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SZÉCHENYI EGYETEM
UNIVERSITY OF GYŐR

DALIA
DANUBE LIGHTHOUSE

EU MISSIONS
RESTORE OUR OCEAN & WATERS

A Szigetközi vízpótlás elsődleges és másodlagos hatásai

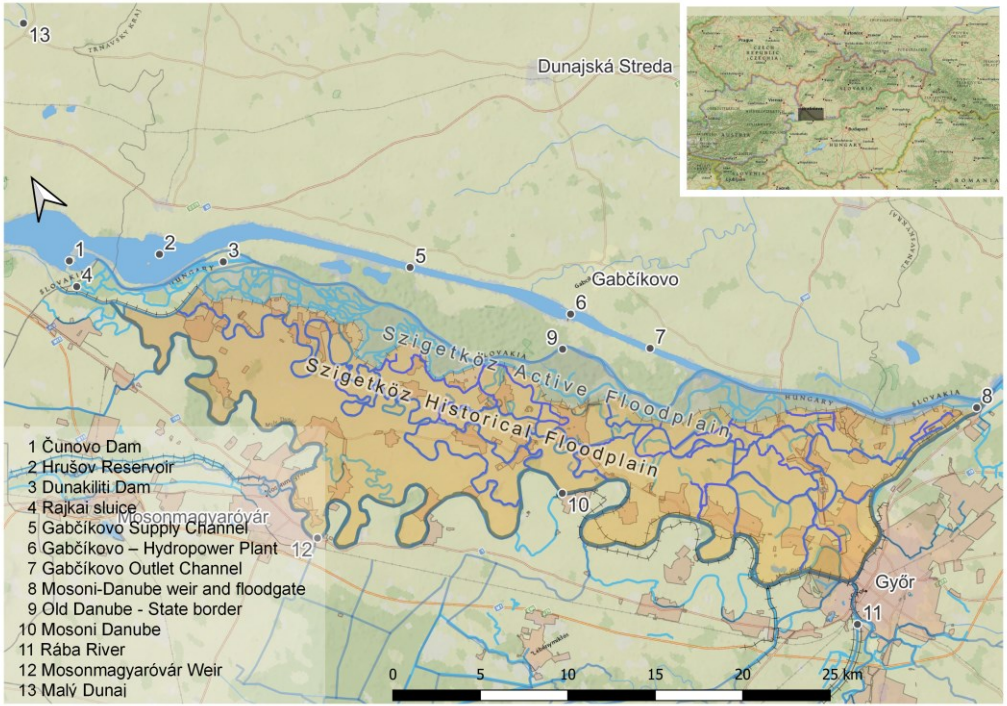
Jó gyakorlatok felvonultatása és ökoszisztéma szolgáltatások értékelése a DALIA projektben

Chappon Máté – doktorandusz, Széchenyi István Egyetem

2025. január 14.

DALIA-DANUBE.eu

Szigetköz



Terület:	375 km2
Hossz:	53 km
Szélesség:	6-8 km
Lakosság:	167.000
Magasság:	110 – 125 m. B.f.
Ártér:	99%

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Elterelés 1992 ősz

Hullámtér

Fotó: ÉDUVÍZIG

Mentett oldal

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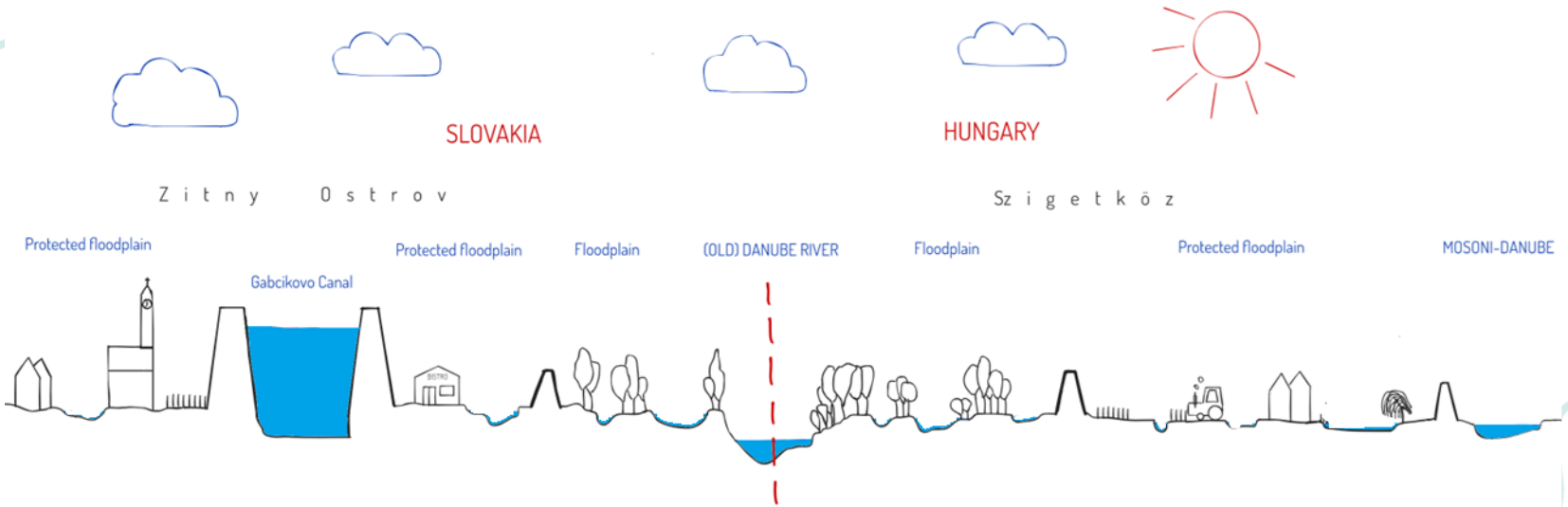
Elterelés után 1992-1995



