

Chapter 16. 6430 *Hydrophilous tall herb fringe communities of plain and of montane to alpine levels* (S. Rūsiņa, A. Auniņš, V. Spunģis)

16.1 Characteristics of the Habitat Type

16.1.1 Brief Description

Habitat type 6430 *Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels* (referred to as *Hydrophilous tall herb fringes* in the text) develop in wet soils on river and lake shores and moderately moist to moist soils on forest edges. Monodominant stands of tall herbaceous plants that have formed by the overgrowing of grasslands and stands of invasive species (for example, *Impatiens glandulifera*, *Echinocystis lobata*) are not included in the habitat.

Hydrophilous tall herb fringes are rare in Latvia (Fig. 16.1.1) and the conservation status of these habitats is often low because the intensive drainage performed in the late 20th century changed the hydrological regime of many rivers and the natural spring flooding action decreased. The largest areas of hydrophilous tall herb fringes have been preserved on the banks of the Venta, Aiviekste and Lielupe rivers. The area of the habitat type is 700 ha or 0.01% of the area of Latvia. The eutrophic stands of tall herbaceous plants that occur on forest edges have not been mapped in Latvia and there is no information on their distribution (Rūsiņa 2013i). Latvia has 13% of the total habitat area in the EU boreal region.

Well-developed hydrophilous tall herb fringes are characteristic to natural sections of the large Lielupe, Gauja, Venta, Rinda rivers with shallow banks, where the course of the river has not been altered by straightening and the water is not polluted with organic compounds (it does not overfertilise this stand) (Fig. 16.1.2–16.1.6).

16.1.2 Important Processes and Structures

There is a large amount of nutrients in ecotone zones of river banks and lake shores (shoals near beds, border area between a riverbed and low floodplain), which is usually brought by deposits. Relatively pronounced water level fluctuations are typical. Therefore the soils are usually moist, but may dry out periodically. As a result of river activity, plants often become mechanically damaged, so these habitats are in a constant dynamic equilibrium – plant communities continuously re-estab-

lish and do not overgrow with shrubs or trees (Fig. 16.1.7, 16.1.8). The action of plain rivers with lower stream gradient is less intensive and the formation and preservation of these habitats on the banks of such rivers is also encouraged by fragmentary extensive grazing. Habitats are usually linear, their width is often less than one metre, wider bands occur on the banks of large rivers, where water level fluctuations and flooding activity is stronger, as well as in places with shallow banks. Water level fluctuations, nutrients and deposits transported by water, micro-terrain formed by water and ice action and mechanical disturbances are important for river bank and lake shore habitats. The main factor on forest edges is partial shading and the influence of forest litter on nutrient cycling.

Mowing and grazing can be important in areas where natural processes are not intensive enough to maintain the habitat in a dynamic equilibrium (Halada et al. 2011).

16.1.3 Vegetation, Plant and Animal Species

Plants and vegetation. Herb layer is usually tall (200 cm and more), but the cover is very varied. It can be relatively sparse, where the mechanical action of water and level fluctuations are more pronounced, and dense in areas, where the river action is not so dynamic. Accordingly, turf can be relatively sparse or well-formed. Dominated by moisture- and nutrient-demanding perennials, usually moisture-resistant species: *Carex acuta*, *Phalaroides arundinacea*, *Calamagrostis canescens*; in sites with lower water level fluctuations, also *Filipendula ulmaria* and *Epilobium hirsutum*. Annual and biennial tall herbs that take advantage of the free spaces created by the disturbances and abundant nutrients, such as *Bidens tripartita* and *Angelica archangelica* are also important. Climbing plants, such as *Calystegia sepium*, *Cuscuta europaea*, *Humulus lupulus* are common. Forest edge habitats are dominated by various species of umbellifers.

Birds. Hydrophilous tall herb fringes are not habitats important for birds. They may serve as a breeding place for the *Acrocephalus schoenobaenus*, *A. palustris* and *Locustella naevia*, as well as *Emberiza schoeniclus*. They can also serve as a feeding place for different passerine species, which is most often determined by the species composition in the adjacent habitats.

