

Landscape protection and development as **cross-sectoral operational programme** in the Hunagrian **pilot** area in the frames of SaveGREEN project



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Bányai Zsombor, Dancsokné Fóris Edina**

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**Tájépítészeti, Településtervezési és
Díszkertészeti Intézet**
**Tájtervezési és Területfejlesztési
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Landscape protection and development in the Hungarian pilot area in the frames of SaveGREEN project



Landscape planning, Heritage protection, Rural development, Spatial development, Tourism,
Landscape rehabilitation, Green Infrastructure 2020/2021 II. semester

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Sources used

Landscape protection and development plan of the region of the planned M2 motorway/ A tervezett M2 autópálya határmenti térségének tájvédelmi és tájfejlesztési tanulmányterve. Made on student workshop, Hungarian University of Agriculture and Life Sciences, Institute of Landscape Architecture and Urbanism and Garden Art, Budapest, 2021. *Nóra Hubayné Horváth, Zolt Szilvácsku, Edina Dancsokné Fóris, László Kollányi, Krisztina Filepné Kovács, Ildikó Módosné Bugyi, Dalma Varga and Ágnes Sallay (eds.),*

Zsombor Bányai (2021): Ökológiai folyosók értékelési módszertanának kidolgozása és alkalmazása az M2-es autópálya tervezett szakaszán / Elaboration and application of assessment method for ecological corridors in the region of the planned M2 motorway, Supervisors: László Kollányi, András Weipert; MATE, Hungarian University of Agriculture and Life Sciences

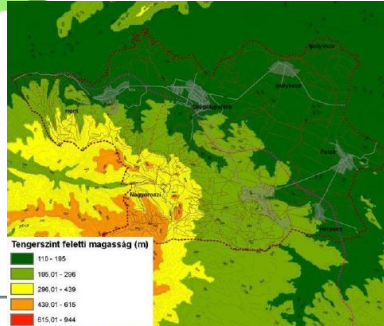
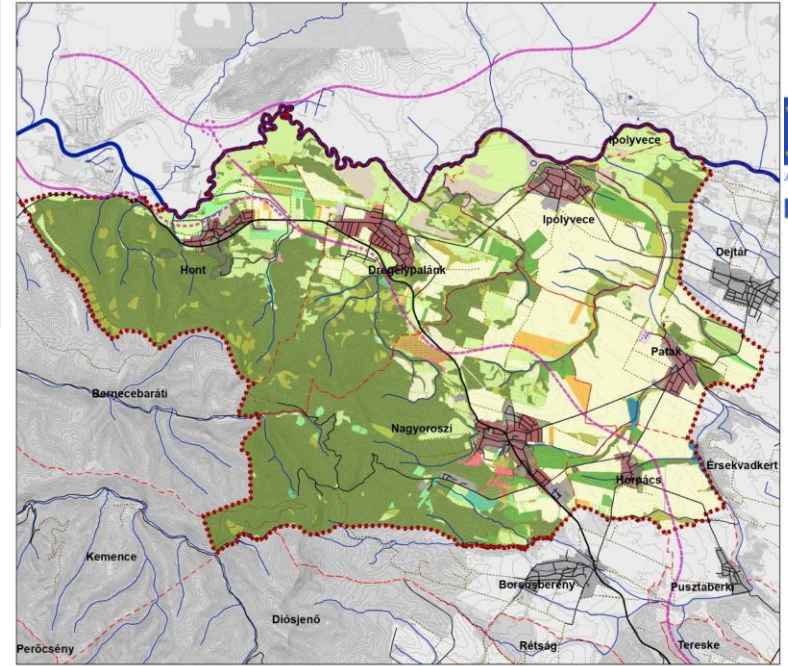
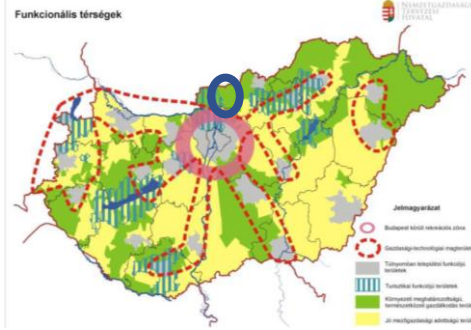
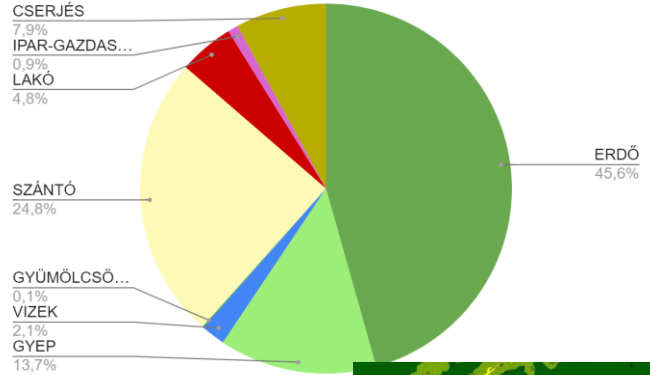
Content of the presentation

- General introduction about the pilot area
- Assessment of ecological corridors
- Glimpses of the Logframe
- Critical zones

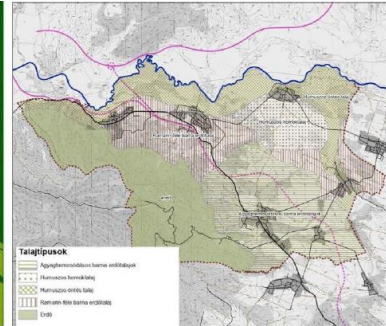


Landscape Analysis

Land use system

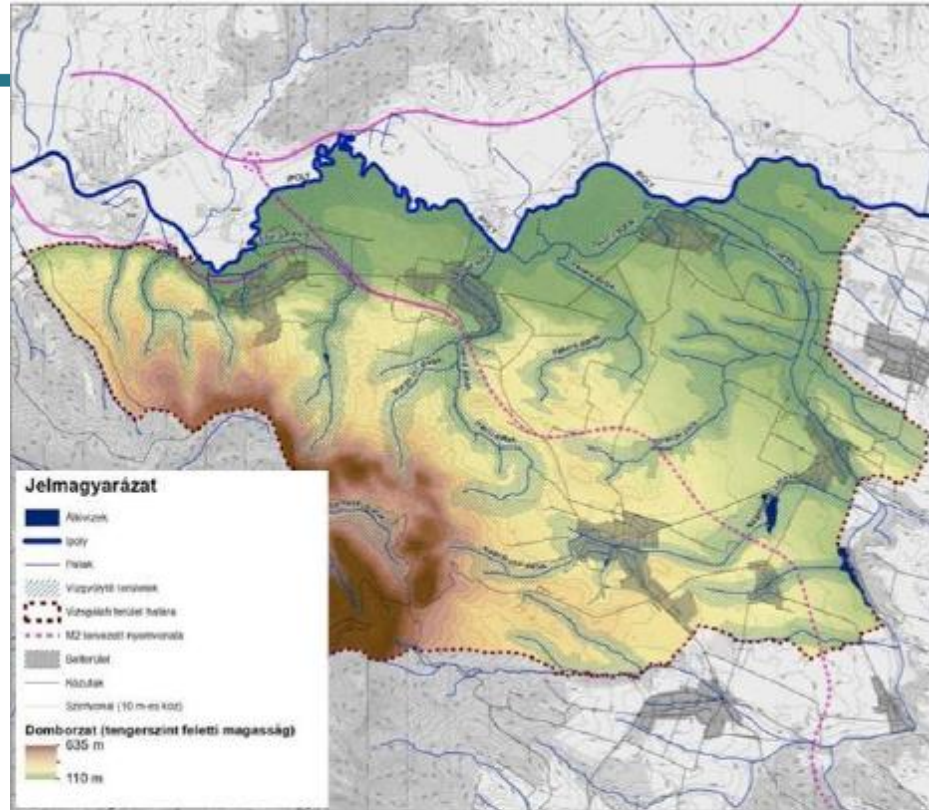


Geography



Soils





Közlekedési hálózat

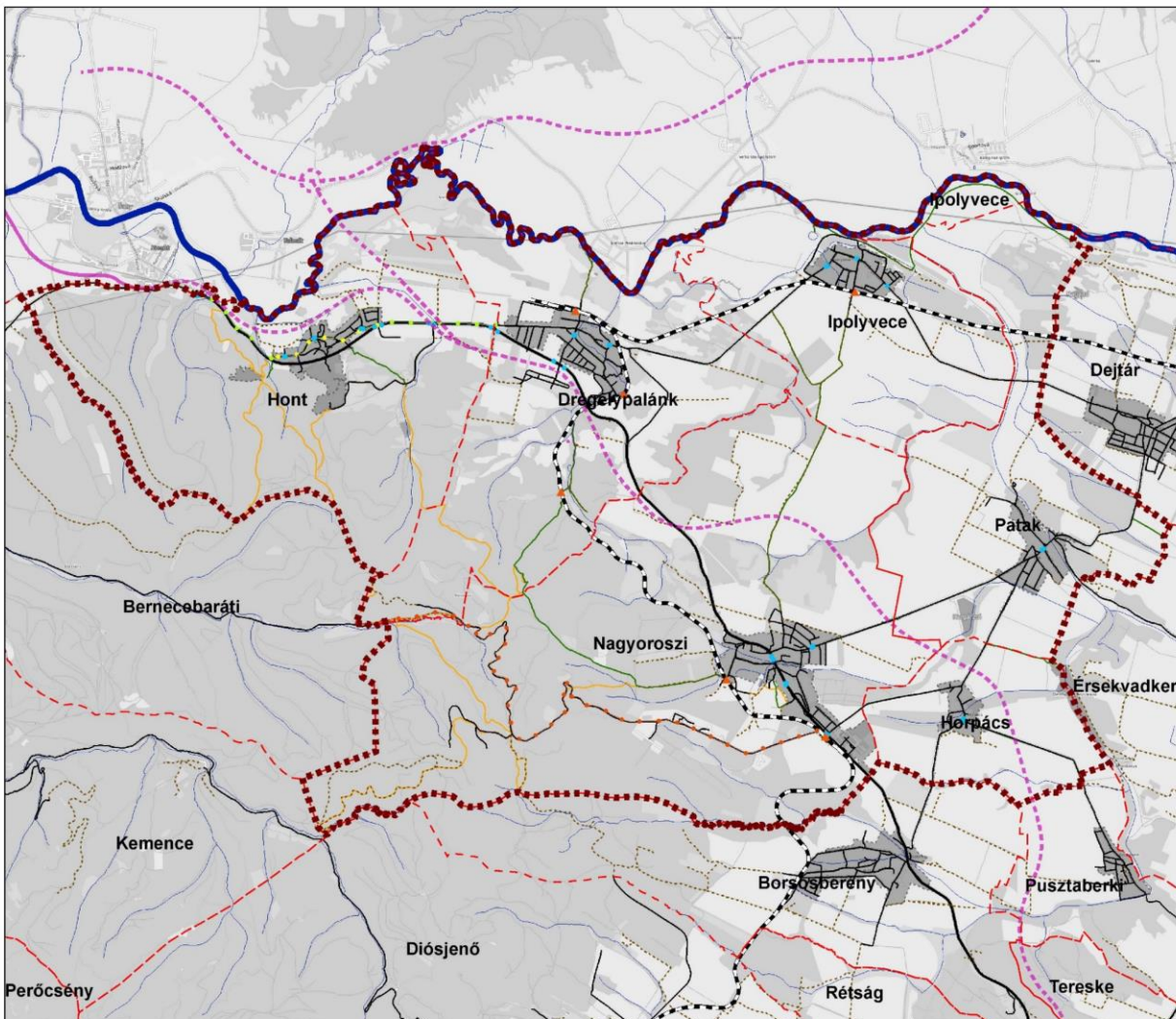
Jelmagyarázat

- Vizsgálati terület határa
- Település közigazgatási határ
- M2 tervezett nyomvonala
- Ipoly
- Patak
- Vasútállomás
- Buszmegálló
- Kerékpárút
- Kerékpáros útvonal
- Kerékpározásra kijelölt erdei út
- Vasút
- elsőrendű út
- másodrendű út
- alsóbbrendű út
- utca
- talajút
- Zöldút
- Turistaút
- Belterület