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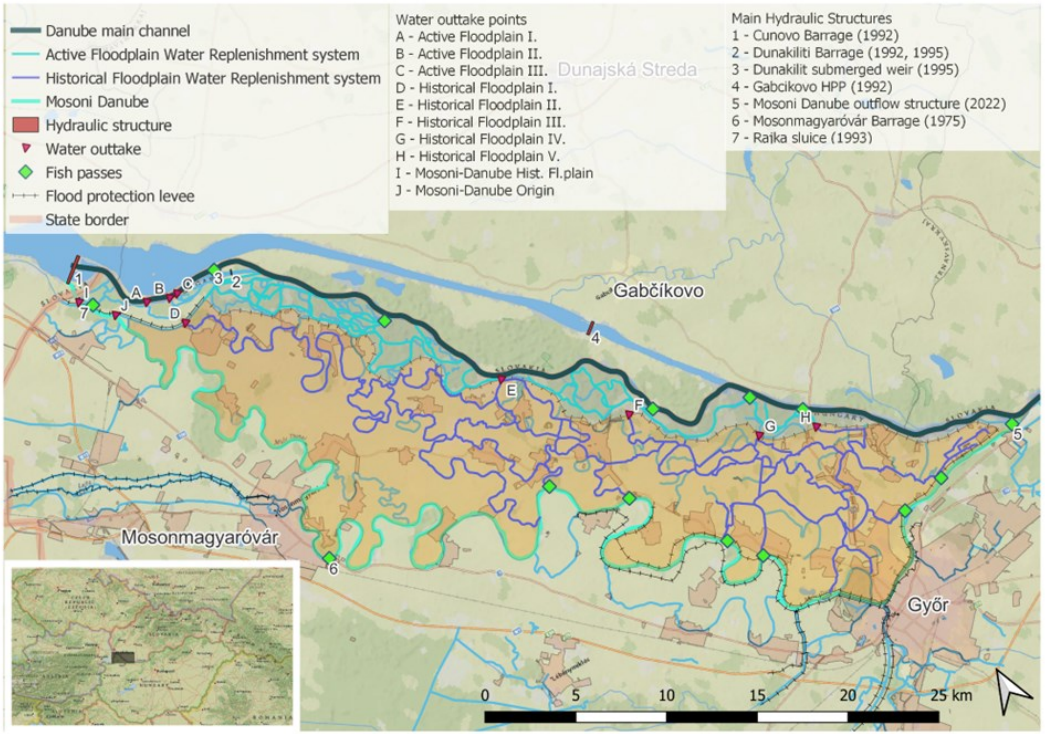

Vízpótlás 1993-2022

Célja: az 1950-es évek referencia-vízszintjeinek helyreállítása felszínen és felszín alatt is.

Hullámtér:	120 km
Mentett oldal:	240 km
Mosoni-Duna:	125 km

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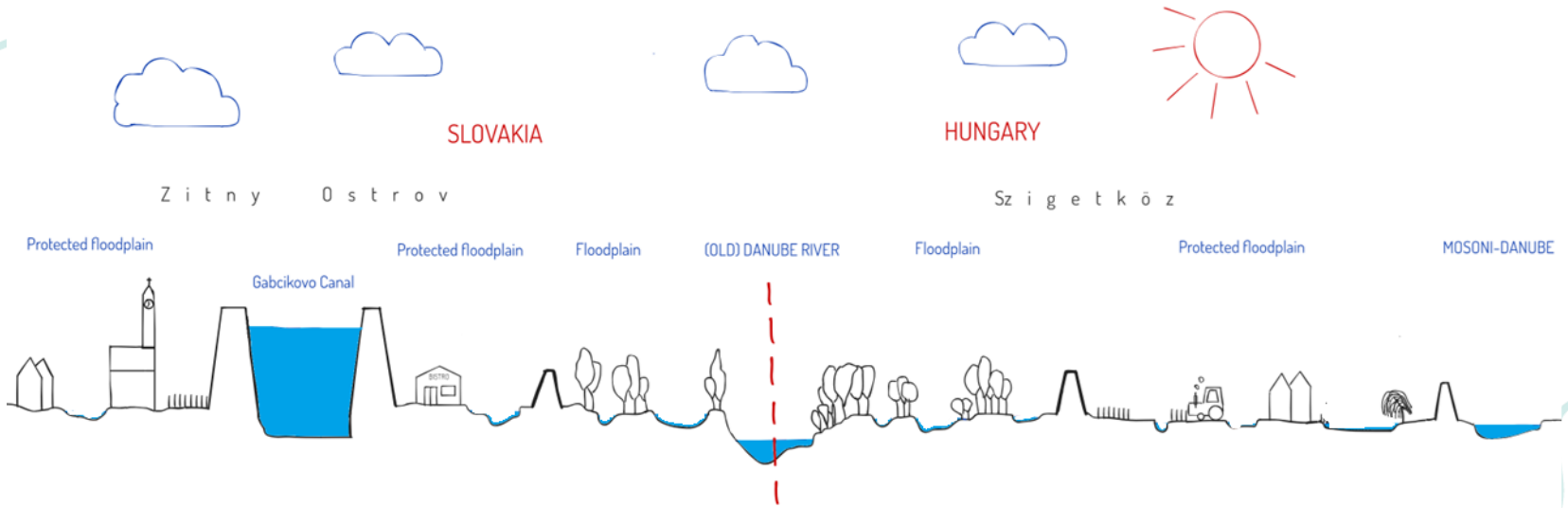
Elterelés után 1992-1995



