Analiza potențialului de utilizare durabilă a vegetației specific sistemului Dunăre-Delta Dunării-Marea Neagră -D3MN-

Pavel Ana Bianca, Catianis Irina, Iordache Gabriel, Gheablau Catalin, Gavrila Catalina, Constantinescu Adriana, Ionescu Maria, Dinu Irina, Bogos Florin, Scrieciu Albert, Kreuter Sylvain, Lupascu Naliana, Florea Daniela, Stanica Adrian


VĂ RUGĂM
NU INTRAȚI
ÎN ZONA MARCATĂ









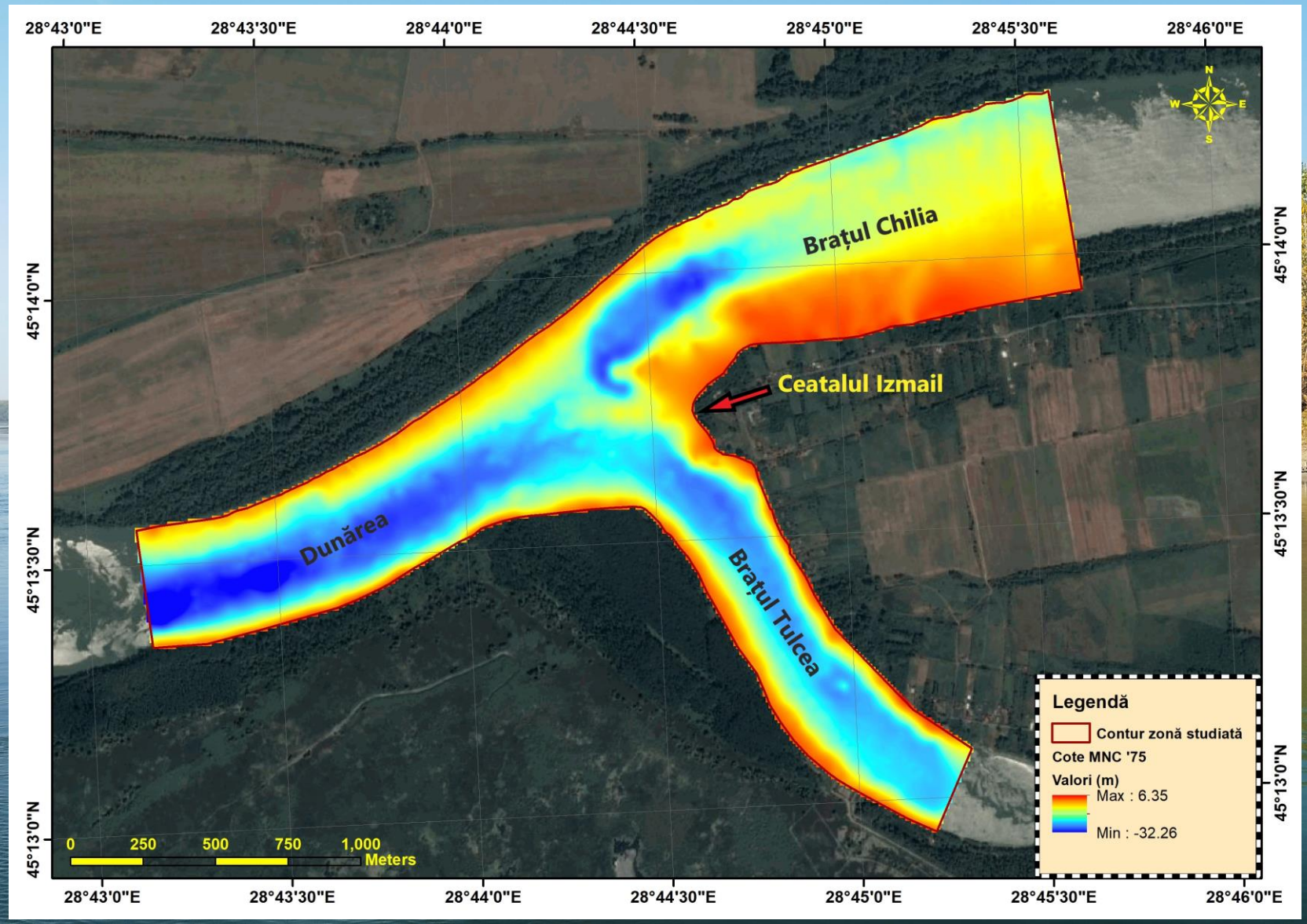




71
70
69
68
67
66
74
73
72
Image © 2022 Maxar Technologies
1742 m
1985
Data imaginilor: 6/28/2020 45°12'29.24" N 28°44'35.84" E cotă 0 m altitudinea de la nivelul va


80
79
78
81
77
76
75
Image © 2022 CNES / Airbus
Image © 2022 Maxar Technologies
1400 m
1985
Data imaginilor: 9/3/2021 45°10'55.85" N 28°53'24.15" E cotă 0 m altitudinea de la nivelul vizual al privitorului 6.34 km
Google Earth

Ceatal Izmail – 24 aprilie 2023



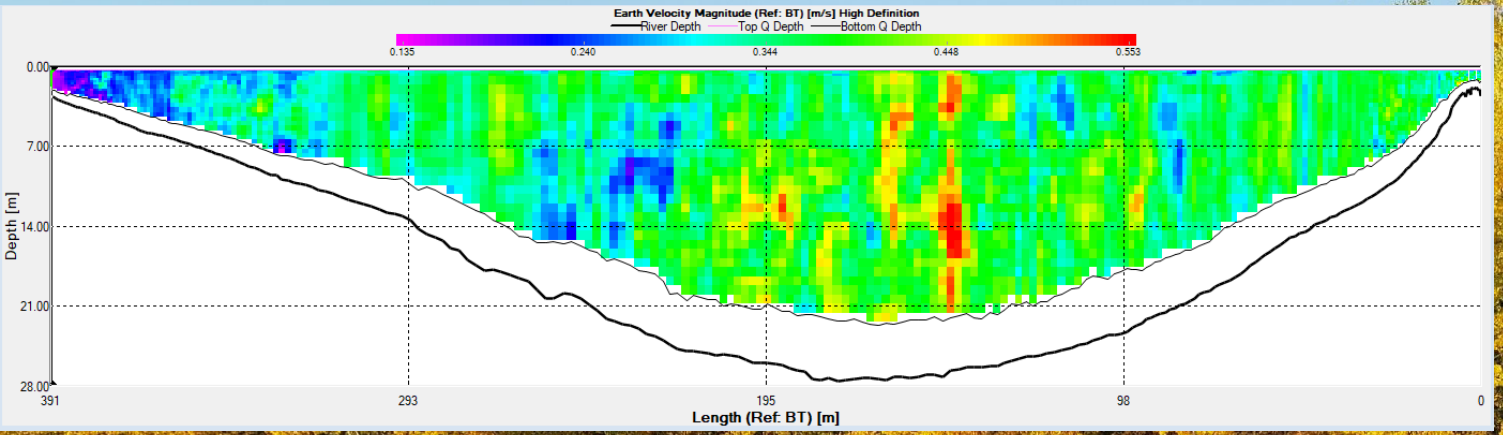
- Dunare (Mm 43,5)
- debit 8085 $m^3.s^{-1}$

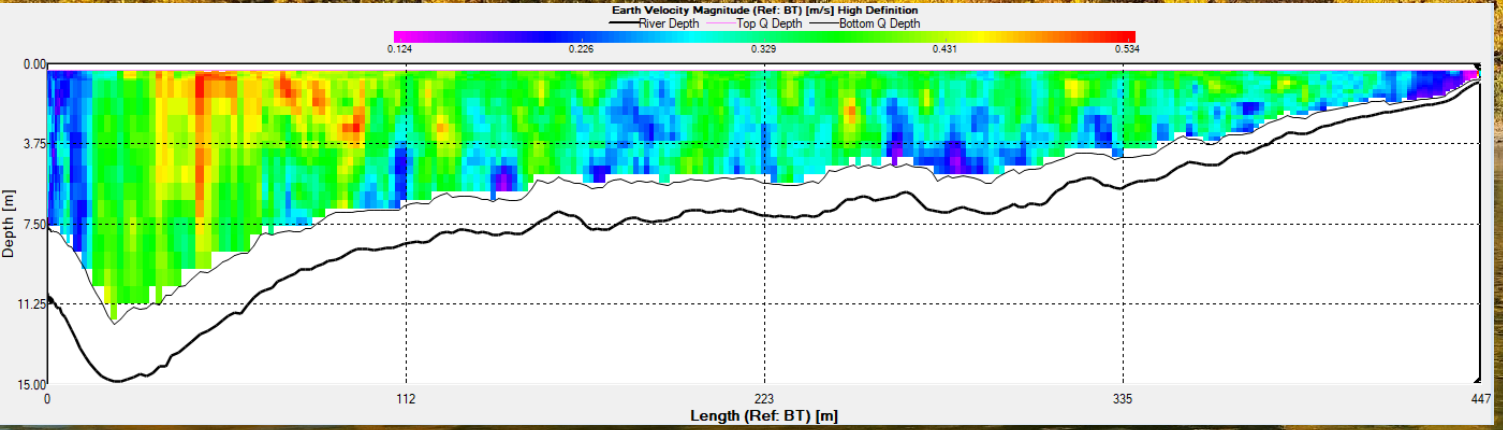
- Brațul Chilia (Km 115)-
- debit 3592 $m^3.s^{-1}$

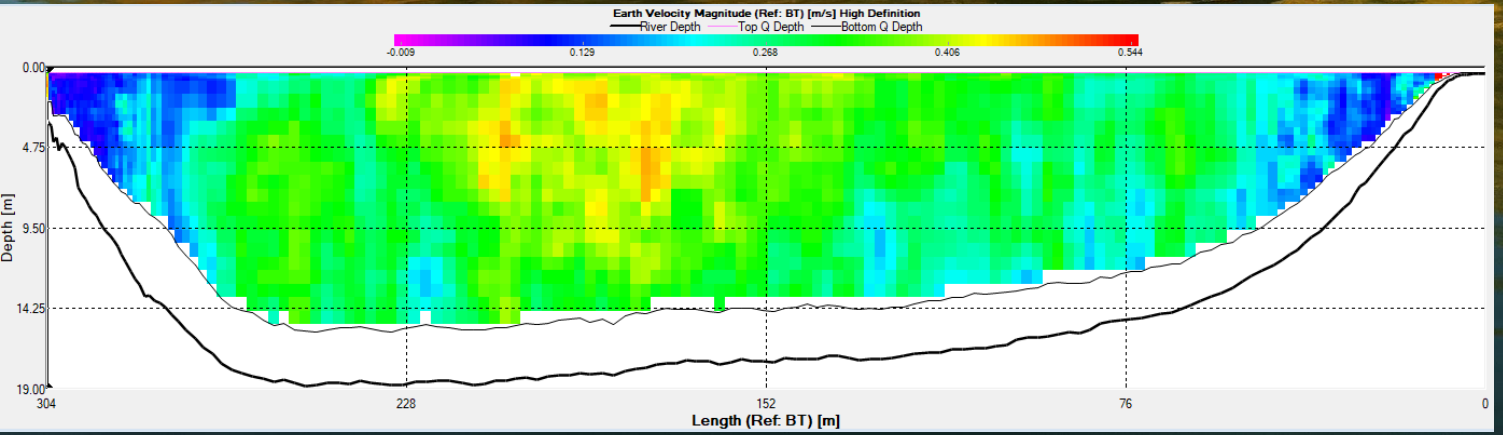
- Brațul Tulcea (Mm 42,5) –
- debit 4493 $m^3.s^{-1}$

- Nivel Mira Tulcea port - 263 cm

Ceatal Izmail – 24 august 2022





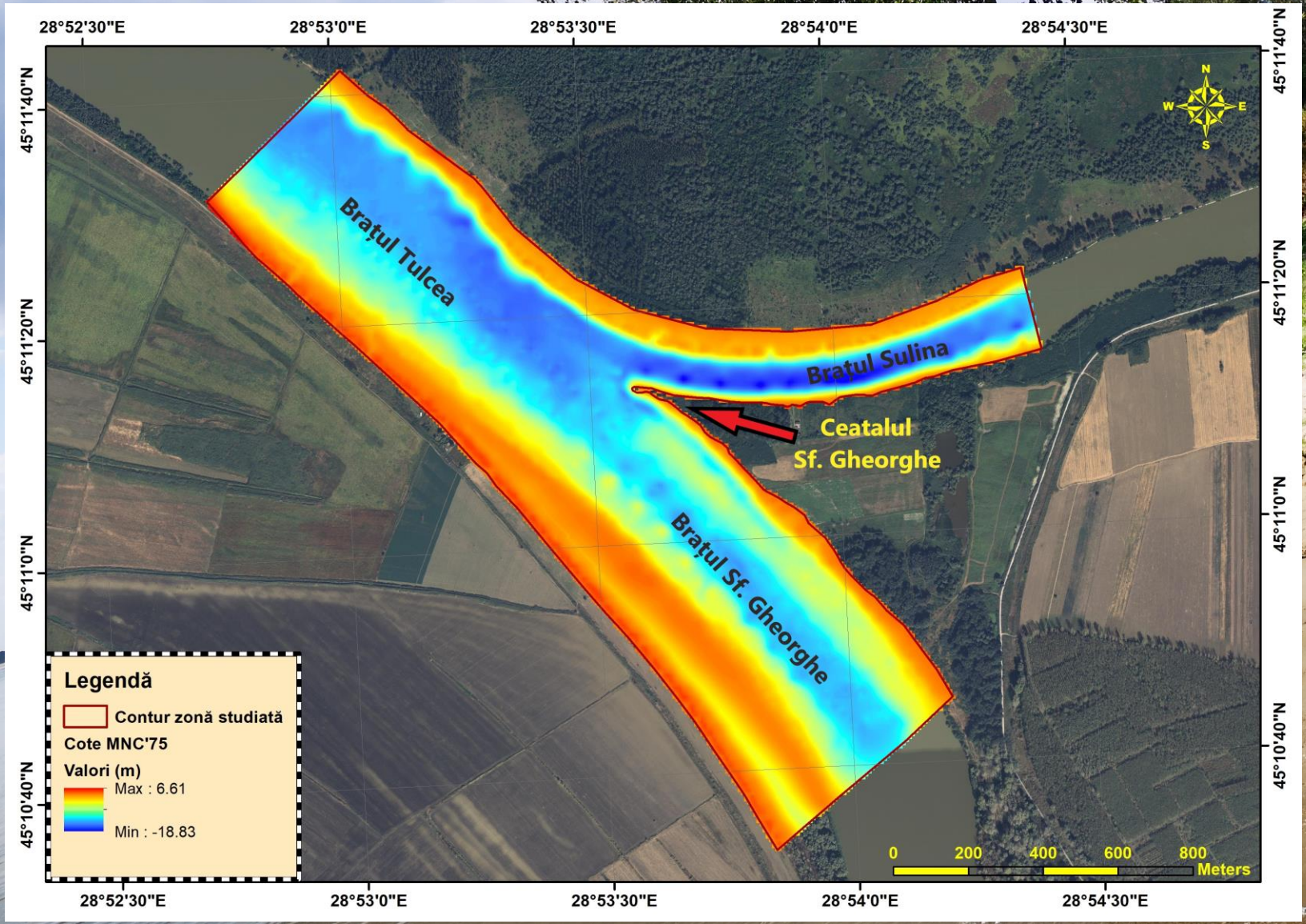


- Dunare (Mm 43,5)
- Debit de aproximativ 2200 $m^3.s^{-1}$

- Brat Chilia (Km 115)-
- Debit 1000 $m^3.s^{-1}$

- Brat Tulcea (Mm 42,5)
- Debit aproximativ 1200 $m^3.s^{-1}$
- Nivel Mira Tulcea port – 49 cm