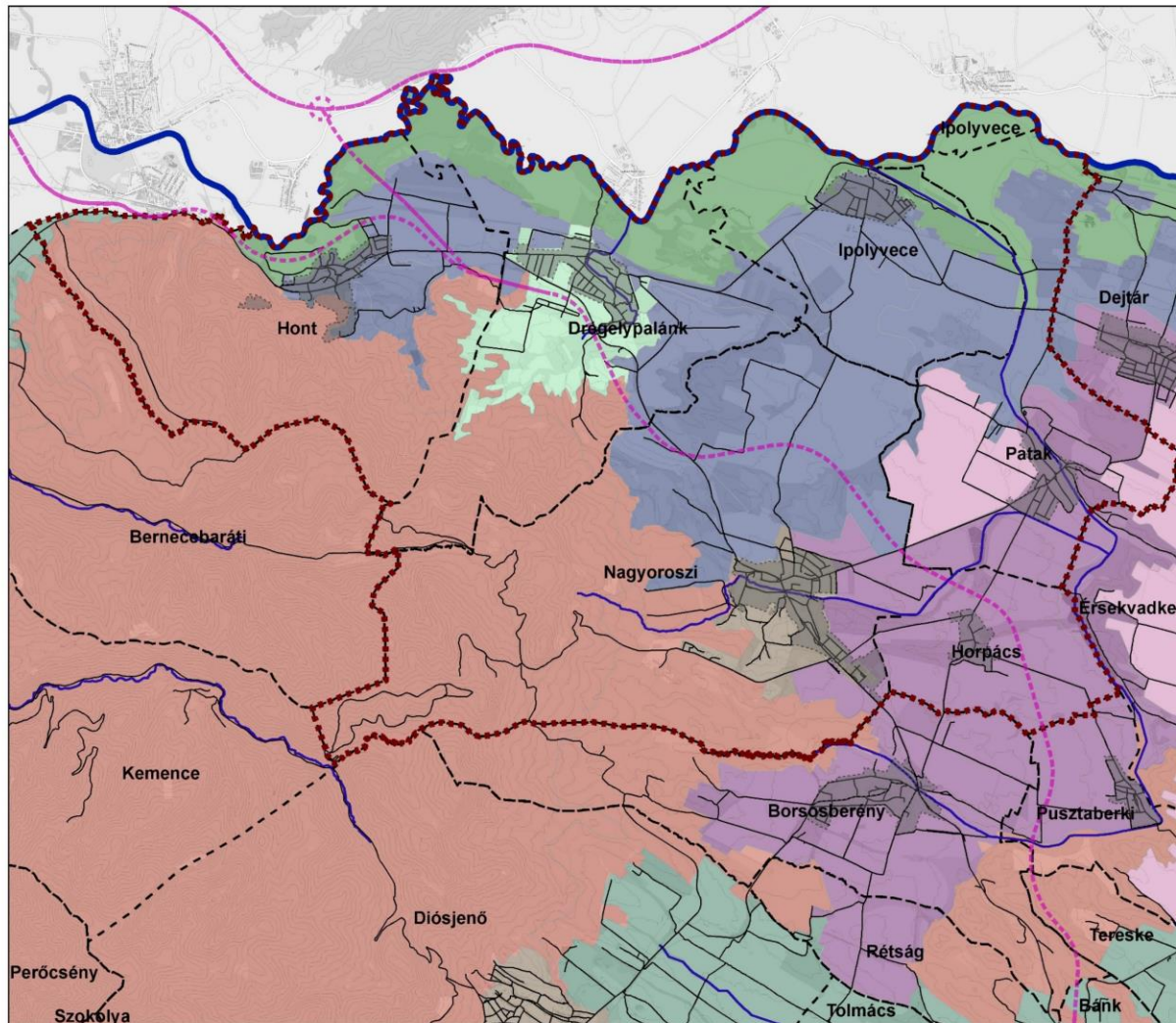


Tájépítészeti,
Településtervezési és
Díszkertészeti Intézet,
Tájtervezési és
Területfejlesztési Tanszék

0 1 2 4
Kilometers



Landscape character types



Jelmagyarázat

- Vízpálai terület határa
- Település közigazgatási határa
- Belterület határa
- M2 tervezett nyomvonala
- Közfutak
- Szintvonalak
- Folyók
- Ipoly

Tájkarakter típus

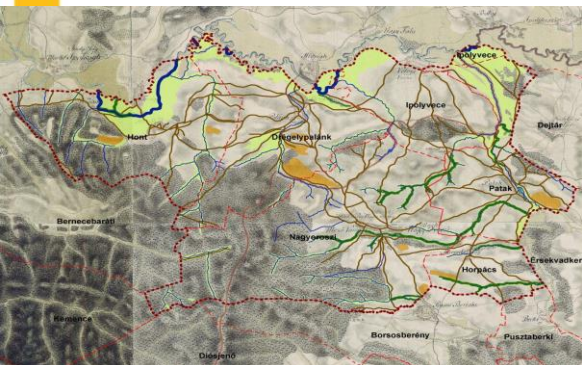
- Erdő-agrármozaikos dombsági táj
- Erdős, homokos hegyágeremi táj
- Gyep-szántómozaikos medence, völgy és hgerem
- Szántó, hullámos síksági, dombsági és hgeremi táj
- Szántó, mozaikos, hullámos síksági táj vízfolyások, erdőfoltok
- Települési táj
- Változatos felszínborítású terület
- Vízdomináns folyótáj



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0 1 2 4
Kilometers

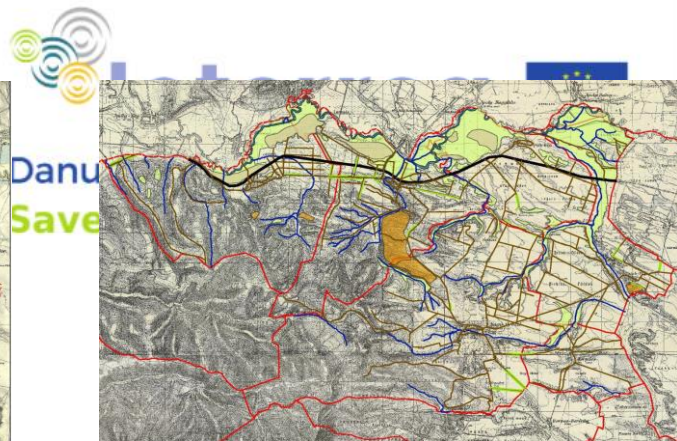
Tájalakulás-történet, tájváltozási folyamatok



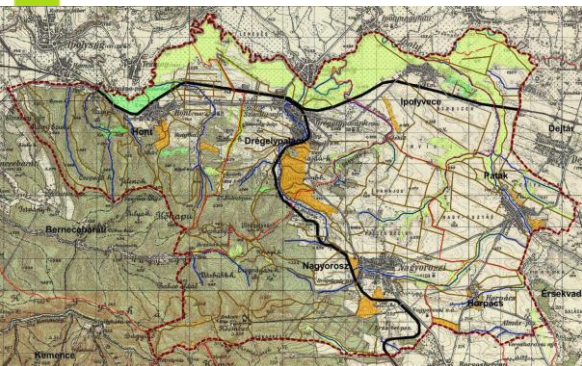
I. katonai felmérés (1782)



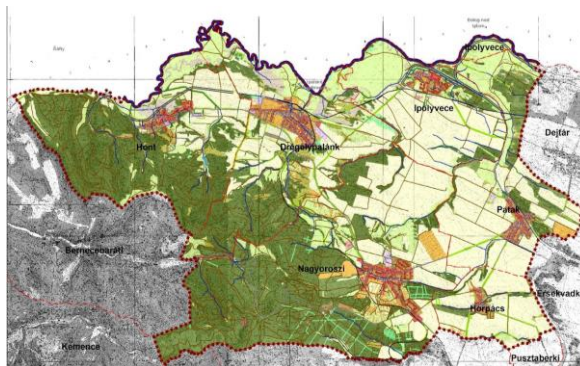
II. katonai felmérés (1842)



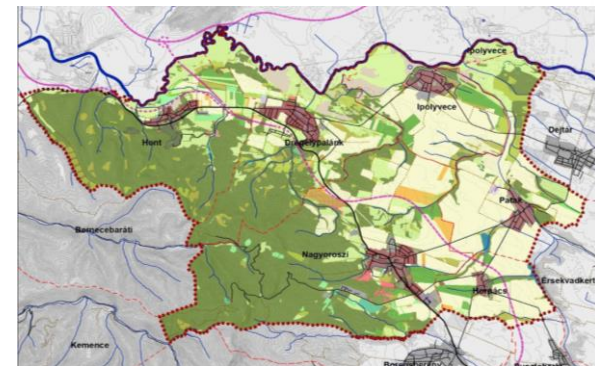
III. katonai felmérés (1882-1884)



1941-es katonai felmérés



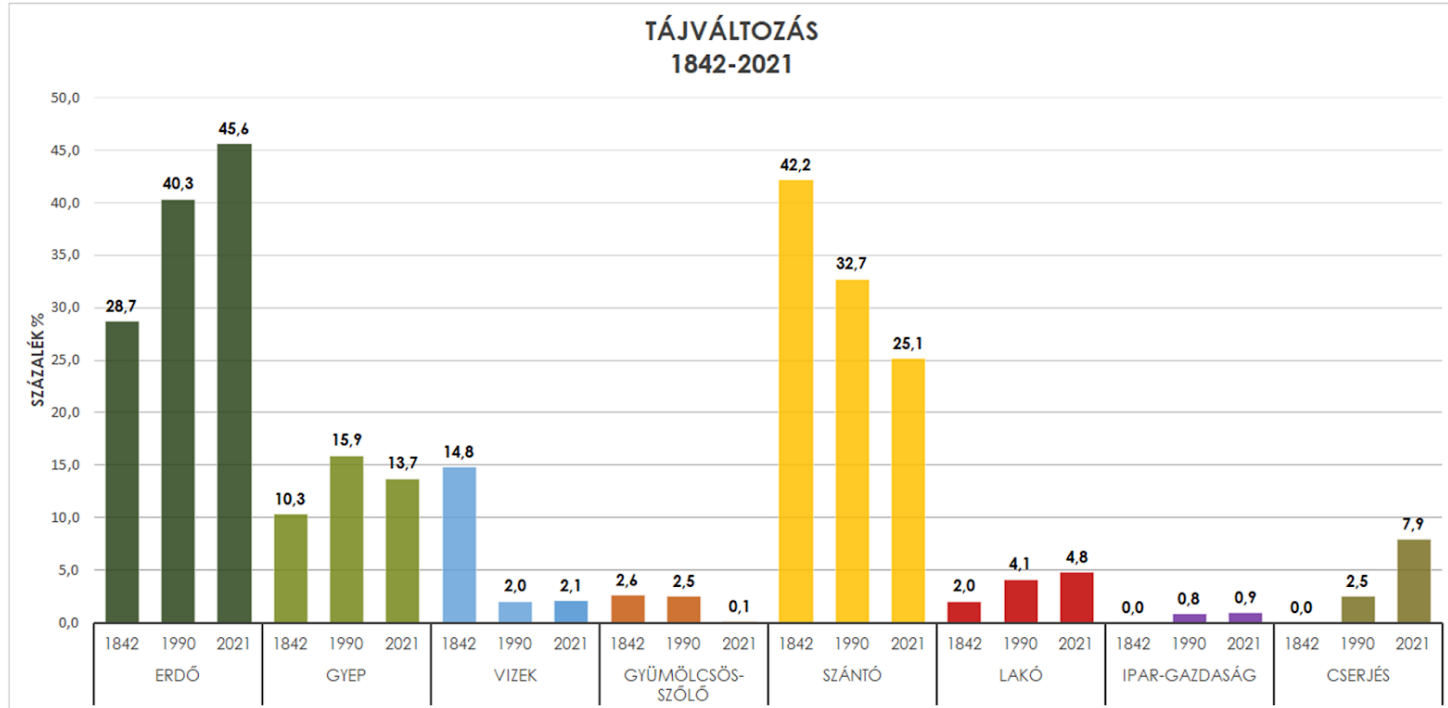
Topográfiai térkép (1990-es évek)