Invertebrates. There is little data on invertebrates of this habitat. Species composition may be similar to that of the habitat 6450 *Northern boreal alluvial meadows*. There is a high diversity of

arthropod species. These habitats are inhabited by *Conocephalus dorsalis* and *Pholidoptera griseoptera*, as well as *Euthystira brachyptera*. Weevils of *Lixus* genus, *Eurygaster testudinaria*, ground bugs of *Cymus* genus are typical. Soil fauna is rich. *Dolomedes plantarius* is typical. Larvae of *Lycaena dispar* develop on *Rumex* spp. in these habitats. Moisture-loving insect species occur widely. Approximately half of the floodplain grassland ground beetle species are represented in this habitat (A. Rozenberga, unpublished data).

In landscapes, where hydrophilous tall herb fringes are the only open perennial herbaceous plant habitats, they significantly increase the total diversity of insects.

16.1.4 Succession

The habitat depends on natural factors – river activity and the transition zone from forest to open vegetation on forest edges. If these environmental conditions are not changed, the habitat can exist in the long term (Fig. 16.1.9). It is typically variable in space and time – it may be completely destroyed by stream waves or spring floods (especially during ice drift). Elsewhere, as a new sand and deposit band forms, the habitat can be created again. On banks of large rivers it can occur together with the habitat 3270 *Rivers with muddy banks with *Chenopodium rubri* p.p. and *Bidention* p.p. vegetation* (more on its conservation and management: Urtāns (ed.) 2017, Chapter 18). Human activity mostly has an adverse impact on the existence of this habitat. After drainage, the hydrophilous tall herb fringes disappear completely because the banks become steeper, there is no characteristic shallow shore zone where the stands could develop. River pollution by organic matter makes river bank vegetation excessively eutrophic, it becomes poor in species, dominated by *Urtica dioica*, *Phragmites australis*.

16.1.5 Pressures and Threats

The habitat is adversely affected by all factors listed and described in Chapter 3. The most important factor is eutrophication and the introduction of invasive species, which is largely a consequence of eutrophication (Fig. 16.1.10, 16.1.11). River banks are very sensitive to the introduction of invasive plant species. They usually spread quickly, suppressing other species. Soil becomes loose as these species do not form strong turf, so erosion is often observed, particularly in the autumn and winter. Thus not only does the river bank biodiversity suffer, but

the water becomes polluted as well. Many of these species spread well by water and river banks serve as corridors for the dispersal of invasive species.

Establishment and spread of such species is faster on river banks that have been drained and are excessively eutrophic (nutrient runoff from agricultural land). *Impatiens glandulifera*, *Echinocystis lobata*, *Solidago canadensis* are especially common, in some places also *Reynoutria japonica* and *R. sachalinensis*. The latter species are very likely to spread even more, as evidenced by research in other countries, especially in Atlantic Europe (Great Britain, Belgium), where river banks have been completely taken over by invasive plants (Pyšek, Prach 1994.). This process is encouraged by dumping waste (weeds) on river banks.

The most expansive local species usually are *Urtica dioica* and *Elytrigia repens*, the establishment of which is encouraged by water excessively rich in nutrients, especially phosphorus. Beaver activity can adversely affect this habitat on the banks of small rivers and straightened rivers, which changes the river stream regime, and creates ponds of standing water unfavourable for this habitat because it requires well-aerated soil and the mechanical impact of the stream. Climate change is likely to encourage the spread of invasive species, since the climate is milder in the native areas of many such species. The effect of ice on river banks will decrease and stands of invasive species will no longer be limited by mechanical dragging of banks.

Habitat-specific influencing factors are:

- river management and water level changes, as well as the construction of reservoirs significantly reduces the area of this habitat, particularly on the banks of small and medium-sized rivers;
- intensive management of banks and forest edges – excessively intensive bank management, for example, intensive grazing, mowing every year several times per season (creation of lawn), construction of promenades, bank reinforcement, construction of beaches and boat piers, destroys the habitat;
- mowing grass without removing it in the grasslands adjacent to the habitat enriches grassland with nutrients – the floods carry the uncollected grass to the shore, where it gets stuck and remains.

16.2 Conservation and Management Objectives of Hydrophilous Tall Herb Fringes

- Ensure the landscape continuity of the river bank and forest edge development cycle, maintaining the necessary conditions for natural processes.
- Restore and maintain the hydrophilous tall herb fringes characteristic of natural river banks and forest edges and the environmental conditions necessary for them.
- Conserve the continuity of natural river banks with river bank plant and animal species characteristic for each region.
- Preserve the landscape quality of river banks and forest edges, preventing their degradation and the introduction of invasive species.