Ceatal Sf. Gheorghe – 25 aprilie 2023

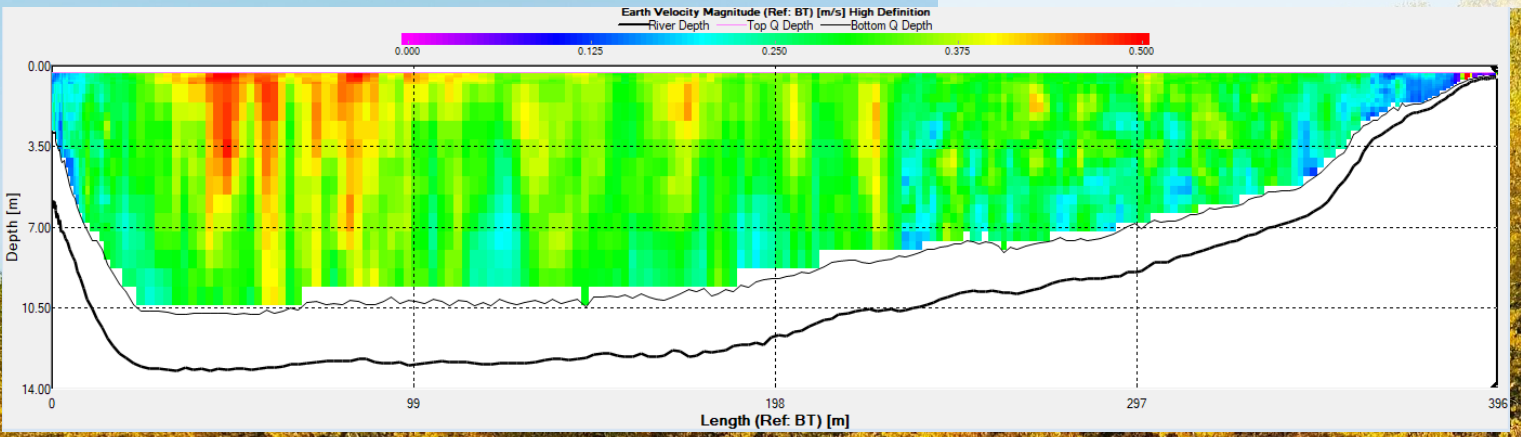


- Brat Tulcea (Mm 34)
- debit 4368 $m^3.s^{-1}$

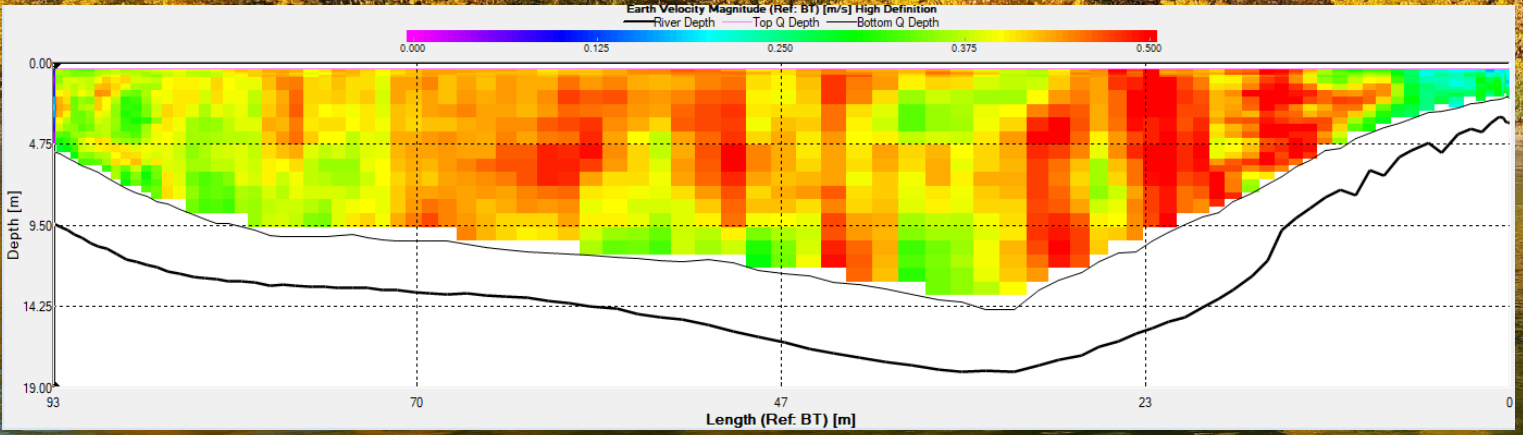
- Canal Sulina (Mm 33,5)
- debit 1568 $m^3.s^{-1}$

- Brat Sf. Gheorghe (KM 108)
- debit 2800 $m^3.s^{-1}$

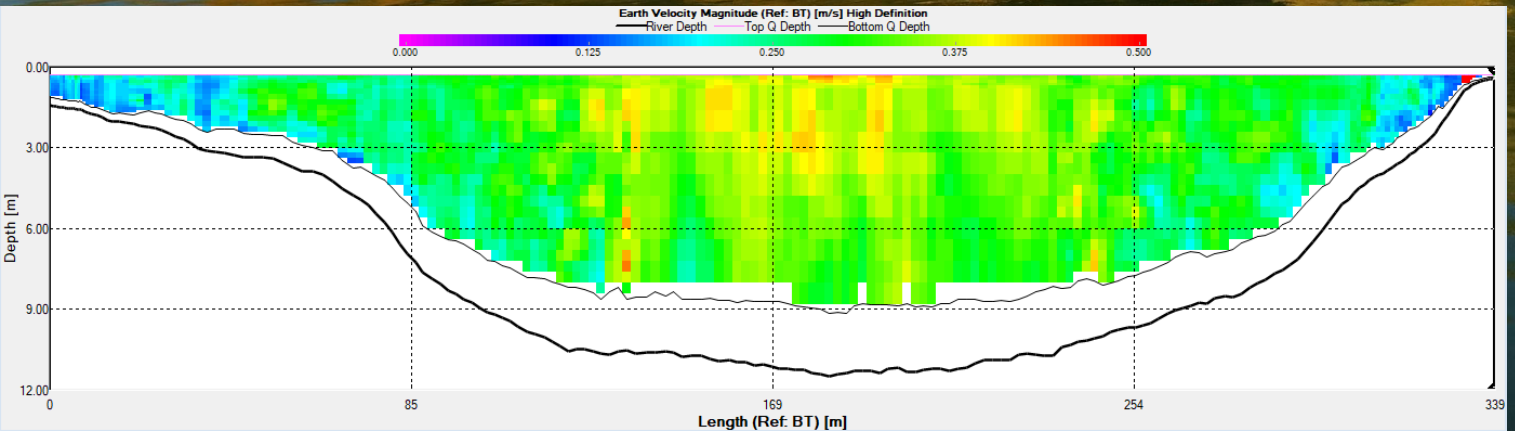
Ceatal Sf. Gheorghe – 25 august 2022



- Brat Tulcea (Mm 34)
- Debit de 1170 $m^3.s^{-1}$



- Canal Sulina (Mm 33,5)
- Debit de 470 $m^3.s^{-1}$



- Brat Sf. Gheorghe (KM 108)
- Debit de 700 $m^3.s^{-1}$

2021

- **125 probe sediment** din Depresiunea Gorgova-Uzlina (Uzlina, Durnoliatca, Isăccel, Gherasim, Isacova, Pojarnia, Bleziuc-Pojarnia, Potcoava, Cuzmânțu Lat, Cuzmânțu Mare, Gorgovăț, Gorgova, Rădăcinos și Rotund) în scopul analizei granulometrice, a conținutului de metale grele și a compoziției litologice.
- **21 probe de sediment** din zona costiera - Laguna Sacalin, Golful Musura, Canalul cu Sondă, Câșla Vădanei, Canal Tătaru, Jurilovca în scopul analizei granulometrice, a conținutului de metale grele și a compoziției litologice
- **276 probe de stuf** in vedere analizei continutului de metale grele

2022

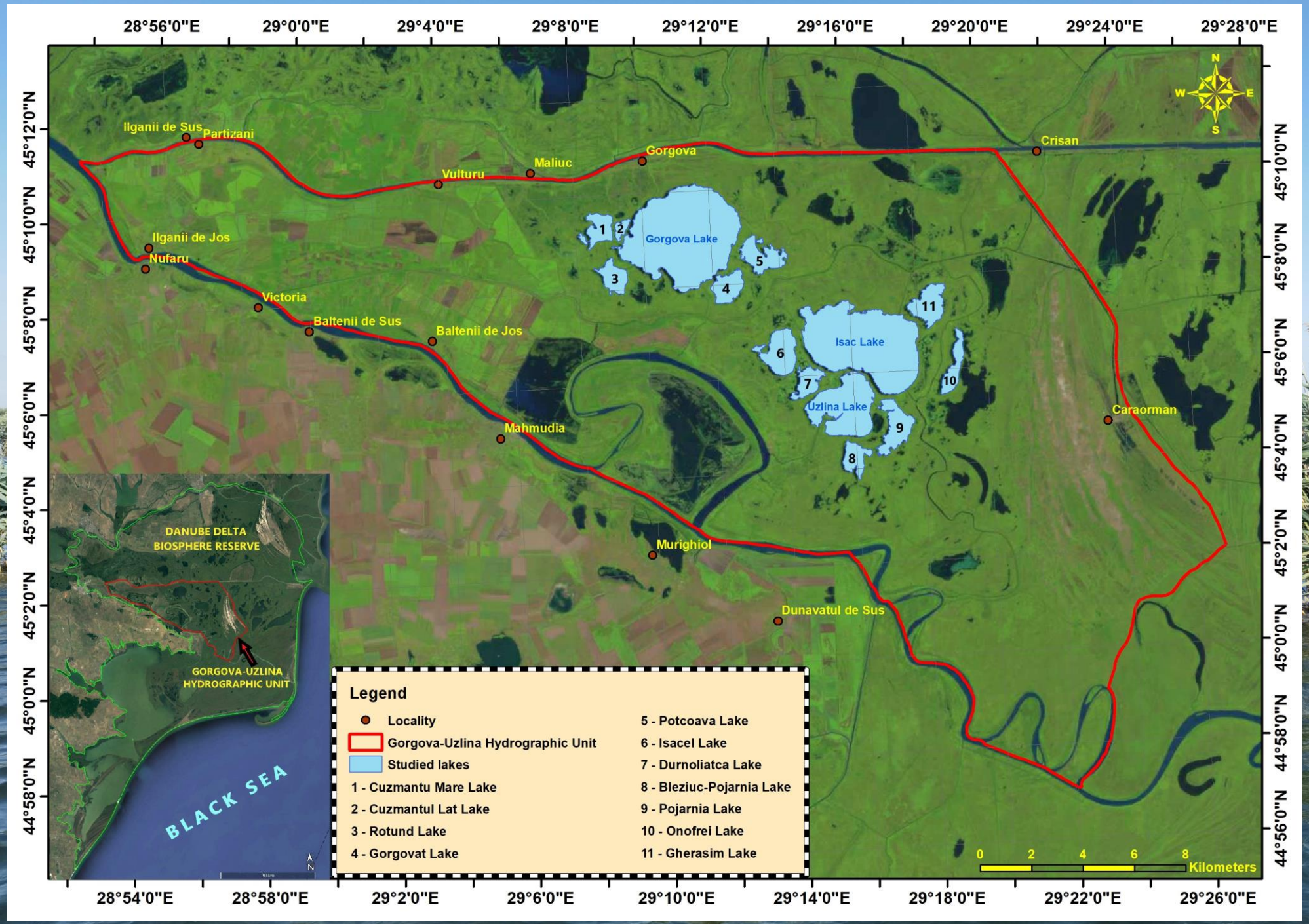
- **111 probe de sediment** din Depresiunea Lumina-Rosu (Rosu, Rosulet, Puiu, Lumina, Puiuleț, Macovei și Iacub), în scopul analizei granulometrice, a conținutului de metale grele și a compoziției litologice
- **93 probe de sediment si apa** aval Portile de Fier II (Golenți – Cetate km 805 - km 811, Pisculeț – Desa km 760 – km 765, Bechet Km 674 – 678, Aval Corabia Km 626 - 631, km 595 Turnu Magurele, km 557 Zimnicea, km 500 – km 481 Giurgiu), în scopul analizei granulometrice, a conținutului de metale grele și a compoziției litologice din sediment si analizei clorofilei si a nutrientilor din apa.
- **150 probe de stuf** in vedere analizei continutului de metale grele
- **36 probe sediment si apa**, Ceataluri (Izmail si Sf. Gheorghe) în scopul analizei granulometrice, a conținutului de metale grele și a compoziției litologice din sediment si analizei clorofilei si a nutrientilor din apa.
- **31 probe de sediment si apa** Complexul lagunar Razelm - Sinoe (Razelm, Sinoe, Golovita, Zmeica) în scopul analizei granulometrice, a conținutului de metale grele și a compoziției litologice din sediment si analizei clorofilei si a nutrientilor din apa.

2023

- **36 probe sediment si apa**, Ceataluri (Izmail si Sf. Gheorghe) în scopul analizei granulometrice, a conținutului de metale grele și a compoziției litologice din sediment si analizei clorofilei si a nutrientilor din apa.

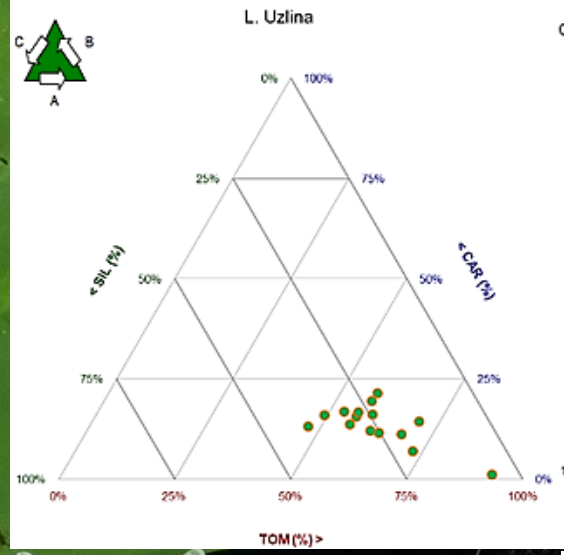
- **72 probe de sediment** din Depresiunea Matita – Merhei (Babina – Corciuvate - Ciorticut, Bogdaproste, Trei Ozere, Matita, Merhei, Radacinos) în scopul analizei granulometrice, a conținutului de metale grele și a compoziției litologice din sediment.