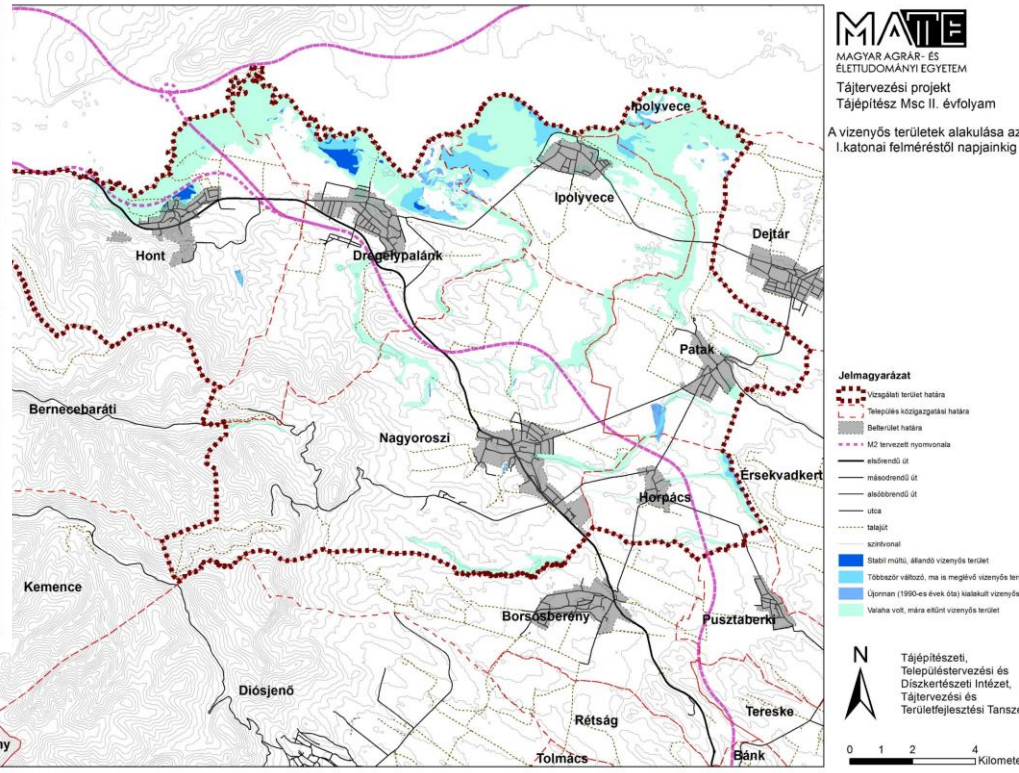
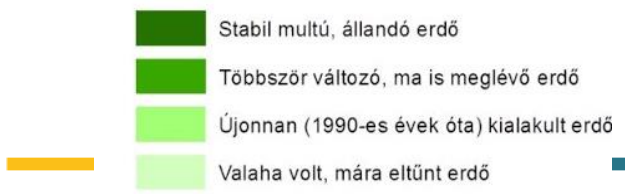
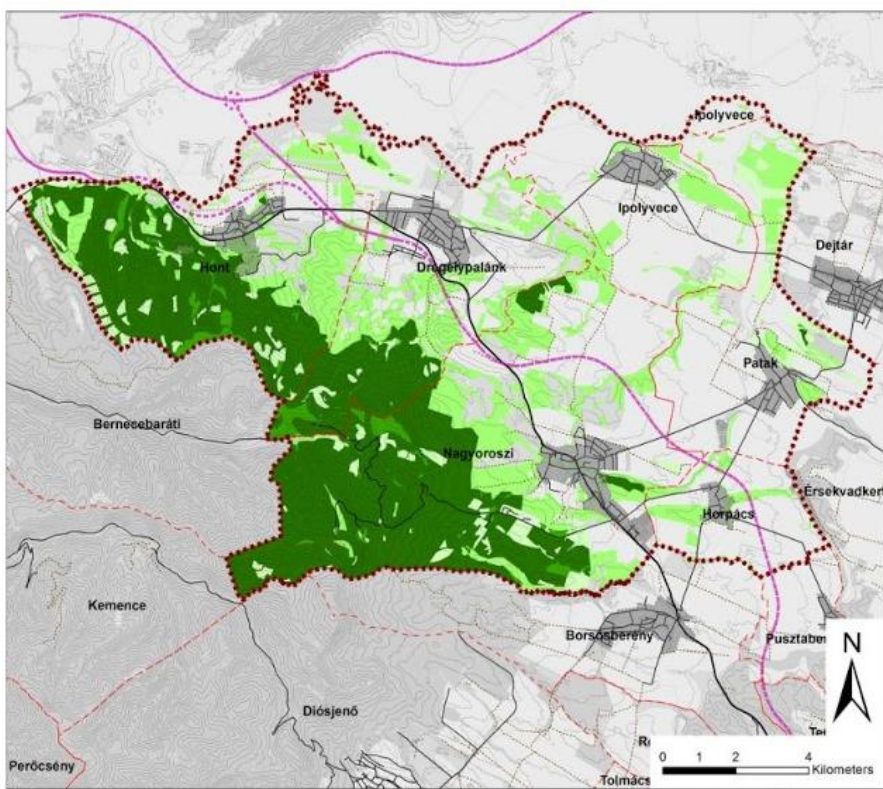


Térség napjainkban (2021)

Trends of the land use changes

- II. katonai felmérés - 1842 ● Topográfiai térkép- 1990 ● Jelenlegi állapot - 2021





MATE
 MAGYAR AGRÁR- ÉS
 ÉLETTUDOMÁNYI EGYETEM
 Tájtervezési projekt
 Tájépítész Msc II. évfolyam

A víznyeri területek alakulása az
 I. katonai felméréstől napjainkig

Jelmagyarázat

- Vízgazdálkodási terület határa
- Települési közigazgatási határa
- Belterület határa
- M2 tervezési nyomvonal
- elsőrendű út
- másodrendű út
- alacsonyabbrendű út
- sík
- talajt
- szőlőterület
- Stabilit múltú, állandó víznyeri terület
- Többször változó, ma is meglévő víznyeri terület
- Újonnan (1990-es évek óta) kialakult víznyeri terület
- Valaha volt, mára eltűnt víznyeri terület

N Tájépítészeti,
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 Tájtervezési és
 Területfejlesztési Tanszék

0 1 2 4
 Kilometers

Erdők természetességének állapota

Jelmagyarázat

- Vizsgálati terület határa
- Település közigazgatási határ
- Ipoly
- Patak
- M2 tervezett nyomvonala
- elsőrendű út
- másodrendű út
- alsóbbrendű út
- utca
- talajút
- Belterület

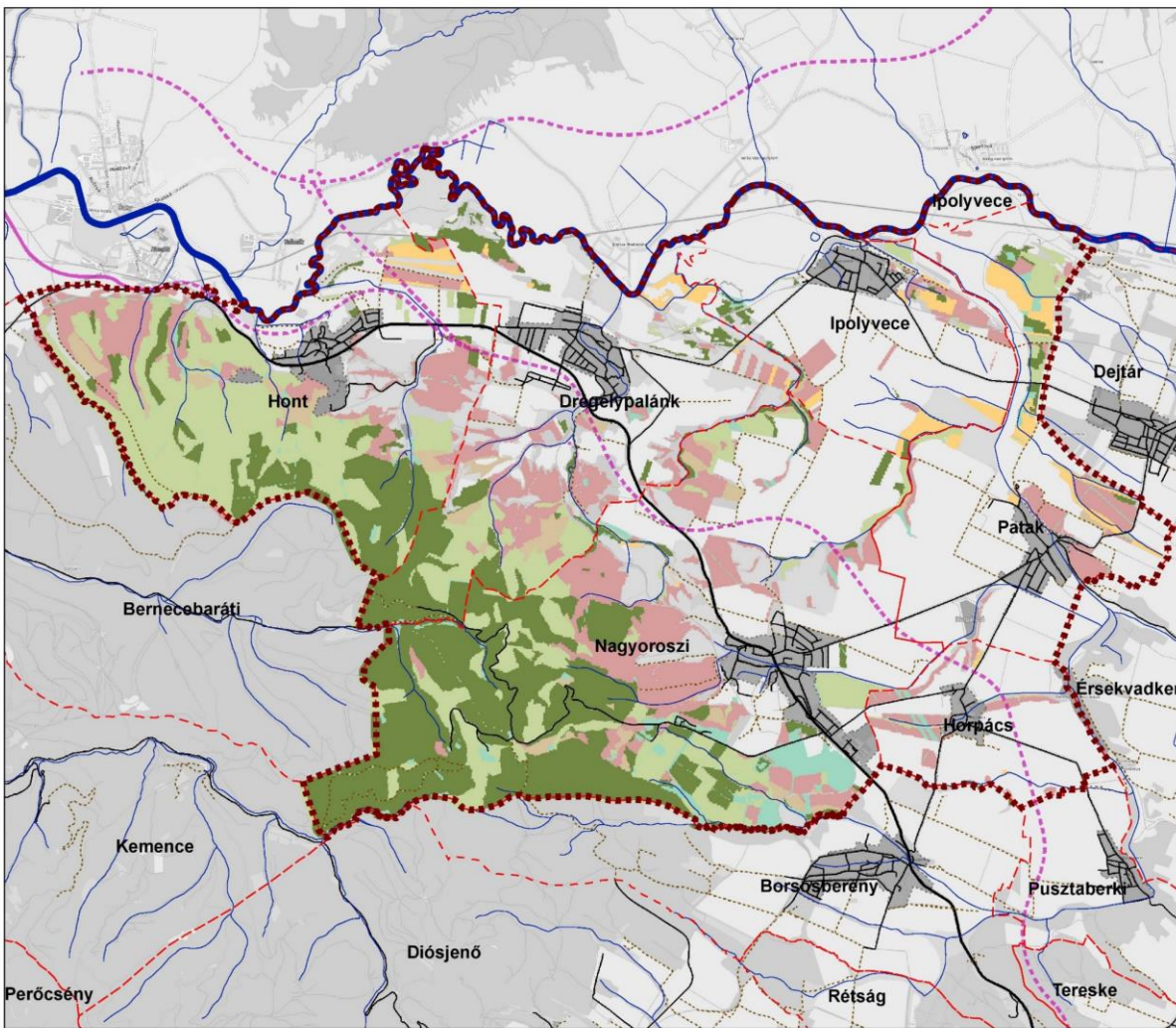
Természetességi állapot

- természetserű erdő
- származékerdő
- átmeneti erdő
- kultúrerdő
- faültetvény
- nincs adat