Forest edges are the most important habitat for *Alliaria petiolata*, *Agrimonia pilosa* (occurs rarely in Western Latvia), *Astrantia major*, *Delphinium elatum*, *Digitalis grandiflora*. Water shores are a very important habitat for *Angelica archangelica*.

Some of the EU protected invertebrate species found in hydrophilous tall herb fringes are *Lycaena*

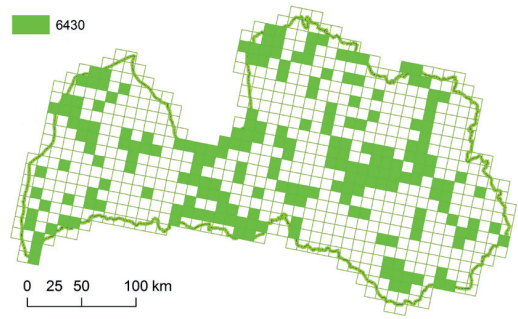








Fig. 16.1.1. Distribution of EU protected habitat type 6430* Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels in Latvia (Anon. 2013a).

dispar and *Vertigo angustior*.

16.3 Maintenance and Restoration of Hydrophilous Tall Herb Fringes

If the habitat is in a favourable condition, then restoration is not necessary and only maintenance management is sufficient (see Chapter 16.3.1). If any habitat features indicate the opposite (see Chapter 16.3.3), they require restoration first. Examination

Table 16.1.1. Variants of habitat type 6430 Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels. Photo: S. Rūsiņa, A. Auniņa, A. Priede.

Hydrophilous tall herb fringes on river banks (6430_1, river bank variant)	Hydrophilous tall herb fringes on forest edges (6430_2, forest edge variant)
<p>Stands on river banks and lake shores. Dominated by nutrient-demanding perennials, usually moisture-resistant species: <i>Carex acuta</i>, <i>Phalaroides arundinacea</i>. Climbing plants, such as <i>Calystegia sepium</i> (Fig. 6.37), <i>Cuscuta europaea</i> (parasite), are very common.</p>	<p>Develops in partly shaded forest fringes (in ecotone zones of forest and open areas). Forest edge habitats are dominated by various species of umbellifers <i>Apiacea</i>.</p>
	
 <p><i>Senecio paludosus</i></p>	 <p><i>Calystegia sepium</i></p>
 <p><i>Alliaria petiolata</i></p>	 <p><i>Agrimonia pilosa</i></p>

of the area is required to ascertain the present nature values before commencing habitat restoration or management and a management plan has to be developed (see Chapter 7), taking into account the habitat management legal framework (see Chapter 7.2).

16.3.1 Hydrophilous Tall Herb Fringes Requiring Maintenance

Hydrophilous tall herb fringes in a favourable condition only require maintenance if the natural conditions (water streams and flooding in particular) do not provide sufficient disturbance for the long-term preservation of the stand. The vegetation of a hydrophilous tall herb fringe in a favourable condition consists of several plant species, not just one or two dominant species. The stand is formed and influenced by sediments brought by the stream. The sediments contain seeds of typical plant species of the habitat; river waters are not polluted with biogenic elements and the banks have not been altered. Various invertebrate species live in the soil. No invasive plant species occur. In some places the vegetation is sparser and lower, in others taller and thicker. Extensive grazing that encourages vegetation diversity takes place in some areas (Table 16.3.1).

16.3.2 Optimal, Suboptimal and Inappropriate Management

A summary of optimal, suboptimal and inappropriate management types is given in Table 1 and 8 of Annex 2.

If the habitat has not been influenced by human activity and is not threatened, no management is necessary. In such cases it is important to observe the non-intervention mode and this applies mostly to large rivers. In medium-sized and small rivers, where the flooding regime has been altered by river straightening or draining of the surrounding land, habitat may be maintained by mowing or extensive grazing once every few years (however, annual grazing will create a grassland habitat). Extensive grazing or mowing with the collection of grass once every 2-3 years creates more open spaces with low vegetation that are suitable for waterbirds as rest and feeding places (Halada et al. 2011).

No intensive grazing or mowing that transforms the habitat into a grassland is permitted. Under intensive grazing, the habitat may be degraded (Fig. 16.3.1). Habitat degradation has been found on the banks of the River Lielupe, where the floodplain



Fig. 16.1.2. An extensively grazed hydrophilous tall herb fringe in a narrow band on the bank of the River Daugava adjacent to grassland on the bank slope. Protected landscape region "Augšdaugava". Photo: S. Rūsiņa.