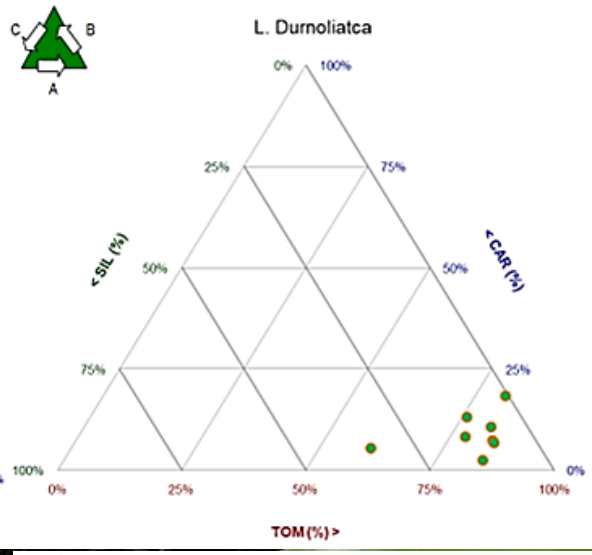
- **30 probe de apa** din Depresiunea Matita – Merhei (Babina – Corciuvate - Ciorticut, Bogdaproste, Trei Ozere, Matita, Merhei, Radacinos) in vederea analizei clorofilei si a nutrientilor din apa

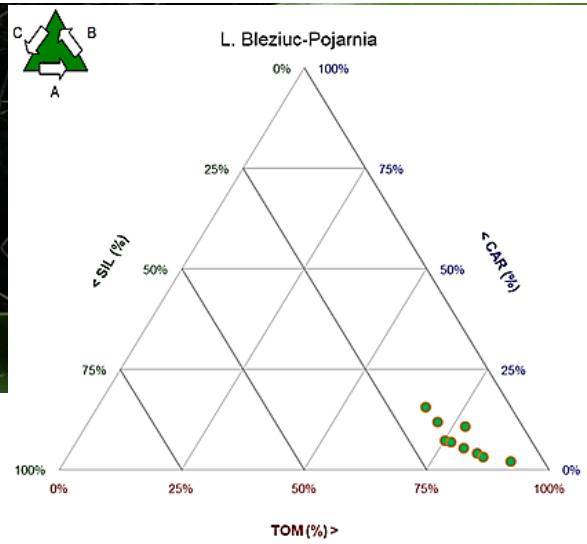

28°56'0"E
29°0'0"E
29°4'0"E
29°8'0"E
29°12'0"E
29°16'0"E
29°20'0"E
29°24'0"E
29°28'0"E
45°12'0"N
45°10'0"N
45°8'0"N
45°6'0"N
45°4'0"N
45°2'0"N
45°0'0"N
44°58'0"N
44°56'0"N
N
S
W
E
Ilganii de Sus
Partizani
Vulturu
Maliuc
Gorgova
Crisan
Ilganii de Jos
Nufaru
Victoria
Baltenii de Sus
Baltenii de Jos
Mahmudia
Murighiol
Dunavatul de Sus
Caraorman
Gorgova Lake
Isac Lake
Uzlina Lake
1
2
3
4
5
6
7
8
9
10
11
DANUBE DELTA
BIOSPHERE RESERVE
GORGOVA-UZLINA
HYDROGRAPHIC UNIT
BLACK SEA
Legend
Locality
Gorgova-Uzlina Hydrographic Unit
Studied lakes
1 - Cuzmantu Mare Lake
2 - Cuzmantul Lat Lake
3 - Rotund Lake
4 - Gorgovat Lake
5 - Potcoava Lake
6 - Isacel Lake
7 - Durnoliatca Lake
8 - Bleziuc-Pojarnia Lake
9 - Pojarnia Lake
10 - Onofrei Lake
11 - Gherasim Lake
0
2
4
6
8
Kilometers
28°54'0"E
28°58'0"E
29°2'0"E
29°6'0"E
29°10'0"E
29°14'0"E
29°18'0"E
29°22'0"E
29°26'0"E

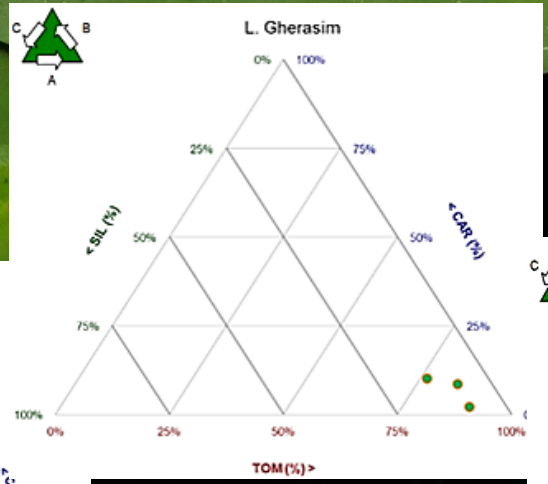
2021

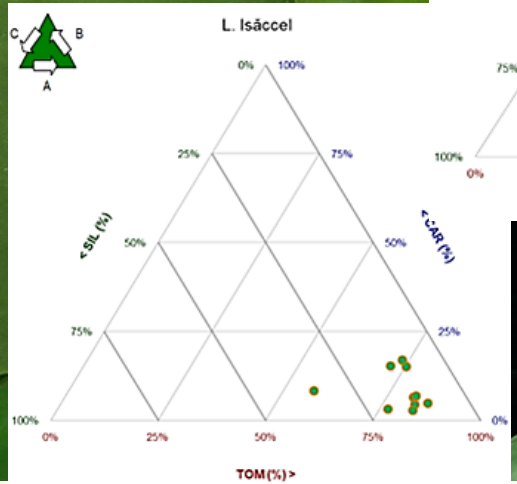
	TOM%	CAR%	SIL%
Uzlina	**61.47**	13.79	**24.74**
Durnoliatca	78.7	9.07	12.23
Isăccel	76.74	8.4	14.86
Gherasim	**83.35**	**6.95**	**9.7**
Isacova	64.98	**22.39**	12.62
Pojarnia	75.14	11.92	12.94
Bleziuc-Pojarnia	67.03	7.48	13.98

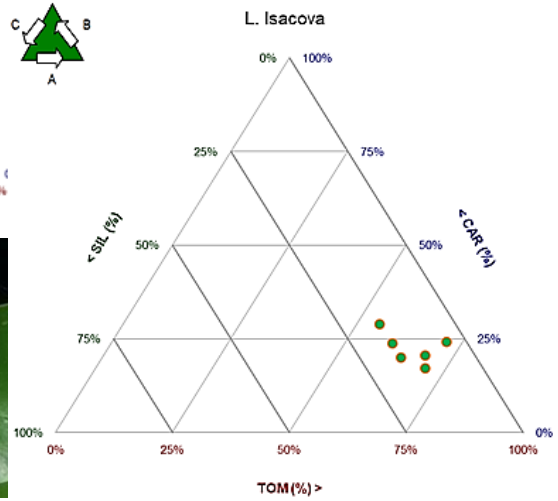


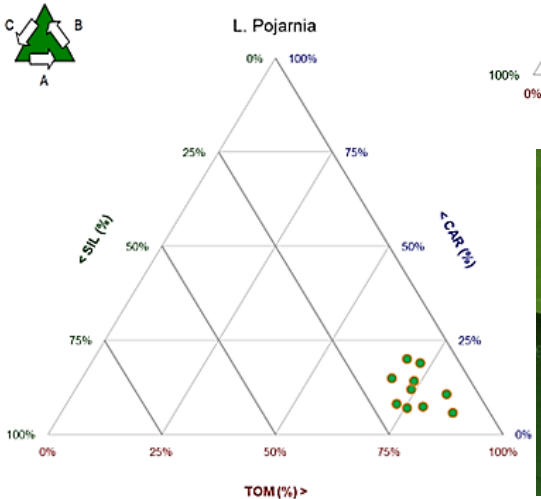


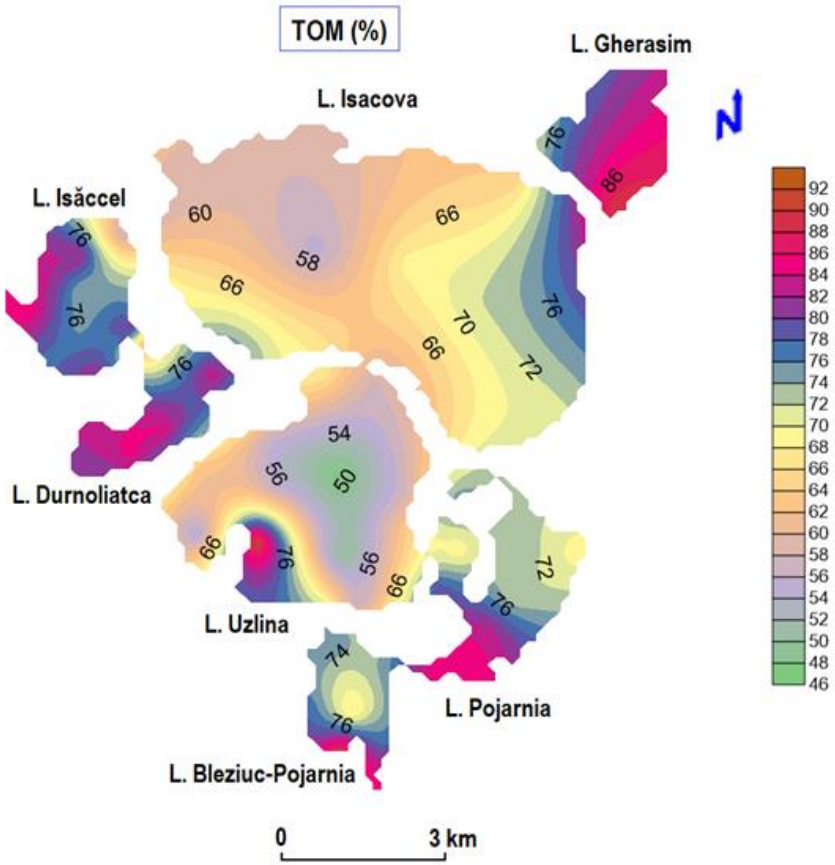


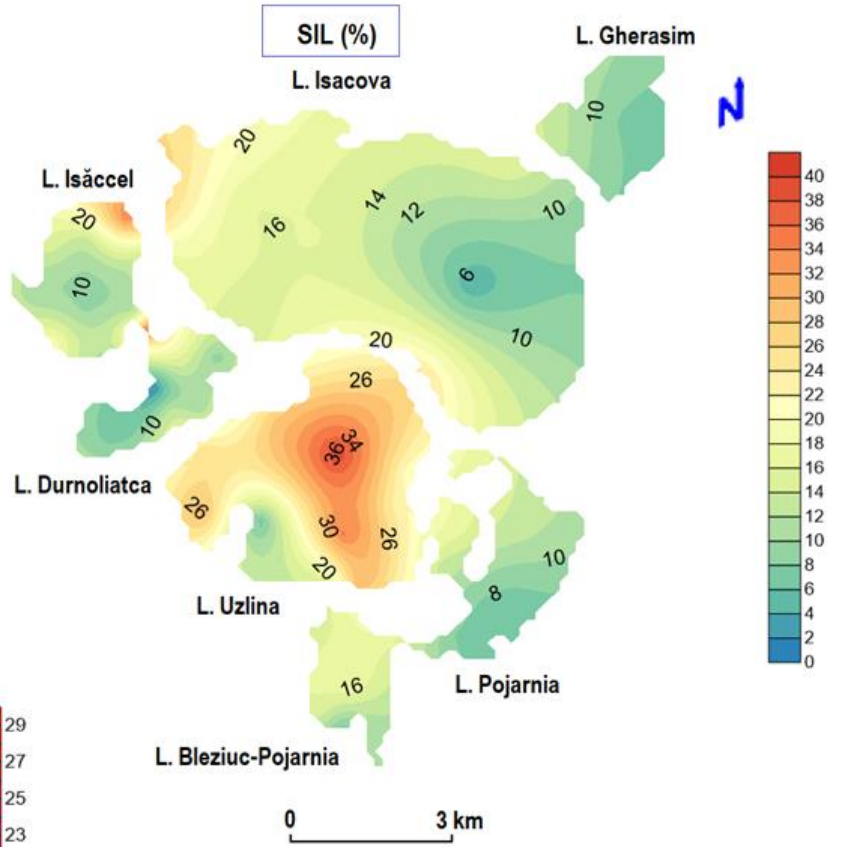


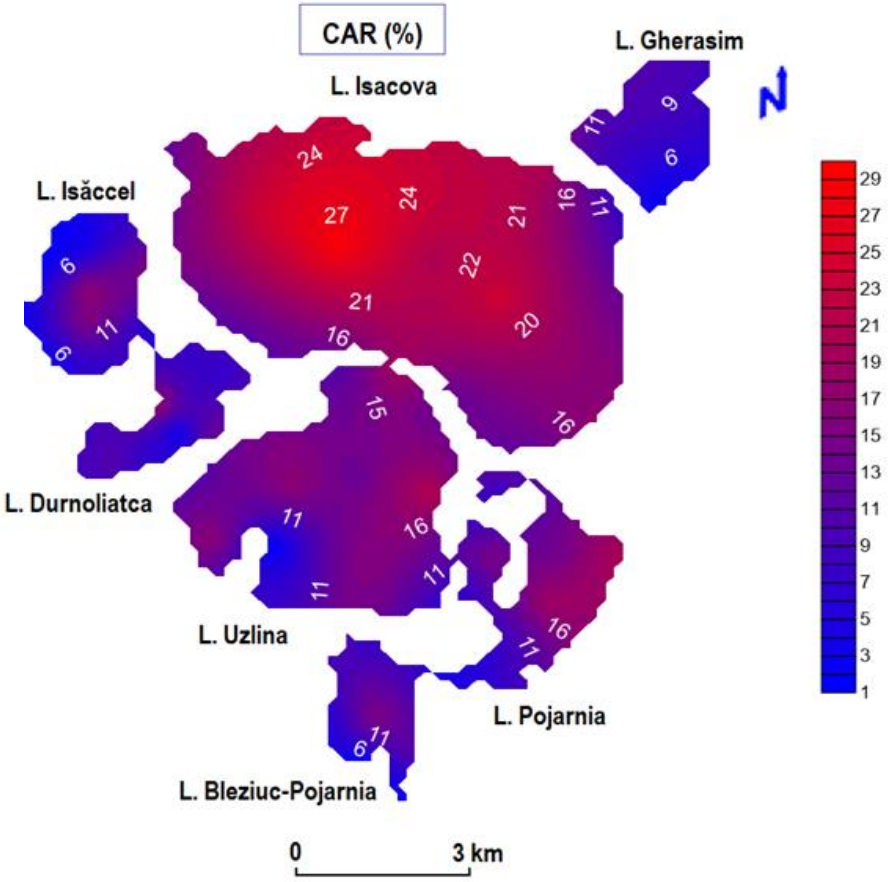




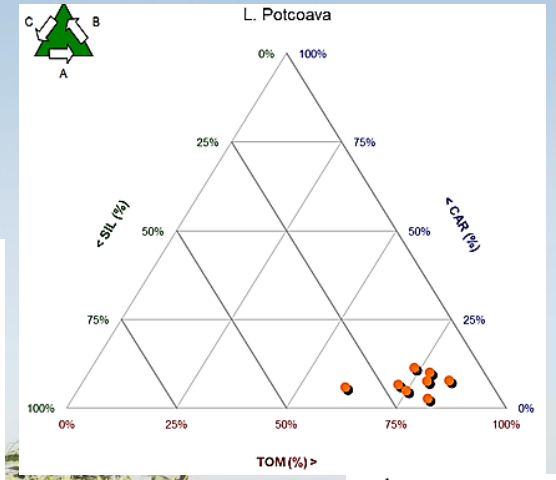


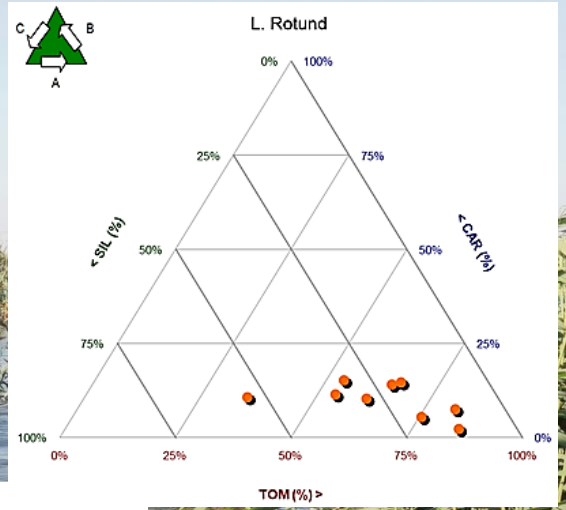

TOM (%)
L. Gherasim
L. Isacova
L. Isăccel
L. Durnoliatca
L. Uzlina
L. Pojarnia
L. Bleziuc-Pojarnia
N
0
3 km

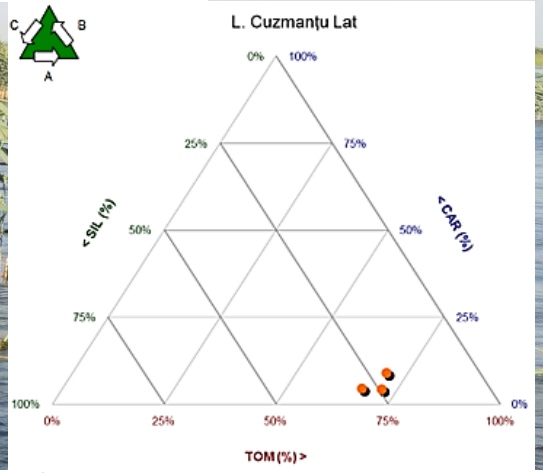

SIL (%)
L. Gherasim
L. Isacova
L. Isăccel
L. Durnoliatca
L. Uzlina
L. Pojarnia
L. Bleziuc-Pojarnia
N
0
3 km