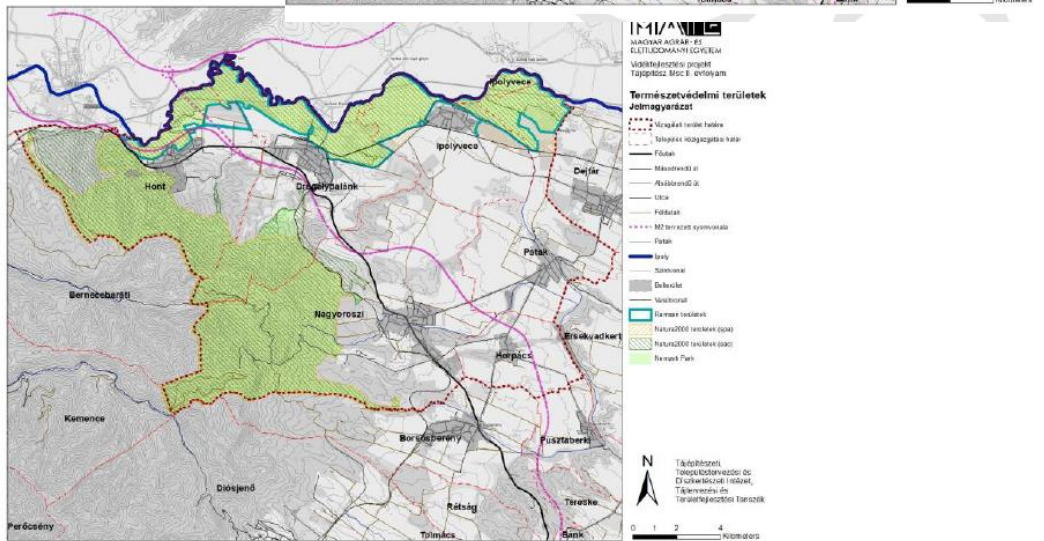
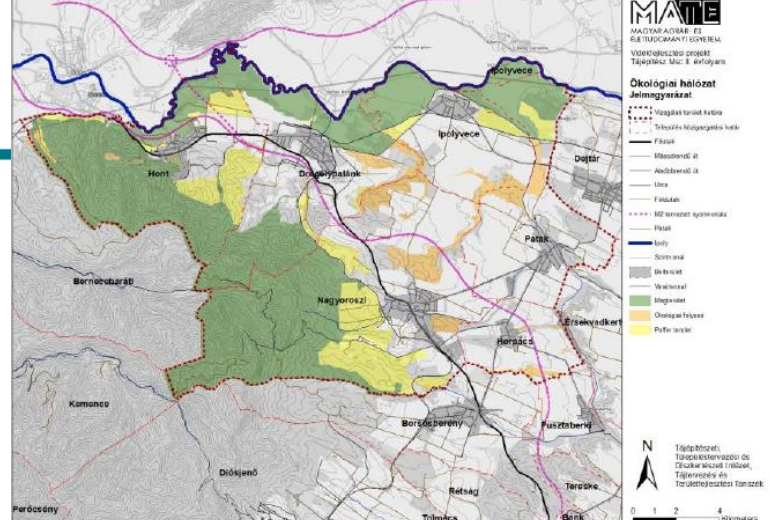
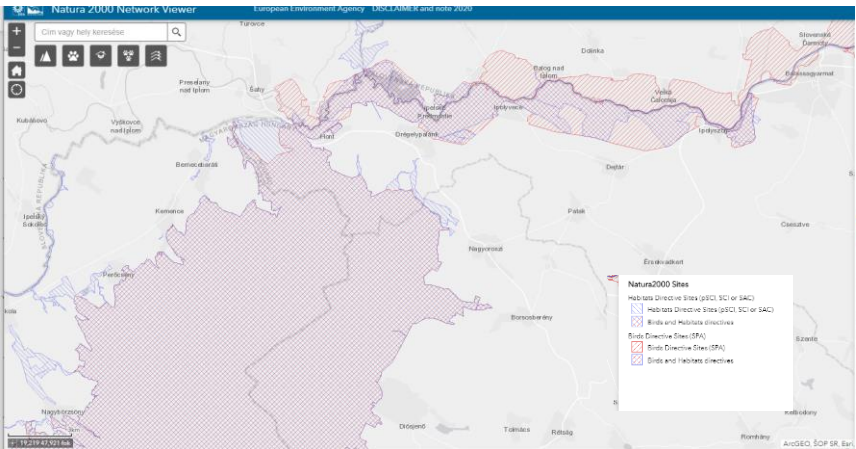


Tájékesztési,
Településtervezési és
Dizsksztési Intézet,
Tájtervezési és
Területfejlesztési Tanszék

0 1 2 4
Kilometers



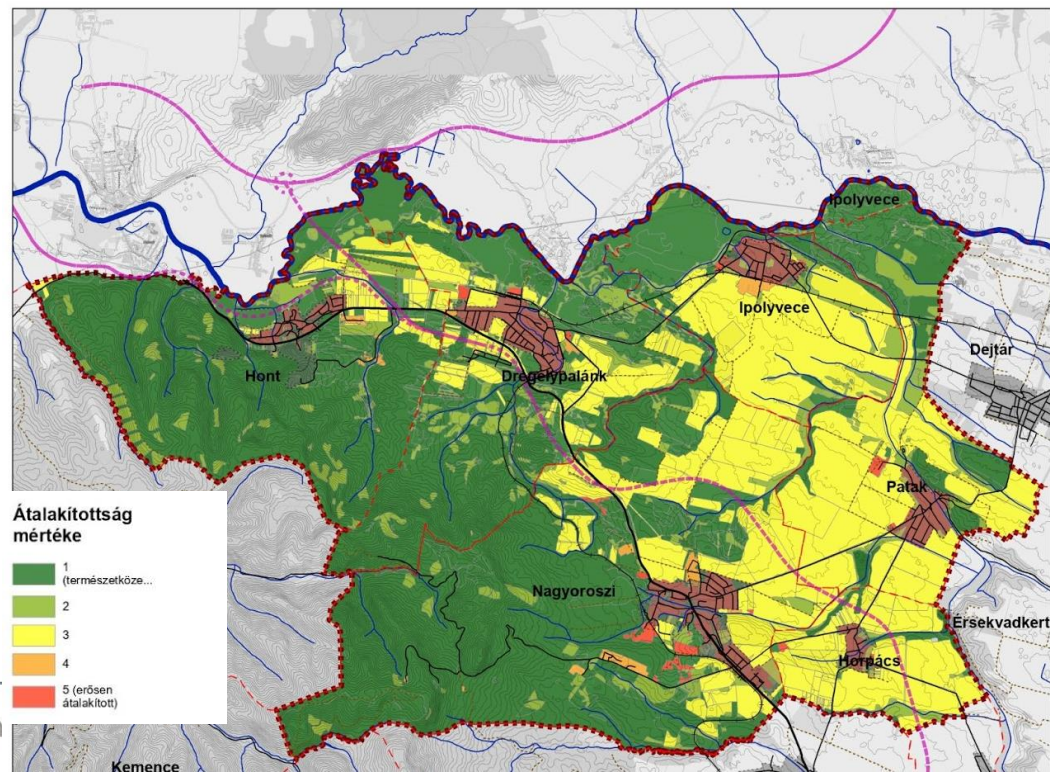
PROTECTION OF GREEN INFRASTRUCTURE ELEMENTS



HEMEROBY level

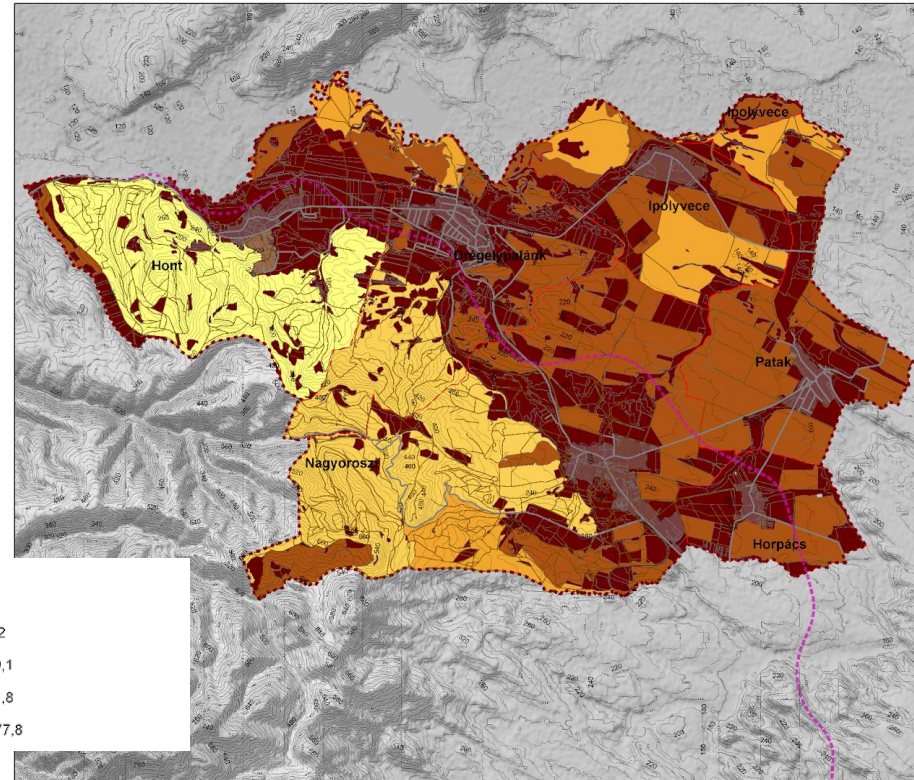
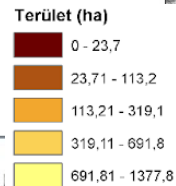
Indicates the extent of anthropogenic modification of the landscape, 5 categories

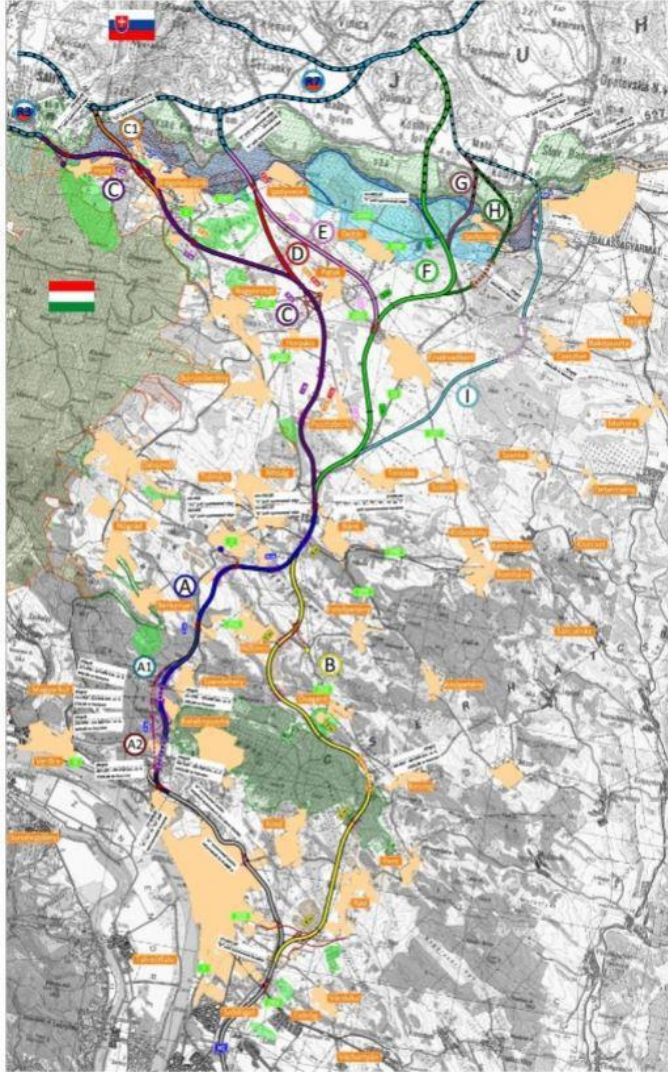
- Category 1 (semi-natural): deciduous forest, grassland, standing water, wetland
- Category 2: shrub-scrub, grassland-scrub, tree group, pine forest, wooded pasture,
- Category 3 (moderately modified): plantation forest, tree-lined woodland, orchard, orchard, field, vineyard, field protection woodland, field meadow
- Category 4: farm, castle ruin, farmstead, recreation area
- Category 5 (heavily converted): abandoned mine, industrial-farm-commercial, detached house, detached house with garden, cemetery



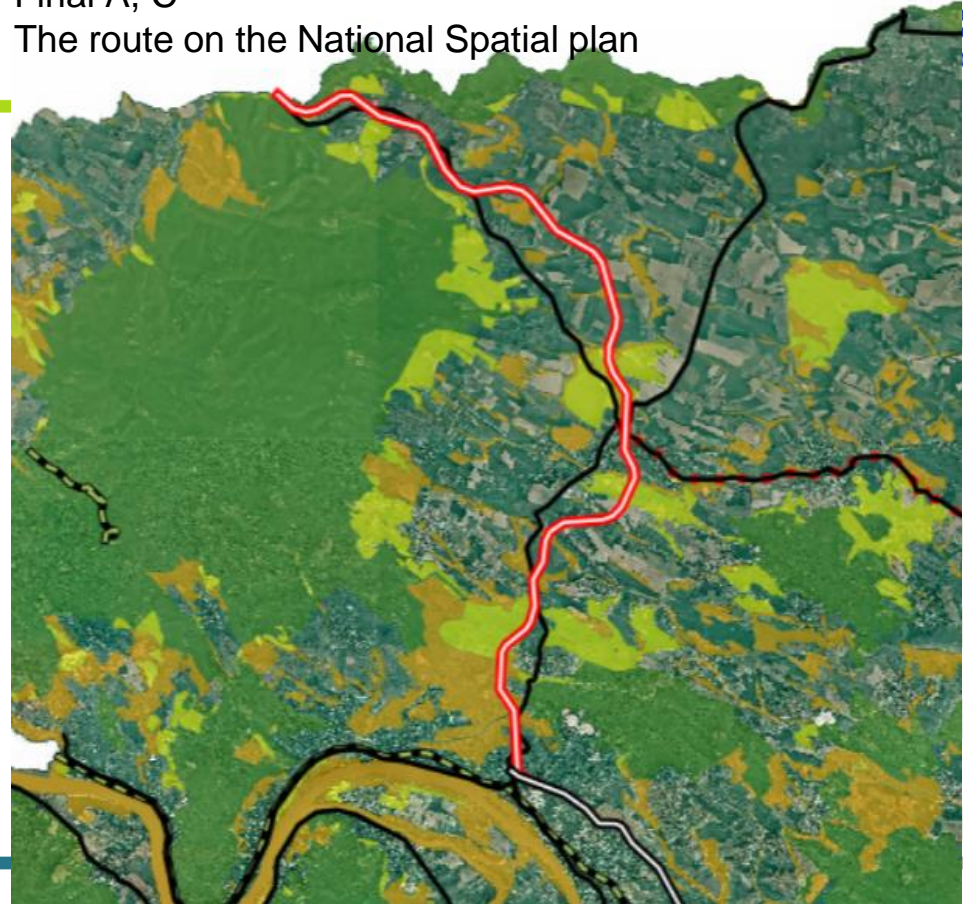
FRAGMENTATION

- Processes of habitat loss and fragmentation
- Extent to which current land uses are fragmented by linear elements
- Minimum land use "fragments" between 0 and 23,7 ha
- The largest land use fragments, such as the forests in the Börzsöny, range between 691,81 and 1377,8 ha