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Vízpótlás után – 2023

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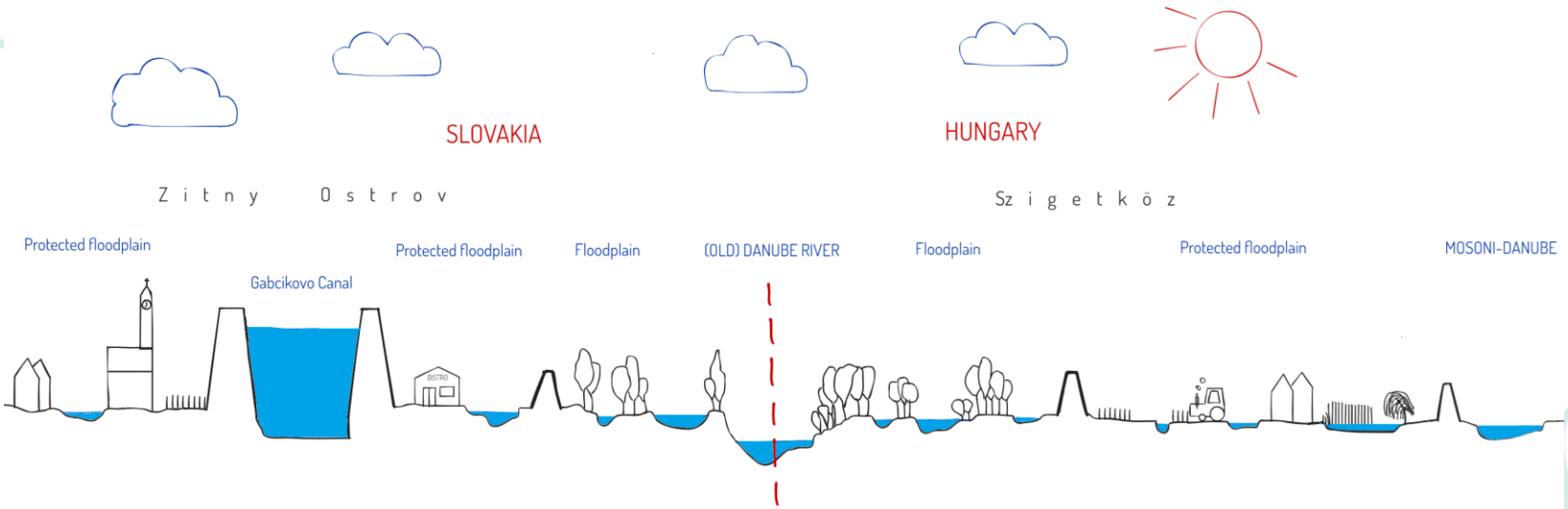

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Vízpótlás után – 2023

Hullámtér

Mentett oldal

Fotó: ÉDUVÍZIG

DALIA PROJEKT TEVÉKENYSÉGEK

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DALIA
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A. TUDÁSÁTADÁS

Projekten belüli pályázati felhívás a <u>jó gyakorlatok</u> replikációjára

<u>Replikáció:</u> 2 év, max 100.000 €

<u>Ajánlott tevékenység:</u>
A vízpótló rendszer (1) tervezési, (2) üzemeltetési és (3) társadalmasítási elvei, módszerei

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DALIA PROJEKT TEVÉKENYSÉGEK

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UNIVERSITY OF GYŐR

A. TUDÁSÁTADÁS:

Projekten belüli pályázati felhívás a jó gyakorlatok replikációjára

B. KUTATÁS:

Vízpótlás hatásai a Szigetközi ökoszisztéma szolgáltatások vonatkozásában –

RESI módszertan alkalmazása

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DALIA PROJEKT TEVÉKENYSÉGEK

SZÉCHENYI EGYETEM
UNIVERSITY OF GYŐR

A. TUDÁSÁTADÁS:

Projekten belüli pályázati felhívás a jó gyakorlatok replikációjára

B. KUTATÁS:

Vízpótlás hatásai a Szigetközi ökoszisztéma szolgáltatások vonatkozásában –

RESI módszertan alkalmazása

C. TÁRSADALMASÍTÁS

Helyi érintettek megkérdezése, tájékoztatása, bevonása

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RESI módszertan

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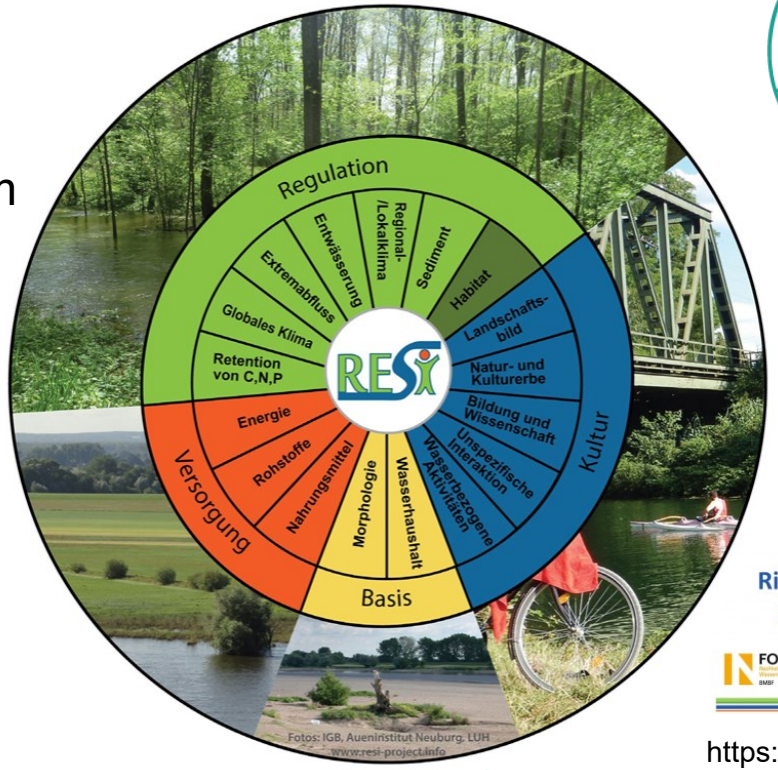
Ökoszisztéma szolgáltatások:

Hasznok, melyeket a társadalom számára az ökoszisztéma biztosít.



Kategóriái:

Ellátó (Versorgung)

Szabályozó (Regulation)

Kulturális (Kultur)

Támogató (Basis)

RESI
River Ecosystem Service Index
BMBF Verbundforschungsprojekt 2015-2018
FONA NaWaM ReWaM

https://www.resi-project.info/en/

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RESI módszertan

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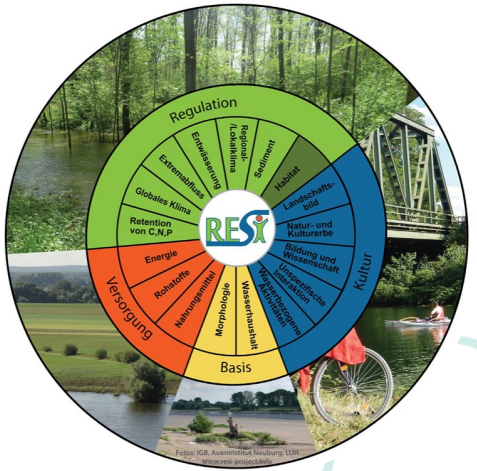
Cél:

A Szigetközi térség kiválasztott ökoszisztéma szolgáltatásainak értékelése jellemző időszakokra, a vízpótlórendszerek hatásainak bemutatása érdekében.