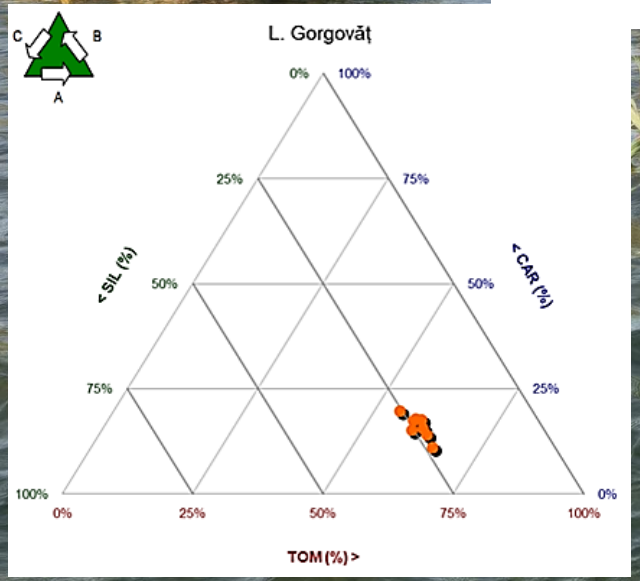

CAR (%)
L. Gherasim
L. Isacova
L. Isăccel
L. Durnoliatca
L. Uzlina
L. Pojarnia
L. Bleziuc-Pojarnia
N
0
3 km

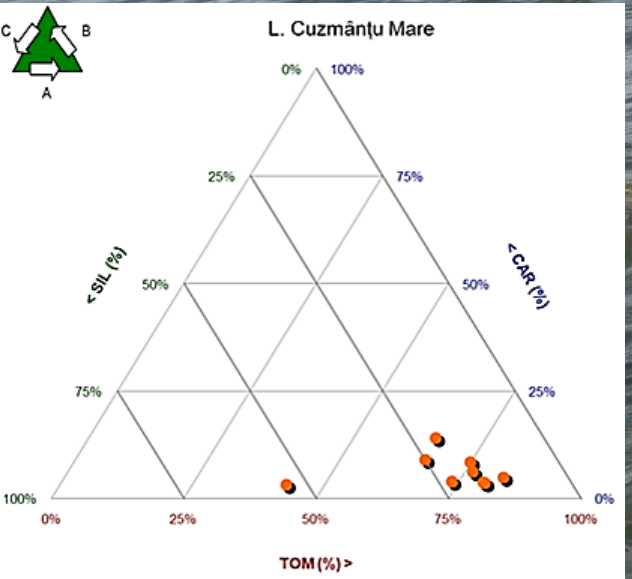
	TOM%	CAR%	SIL%
Potcoava	**75.04**	7.12	**17.84**
Cuzmânțu Lat	69.46	5.98	24.56
Cuzmânțu Mare	71.25	6.36	22.39
Gorgovăț	**60.26**	**16.01**	23.73
Gorgova	63.59	14.65	21.76
Rădăcinos	67.26	**5.81**	**26.93**
Rotund	64.12	10.22	25.66

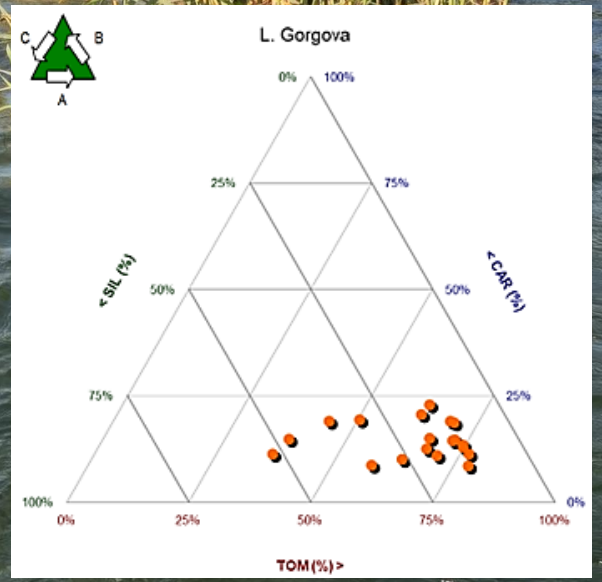


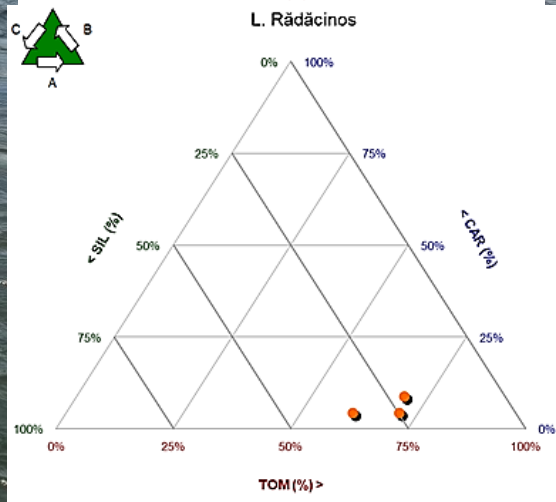


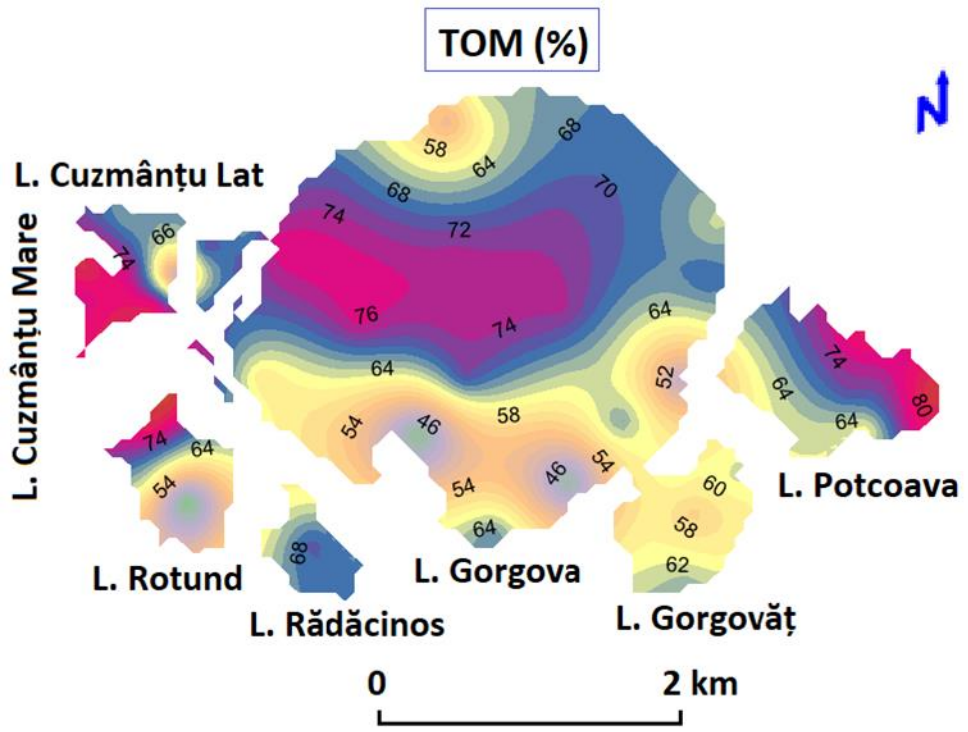


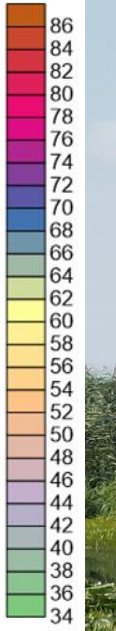









TOM (%)
L. Cuzmântu Lat
L. Cuzmântu Mare
L. Rotund
L. Rădăcinos
L. Gorgova
L. Gorgovăț
L. Potcoava
0
2 km


86
84
82
80
78
76
74
72
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64
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60
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56
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52
50
48
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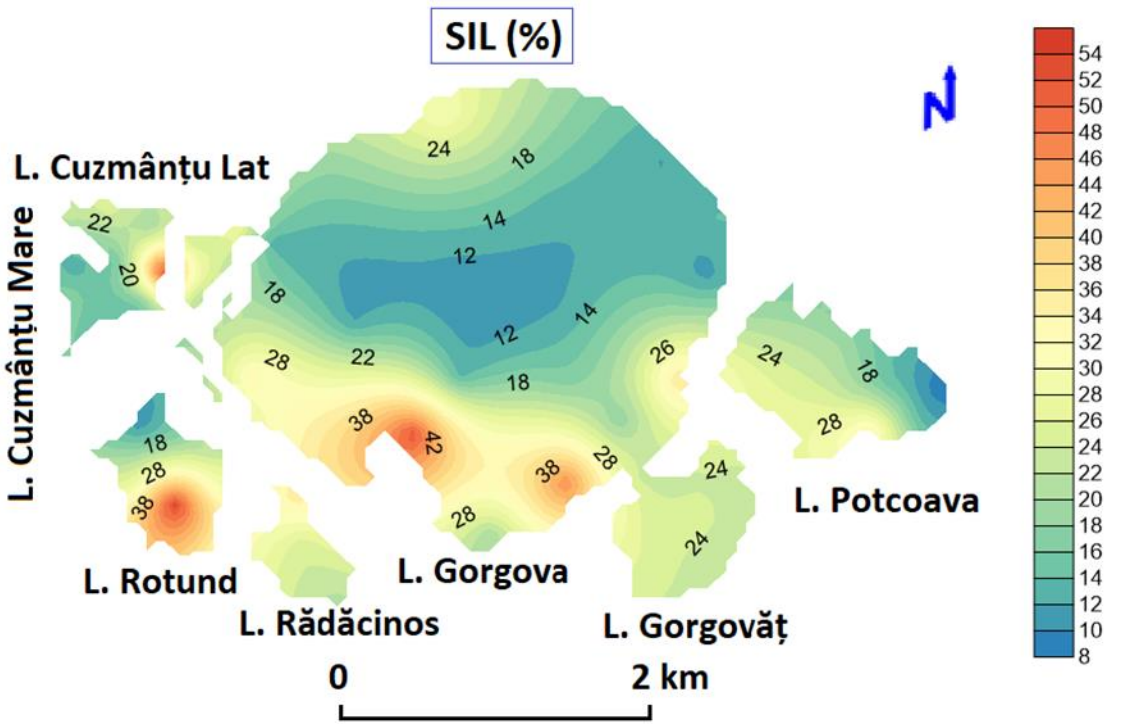
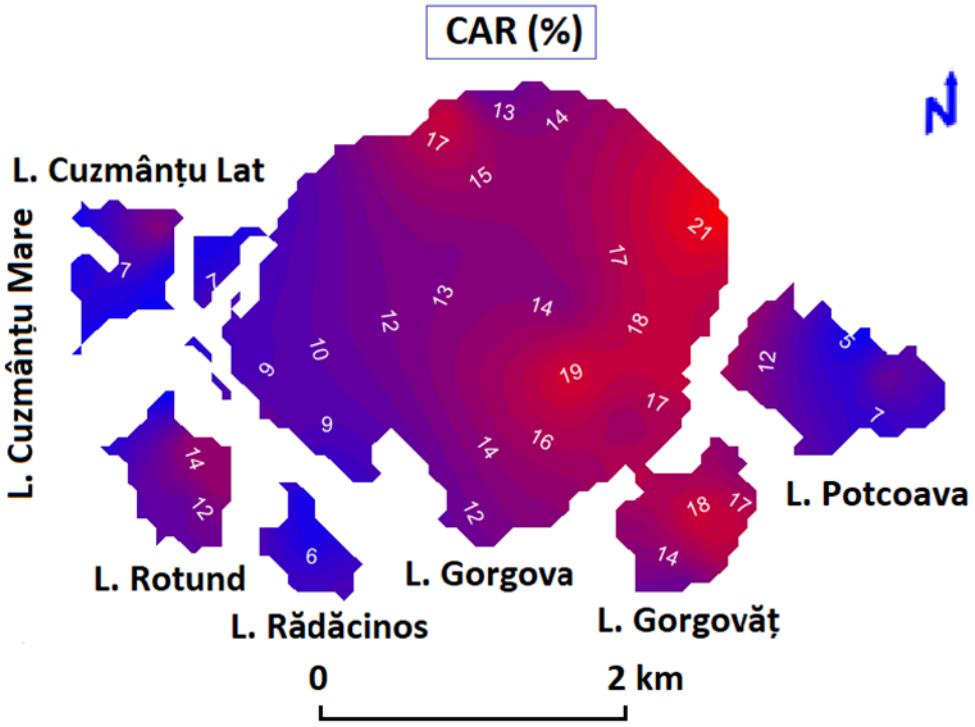
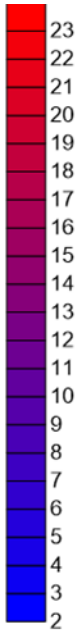
44
42
40
38
36
34


SIL (%)
L. Cuzmântu Lat
L. Cuzmântu Mare
L. Rotund
L. Rădăcinos
L. Gorgova
L. Gorgovăț
L. Potcoava
0
2 km
54
52
50
48
46
44
42
40
38
36
34
32
30
28
26
24
22
20
18
16
14
12
10
8


CAR (%)
L. Cuzmântu Lat
L. Cuzmântu Mare
L. Rotund
L. Rădăcinos
L. Gorgova
L. Gorgovăț
L. Potcoava
0
2 km


23
22
21
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11
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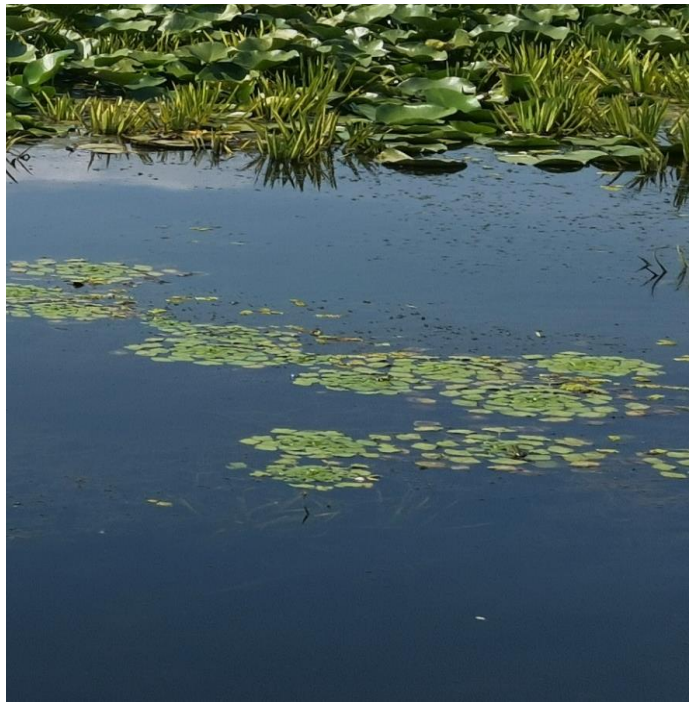
6
5
4
3
2



Metale grele in sediment 2021

- In toate lacurile au fost valori peste limita la Ni (**80** mg/kg val. max in Cuzmânțu Mare) si Cu (**100** mg/kg val. max. Cuzmânțu Mare)

