemical and physical parameters are only indicative, they may change in different geographical area and climatic conditions.

Characteristic species:

Vascular plants: *Stratiotes aloides*, *Utricularia vulgaris*, *U. australis, Stuckenia pectinata, Potamogeton* spp. (e.g. *Potamogeton natans*, *P. coloratus, P. compressus, P. crispus, P. perfoliatus, P. pusillus, P. lucens, P. acutifolius, P. berchtoldii, P. alpinus, P. friesii, P. obtusifolius, P. trichoides, P. nodosus, P. praelongus,* etc.), *Nymphaea alba, N. pumila, N. lotus var. thermalis* (only in Romania), *Nuphar lutea, N. pumila, Nymphoides peltata, Hydrocharis morsus-ranae, Ranunculus spp.* (*Ranunculus circinatus, R. aquatilis, R. baudotii, etc.*), *Myriophyllum spicatum, M. verticillatum, M. sybiricum, Ceratophyllum demersum, Trapa natans, Najas*

marina, *N. minor, N. flexilis, Groenlandia densa, Callitriche spp.* (e.g. *Callitriche palustris, C. stagnalis, C. hermaphroditica,* etc.), *Hottonia palustris, Wolffia arrhiza. Rare plant species are Aldrovanda vesiculosa, Caldesia parnassifolia, Luronium natans, Potamogeton rutilus, Najas tenuissima*

Bryophytes: *Riccia fluitans, R. rhenanan*, *Ricciocarpus natans*

Macroinvertebrates: This habitat hosts a very high diversity of macroinvertebrates (insects, crustaceans, worms , etc.), the most typical groups are *Odonata, Diptera, Decapoda, Amphipoda, Isopoda, Hemiptera, Bivalvia, Gasteropoda, Coleoptera, Tricladida, Hirudinea, Oligochaeta*.

Vertebrates: mammals: *Lutra lutra*; reptiles: *Natrix spp.* (*N. maura, N. megalocephala, N. natrix, N. tessellate*), *Emys orbicularis* (*includes several endemic subspecies*); amphibian: *Rana spp., Pelophylax* spp., *Bufo bufo, B. viridis*; birds: *Aythya ferina, A. fuligula, A. nyroca, Netta rufina, Anas strepera, A. platyrhynchos, Chlidonias hybrida, Larus ridibundus, L. minutus, Podiceps nigricollis, P. auritus, P. grisegena*, *P. cristatus, Tachybaptus rufficollis*, *Fulica atra*, *Himantopus himantopus, Galinulla chloropus, Cygnus olor, C. bewickii, C. colombianus, Ardea alba, A. cinerea, A. purpurea, A. ralloides, Phalacrocorax carbo,* etc.

Classification

This habitat may be equivalent to, or broader than, or narrower than the habitats or ecosystems in the following typologies.

EUNIS:

C1.2 Permanent mesotrophic lakes, ponds and pools

C1.3 Permanent eutrophic lakes, ponds and pools

EuroVegChecklist:

Lemnion minoris O. de Bolòs et Masclans 1955

Utricularion vulgaris Passarge 1964

Hydrocharition morsus-ranae (Passarge 1964) Westhoff et Den Held 1969

Potamogetonion Libbert 1931

Nymphaeion albae Oberd. 1957

Nelumboion nuciferae Losev et Golub in Golub et al. 1991

Ranunculion aquatilis Passarge 1964

Annex 1:

3150 Natural eutrophic lakes with Magnopotamion or Hydrocharition -type vegetation

31A0 Transylvanian hot-spring lotus beds

Emerald:

C1.222 Floating Hydrocharis morsus-ranae rafts

C1.223 Floating Stratiotes aloides rafts

C1.224 Floating Utricularia australis and Utricularia vulgaris colonies

C1.225 Floating Salvinia natans mats

C1.226 Floating Aldrovanda vesiculosa communities

C1.2416 Nelumbo nucifera beds

C1.24113 Transylvanian hot-spring lotus beds

C1.32 Free-floating vegetation of eutrophic waterbodies

C1.33 Rooted submerged vegetation of eutrophic waterbodies

C1.3411 Ranunculus communities in shallow water

C1.3413 Hottonia palustris beds in shallow water

MAES-2:

Fresh water, Rivers and lakes

IUCN:

5.5. Permanent Freshwater Lakes [over 8 ha]

5.7. Permanent Freshwater Marshes/Pools [under 8 ha]

Water Framework Directive:

201, 301a, LCB1

Does the habitat type present an outstanding example of typical characteristics of one or more biogeographic regions?
No

Justification
The habitat is not limited to one or few geographical regions.