Ökoszisztéma szolgáltatás	Referencia 1950-1990	Elterelés 1993-1994	Vízpótlás 2015-2025
Szántóföldi növénytermesztés hozama (E)	x	x	x
Gyepterületek hozama (E)	x	x	x
Erdőterületek növekménye (E)	x	x	x
Üvegházhatású gázok megkötése (SZ)	x	x	x
Élőhelyek biztosítása (SZ)	x	x	x
Halállomány – horgászat, halászat (K, E)	x	x	x
Vízhez kötődő rekreáció (K)	x	x	x
Árvíz szabályozás (T)	x	x	x



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RESI Minta-eredmények

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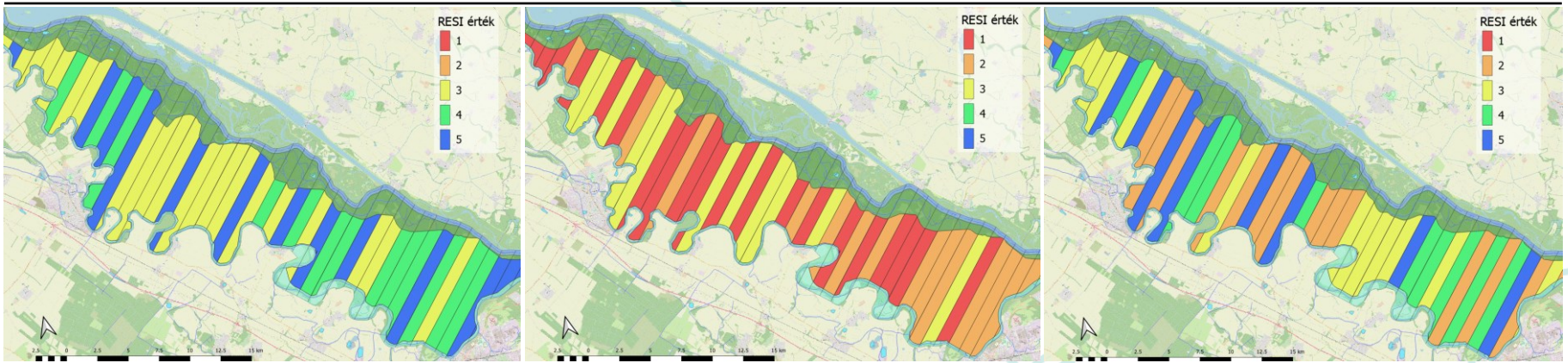
Milyen eredményeket szolgáltat a RESI?

Pl. egy adott – a mentett oldalon értelmezhető – ökoszisztéma szolgáltatás értékelése a RESI módszertanban meghatározott index alapján 3-5 közötti osztályzatról 1-3 közé romlott, majd a vízpótlás hatására 2-5 közé javult.

Referencia 1950-1990	Elterelés 1993-1994	Vízpótlás 2015-2025



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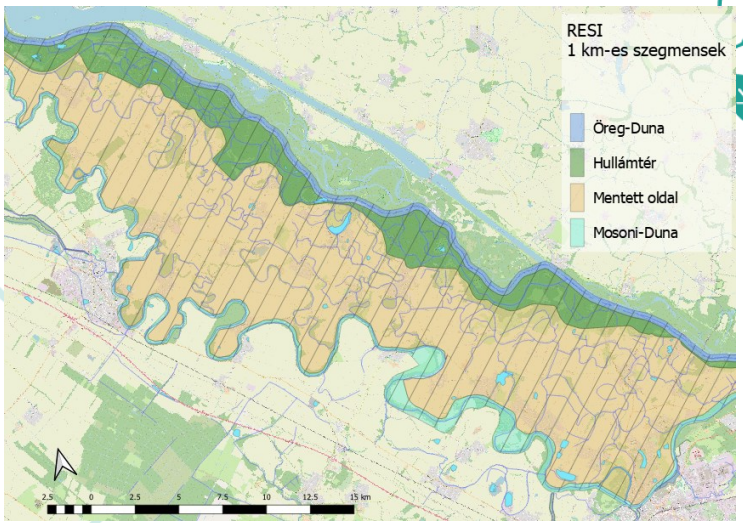
Szántóföldi növénytermesztés

$$Ind_{KULT}\ (j) = \sum_{i=1}^{n}(j)\frac{AF_{alt,i} * EP_i}{A_{seg,j}} + \frac{AF_{rez,i} * EP_i}{A_{seg,j}} * EA_{HW}$$



Ind(kult) – terméshozam (mázsa, dt)

AF(alt) – Mentett oldali szántó terület (ha)

AF(rez) – Hullámtéri szántó (ha)

A(seg) – 1,0 km-es szelvény területe (ha)

EA (HW) – árvízi veszteségtényező

EP – mezőgazdasági terméspotenciál (dt/ha)

Ind_{KULT}	> 40 dt ha^{-1}	> 30 – 40 dt ha^{-1}	> 20 - 30 dt ha^{-1}	> 10 – 20 dt ha^{-1}	≤ 10 dt ha^{-1}
RESI	5	4	3	2	1

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Vízpótlás és terméspotenciál

Adott talaj és adott növénykultúra esetén:

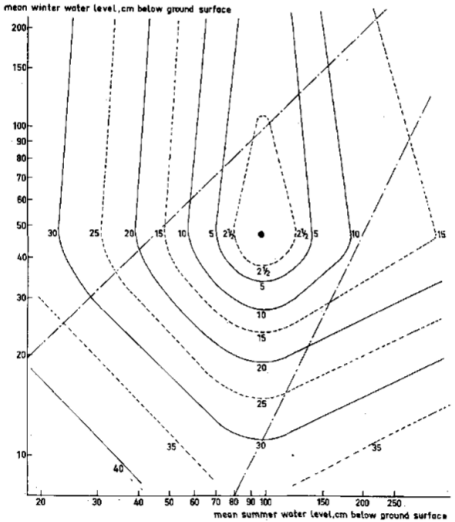
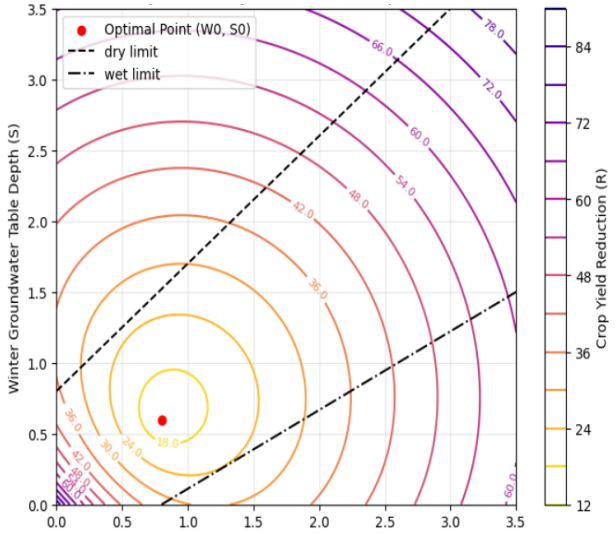


FIG. 6. PER CENT DECREASE IN YIELD AS FUNCTION OF WINTER AND SUMMER WATER TABLE DEPTHS SHOWING LINES OF EQUAL DECREASE
The two oblique straight lines give the limits between which the water table is generally situated. These isocarp diagrams were constructed for the seven soil mapping units mentioned in Fig. 3

W. C. Visser – Crop growth and availability of moisture, 1959



$$R = A \cdot \sqrt{(W - W_0)^2 + (S - S_0)^2} + \frac{B}{1 + k \cdot (W + S)}$$

R – Terméscsökkenés (%)

W – téli jellemző talajvízszint mélység

S – nyári jellemző talajvízszint mélység

A, B, k – illesztési paraméterek

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Szántóföldi növénytermesztés

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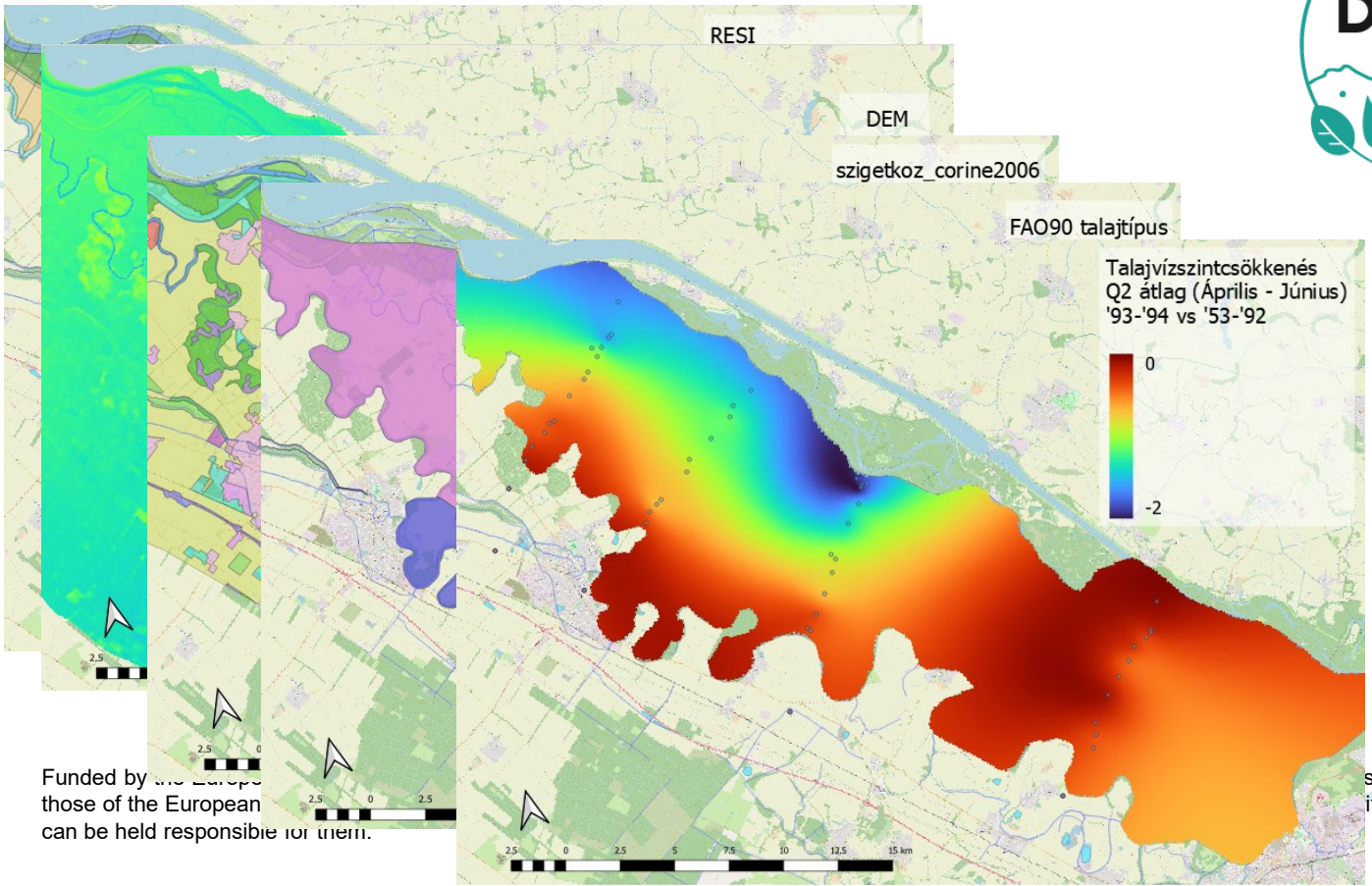

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Szántóföldi növénytermesztés