Variations of the planned route M2
Final A, C
The route on the National Spatial plan



lands (ERDF)

www.interreg-danube.eu/savegreen

Conflicts related to the planned M2 Motorway

- Changes in soil water balance --> geological hazards
- Cuts due to earthworks --> erosion risk
- Surface and groundwater pollution
- Vegetation destruction along the route
- Habitat degradation, loss of habitats;
- Habitat fragmentation, isolation of populations, disconnection
- Fragmentation of agricultural land, settlements
- Mortality by road vehicles;-
- Light and noise pollution from vehicles on the road;-
- Air pollutants released into the air by traffic and then deposited in the immediate vicinity of the motorway (at a decreasing rate with distance), entering the food chain, and in the case of heavy metals, accumulation in the organisms of top predators.
- Reduction of permeability --> only at nodes
- Co-benefits --> economic recovery, new investments



Logframe/ Main threats/CSOP

- 1. New Transport and other Linear Infrastructure (TLI*) projects may increase the barrier effect at landscape level.
 - Conflicts caused by existing transport infrastructure
- 2. Linear transport infrastructures (including electric power lines) cause wildlife mortalities
- 3. Changes in land management
- Changes in land management - fencing
- Changes in land management – crop cultivation
- 4. Land management causing degradation of natural habitats may reduce landscape permeability
- 5. Land management through mineral extraction may reduce landscape permeability
- 6. Other anthropogenic activities - game management - may reduce landscape permeability
 - Other anthropogenic activities - human-wildlife conflicts - may reduce landscape permeability
- 7. Lack of coherent monitoring at landscape level and adaptation of solutions
- 8. The support of stakeholders for a cross-sectoral & integrated approach at landscape level is reduced

Logframe

2. Analysis of effects of infrastructure

2.1. Logframe

THREAT / PRESSURE	GENERAL OBJECTIVES	Problems	Measures	Actions
1. New Transport and other Linear Infrastructure (TLI) projects may increase the barrier effect at landscape level.	01. Ensure adequate and relevant background data of new infrastructure projects for proper decision making.	Continuous data collection and monitoring is needed even before investment starts.	Gather data on relevant species using camera traps, tracking and telemetry. For watercourses, continuous sampling is required.	Set up a systematic monitoring plan of new linear infrastructure (before baseline, during the construction and after the construction finished).
	02. Support/participate in the SEA/EIA/AA processes and procedures with relevant data and examples of good-practice	SEA and EIA studies are based on a general methodologies and guidelines. The legislation does not address the specific problems of the road. Lack of possibility to have defragmentation	SEA and EIA legislation should be complemented by provisions for specific roads. For example, the direct and indirect impact area of different roads.	Cooperate with NIF and involve Chamber of Engineers to create new standardised methodologies and national standards specifically for new road constructions.

CSOP M2 motorway in Hungary (draft) | www.interreg-danube.eu/SaveGREEN
Project co-funded by European Union funds (ERDF)

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THREAT / PRESSURE	GENERAL OBJECTIVES	Problems	Measures	Actions
		mitigation measures in SEA/EIA/AA outside infrastructure easement due to law.	Specific, well-measured indicators such as fragmentation analysis (e.g. minimum net size) or biological activation value calculations should be incorporated into the SEA process and spatial planning.	Round table organization for stakeholders, to provide a common platform for a common initiative
	03. Support the design & technical details and constructive solutions with examples of good-practice	There is no single publication that summarizes best international and national practices.	Review of national and international practice and adaptation to domestic conditions.	Cooperate with NIF to apply best techniques.
		Searching for funds for further financing the implement of research, database building, publication and	Advocacy for development of new small infrastructure project to create defragmentation facility (overpass).	

CSOP M2 motorway in Hungary (draft) | www.interreg-danube.eu/SaveGREEN
Project co-funded by European Union funds (ERDF)

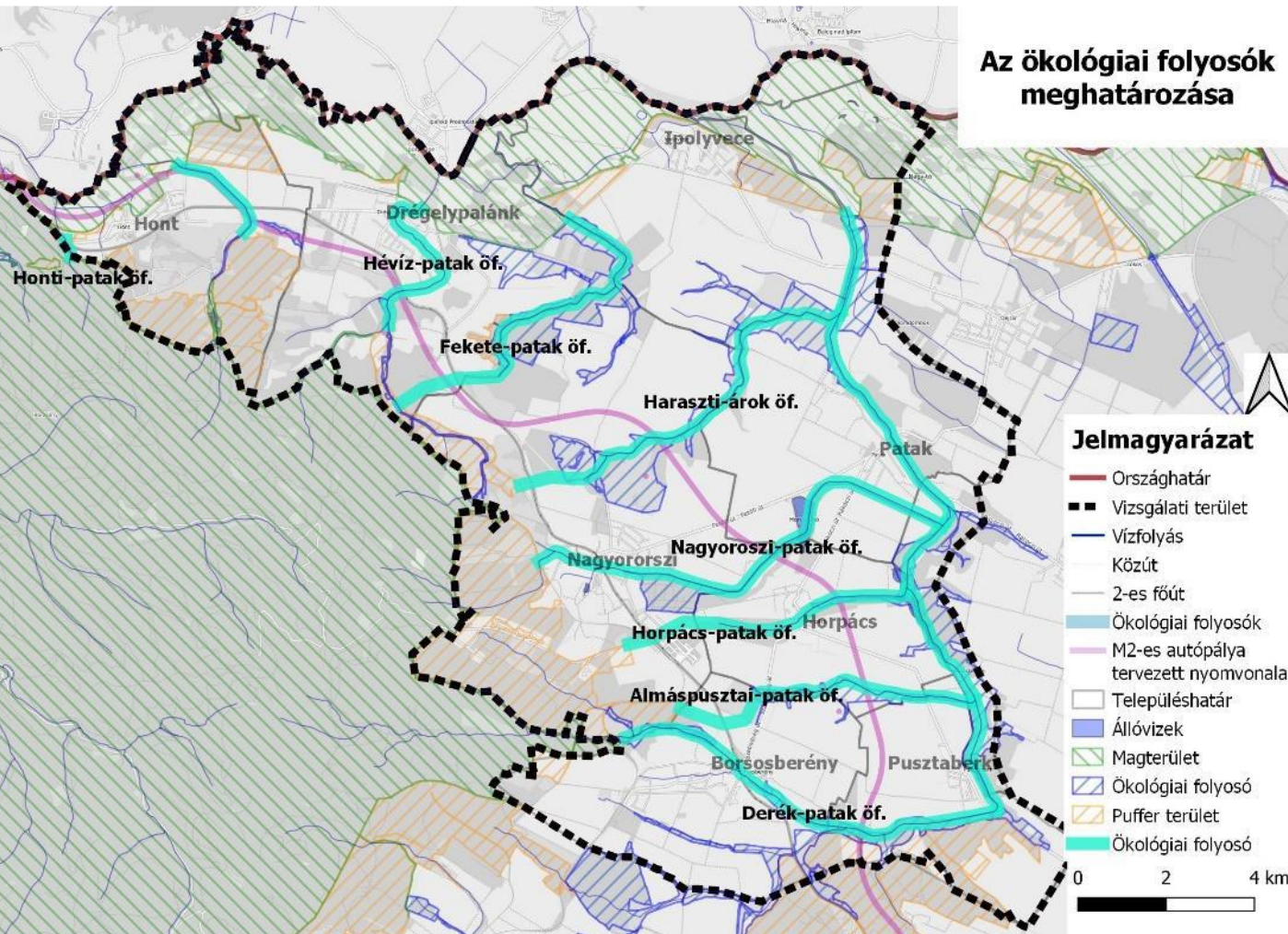
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THREAT / PRESSURE	GENERAL OBJECTIVES	Problems	Measures	Actions
		exploitation of such a database.		Cooperate with NIF

THREAT / PRESSURE	GENERAL OBJECTIVES	Problems	Measures	Actions
			Systematic survey of the actual state of embankment.	For unfenced roads on embankment, possibility should be

Az ökológiai folyosók meghatározása

Watercourses and ecological network of the pilot area

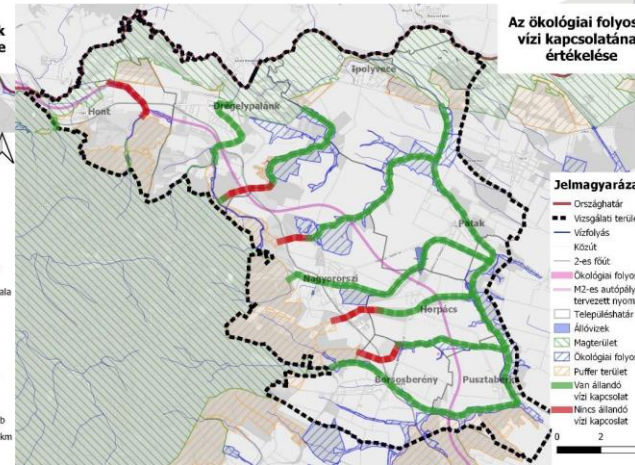
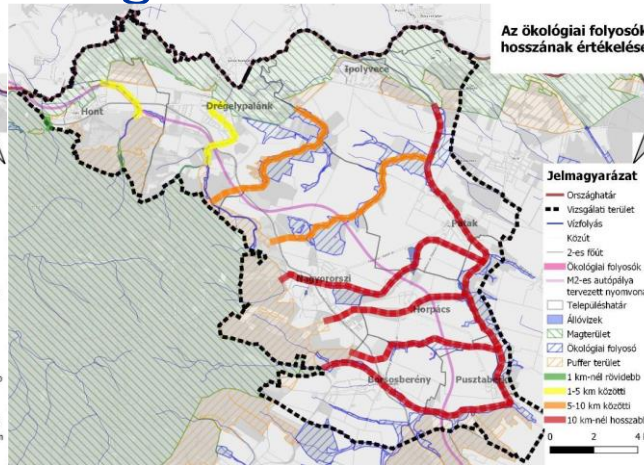
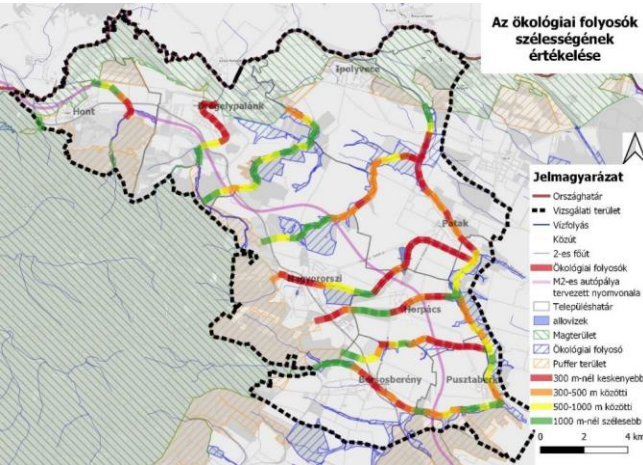