Geographic occurrence and trends

EU 28	Present or Presence Uncertain	Current area of habitat	Recent trend in quantity (last 50 yrs)	Recent trend in quality (last 50 yrs)
Austria	Present	300 Km^2	Decreasing	Decreasing
Belgium	Present	30 Km^2	Decreasing	Unknown
Bulgaria	Present	110 Km^2	Decreasing	Decreasing
Croatia	Present	35 Km^2	Stable	Decreasing
Cyprus	Present	0.05 Km^2	Stable	Stable
Czech Republic	Present	255 Km^2	Decreasing	Decreasing
Denmark	Present	Unknown Km^2	Unknown	Unknown
Estonia	Present	320 Km^2	Stable	Unknown
Finland	Aland Islands: Uncertain Finland mainland: Present	540 Km^2	Stable	Decreasing
France	Corsica: Uncertain France mainland: Present	150 Km^2	Decreasing	Decreasing
Germany	Present	1030 Km^2	Decreasing	Decreasing
Greece	Crete: Uncertain East Aegean: Uncertain Greece (mainland and other islands): Present	33 Km^2	Stable	Stable

EU 28	Present or Presence Uncertain	Current area of habitat	Recent trend in quantity (last 50 yrs)	Recent trend in quality (last 50 yrs)
Hungary	Present	100 Km^2	Increasing	Decreasing
Ireland	Present	411 Km^2	Stable	Stable
Italy	Italy mainland: Present Sardinia: Present Sicily: Present	640 Km^2	Decreasing	Decreasing
Latvia	Present	Unknown Km^2	Unknown	Unknown
Lithuania	Present	90 Km^2	Increasing	Stable
Luxembourg	Present	Unknown Km^2	Unknown	Unknown
Malta	Uncertain	Unknown Km^2	Unknown	Unknown
Netherlands	Present	150 Km^2	Stable	Decreasing
Poland	Present	Unknown Km^2	Unknown	Unknown
Portugal	Madeira: Uncertain Portugal Azores: Uncertain Portugal mainland: Present Savage Islands: Uncertain	57 Km^2	Increasing	Unknown
Romania	Present	66 Km^2	Decreasing	Decreasing
Slovakia	Present	5 Km^2	Decreasing	Decreasing
Slovenia	Present	61 Km^2	Decreasing	Decreasing
Spain	Balearic Islands: Uncertain Canary Islands: Uncertain Spain mainland: Present	84 Km^2	Decreasing	Decreasing
Sweden	Present	1176 Km^2	Stable	Decreasing
UK	Gibraltar: Present Northern Island: Present United Kingdom: Present	554 Km^2	Stable	Decreasing