Fig. 16.1.3. A species-rich hydrophilous tall herb fringes on the bank of the River Mūsa. Photo: S. Rūsiņa.



Fig. 16.1.4. A hydrophilous tall herb fringe on the bank of the River Rinda bordering on dry semi-natural grassland. Photo: S. Rūsiņa.



Fig. 16.1.5. A relatively diverse stand of hydrophilous tall herbs formed by naturalisation of the straightened river. Photo: A. Priede.



Fig. 16.1.6. A species included into the Red Data Book of Latvia – *Alliaria petiolata* – grows in a partially shaded forest edge. Photo: A. Priede.



Fig. 16.1.7. Natural processes with mechanical stream impact are very important for the existence of the habitat. In this case, no management measures are required. Photo: A. Priede.



Fig. 16.1.8. A hydrophilous tall herb stand on the bank of the River Venta. No maintenance is necessary in natural sections of large rivers. The existence of the habitat is supported by natural processes. Photo: K. Lapiņš.

grasslands and hydrophilous tall herb fringes are grazed (Caune, Priede, 2015). River management and drainage of the surrounding areas have a strong adverse effect on the habitat. Reinforcement of coast, for example, use of concrete, completely destroys the biodiversity characteristic of such habitats.

Unmanaged river banks in populated areas are often full of household waste and are not aesthetically pleasing, even if the species diversity is not affected. In such places, it is recommended to mow the banks once at the end of summer and collect the grass and household waste. If the maintenance of an aesthetically pleasant landscape in this manner is impossible, a meadow should be created (mowing grass not more often than 1-2 times per

season). Creation of a lawn is not preferable.

16.3.3 Hydrophilous Tall Herb Fringes Requiring Ecological Restoration

Habitat requires restoration if it has one or more of the following indications:

- it has been mown by mulching or leaving the grass for more than five years;
- overgrown with trees and shrubs;
- it has been drained therefore stream and flooding action is absent or is significantly lower than before drainage;
- the sward is dominated by only one or two species (*Urtica dioica*, *Aegopodium podagraria*, *Anthriscus sylvestris*, *Elytrigia repens*, *Filipendula*

ulmaria, *Phragmites australis*), there is no typical forb species community;

- mowing or grazing has created vegetation that is characteristic of a lawn or a floodplain grassland;
- there are many invasive species, for example, *Impatiens glandulifera*, *Echinocystis lobata*, *Reynoutria* spp., *Helianthus tuberosus*.

16.3.4 Restoration Methods

In river sections, where coast morphology has been altered by straightening and digging, the restoration of a natural course of the river is a significant precondition for habitat restoration. It has been described in detail in the water habitat guidelines (Urtāns (ed.) 2017, Chapter 17).

The main problem that needs to be solved in natural river sections is the effect of eutrophication, which results in a reduction of habitat species diversity and an increase in expansive species. An additional problem in many places is the introduction and spread of invasive species. In both cases, improvement of the habitat conservation status is only possible once the river pollution is reduced, therefore habitat restoration should be considered jointly with river habitat restoration (Urtāns (ed.) 2017, Chapter 17).

Measures to be taken in a habitat include the restriction of expansive and invasive plant species (see Chapter 21.9) and nutrient removal by mowing or grazing to reduce the effect of eutrophication.

To restore a fringe variant of the habitat type, the environmental condition characteristic of fo-