Assessment of ecological corridors along watercourses

With

Length

Relation to water

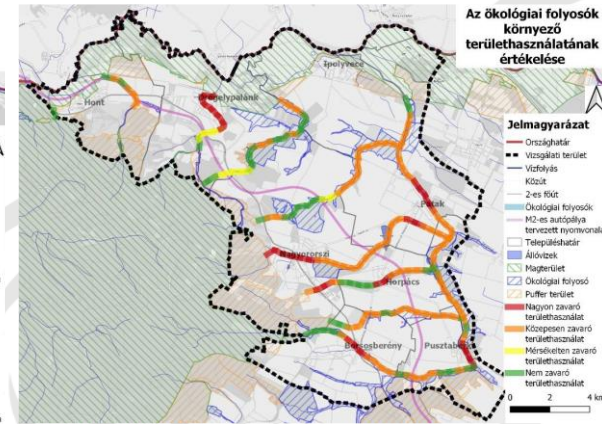
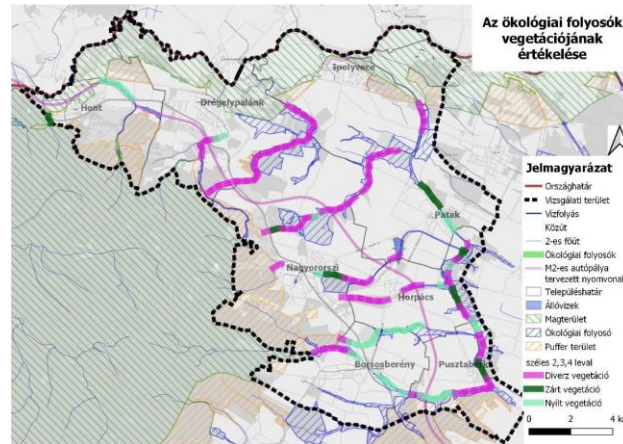
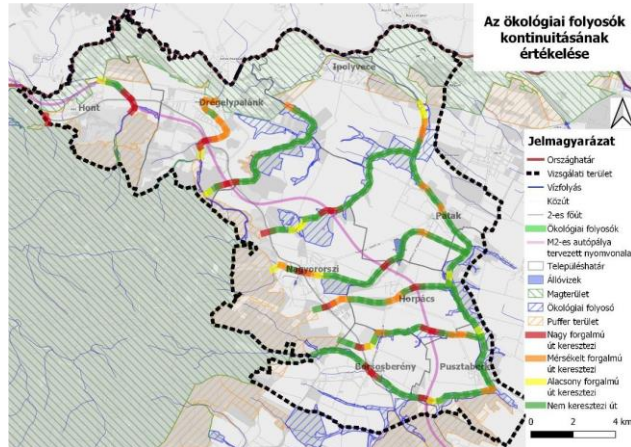


Assessment of ecological corridors along watercourses

Continuity

Vegetation

Land use



Area Nr 1: M2 segment near Hont municipality, Ipoly valley



Natura 2000 sites in the Hungarian region:

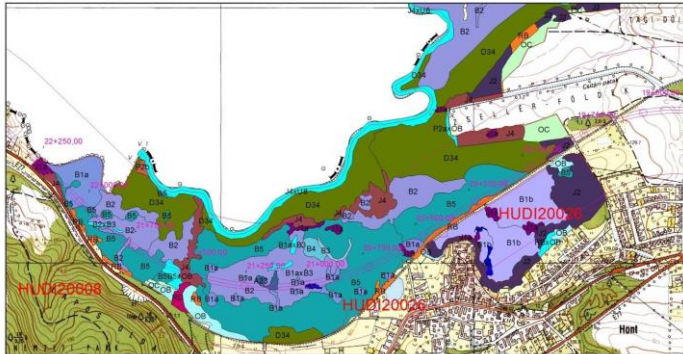
1. Birds protection Directive Site, Ipoly valley, (SPA) (HUDI10008),
2. Habitats Directive Site, Ipoly valley (HUDI20026)

Habitat types of Community importance:

- 6440 *Cnidion dubii* river valley marshes,

Habitat types of Special Community importance:

- 6260 Pannonian sand grasslands,
- 91E0 Mild alder (*Alnus glutinosa*) and tall ash (*Fraxinus excelsior*) woodland (*Alno-Padion*, *Alnion incanae*, *Salicion albae*)

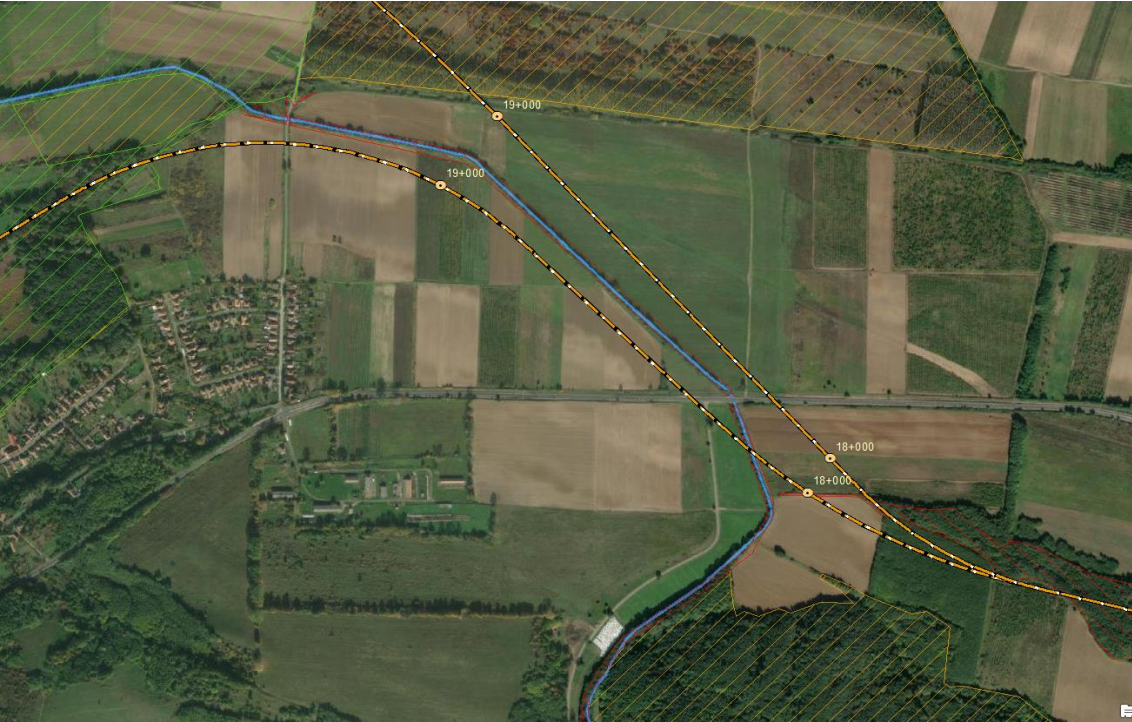


The planned route crosses semi-natural wetland meadows (D34), which are mosaic with tall-sedge beds (B5) and reed (B1a) stands, with transitions (floodplains) often gradient in character.

Types and size of structures to mitigate barrier effect in Ipoly valley

Number of structure	Location km section	Type	Length (m)
Cö2	19+850	medium mammal passage	2,2 x 2,2
Cö3	20+000	frog and small mammal passage	2,2 x 1,7
Cö4	20+125	frog and small mammal passage	2,2 x 1,7
Cö5	20+250	medium mammalian gateway	2,2 x 2,2
Cö6	20+500	frog and small mammal passage	2,2 x 1,7
Cö7	21+300 22+200	lifting on pillars (min. 4 m high) - viaduct	900
Cö8	20+850 21+500	lifting on pillars (min. 2 m high) - viaduct	300

Area Nr2: M2 segment near the Hont municipality, Csitári-stream



The area in question represents an important bio-corridor.

The length of the ecological corridor is about 2600 m. The Csitári stream is currently an temporary watercourse. Only after heavy rainfall is there water in the ditch. The topography is flat. The average width of the vegetation is well below 300 m, about 100 m. It is rarely connected to a larger area of permanent vegetation. The vegetation is dominated by floodplain herbaceous vegetation with mosaic-like clearings. Of the surrounding land uses, ploughland is the most prevalent.

No passage for animals is planned at the stream crossing. To improve permeability, an underpass for large animals is proposed to be built.

The rehabilitation of the watercourse is suggested including the restoration of the riverbed to its natural state, planting vegetation, restoration with environmental engineering methods, restoration of buffer zones and the establishment of monitoring

Animal groups	Species	With	Length	Vegetation	Land use	Water	Continuity	Suitability	Overall suitability
Large mammal	Red deer	S1	S1	S2	S1	S0	S1	S1,4	S1,1
	Wild boar	S1	S1	S0	S1	S1	S1	S1	
	Common lynx	S1	S1	S1	S1	S0	S1	S1	
Small and medium-sized mammal	European hedgehog	S1	S1	S1	S1	S0	S1	S1	S1
	Otters	S1	S1	S1	S1	S1	S1	S1	
	Red fox	S1	S1	S0	S1	S0	S1	S1	
Amphibian	Common toad	S1	S1	S1	S1	S1	S1	S1	S1
	Newts	S1	S1	S1	S1	S1	S1	S1	
Reptile	Green lizard	S1	S1	S3	S1	S0	S1	S1,4	S1,6
	Forest Glider	S1	S1	S2	S1	S0	S1	S1,2	
Fish	Gudgeon	S1	S1	S1	S1	S1	S4	S1,5	S1,6
	Common chub	S2	S1	S1	S1	S1	S4	S1,6	
	Spined loach	S2	S1	S0	S1	S1	S4	S1,6	

Area Nr3: M2 segment near the Drégelypalánk municipality, Hévíz- stream



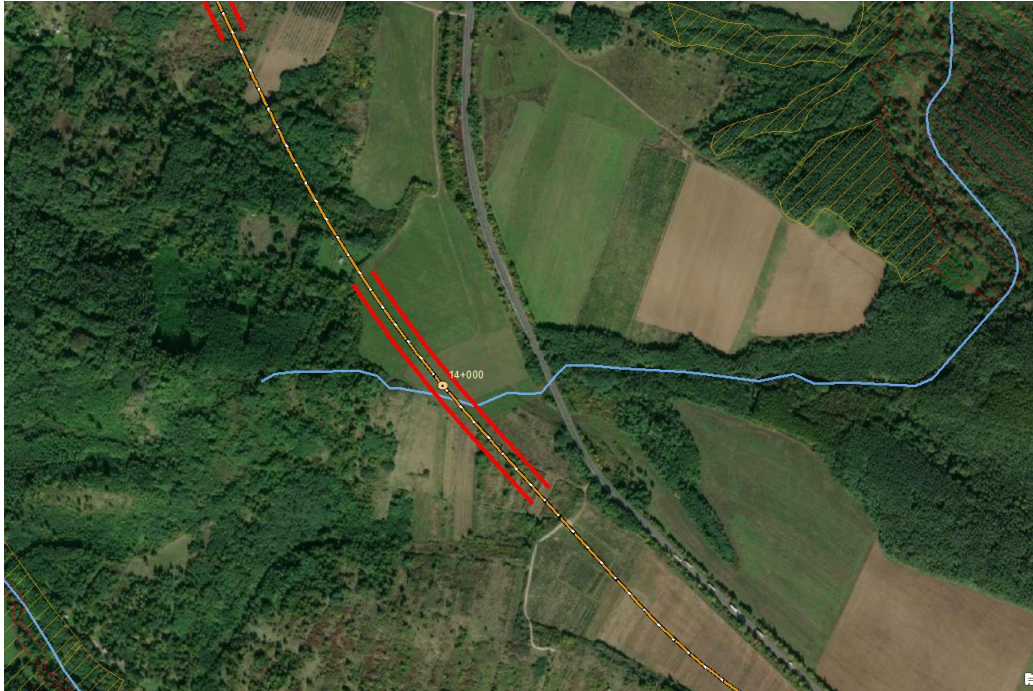
The length of the ecological corridor is about 4200 m. Its width is almost the same as the width of the watercourse along its entire length. More extensive vegetation is found only in the southern part. It runs through a populated area, so it is subject to strong anthropogenic influences and is easily accessible. The topography is flat. Its continuity is moderated by the main road 2 and the settlement of Drégelypalánk.