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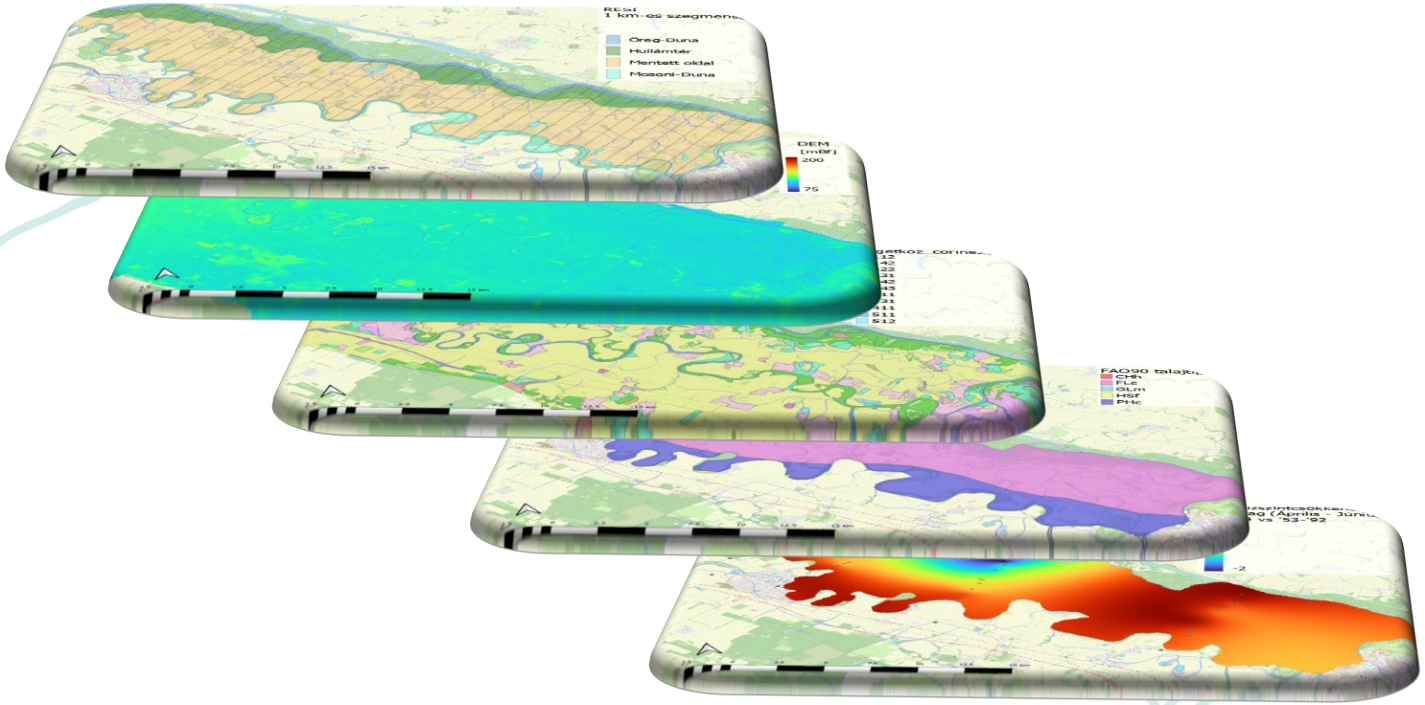

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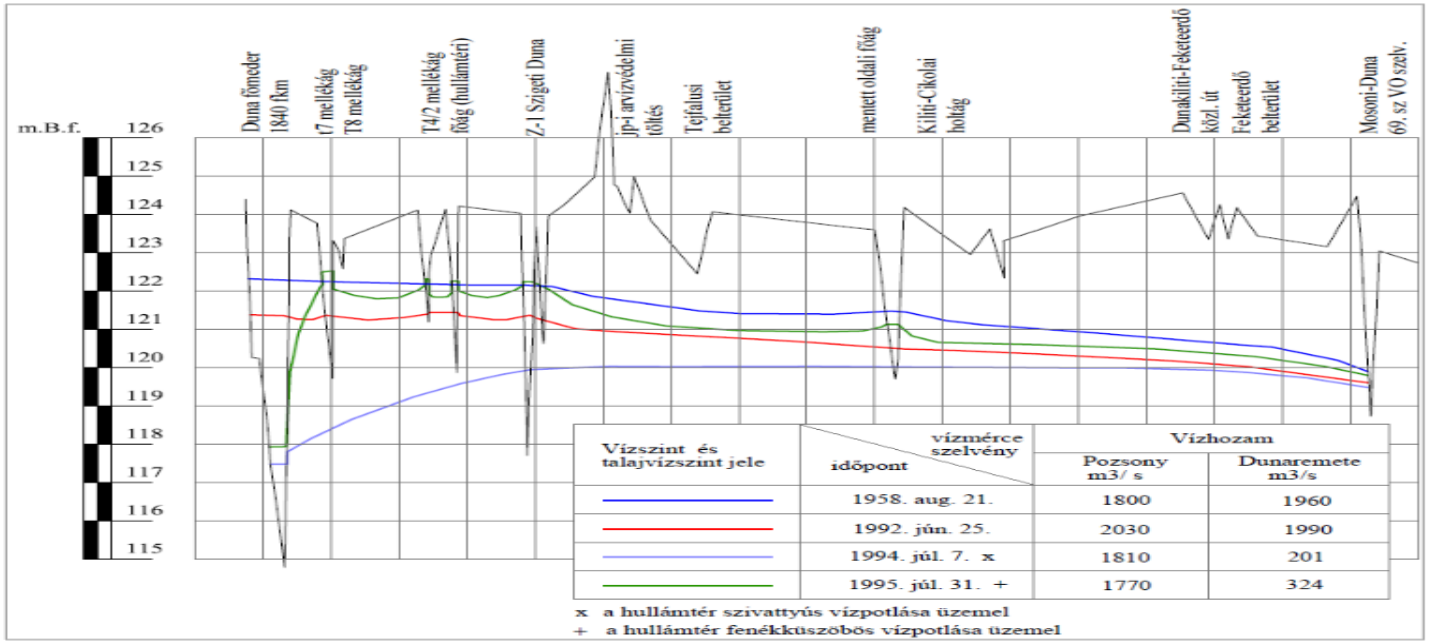
Talajvízszint rehabilitáció