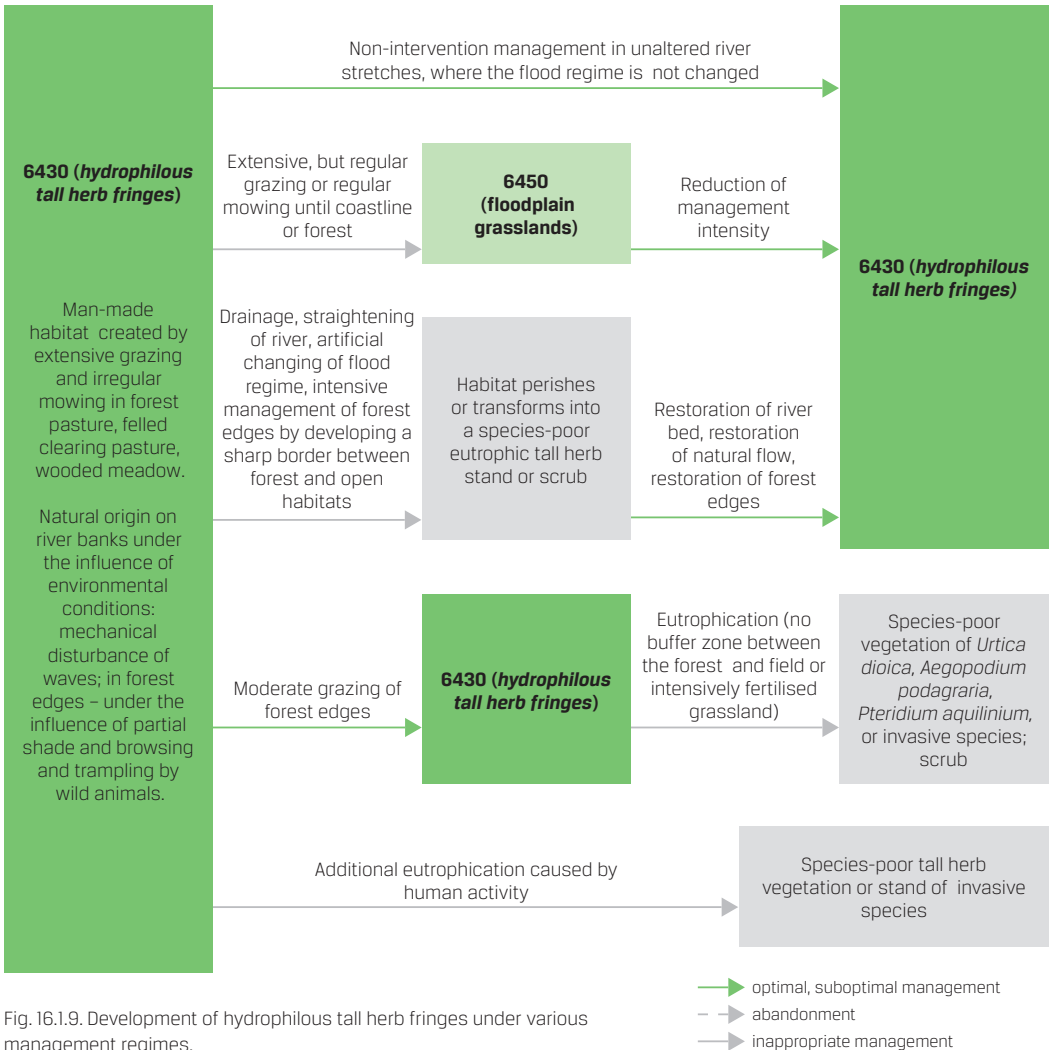


Fig. 16.1.9. Development of hydrophilous tall herb fringes under various management regimes.



Fig. 16.1.10. An excessively eutrophicated stand of tall herbaceous plants, where a rich supply of nutrients from polluted river water creates vegetation poor in species with the presence of *Urtica dioica*. Photo: S. Rūsiņa.

rest edges should be restored – partial shading, uneven forest edge (which can be achieved by selective felling of trees and shrubs), followed by extensive grazing or mowing (see Chapter 24.2.2).

16.4 Conflicting Management Priorities of Hydrophilous Tall Herb Fringes

The most significant conflicting situation in conservation planning of this habitat is the varied nature of the development and existence of this habitat – it is not permanent in a particular place and its development fully depends on river flow and spring flood action. Therefore, habitat restoration planning is very complex because the landscape context should be taken into account.

Reduction of river regulation and impacts of



Fig. 16.1.11. In Daugava floodplain, a stand of tall herbaceous plants has been outcompeted by the invasive species *Echinocystis lobata*. Photo: S. Rūsiņa.

pollution are important on river banks, while ensuring extensive mowing and grazing is important on forest edges. In Latvian conditions, the completely natural development and long-term existence of these habitats is only possible on the banks of large rivers, where a notable influence of flooding and mechanical ice action occurs. Extensive grazing may have been more important on the banks of small and medium-sized rivers.

Forest edges only form naturally as a temporary succession stage, as the forest gradually expands into the open habitats. Forest edges may exist in extensive pastures, but their formation cannot be predicted. If animals do not use an area actively for a certain period of time, the forest edge will develop, but it will disappear with more intensive grazing.