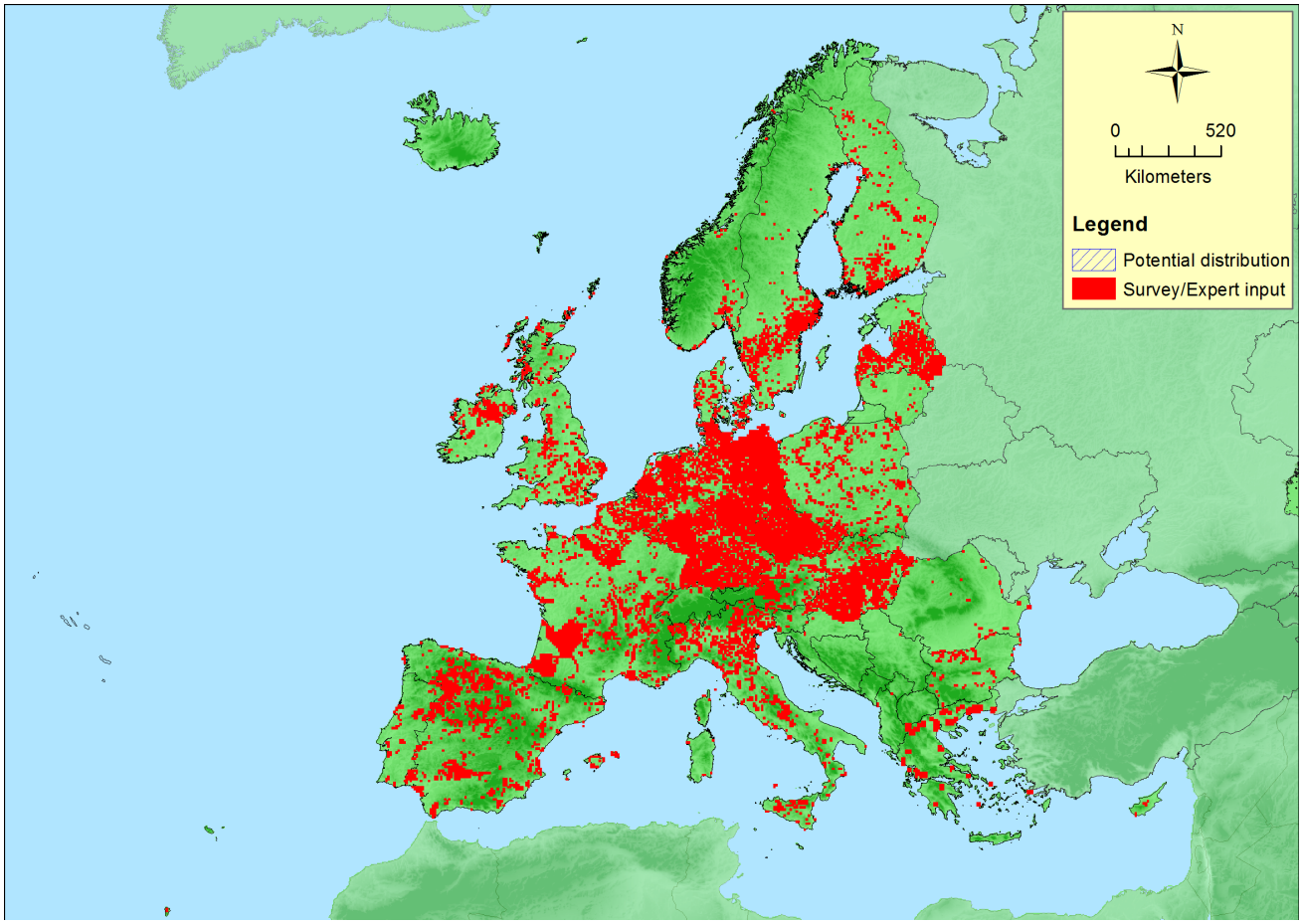
EU 28 +	Present or Presence Uncertain	Current area of habitat	Recent trend in quantity (last 50 yrs)	Recent trend in quality (last 50 yrs)
Albania	Uncertain	Unknown Km^2	Unknown	Unknown
Andorra	Uncertain	Unknown Km^2	Unknown	Unknown
Bosnia and Herzegovina	Present	20 Km^2	Decreasing	Decreasing
Faroe Islands	Uncertain	Unknown Km^2	Unknown	Unknown
Former Yugoslavian Republic of Macedonia (FYROM)	Present	0.5 Km^2	Decreasing	Decreasing
Guernsey	Uncertain	Unknown Km^2	Unknown	Unknown

EU 28 +	Present or Presence Uncertain	Current area of habitat	Recent trend in quantity (last 50 yrs)	Recent trend in quality (last 50 yrs)
Iceland	Present	Unknown Km^2	Unknown	Unknown
Isle of Man	Uncertain	Unknown Km^2	Unknown	Unknown
Jersey	Uncertain	Unknown Km^2	Unknown	Unknown
Kaliningrad	Present	Unknown Km^2	Unknown	Unknown
Kosovo	Present	Unknown Km^2	Unknown	Unknown
Monaco	Uncertain	Unknown Km^2	Unknown	Unknown
Montenegro	Uncertain	Unknown Km^2	Unknown	Unknown
Norway	Jan Mayen: Uncertain Norway Mainland: Present Svalbard: Uncertain	1600 Km^2	Stable	Decreasing
San Marino	Uncertain	Unknown Km^2	Unknown	Unknown
Serbia	Present	Unknown Km^2	Unknown	Unknown
Switzerland	Present	15 Km^2	Stable	Decreasing
Vatican City	Present	Unknown Km^2	Unknown	Unknown