AZ ábra

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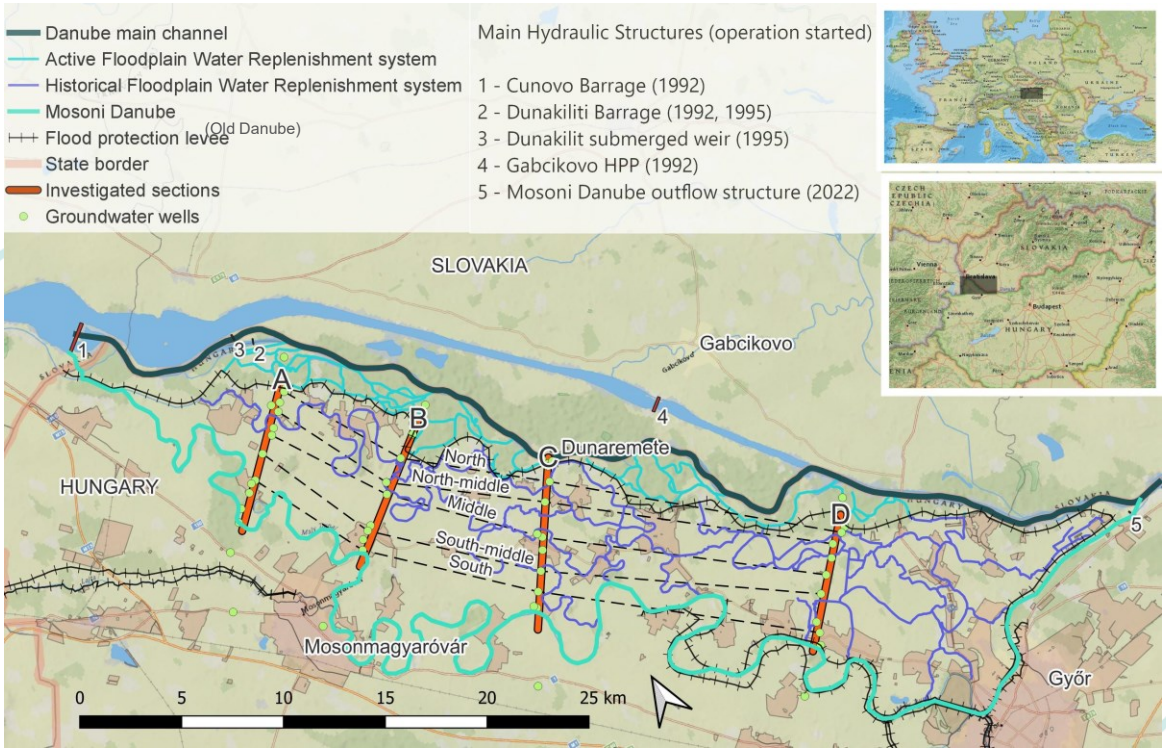
Hosszú távú jellemző talajvízszintek



Forrás:

Assessing the Long-Term Groundwater Level Dynamics in Szigetköz, Hungary

Máté Chappon, Klaudia Madarász, Katalin Bene

Cet, Vol. 114, Dec. 2024, pp.859-864,

https://www.cetjournal.it/cet/24/114/144.pdf

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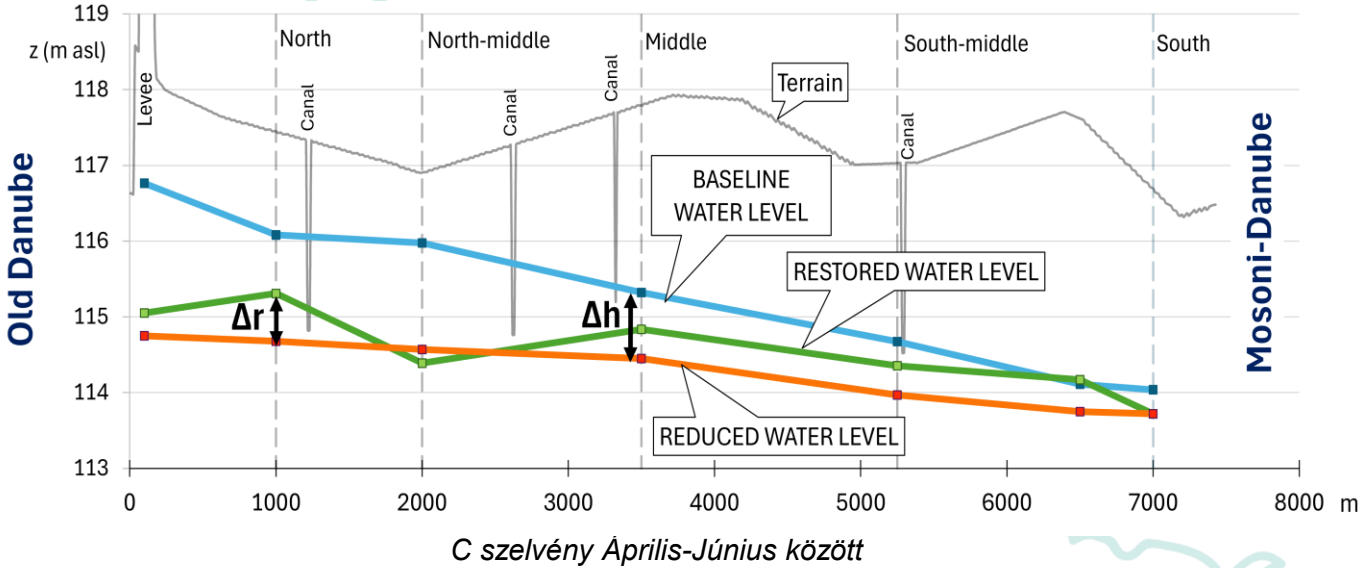
Hosszú távú jellemző talajvízszintek



C szelvény Április-Június között

Módszer

<u>3 időszak</u>

Baseline - Referencia (1953-1992)

Reduced – Elterelés után (1993-1994)

Restored - Vízpótolt (2003-2022)

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Hosszú távú jellemző talajvízszintek

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Eredmények

Δh – talajvízszint süllyedés [m]