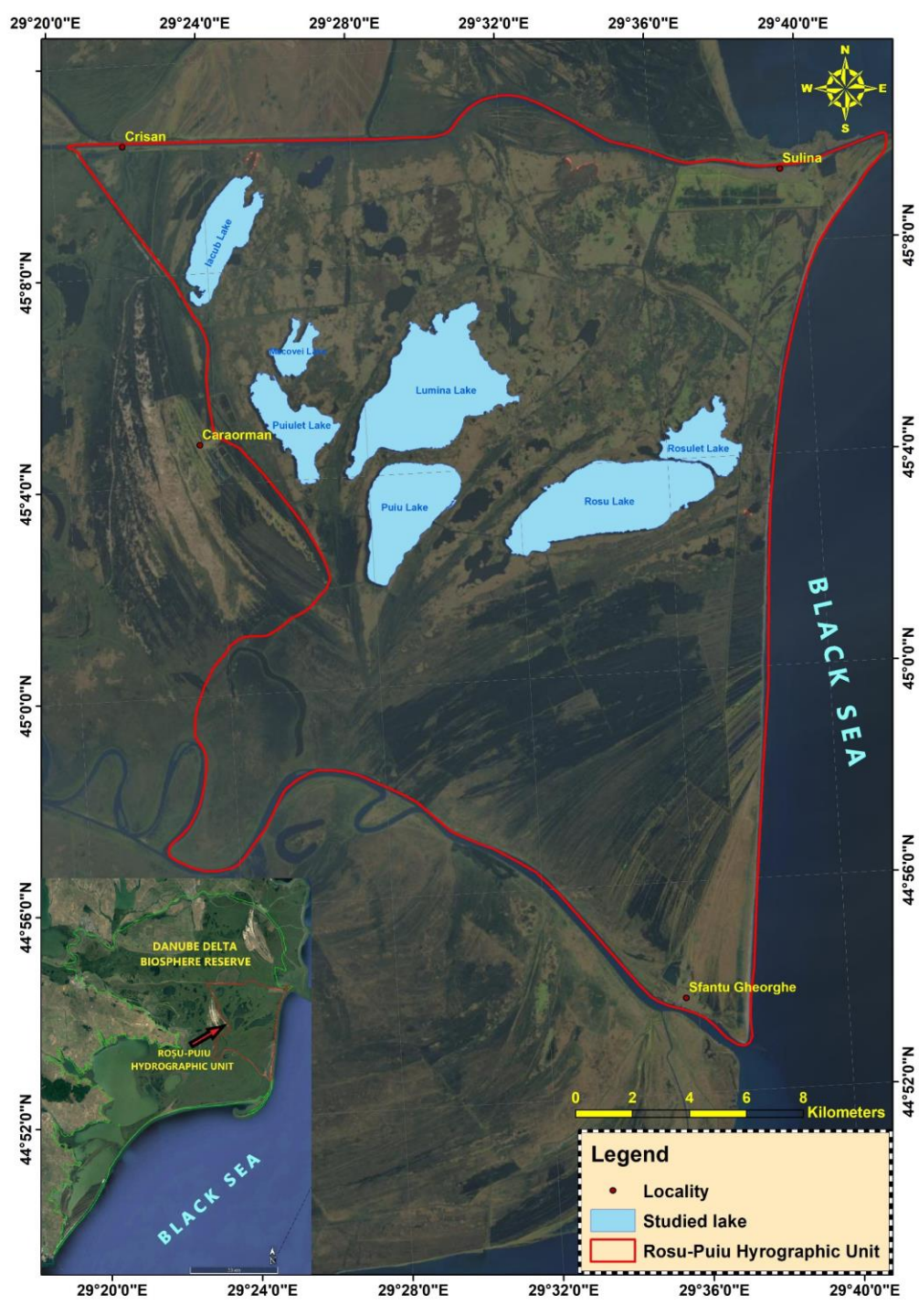
	Cr mg/kg	Hg mg/kg	As mg/kg
Uzlina	130	0.4	30
Isaccel		0.303	
Isacova	100		
Pojarnia		0.334	
Bleziuc-Pojarnia		0.33	
Cuzmânțu Lat	100		30
Cuzmânțu Mare	120	0.332	30
Gorgova			30
Rotund	110	0.34	30

Metal	UM	Ord. 161/2006
Crom total (Cr^{3+} + Cr^{6+})	mg/kg	100
Cupru	mg/kg	40
Plumb	mg/kg	85
Zinc	mg/kg	150
Nichel	mg/kg	35
Arseniu	mg/kg	29
Mercur total	µg/kg	300

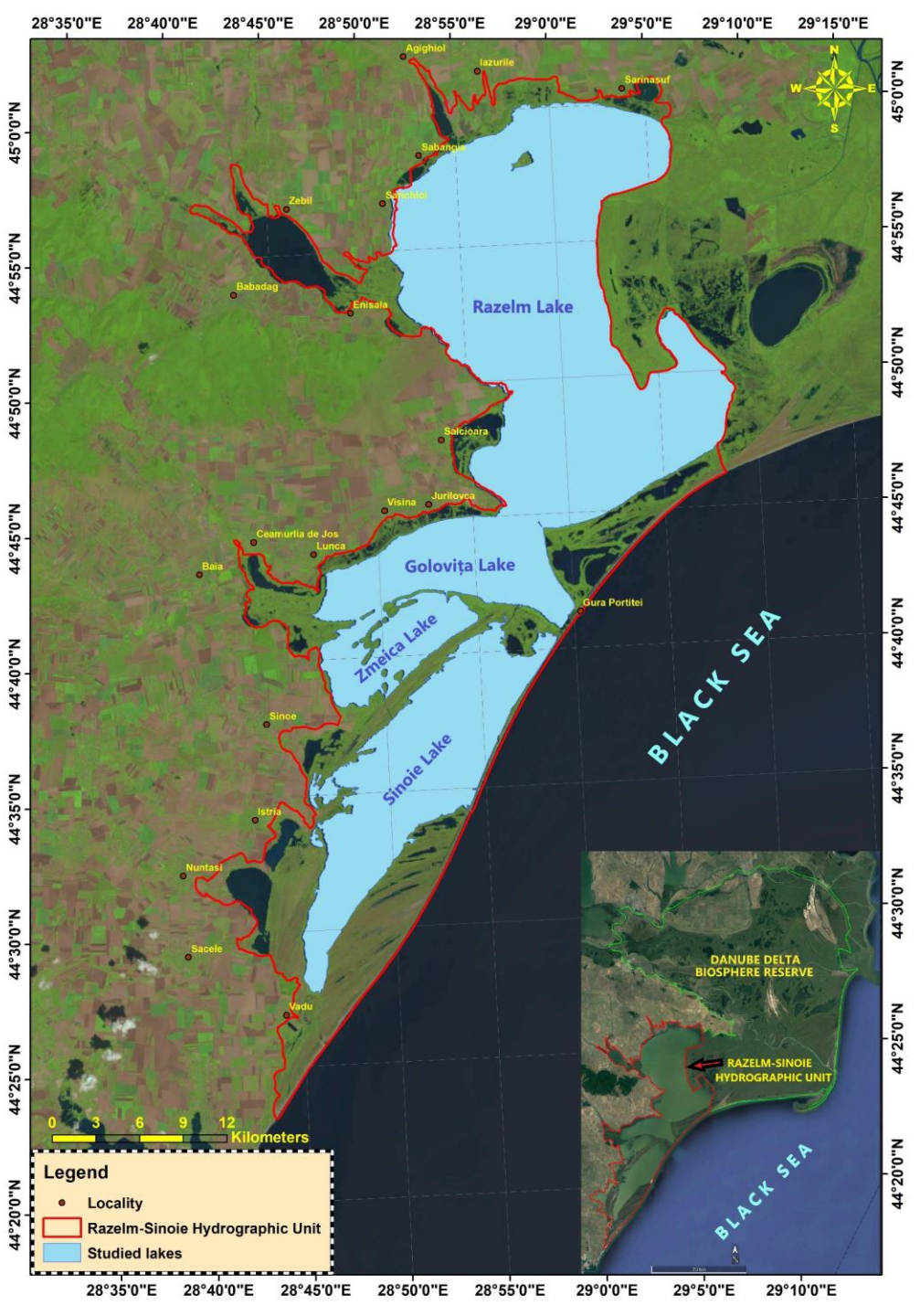
Metale grele in sediment 2021
(Golful Musura – DDC si Meleaua Sacalin – SHSTF)

Statia	Cr	Ni	Cu	Zn	As	Pb
DDC 050	**107.00**	**45.88**	35.19	86.00	8.31	23.89
DDC 052	**113.00**	**37.59**	13.60	56.20	4.60	15.15
DDC 053	**107.00**	**37.91**	5.80	54.10	3.52	13.50
DDC 054	71.20	**58.80**	10.32	79.30	5.24	14.46
DDC 055	64.10	**35.70**	9.97	53.50	4.92	14.54
DDC 056	**166.00**	**39.69**	10.96	58.70	3.56	16.28
DDC 058	**125.00**	33.71	10.35	68.30	5.14	14.45
DDC 059	83.90	**46.53**	**47.66**	99.50	8.61	26.78
DDC 059 bis	85.80	**38.59**	31.22	74.20	7.05	21.70
DDC 60	**110.00**	**35.96**	35.73	81.30	7.53	20.77
DDC 061	71.80	**35.41**	**41.33**	82.70	8.30	23.06
DDC 062	83.50	**42.04**	28.71	76.90	6.45	20.24
SHSTF 21 -01	70.90	**35.91**	9.45	52.40	3.86	15.35
SHSTF 21-02	89.00	**47.12**	33.77	84.20	7.03	25.98
SHSTF 21-03	77.10	**41.00**	13.33	57.60	6.48	15.63
SHSTF 21-04	72.60	**54.90**	35.74	75.30	22.49	25.36
SHSTF 21-05	96.50	**44.90**	31.87	80.40	8.00	24.36
SHSTF 21-06	97.50	**58.00**	33.42	82.50	13.08	24.97
L.T. 21-07	55.50	22.50	8.38	33.36	2.53	10.37
C.V_C.T. 21-08	88.50	23.71	5.61	33.56	4.56	8.66
CSP STUF	39.06	16.51	3.92	20.95	2.01	8.73

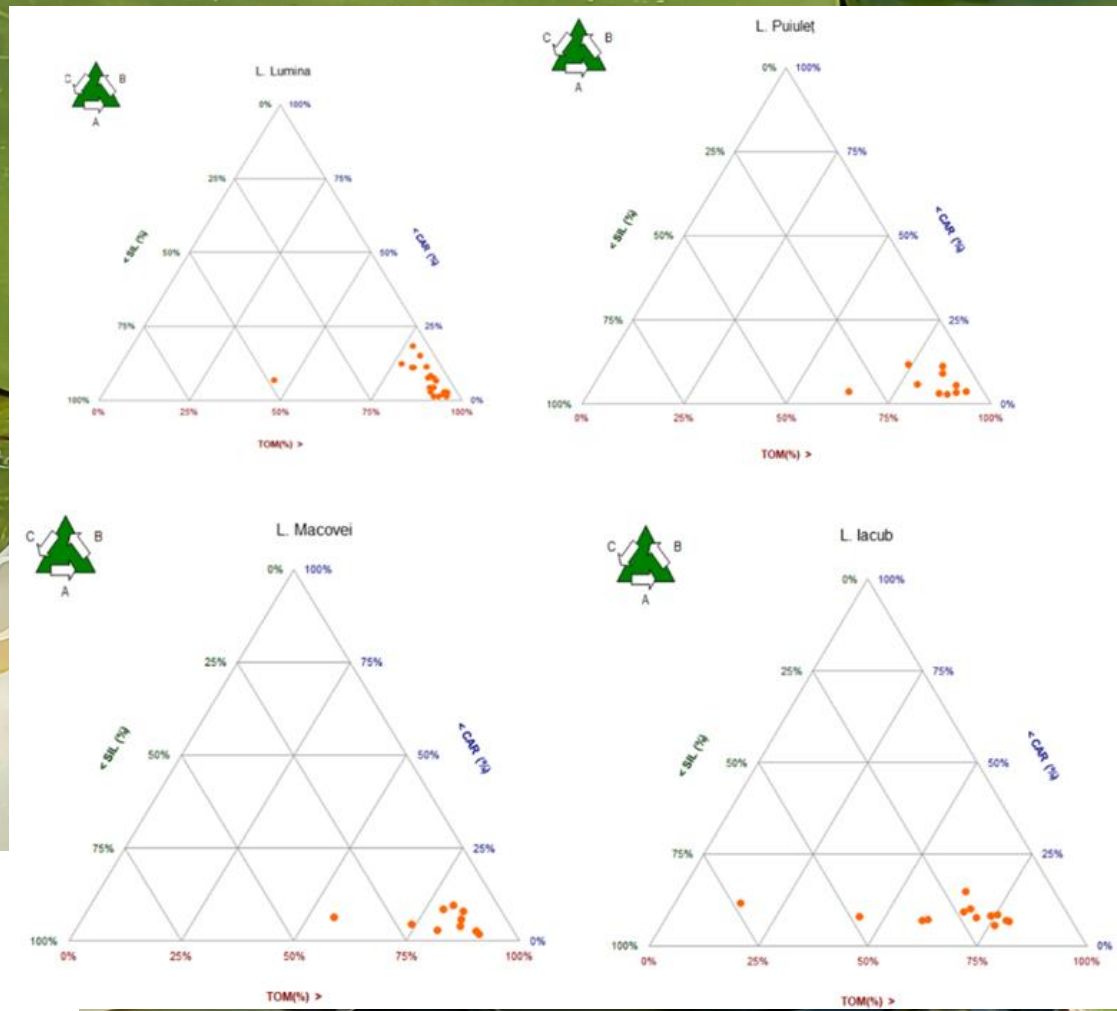
Metal	UM	Ord. 161/2006
Crom total ($Cr^{3+} + Cr^{6+}$)	mg/kg	**100**
Cupru	mg/kg	**40**
Plumb	mg/kg	**85**
Zinc	mg/kg	**150**
Nichel	mg/kg	**35**
Arseniu	mg/kg	**29**
Mercur total	µg/kg	**300**

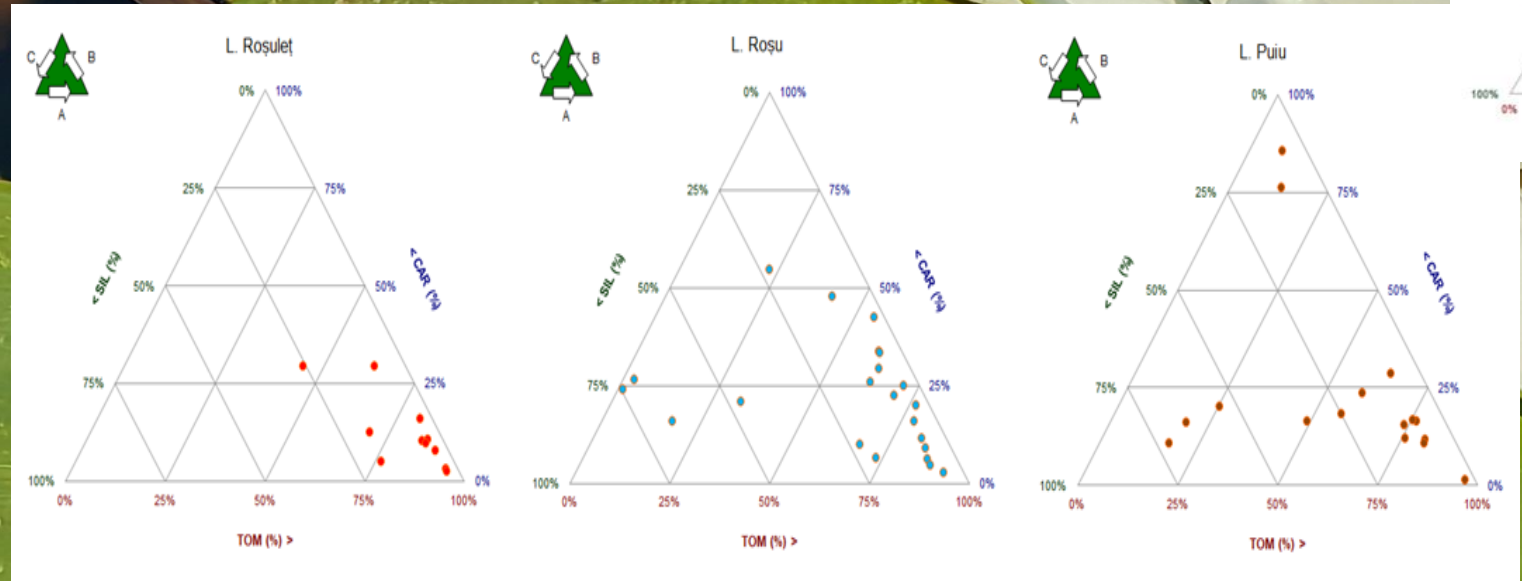

Crisan
Sulina
Iacub Lake
Lumina Lake
Puiulet Lake
Caraorman
Rosulet Lake
Puiu Lake
Rosu Lake
BLACK SEA
Sfantu Gheorghe
DANUBE DELTA BIOSPHERE RESERVE
ROSU-PUIU HYDROGRAPHIC UNIT
BLACK SEA
0 2 4 6 8 Kilometers
Legend
Locality
Studied lake
Rosu-Puiu Hyrographic Unit