Suggested measures:

To improve permeability, an underpass for large animals is proposed to be built.

The rehabilitation of the watercourse is suggested including the restoration of the riverbed to its natural state, planting vegetation, restoration with environmental engineering methods, restoration of buffer zones and the establishment of monitoring Sampling points.

Area Nr4: M2 segment Fekete-stream



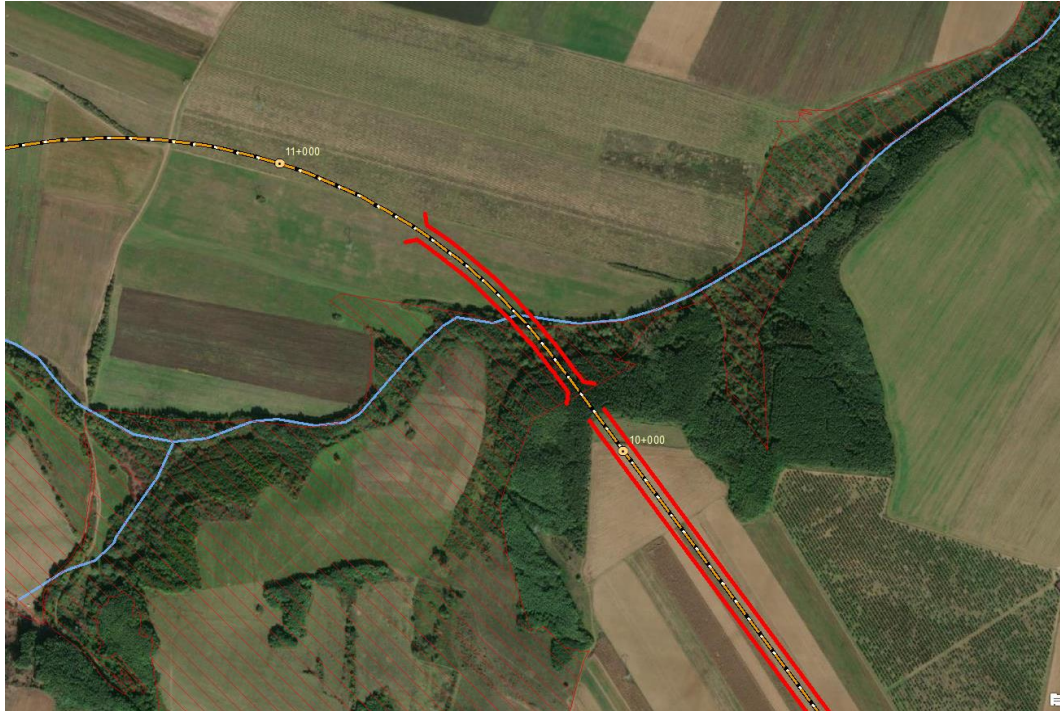
The ecological corridor is about 8600 m long. Its width varies between 2700 m and 300 m. The average width is about 1000 m. There is no full length water connection between the two core areas. Its topography is flat. The vegetation is diverse and surrounds the stream on both sides, with both closed and open vegetation types. The surrounding land uses are dominated by arable land, with no residential areas. Its continuity is moderated by the main road 2. It is difficult to access due to its wide vegetation cover and therefore has a low level of disturbance.

Animal overpass is proposed but underpass would be more suitable

Suitability of Fekete stream ecological corridor

Animal groups	Species	With	Length	Vegetation	Land use	Water	Continuity	Suitability	Overall suitability
Large mammal	Red deer	S3	S1	S1	S2	S0	S1	S1,6	S1,6
	Wild boar	S1	S1	S0	S1	S2	S1	S1,2	
	Common lynx	S3	S1	S2	S2	S0	S2	S2	
Small and medium-sized mammals	European hedgehog	S1	S2	S2	S1	S0	S2	S1,6	S1,6
	Otters	S1	S2	S2	S2	S3	S2	S2	
	Red fox	S1	S2	S0	S1	S0	S1	S1,2	
Amphibian	Common toad	S1	S3	S1	S1	S2	S2	S1,6	S2
	Newts	S3	S3	S2	S2	S3	S2	S2,5	
Reptile	Green lizard	S1	S3	S1	S1	S0	S2	S1,6	S1,6
	Forest Glider	S1	S3	S1	S1	S0	S2	S1,6	
Fish	Gudgeon	S1	S2	S2	S1	S3	S1	S1,7	S1,8
	Cutworm	S1	S2	S0	S1	S3	S1	S1,6	

Area Nr5: M2 segment crossing Haraszti-árok (ditch)

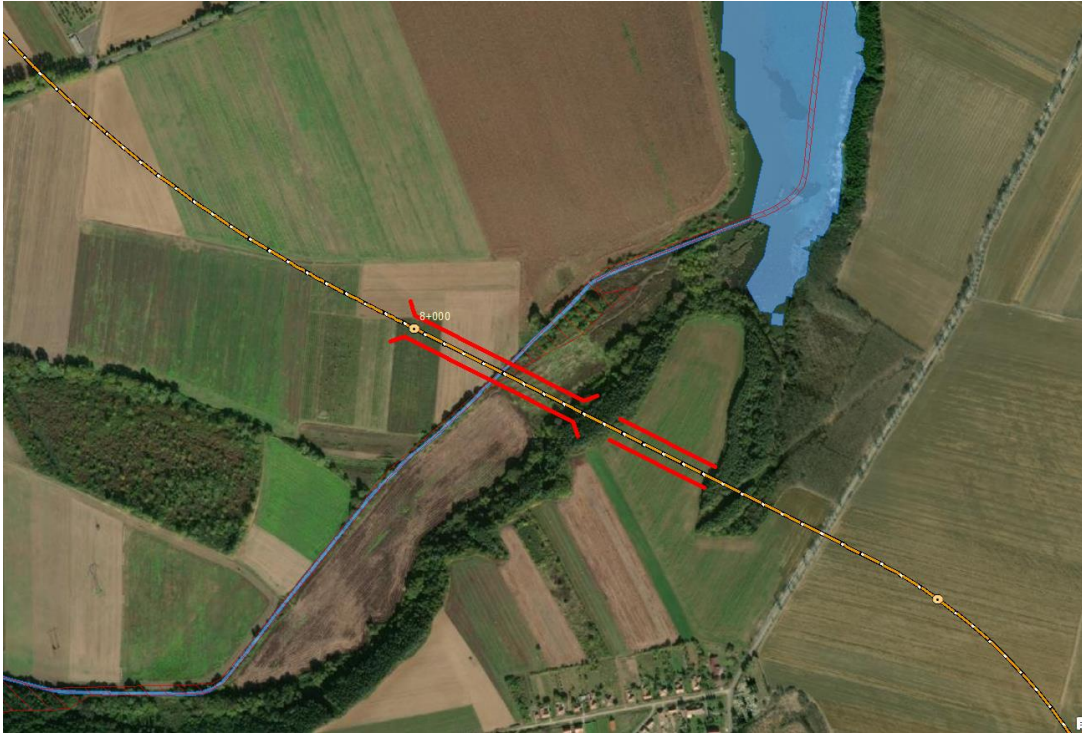


The ecological corridor is about 12000 m long. Its width varies between 1400 and 50 m with an average width of about 500 m. It does not have a full length water connection between the two core areas. Its vegetation is diverse, with both closed and open vegetation types in almost equal proportions. Surrounding land uses are dominated by arable land, but there is also a mosaic of orchards. The high proportion of ploughland means that it is considered to be disturbed.

The Haraszti-árok (Ditch) as ecological corridor is the most favorable for large mammals and the least favourable for amphibians.

The rehabilitation of the watercourse is suggested including the restoration of the riverbed to its natural state, planting vegetation, restoration with environmental engineering methods, restoration of buffer zones and the establishment of monitoring Sampling points

Area Nr6: M2 segment crossing Nagyoroszi-stream

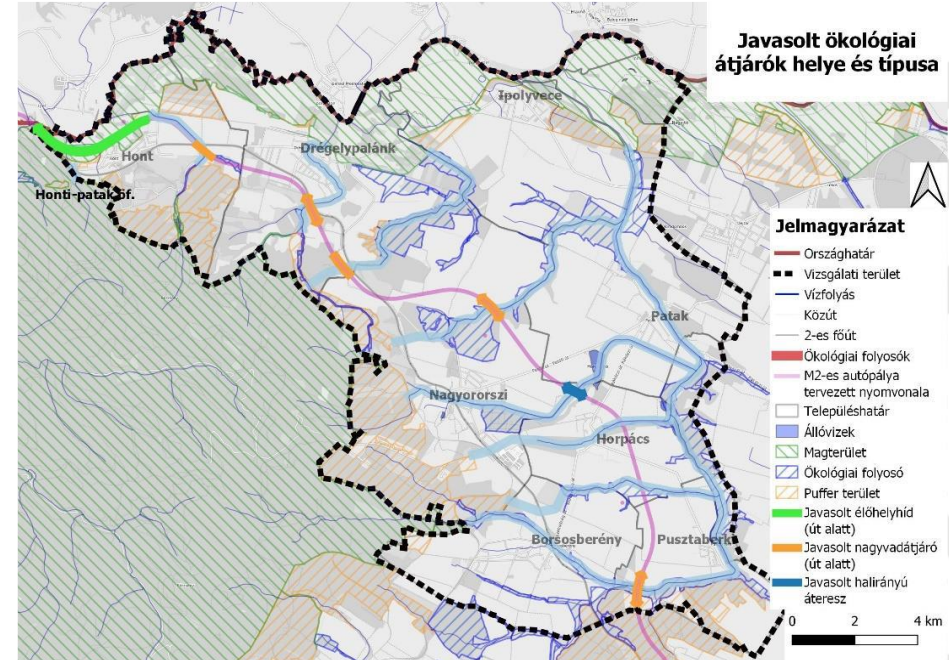
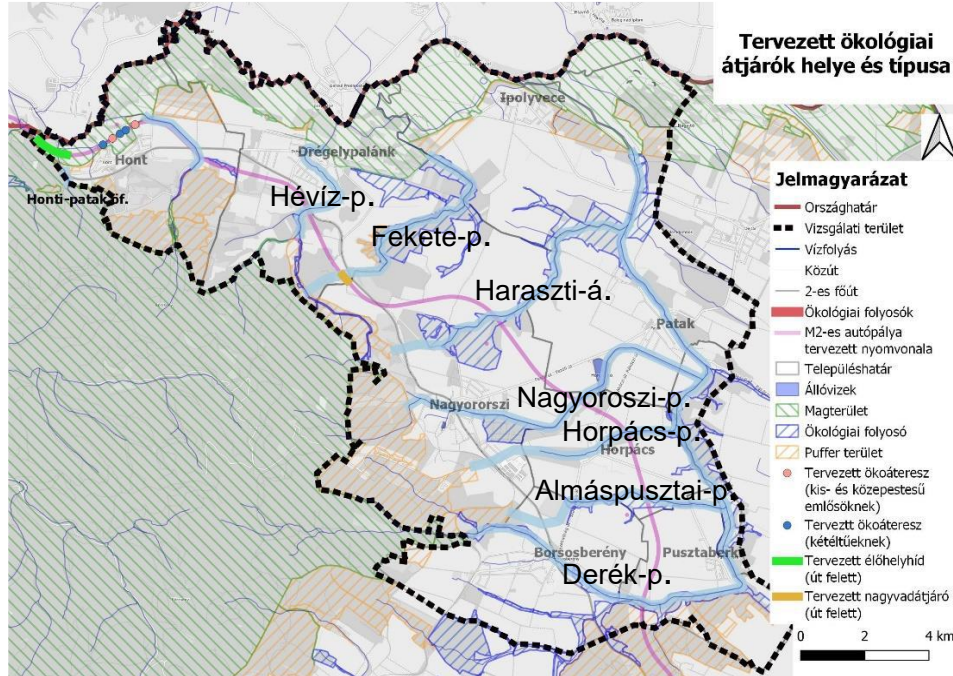


The ecological corridor is about 19000 m long. Its width varies between 1200 m and 50 m, with a typical width of about 200 m. Its vegetation is predominantly of the closed type, Disturbed by the road No 2, the villages of Nagyoroszi and Patak.

