

# Supplementary Material

## Appendix

### Attributes and land cover categories of the High Resolution Aerial Monitoring Network database

**Table 1** of Supplementary 3.  
Attributes of the High Resolution Aerial Monitoring Network vector graphic spatial database  
interpreted by local field experts.

Attribute type	Description
Identifier	Patch ID (automatic).
Land cover (LC)	What land cover does the spot indicate.
Dominant species	The upper canopy layer, or the dominant plant species of grassland.
Age	In case of homogeneous vegetation age
Companion species	<p>Other woody and herbaceous plant species and fungi species observed in the patch (efforts should be made to include 10 species with characteristic cover and to include the protected and the invasive species).</p> <p>The methodology for determining companion species is based on a double weighting system:</p> <p>1. High cover (dominated) species generally have a higher ecological contribution, as is the case in most ecosystem services. Therefore, this is the main consideration.</p> <p>What special species are present in the patch:</p> <p>2a) protected species</p> <p>2b) invasive species, species with environmental conversion functions</p> <p>2c) not typical in a given climate area (curiosities, observations).</p>
Habitat	Habitat classification of the patch (ÁNER 2011).
Potential vegetation	Such vegetation is likely in the area without anthropogenic impact.
Invasive vegetation	Presence of an invasive plant species in the patch. I: Yes NULL: No
Naturalness	Assessing the naturalness of the patch; 0 to 5 (natural).
Landuse	Surface functionality.
Anomalies	Unusual phenomena experienced in the patch is important to mention, e.g. disturbance, degradation, or risk factors.
Soil type	Genetic soil type.
Estimated soil depth	The average depth of the soil layer in the spot with dm sharpness.
The physical type of soil	Debris; Coarse sand; Sand; Sandy loam; Adobe; Clay loam; Clay; Clay sand; Sandy clay; Heavy clay; Kotu, peat.
Comment	Any relevant property of the patch can be explained, for example, the presence of dead wood is also indicated here.
Area	Actual spot size (m2) (automatically calculated).
Originator	List of people involved in uploading patch data.

**Table 2** of Supplementary 3.  
The Land Cover categories of the first sites of High Resolution Aerial Monitoring Network.

<b>Land Cover (LC) marking and short name</b>		<b>Short description of the category</b>
1	Woody vegetation canopy cover	Canopies of free-standing trees, upper canopy contours of contiguous groups of trees.
2	Gaps in the forest canopy	Surfaces without canopy cover between forest trees.
3	Artificial objects	Built objects, buildings, fences, signs, etc.
4	Uncovered water surfaces	Water surface not covered by vegetation or artificial objects.
41	Bogs	Sponge-structured wetlands where the soil consists of peat (peat moss and other humified-peated plant-derived materials). Areas under constant moisture, which in principle never dry out.
42	Land swamps	Freshwater swamps.
43	Still water	Lakes, reservoirs.
44	River	Water surfaces of streams, streams, rivers, streams.
45	Reedbeds	Flat surfaces covered by aquatic reed.
5	Barren soil	Dirt roads, stabilized soils, rammed soil, without vegetation.
6	Lawns	Natural grasslands, meadows.
7	Barren rocks	Debris, rock walls, rocks, rock outcrops.
8	Artificial coverings	Concrete, tarred, asphalted surfaces.
9	Anthropogenic areas	Densely built-up contiguous areas covered with nonnatural vegetation between buildings and solid pavements.
91	Urban green spaces	Areas covered with vegetation in the settlement structure. These include city parks and vegetated cemeteries.
92	Intensively used urban green spaces	Campsites, sports fields, leisure parks, golf courses, racecourses, etc. infrastructures.
11	Extraction of raw materials	Surface extraction of raw materials (sand mines, quarries) or other materials extraction (opencast mines).
12	Landfills, waste dumps	Mining, industrial or public waste landfills, landfills.
13.	Construction sites	Areas under construction, land or bedrock extraction, areas affected by earthworks.
14.	Agricultural land	Cereal production, field vegetable production, fodder production, crop plants, and fallow land.
15.	Vineyards	Areas planted with vines.
16.	Orchards	Plots of land planted with fruit trees and shrubs: homogeneous crops or mixed fruit varieties, fruit trees with permanently grassy surfaces. Areas of sweet chestnuts and walnut trees are also included.
17.	Meadow / pasture	High productivity, grassy areas, where species belonging to the family Gramineae predominate. The areas are (mainly) grazed or utilized by mowing. They do not use crop rotation in these areas, but they can use sowing, fertilization, water regulation, and irrigation.
18.	Shrubland	Shrubland vegetation accounts for greater than 20% of vegetative cover and the soil.

**Table 3** of Supplementary 3.

The Naturalness categories of the High Resolution Aerial Monitoring Network.

## **0 – Coated surfaces**

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### **1 – Completely degraded / early-regeneration state**

Only “weeds” and uncharacteristic species predominate, no more natural type of vegetation can be recognized, i.e. there are none in the near-natural and semi-natural categories.

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### **2 – Heavily degraded / poorly regenerated condition**

The species set is uncharacteristic, disturbance tolerant, “weeds”, invasive weeds prevail, the structure of the vegetation is disintegrated or undeveloped (monodominant, contemporaneous patches, few species live together), the vegetation is often fragmented, the place of production is usually degraded, more natural habitat could not be named. If the original habitat is recognizable, its condition is still “very poor”, with the mostly large cover of adventitious species;

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### **3 – Moderately degraded / moderately regenerated condition**

Natural species predominate, but there are few coloring elements, other disturbance-rich species are often disturbed, and even “weeds” can be common, the production site is often moderately degraded, the vegetation structure is not good (homogeneous, contemporaneous, or unnaturally spotted) / other times the structure is better, but then the species stock is uncharacteristic; it is almost always possible to name a more natural habitat, but its condition is “not good”.

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### **4 – Close to nature / Well regenerated state**

The structure of the vegetation is good and/or natural species predominate, there are many coloring elements, but mostly there are few species that are tolerant of disturbance; it is not uncommon for vegetation characteristics 3 and 5 to be combined: I. in species poorer, possibly weedy, but with a very well-structured patch, II. very rich in species but not in good structure, III. old forest stock, but species deficient or not well structured, IV. one vegetation level is in significantly better condition than the other level (this is the widest natural category).

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### **5 – Natural state**

In specialist, companion, and site-indicating species, the area is rich in structures, and has a sanctuary value, is one of the best (regionally) 10-50-100 stands in the given habitat, there are no or few weeds and invasive species, the site is in a natural condition (Takács and Molnár 2007).

References of Table 3 of Supplementary 3.

- Bölöni J., Molnár Zs., Horváth F. & Illyés E. (2008) Naturalness-based habitat quality of the Hungarian (semi-)natural habitats. *Acta Botanica Hungarica* 50(Suppl.), pp. 149-159.
- Bölöni J., Molnár Zs., Kun A. (eds.) (2011): Magyarország élőhelyei. A hazai vegetációtípusok leírása és határozója. ÁNÉR 2011. MTA ÖBKI, Vácrátót, pp. 441.