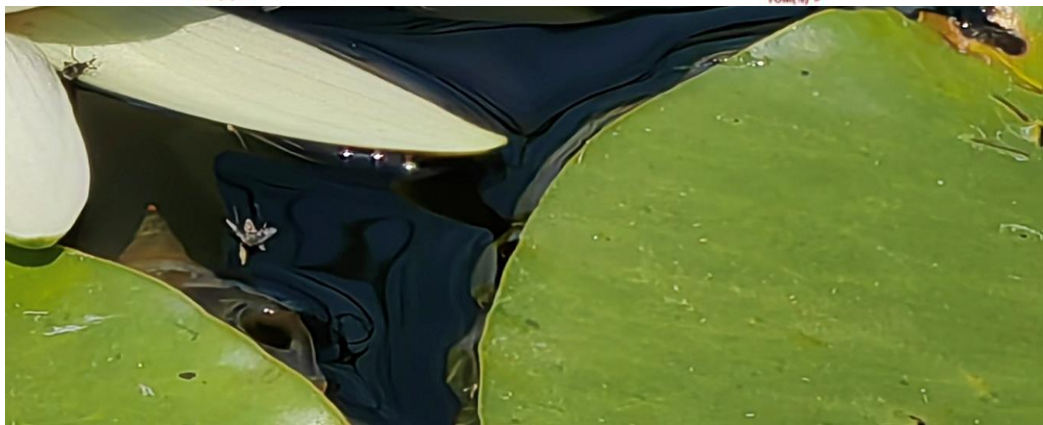

2022

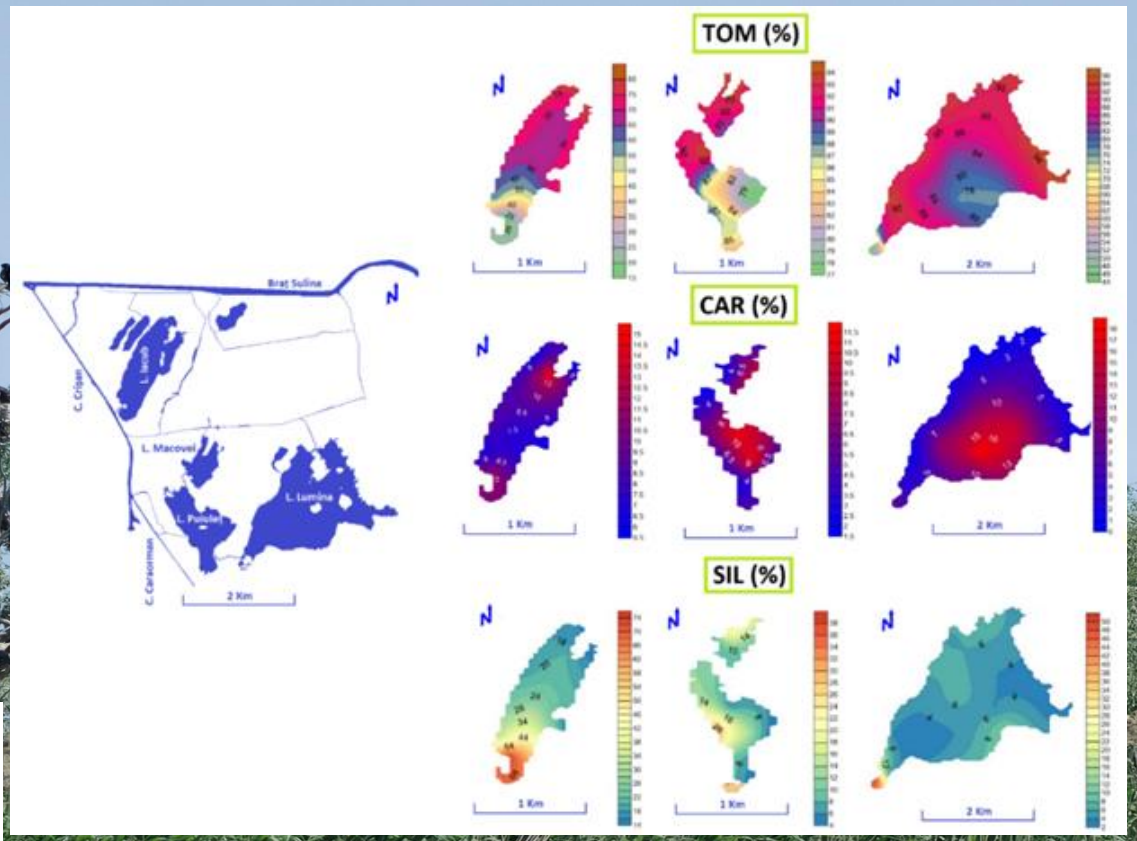

Agighiol
Iazurile
Sarinasuf
Sabangia
Zebil
Babadag
Enisala
Razelm Lake
Salcioara
Visina
Jurilovca
Ceamurlia de Jos
Lunca
Baia
Golovița Lake
Gura Portitei
Zmeica Lake
Sinoie Lake
Since
Istria
Nuntasi
Sacele
Vadu
BLACK SEA
0 3 6 9 12 Kilometers
Legend
Locality
Razelm-Sinoie Hydrographic Unit
Studied lakes
DANUBE DELTA BIOSPHERE RESERVE
RAZELM-SINOIE HYDROGRAPHIC UNIT
BLACK SEA

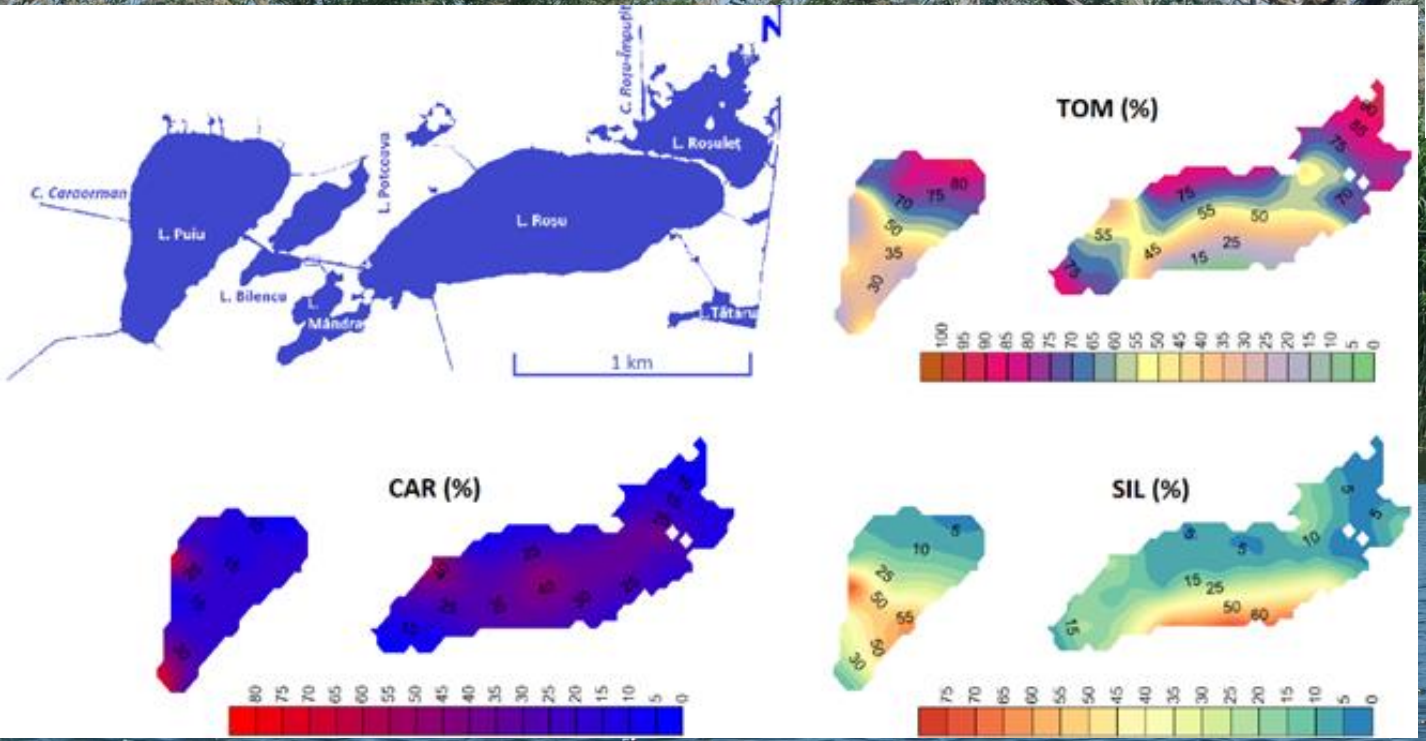
	TOM%	CAR%	SIL%
Roșuleț	78.89	12.35	8.76
Roșu	58.77	22.13	19.11
Puiu	**54.53**	**23.77**	21.7
Lumina	**86.14**	6.6	**7.26**
Puiuleț	82.92	5.95	11.14
Macovei	80.38	**5.32**	14.3
Iacub	64.25	8.48	**27.28**








TOM (%)
CAR (%)
SIL (%)
Brat Sulina
C. Crisan
L. Iacob
L. Macovei
L. Lumina
L. Puiulet
C. Caraorman
1 Km
2 Km


C. Caraorman
L. Puiu
L. Potcoava
L. Roşu
C. Roşu-Împuţit
L. Roşuleţ
L. Bilenca
L. Mândra
L. Tătaru
1 km
TOM (%)
CAR (%)
SIL (%)