Q1 (Jan-March)	sections			
	"A"	"B"	"C"	"D"
Δh (North) **[m]**	-1.31	-0.94	-1.31	-0.83
Δh (North-middle) **[m]**	-1.00	-0.78	-1.31	-0.53
Δh (Middle) **[m]**	-0.56	-0.68	-0.77	-0.51
Δh (South-middle) **[m]**	-0.47	-0.67	-0.60	-0.62
Δh (South) **[m]**	-0.26	-0.23	-0.40	-0.17

Q2 (Apr-June)	sections			
	"A"	"B"	"C"	"D"
Δh (North) **[m]**	-1.60	-1.15	-1.40	-0.72
Δh (North-middle) **[m]**	-1.01	-0.91	-1.41	-0.50
Δh (Middle) **[m]**	-0.69	-0.80	-0.87	-0.40
Δh (South-middle) **[m]**	-0.60	-0.69	-0.70	-0.55
Δh (South) **[m]**	-0.37	-0.31	-0.32	-0.15

Q3 (July-Sept)	sections			
	"A"	"B"	"C"	"D"
Δh (North) **[m]**	-1.39	-0.77	-1.17	-1.01
Δh (North-middle) **[m]**	-0.96	-0.79	-1.19	-0.63
Δh (Middle) **[m]**	-0.63	-0.71	-0.75	-0.58
Δh (South-middle) **[m]**	-0.56	-0.57	-0.59	-0.62
Δh (South) **[m]**	-0.35	-0.23	-0.14	-0.14

Q4 (Oct-Dec)	sections			
	"A"	"B"	"C"	"D"
Δh (North) **[m]**	-0.83	-0.17	-0.85	-1.07
Δh (North-middle) **[m]**	-0.69	-0.38	-0.75	-0.69
Δh (Middle) **[m]**	-0.26	-0.35	-0.41	-0.65
Δh (South-middle) **[m]**	-0.23	-0.40	-0.31	-0.58
Δh (South) **[m]**	-0.13	-0.03	-0.40	-0.14

Legend
Δh [m]
0.00
-0.20
-0.40
-0.60
-0.80
-1.00
-1.20
-1.40
-1.60

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Hosszú távú jellemző talajvízszint változás

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Eredmények II.

Δr – visszapótolt [m]; P – visszapótlás aránya a csökkenéshez képest [%]

Q1 (Jan-March)	sections			
	"A"	"B"	"C"	"D"
Δr (North) **[m]**	-0.10	0.03	0.33	0.31
P (North) **[%]**	-8%	4%	25%	37%
Δr (North-middle) **[m]**	-0.13	0.06	-0.41	0.33
P (North-middle) **[%]**	-13%	8%	-32%	62%
Δr (Middle) **[m]**	-0.19	0.02	0.16	0.28
P (Middle) **[%]**	-34%	3%	22%	55%
Δr (South-middle) **[m]**	-0.05	0.08	0.21	0.25
P (South-middle) **[%]**	-10%	12%	34%	40%
Δr (South) **[m]**	-0.08	0.13	0.05	0.12
P (South) **[%]**	-30%	57%	14%	69%

Q2 (Apr-June)	sections			
	"A"	"B"	"C"	"D"
Δr (North) **[m]**	0.26	0.28	0.63	0.11
P (North) **[%]**	17%	24%	45%	15%
Δr (North-middle) **[m]**	0.08	0.33	-0.18	0.12
P (North-middle) **[%]**	8%	36%	-13%	24%
Δr (Middle) **[m]**	0.02	0.3	0.38	0.05
P (Middle) **[%]**	3%	37%	44%	13%
Δr (South-middle) **[m]**	0.16	0.27	0.38	0.06
P (South-middle) **[%]**	27%	39%	55%	11%
Δr (South) **[m]**	0.10	0.41	0.00	-0.04
P (South) **[%]**	27%	134%	0%	-27%

Q3 (July-Sept)	sections			
	"A"	"B"	"C"	"D"
Δr (North) **[m]**	0.15	0.11	0.42	0.26
P (North) **[%]**	11%	15%	36%	26%
Δr (North-middle) **[m]**	0.04	0.27	-0.32	0.17
P (North-middle) **[%]**	4%	33%	-27%	27%
Δr (Middle) **[m]**	0.02	0.24	0.35	0.11
P (Middle) **[%]**	3%	34%	47%	19%
Δr (South-middle) **[m]**	0.20	0.23	0.36	0.12
P (South-middle) **[%]**	35%	40%	62%	20%
Δr (South) **[m]**	0.16	0.39	-0.09	-0.11
P (South) **[%]**	46%	168%	-63%	-80%

Q4 (Oct-Dec)	sections			
	"A"	"B"	"C"	"D"
Δr (North) **[m]**	-0.32	-0.36	-0.01	0.57
P (North) **[%]**	-38%	-206%	-1%	53%
Δr (North-middle) **[m]**	-0.28	-0.14	-0.76	0.55
P (North-middle) **[%]**	-41%	-38%	-101%	80%
Δr (Middle) **[m]**	-0.29	-0.13	0.115	0.43
P (Middle) **[%]**	-112%	-37%	28%	66%
Δr (South-middle) **[m]**	-0.12	-0.05	0.06	0.37
P (South-middle) **[%]**	-49%	-14%	18%	64%
Δr (South) **[m]**	-0.11	0.00	0.15	0.13
P (South) **[%]**	-90%	0%	37%	95%

Legend

Δr [m]	P [%]
-1.00	-100%
-0.75	-75%
-0.50	-50%
-0.25	-25%
0.00	0%
0.25	25%
0.50	50%
0.75	75%
1.00	100%

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Összefoglalás

A Felső-Szigetközben (A szelvény) a talajvízszint visszapótlás a téli félévben 0 közeli, vagy akár negatív is lehet.

A Közép-Szigetközben (B, C szelvény), a vegetációs időszakban (Q2-Q3) a talajvízszintcsökkenés 1/3-a visszapótolt. Télen a teljesítmény rosszabb.

Az Alsó-Szigetközben (D szelvény) a talajvízszint a téli félévben számottevően, nyári félévben csekély mértékben javult, vagy romlott.

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