Extent of Occurrence, Area of Occupancy and habitat area

	Extent of Occurrence (EOO)	Area of Occupancy (AOO)	Current estimated Total Area	Comment
EU 28	11343450 Km^2	11659	7245 Km^2	
EU 28+	11343450 Km^2	11766	8886 Km^2	The main contribution of EU28+ is from Norway

Distribution map



The map is rather complete for EU28, but data gaps exist outside EU28 in the Balkan, Norway and Switzerland. Data sources: Art17, EVA, GBIF.

How much of the current distribution of the habitat type lies within the EU 28?

The percentage of the habitat type in the EU 28 is (very roughly) estimated to be about 10-20%, based on an assumed Eurasian distribution of the habitat worldwide. In Europe 50-60% of this habitat type lies within the EU 28. The rest is across EU 28+ countries. However the same or very similar habitat type (with the same genera but partially or totally different species can be found in whole Northern Hemisphere.

Trends in quantity

The trends in quantity most often vary from stable to decreasing for both EU 28 and EU 28+ countries. However few countries reported an increasing trend. This apparently positive trend is due to eutrophication processes of oligotrophic to mesotrophic lakes and mesotrophic to eutrophic lakes.

- Average current trend in quantity (extent)
  EU 28: Decreasing
  EU 28+: Decreasing
- Does the habitat type have a small natural range following regression?
  No
  Justification
  The habitat does not have a small natural range, instead it occurrs over a large area of Europe.
- Does the habitat have a small natural range by reason of its intrinsically restricted area?
  No
  Justification
  The habitat does not have a small natural range, instead it occurrs over a large area of Europe.

Trends in quality

The overall trend in biotic and abiotic quality is currently decreasing for both EU 28 and EU 28+, only few countries reported stable conditions.

- Average current trend in quality
  EU 28: Decreasing
  EU 28+: Decreasing

Pressures and threats

The main pressures reported by countries are eutrophication due to agricultural and forestry activities, pollution, modification of hydrographic functioning and human induced changes in hydraulic conditions. Sometimes land use and problematic non-native species are reported. Hydrological changes include water level regulation and, especially in the past, draining of lakes. Climate change is predicted to exacerbate the issues associated with eutrophication.

List of pressures and threats

Biological resource use other than agriculture & forestry

Fishing and harvesting aquatic resources

Pollution

Diffuse pollution to surface waters due to agricultural and forestry activities
Nutrient enrichment (N, P, organic matter)

Invasive, other problematic species and genes

Invasive non-native species
Problematic native species

Natural System modifications

Human induced changes in hydraulic conditions
Modification of hydrographic functioning, general
Other human induced changes in hydraulic conditions

Climate change

Changes in abiotic conditions
Changes in biotic conditions

Conservation and management

The main current approaches to conservation, management and restoration of this habitat are: 1. Restoring the hydrology, included the influence of the groundwater system; 2. Limiting the nutrient input from the surrounding agricultural areas; eutrophication need to be prevented from both surface water and ground water input; 3. Allowing the ecosystems to build up autochthonous organic material and development of succession stages in the vegetation.

List of conservation and management needs

Measures related to wetland, freshwater and coastal habitats

Restoring/Improving water quality
Restoring/Improving the hydrological regime
Managing water abstraction

Measures related to spatial planning

Establish protected areas/sites
Establishing wilderness areas/allowing succession
Legal protection of habitats and species
Manage landscape features

Measures related to hunting, taking and fishing and species management

Specific single species or species group management measures

Measures related to urban areas, industry, energy and transport

Urban and industrial waste management

Conservation status

Annex 1:

3150: ALP U2, ATL U2, BLS U1, BOR U2, CON U1, MAC XX, MED U1, PAN U1, STE FV

31A0: PAN FV

When severely damaged, does the habitat retain the capacity to recover its typical character and functionality?

Experience from North-Western Atlantic and Central Europe shows that aquatic vegetation types occurring in late successional stages are difficult to recreate, and when it is possible it is a long-term effort.