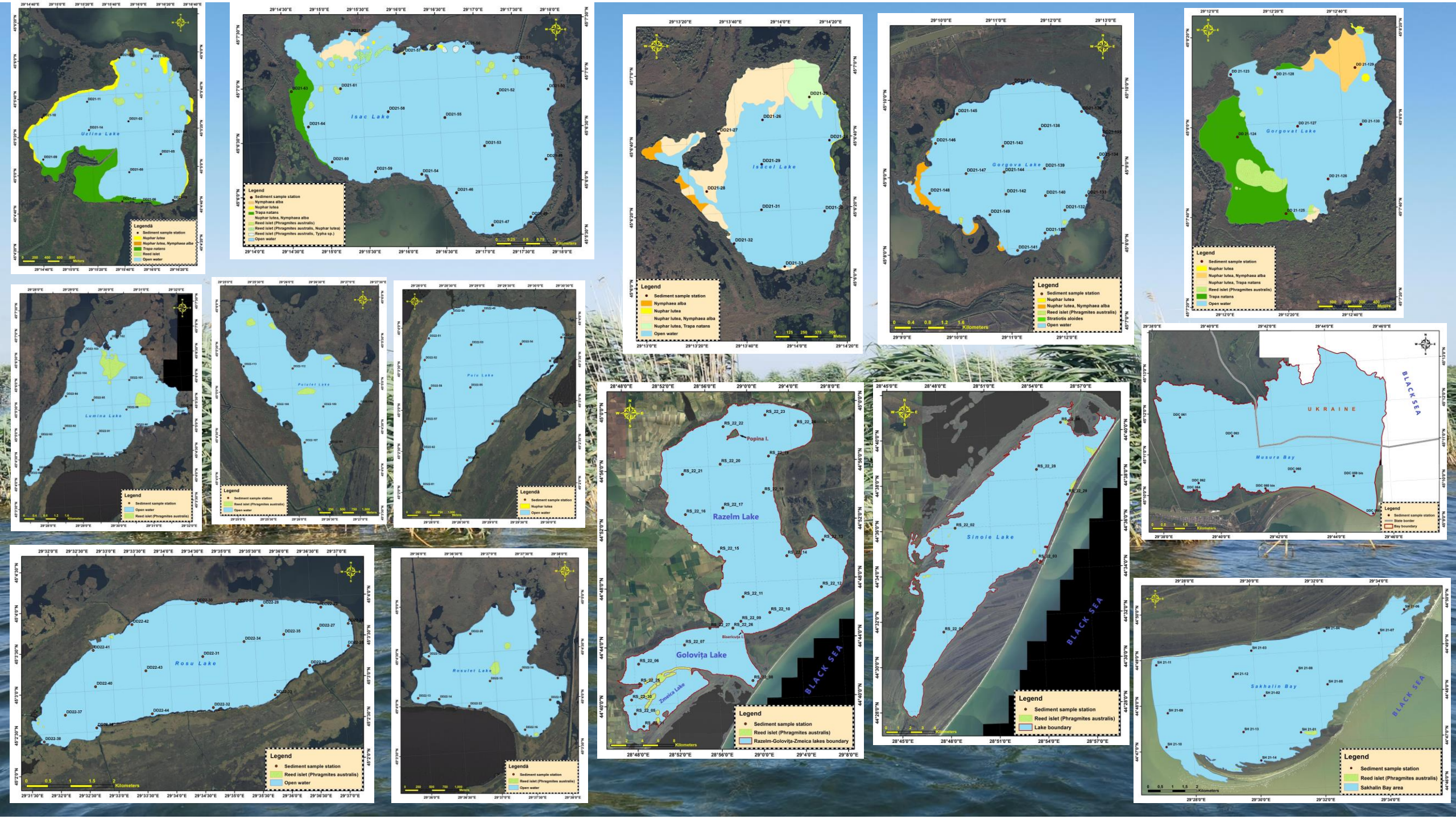
Metale grele in sediment 2022

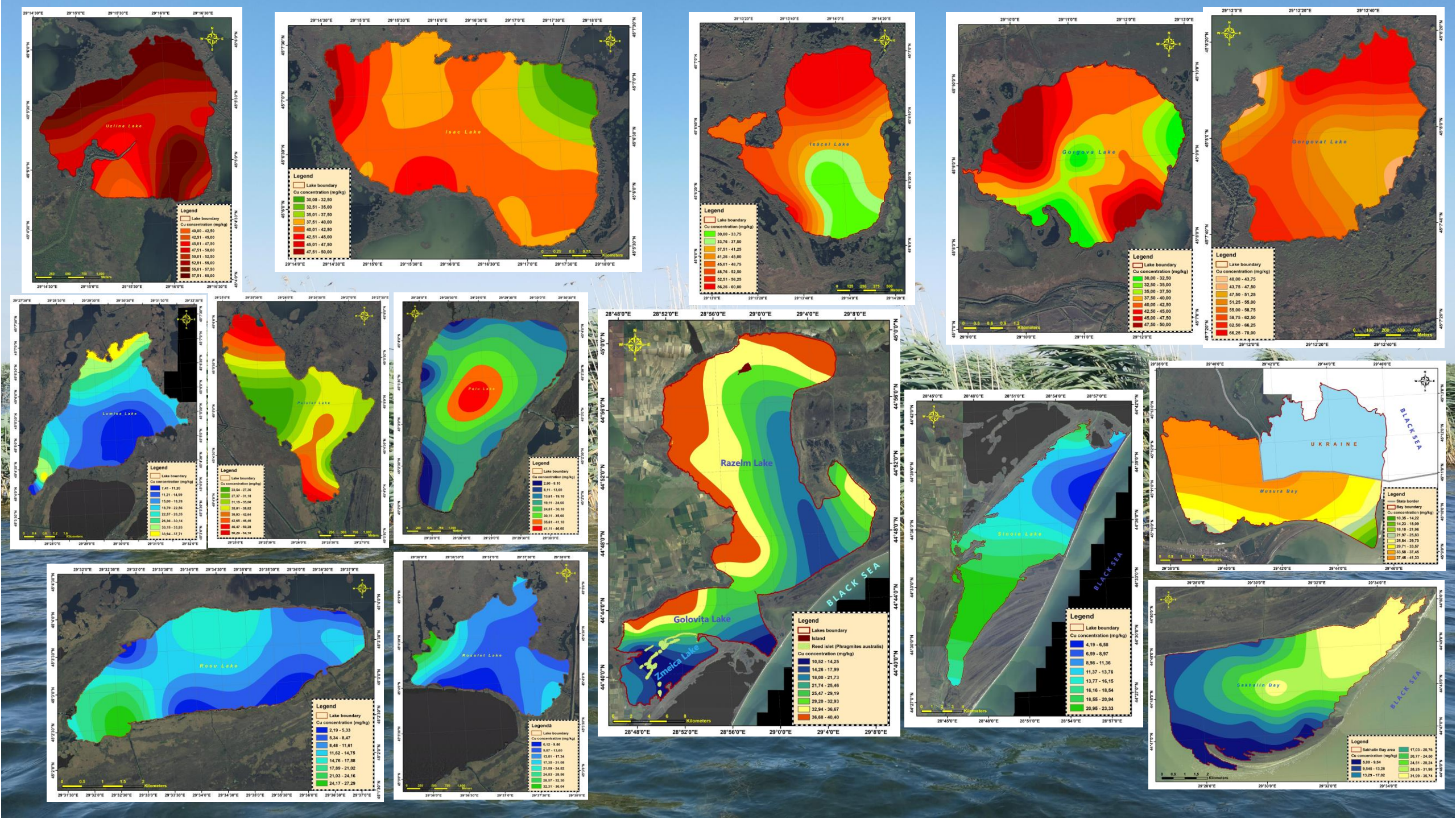
	Cr mg/kg	Ni mg/kg	Cu mg/kg
Braț Sf. Gheorghe - km 108 (C)	150	51.7	
Braț Tulcea – Mm 34,5 (MD)		44.35	
Braț Sulina - Mm 14 (C)		48.51	
Dunărea Veche (lângă Mm14)		48.86	
Braț Sulina - Mm 0 (C):		35.14	
L. Puiu		38.51	46.61
C. Caraorman		46.89	
L. Lumina		36.35	
L. Puiulet		40.72	
L. Macovei		52.8	

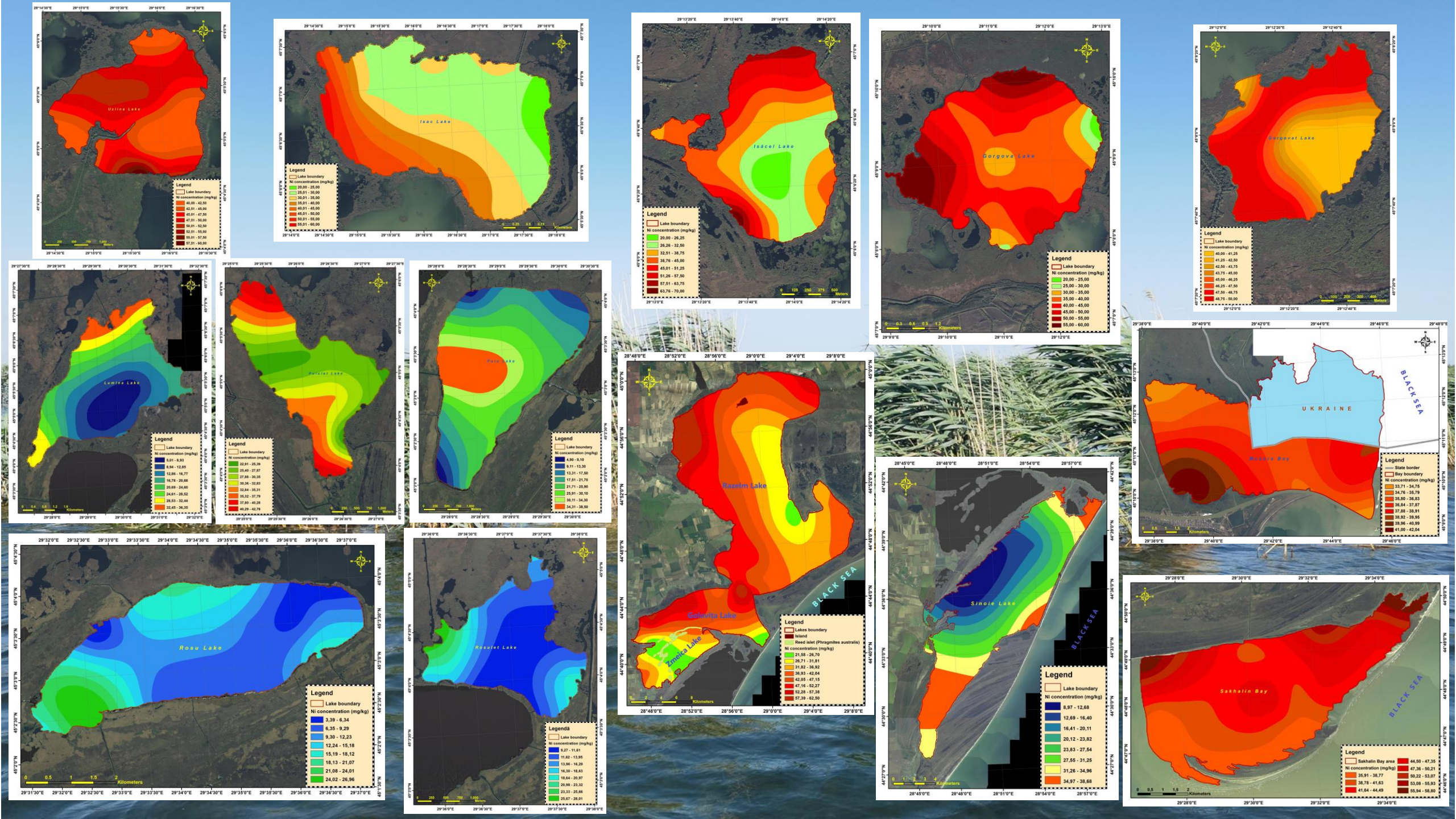
Metal	UM	Ord. 161/2006
Crom total (Cr^{3+}+ Cr^{6+})	mg/kg	100
Cupru	mg/kg	40
Plumb	mg/kg	85
Zinc	mg/kg	150
Nichel	mg/kg	35
Arseniu	mg/kg	29
Mercur total	µg/kg	300

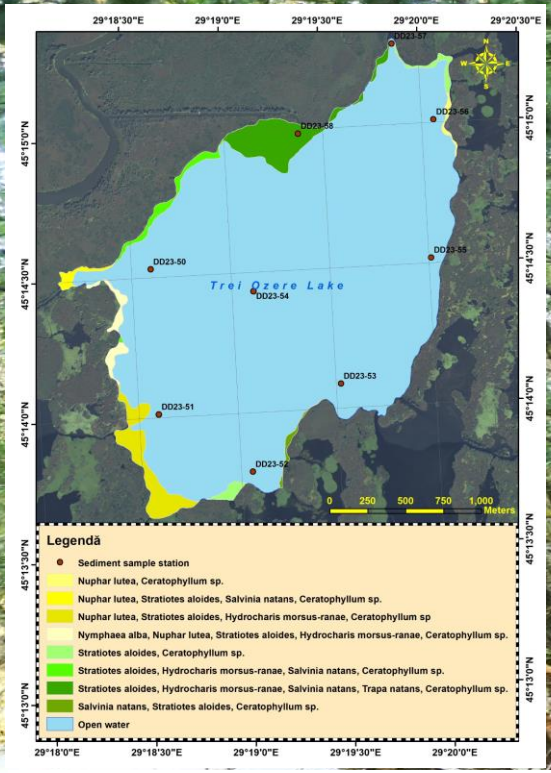
Metal	UM	Ord. 161/2006
Crom total (Cr^{3+} + Cr^{6+})	mg/kg	100
Cupru	mg/kg	40
Plumb	mg/kg	85
Zinc	mg/kg	150
Nichel	mg/kg	35
Arseniu	mg/kg	29
Mercur total	µg/kg	300

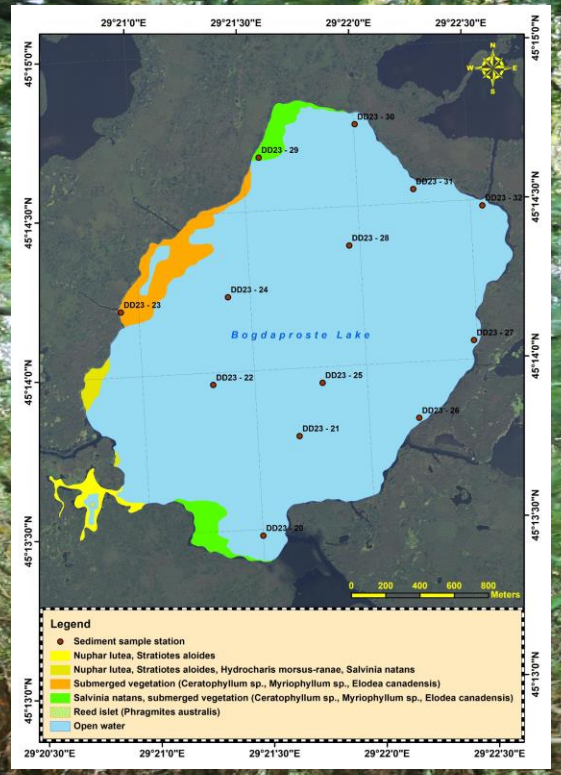
Locatie	Cr	Ni	Cu	Zn	As	Pb
Lac Sinoe – Zona Istria	85.6	**36.82**	23.33	52.3	9.03	16.98
Lac Sinoe	26.1	8.97	14.59	20.86	8.25	8.2
Lac Sinoe – Zona Edighiol	81.7	**38.68**	18.24	60.3	5.46	15.46
Lac Sinoe	64.6	33.47	18.09	54.2	6.59	19.08
Lac Zmeica	72.2	**37.29**	20.71	51.8	11.63	14.85
Lac Golovita	95.9	**56.4**	38.62	99.6	9.62	33.59
Lac Golovita	83.3	**53.3**	38.35	95.5	8.8	34.89
Lac Golovita	99.2	22.58	10.52	36.04	3.99	12.36
Lac Razelm	77.9	**42.86**	32	78.8	7.87	28.2
Lac Razelm	81.1	**39.28**	24.35	67.9	5.79	22.9
Lac Razelm	86.1	**50.1**	37.86	88.8	8.87	33.07
Lac Razelm	100	**36.59**	23.69	66.7	5.95	22.58
Lac Razelm - Golf Holbina	84.4	**37.12**	33.92	81.7	6.38	26.64
Lac Razelm - Caşburunul Mare	**108**	25.46	17.07	44.53	5.33	11.86
Lac Razelm - Iancila	83.3	**49.59**	37.04	88.6	8.73	34.1
Lac Razelm	82.1	**50.2**	36.59	92.2	10.75	35.61
Lac Razelm	75	**44.13**	35.72	81.4	8.23	30.84
Lac Razelm	99.2	28.25	18.53	55.9	7.57	22.12
Lac Razelm	68	33	26.25	65	10.57	20.8
Lac Razelm	64.4	**37.47**	31.13	70.1	9.56	25.58
Lac Razelm	98.3	**62.2**	**40.38**	104	14.97	38.71
Lac Razelm - Insula Popina	79.6	**44.13**	34.59	82.7	8.04	30.48
Lac Razelm	76.4	**45.92**	37.4	88.1	6.64	32.69
Lac Razelm	84	**51**	**40.4**	97.5	7.65	34.37
Lac Golovita	45.7	21.58	12.14	37.1	7.68	13.24
Lac Golovita - W Bisericuţa	96.2	**62.5**	30.26	87.9	14.44	31.97
Lac Golovita - E Doloşman	67.5	**38.29**	28.65	70.6	9.37	26.88
Lac Sinoe	42.2	16.17	8.39	23.55	4.8	8.26
Lac Sinoe	93.8	28.44	4.19	42.21	2.82	10.11
Lac Zmeica	83.1	30.16	17.63	47.18	8.94	16.82
Lac Zmeica	94.1	31.41	15.99	50.1	8.12	18.21

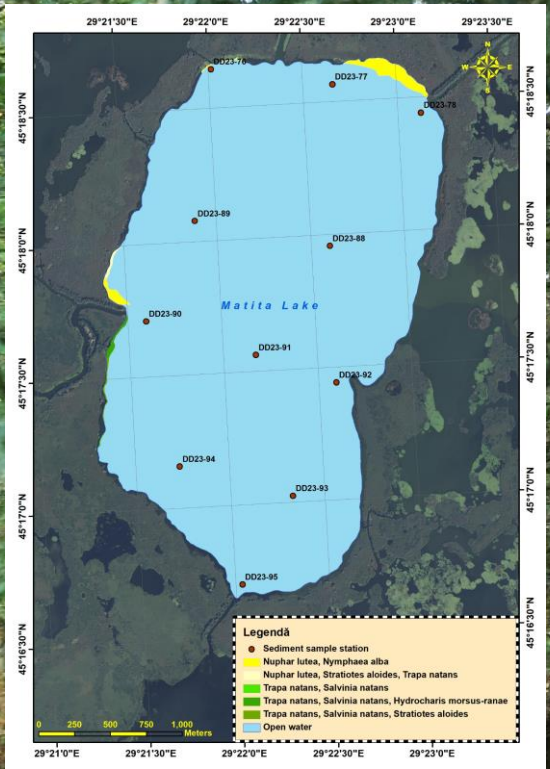

Uzlina Lake
Legendă
Sediment sample station
Nuphar lutea
Nuphar lutea, Nymphaea alba
Trapa natans
Reed islet
Open water
Isac Lake
Legend
Sediment sample station
Nymphaea alba
Nuphar lutea
Trapa natans
Nuphar lutea, Nymphaea alba
Reed islet (Phragmites australis)
Reed islet (Phragmites australis, Nuphar lutea)
Reed islet (Phragmites australis, Typha sp.)
Open water
Isacel Lake
Legend
Sediment sample station
Nymphaea alba
Nuphar lutea
Nuphar lutea, Nymphaea alba
Nuphar lutea, Trapa natans
Open water
Gorgova Lake
Legend
Sediment sample station
Nuphar lutea
Nuphar lutea, Nymphaea alba
Reed islet (Phragmites australis)
Stratiotis aloides
Open water
Gorgovat Lake
Legend
Sediment sample station
Nuphar lutea
Nuphar lutea, Nymphaea alba
Nuphar lutea, Trapa natans
Reed islet (Phragmites australis)
Trapa natans
Open water
Lumina Lake
Legend
Sediment sample station
Open water
Reed islet (Phragmites australis)
Puiulet Lake
Legend
Sediment sample station
Reed islet (Phragmites australis)
Open water
Puiu Lake
Legendă
Sediment sample station
Nuphar lutea
Open water
Popina I.
Razelm Lake
Golovița Lake
Zmeica Lake
Biserica I.
BLACK SEA
Legend
Sediment sample station
Reed islet (Phragmites australis)
Razelm-Golovița-Zmeica lakes boundary
Sinoie Lake
BLACK SEA
Legend
Sediment sample station
Reed islet (Phragmites australis)
Lake boundary
UKRAINE
BLACK SEA
Musura Bay
Legend
Sediment sample station
State border
Bay boundary
Rosu Lake
Legend
Sediment sample station
Reed islet (Phragmites australis)
Open water
Rosulet Lake
Legendă
Sediment sample station
Reed islet (Phragmites australis)
Open water
Sakhalin Bay
BLACK SEA
Legend
Sediment sample station
Reed islet (Phragmites australis)
Sakhalin Bay area