The Nagyoroszi stream is the most favourable for fish and the least favourable for amphibians. Proposed eco-passage type: underpass for large mammals, as it provides longitudinal stream crossing for all aquatic and semi-aquatic species.

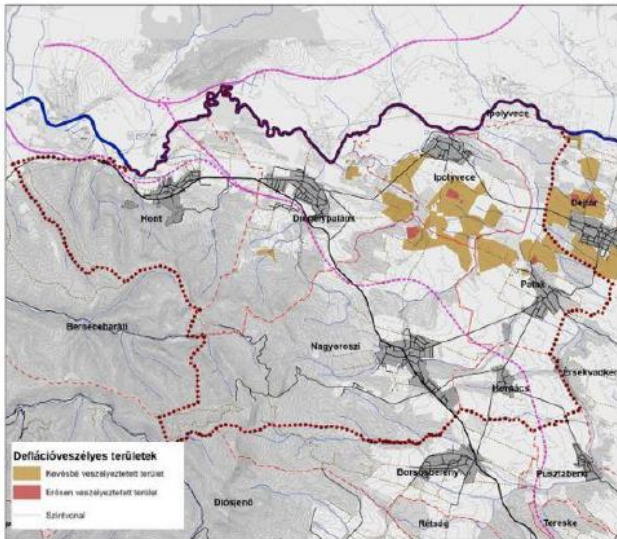
The rehabilitation of the watercourse is suggested including the restoration of the riverbed to its natural state,

Stronger permeability of the planned M2 is suggested

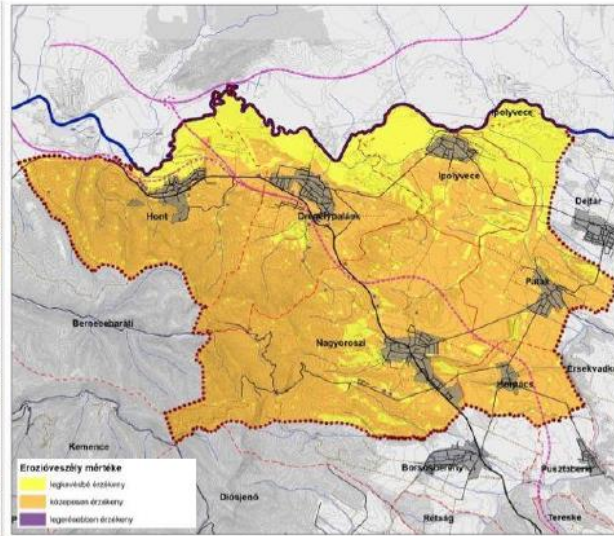




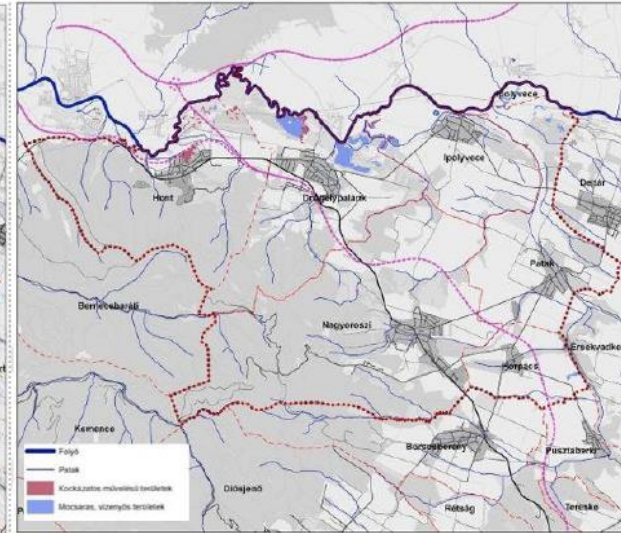
Land use conflicts



defláció



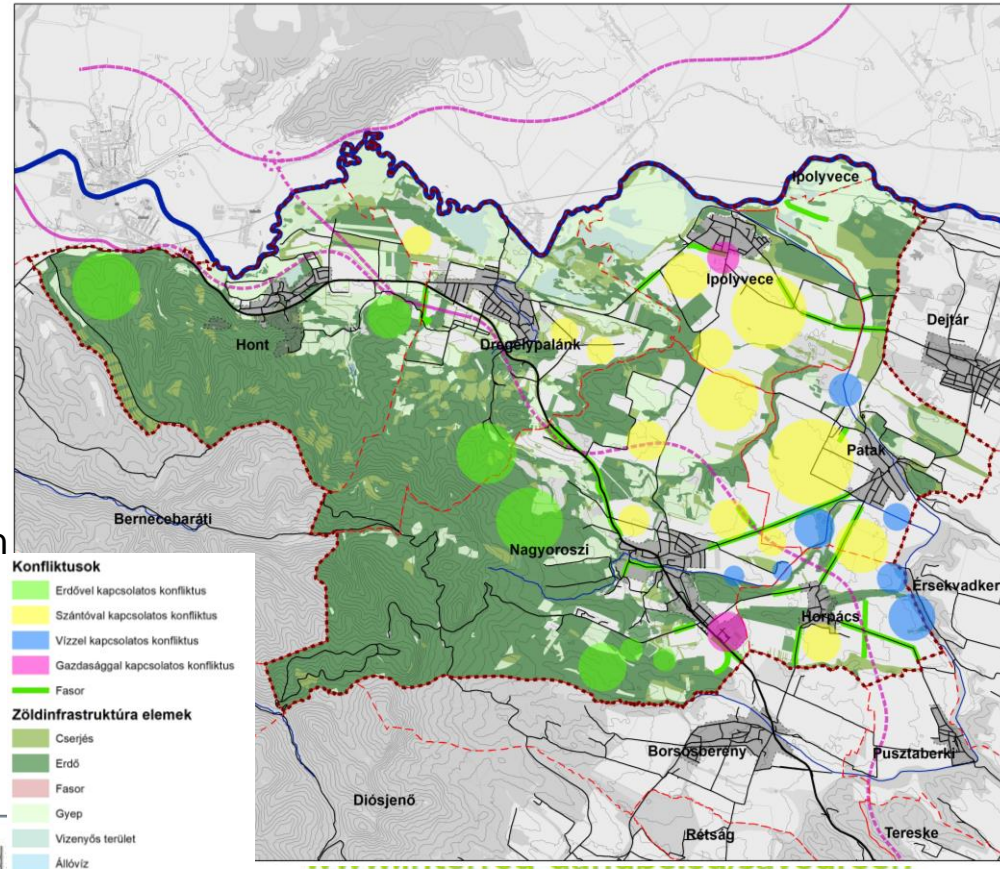
erózió



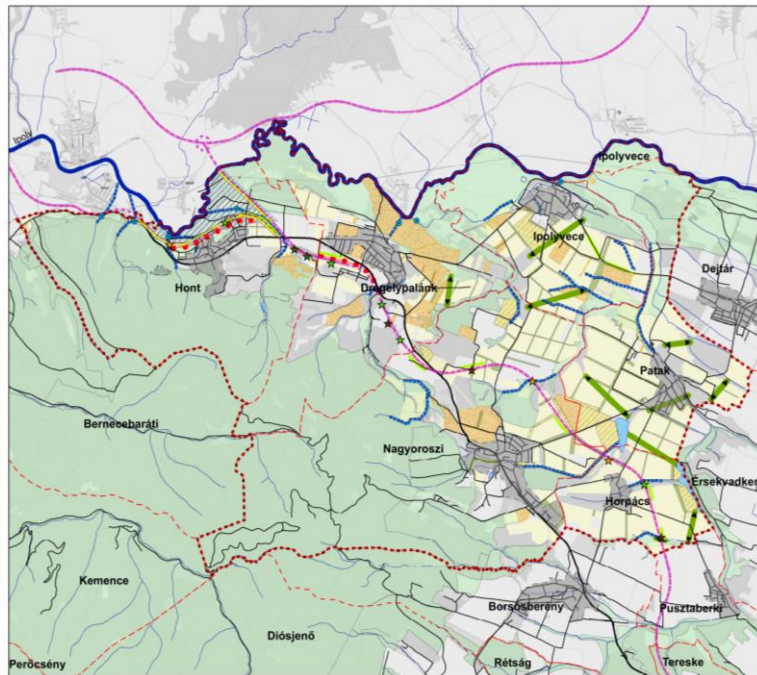
belvíz

General conflicts related to Green Infrastructure elements and network








- Conflicts in forests, arable land, water, farms and woodlands
- Forests: clear cutting, spread of invasive species, low diversity
- Cropland: illegal dumping, fragmentation effects, use of fertilizers and chemicals
- Watercourses: chemical pollution, lack of riparian vegetation
- Economic: lack of protection forest at caravan park
- Degraded condition of hedgerows, field protection forest strips
- Fragmentation of M2

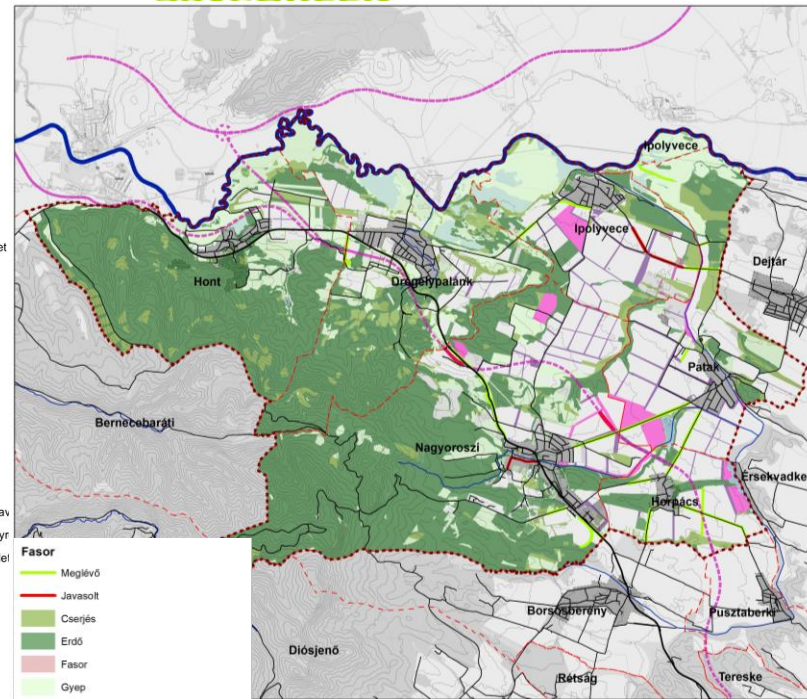


Proposals



Jelmagyarázat

-  Település közigazgatási határa
-  Vizsgálati terület határa
-  M2 tervezett nyomvonala
-  Főutak
-  Mellékutak
-  Földutak
-  Ipoly
-  Patak
-  Belterület
-  Meglévő szántóterület
-  Természetvédelmi oltalom alatt álló terület
-  Monitoring rendszer kialakítása
-  Tájéjáró kiépítése javasolt
-  Kisvad átjáró kiépítése javasolt
-  Nagyvad aluljáró kiépítése javasolt
-  Nagyvad felüljáró kiépítése javasolt
-  Autópálya lábakra emelése javasolt
-  Ökológiai kapcsolat helyreállítása
-  Javasolt útfásítás
-  Javasolt zajvédő fal kialakítása
-  Kisvízfolyások rehabilitálása javasolt
-  Eutrofizáció szabályozása, töfennntartás jav
-  Egykori gyümölcsstermesztő területek helyr
-  Élőhelykompenzációra javasolt gyepterületei
-  Komplex élőhely-rehabilitáció javaslat
-  Javasolt mezővédő erdősáv



- ### Fasor
-  Meglévő
 -  Javasolt
 -  Cserjés
 -  Erdő
 -  Fasor
 -  Gyep
 -  Vizenyős terület
 -  Állóvíz
 -  Javasolt cserjés
 -  Javasolt mezővédő erdősáv
 -  Javasolt gyep

General conclusion

To avoid further loss of connectivity or at least maintain the present level of permeability of the landscape complex actions are required based on cross-sectoral, integrated approach, cooperation, communication and partnership.

A cross-sectoral operational program would be a good tool for that just the integration of it into the national planning system is still not clear.

Thank you for your attention!