Effort required

20 years	50+ years
Through intervention	Through intervention

Red List Assessment

Criterion A: Reduction in quantity

Criterion A	A1	A2a	A2b	A3
EU 28	-16 %	unknown %	unknown %	-68 %
EU 28+	-13 %	unknown %	unknown %	-64 %

The calculated trend in quantity of the habitat resulted in a low reduction of 13-16% during the last 50 years that corresponds to the category Least Concern according to criterion A1. Only 7 countries (around 20%) provided data concerning the historical trend. However it is reliable to suppose that a similar or stable trend affected also the other European countries leading to a high historic negative trend since 1750 of 64-68%. This score would lead to assess this habitat as Vulnerable according to criterion A3, however considering the few data available it was preferred to assign the habitat to the category Near Threatened.

Criterion B: Restricted geographic distribution

Criterion B	B1				B2				B3
	EOO	a	b	c	AOO	a	b	c	
EU 28	> 50000 Km^2	Yes	Unknown	No	> 50	Yes	Unknown	No	No
EU 28+	> 50000 Km^2	Yes	Unknown	No	> 50	Yes	Unknown	No	No

The habitat is largely extended in Europe therefore both EOO and AOO are far from the thresholds required

by criterion B to consider the habitat threatened. However spatial extent, biotic and abiotic quality of the habitat are continuing to decline.

Criterion C and D: Reduction in abiotic and/or biotic quality

Criteria C/D	C/D1		C/D2		C/D3	
	Extent affected	Relative severity	Extent affected	Relative severity	Extent affected	Relative severity
EU 28	56 %	43 %	unknown %	unknown %	unknown %	unknown %
EU 28+	42 %	43 %	unknown %	unknown %	unknown %	unknown %

Criterion C	C1		C2		C3	
	Extent affected	Relative severity	Extent affected	Relative severity	Extent affected	Relative severity
EU 28	unknown %	unknown %	unknown %	unknown %	unknown %	unknown %
EU 28+	unknown %	unknown %	unknown %	unknown %	unknown %	unknown %

Criterion D	D1		D2		D3	
	Extent affected	Relative severity	Extent affected	Relative severity	Extent affected	Relative severity
EU 28	unknown %	unknown%	unknown %	unknown%	unknown %	unknown%
EU 28+	unknown %	unknown%	unknown %	unknown%	unknown %	unknown%

The decrease of quality have the same severity score (43), while the extent affected in EU 28+ (42%) is slightly smaller than that one in EU 28 (56%). The assessment according criterion C/D1 is Near Threatened for both EU 28 and EU28+.

Criterion E: Quantitative analysis to evaluate risk of habitat collapse

Criterion E	Probability of collapse
EU 28	unknown
EU 28+	unknown

No quantitative calculation of habitat collapse could be performed.

Overall assessment "Balance sheet" for EU 28 and EU 28+

	A1	A2a	A2b	A3	B1	B2	B3	C/D1	C/D2	C/D3	C1	C2	C3	D1	D2	D3	E
EU28	LC	DD	DD	NT	LC	LC	DD	NT	DD	DD	DD	DD	DD	DD	DD	DD	DD
EU28+	LC	DD	DD	NT	LC	LC	DD	NT	DD	DD	DD	DD	DD	DD	DD	DD	DD

Overall Category & Criteria			
EU 28		EU 28+	
Red List Category	Red List Criteria	Red List Category	Red List Criteria
Near Threatened	C/D1	Near Threatened	C/D1

Confidence in the assessment

Medium (evenly split between quantitative data/literature and uncertain data sources and assured expert knowledge)

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References

Berg, C., Dengler, J., Abdank, A. and Isermann, M, 2004. De Pflanzengesellschaften Mecklenburg-Vorpommerns un ihre Gefährdung. Textband. 606 pages. Landesamt für Umwelt, Naturschutz und Geologie Mecklenburg-Vorpommern. Weissdorn-Verlag Jena.

Chytrý, M. (ed.) 2011. Vegetace České republiky 3. Vodní a mokřadní vegetace. [Vegetation of the Czech Republic 3. Aquatic and wetland vegetation]. Academia, Praha, CZ.

Smolders, A.J.P., Lamers, L.P.M., Lucassen, E.C.H.E.T., Van der Velde, G. and Roelofs, J.G.M., 2006. Internal eutrophication: 'How it works and what to do about it', a review. Chemistry and Ecology 22: 93-111.