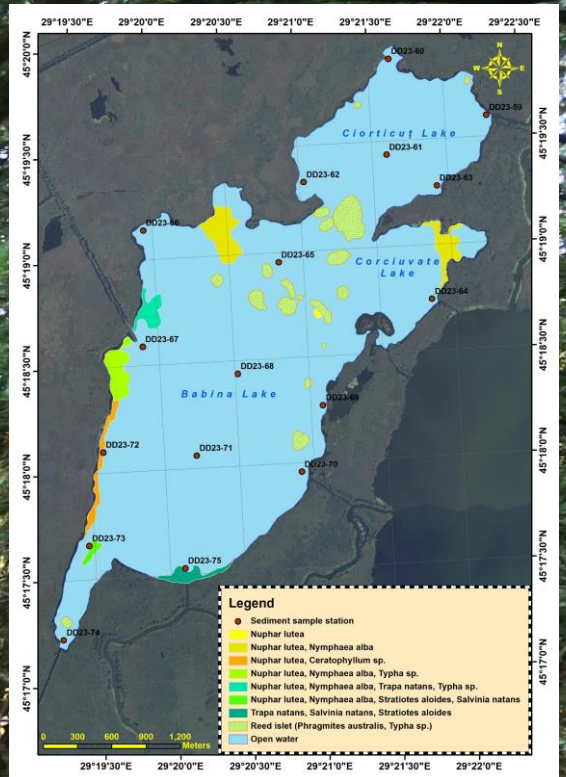

Uzlina Lake
Legend
Lake boundary
Cu concentration (mg/kg)
40,00 - 42,50
42,51 - 45,00
45,01 - 47,50
47,51 - 50,00
50,01 - 52,50
52,51 - 55,00
55,01 - 57,50
57,51 - 60,00
Isac Lake
Legend
Lake boundary
Cu concentration (mg/kg)
30,00 - 32,50
32,51 - 35,00
35,01 - 37,50
37,51 - 40,00
40,01 - 42,50
42,51 - 45,00
45,01 - 47,50
47,51 - 50,00
Isdcel Lake
Legend
Lake boundary
Cu concentration (mg/kg)
30,00 - 33,75
33,76 - 37,50
37,51 - 41,25
41,26 - 45,00
45,01 - 48,75
48,76 - 52,50
52,51 - 56,25
56,26 - 60,00
Gorgova Lake
Legend
Lake boundary
Cu concentration (mg/kg)
30,00 - 32,50
32,50 - 35,00
35,00 - 37,50
37,50 - 40,00
40,00 - 42,50
42,50 - 45,00
45,00 - 47,50
47,50 - 50,00
Gorgovat Lake
Legend
Lake boundary
Cu concentration (mg/kg)
40,00 - 43,75
43,75 - 47,50
47,50 - 51,25
51,25 - 55,00
55,00 - 58,75
58,75 - 62,50
62,50 - 66,25
66,25 - 70,00
Lumina Lake
Legend
Lake boundary
Cu concentration (mg/kg)
7,41 - 11,20
11,21 - 14,99
15,00 - 18,78
18,79 - 22,56
22,57 - 26,35
26,36 - 30,14
30,15 - 33,93
33,94 - 37,71
Puiulet Lake
Legend
Lake boundary
Cu concentration (mg/kg)
23,54 - 27,36
27,37 - 31,18
31,19 - 35,00
35,01 - 38,82
38,83 - 42,64
42,65 - 46,46
46,47 - 50,28
50,29 - 54,10
Puiu Lake
Legend
Lake boundary
Cu concentration (mg/kg)
2,66 - 8,10
8,11 - 13,60
13,61 - 19,10
19,11 - 24,60
24,61 - 30,10
30,11 - 35,60
35,61 - 41,10
41,11 - 46,60
Razelm Lake
Golovița Lake
Zmeica Lake
BLACK SEA
Legend
Lakes boundary
Island
Reed islet (Phragmites australis)
Cu concentration (mg/kg)
10,52 - 14,25
14,26 - 17,99
18,00 - 21,73
21,74 - 25,46
25,47 - 29,19
29,20 - 32,93
32,94 - 36,67
36,68 - 40,40
Sinoie Lake
BLACK SEA
Legend
Lake boundary
Cu concentration (mg/kg)
4,19 - 6,58
6,59 - 8,97
8,98 - 11,36
11,37 - 13,76
13,77 - 16,15
16,16 - 18,54
18,55 - 20,94
20,95 - 23,33
UKRAINE
BLACK SEA
Musura Bay
Legend
State border
Bay boundary
Cu concentration (mg/kg)
10,35 - 14,22
14,23 - 18,09
18,10 - 21,96
21,97 - 25,83
25,84 - 29,70
29,71 - 33,57
33,58 - 37,45
37,46 - 41,33
Rosu Lake
Legend
Lake boundary
Cu concentration (mg/kg)
2,19 - 5,33
5,34 - 8,47
8,48 - 11,61
11,62 - 14,75
14,76 - 17,88
17,89 - 21,02
21,03 - 24,16
24,17 - 27,29
Rosuiet Lake
Legendă
Lake boundary
Cu concentration (mg/kg)
6,12 - 9,86
9,87 - 13,60
13,61 - 17,34
17,35 - 21,08
21,09 - 24,82
24,83 - 28,56
28,57 - 32,30
32,31 - 36,04
Sakhalin Bay
BLACK SEA
Legend
Sakhalin Bay area
Cu concentration (mg/kg)
5,80 - 9,54
9,545 - 13,28
13,29 - 17,02
17,03 - 20,76
20,77 - 24,50
24,51 - 28,24
28,25 - 31,98
31,99 - 35,74

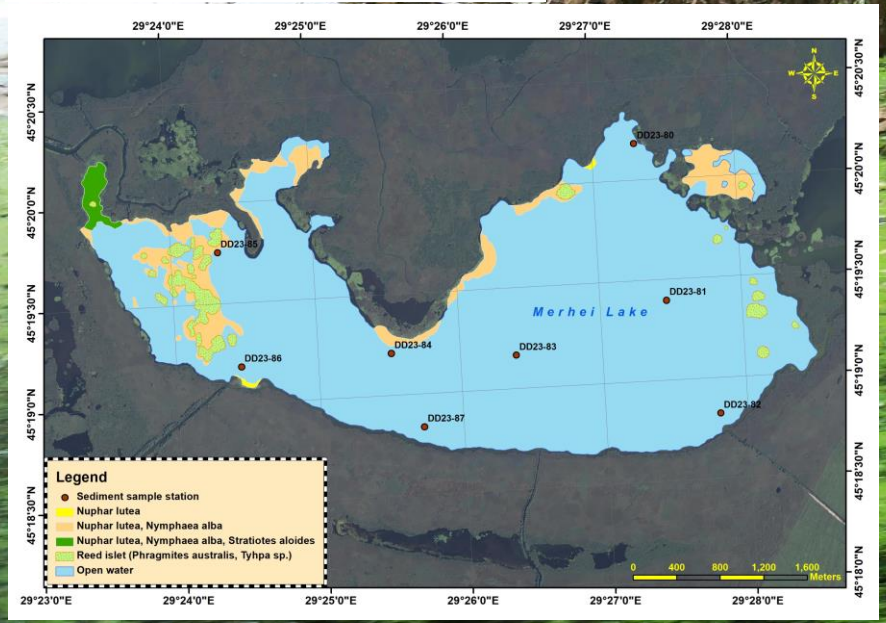

Uzlina Lake
Legend
Lake boundary
Ni concentration (mg/kg)
40,00 - 42,50
42,51 - 45,00
45,01 - 47,50
47,51 - 50,00
50,01 - 52,50
52,51 - 55,00
55,01 - 57,50
57,51 - 60,00
Isac Lake
Legend
Lake boundary
Ni concentration (mg/kg)
20,00 - 25,00
25,01 - 30,00
30,01 - 35,00
35,01 - 40,00
40,01 - 45,00
45,01 - 50,00
50,01 - 55,00
55,01 - 60,00
Isăcel Lake
Legend
Lake boundary
Ni concentration (mg/kg)
20,00 - 26,25
26,26 - 32,50
32,51 - 38,75
38,76 - 45,00
45,01 - 51,25
51,26 - 57,50
57,51 - 63,75
63,76 - 70,00
Gorgova Lake
Legend
Lake boundary
Ni concentration (mg/kg)
20,00 - 25,00
25,00 - 30,00
30,00 - 35,00
35,00 - 40,00
40,00 - 45,00
45,00 - 50,00
50,00 - 55,00
55,00 - 60,00
Gorgovat Lake
Legend
Lake boundary
Ni concentration (mg/kg)
40,00 - 41,25
41,25 - 42,50
42,50 - 43,75
43,75 - 45,00
45,00 - 46,25
46,25 - 47,50
47,50 - 48,75
48,75 - 50,00
Lumina Lake
Legend
Lake boundary
Ni concentration (mg/kg)
5,01 - 6,93
6,94 - 12,85
12,86 - 16,77
16,78 - 20,68
20,69 - 24,60
24,61 - 28,52
28,53 - 32,44
32,45 - 36,35
Perșinel Lake
Legend
Lake boundary
Ni concentration (mg/kg)
22,91 - 25,39
25,40 - 27,87
27,88 - 30,35
30,36 - 32,83
32,84 - 35,31
35,32 - 37,79
37,80 - 40,28
40,29 - 42,78
Puiu Lake
Legend
Lake boundary
Ni concentration (mg/kg)
4,90 - 9,10
9,11 - 13,30
13,31 - 17,50
17,51 - 21,70
21,71 - 25,90
25,91 - 30,10
30,11 - 34,30
34,31 - 38,50
Razelm Lake
Golovita Lake
Zmeica Lake
BLACK SEA
Legend
Lakes boundary
Island
Reed islet (Phragmites australis)
Ni concentration (mg/kg)
21,58 - 26,70
26,71 - 31,81
31,82 - 36,92
36,93 - 42,04
42,05 - 47,15
47,16 - 52,27
52,28 - 57,38
57,39 - 62,50
UKRAINE
BLACK SEA
Budura Bay
Legend
State border
Bay boundary
Ni concentration (mg/kg)
33,71 - 34,75
34,76 - 35,79
35,80 - 36,83
36,84 - 37,87
37,88 - 38,91
38,92 - 39,95
39,96 - 40,99
41,00 - 42,04
Sinoie Lake
BLACK SEA
Legend
Lake boundary
Ni concentration (mg/kg)
8,97 - 12,68
12,69 - 16,40
16,41 - 20,11
20,12 - 23,82
23,83 - 27,54
27,55 - 31,25
31,26 - 34,96
34,97 - 38,68
Rosu Lake
Legend
Lake boundary
Ni concentration (mg/kg)
3,39 - 6,34
6,35 - 9,29
9,30 - 12,23
12,24 - 15,18
15,19 - 18,12
18,13 - 21,07
21,08 - 24,01
24,02 - 26,96
Rosulet Lake
Legendă
Lake boundary
Ni concentration (mg/kg)
9,27 - 11,61
11,62 - 13,95
13,96 - 16,29
16,30 - 18,63
18,64 - 20,97
20,98 - 23,32
23,33 - 25,66
25,67 - 28,01
Sakhalin Bay
BLACK SEA
Legend
Sakhalin Bay area
Ni concentration (mg/kg)
35,91 - 38,77
38,78 - 41,63
41,64 - 44,49
44,50 - 47,35
47,36 - 50,21
50,22 - 53,07
53,08 - 55,93
55,94 - 58,80

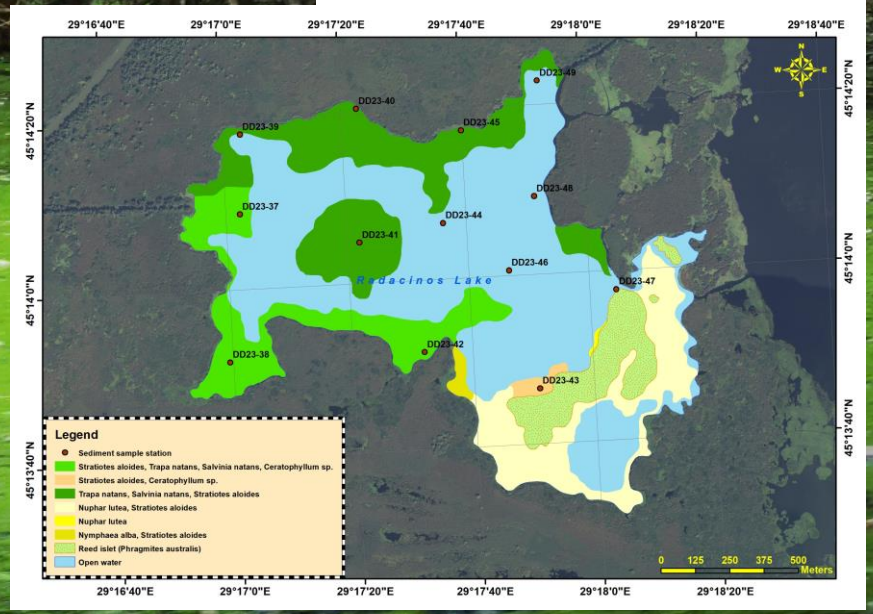

Trei Ozere Lake
DD23-57
DD23-56
DD23-55
DD23-50
DD23-54
DD23-53
DD23-51
DD23-52
Legendă
Sediment sample station
Nuphar lutea, Ceratophyllum sp.
Nuphar lutea, Stratiotes aloides, Salvinia natans, Ceratophyllum sp.
Nuphar lutea, Stratiotes aloides, Hydrocharis morsus-ranae, Ceratophyllum sp
Nymphaea alba, Nuphar lutea, Stratiotes aloides, Hydrocharis morsus-ranae, Ceratophyllum sp.
Stratiotes aloides, Ceratophyllum sp.
Stratiotes aloides, Hydrocharis morsus-ranae, Salvinia natans, Ceratophyllum sp.
Stratiotes aloides, Hydrocharis morsus-ranae, Salvinia natans, Trapa natans, Ceratophyllum sp.
Salvinia natans, Stratiotes aloides, Ceratophyllum sp.
Open water
0 250 500 750 1,000 Meters

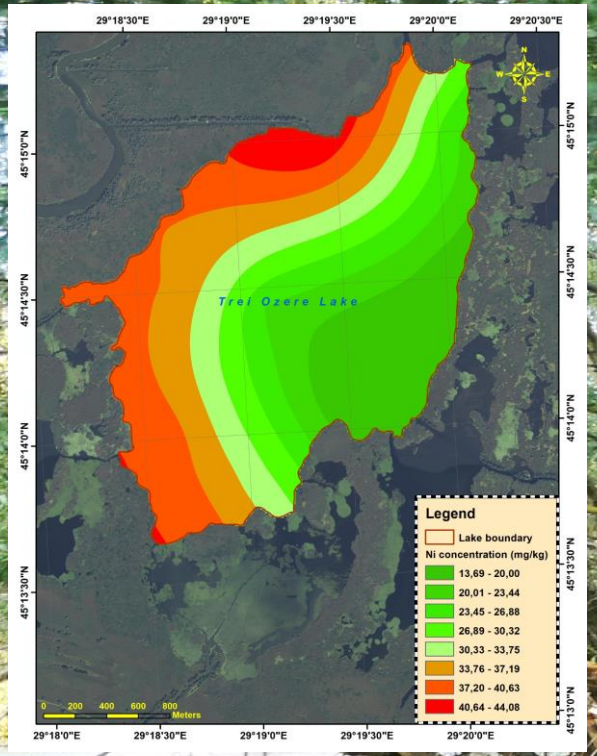

Bogdaproste Lake
DD23 - 30
DD23 - 29
DD23 - 31
DD23 - 32
DD23 - 28
DD23 - 24
DD23 - 23
DD23 - 27
DD23 - 22
DD23 - 25
DD23 - 26
DD23 - 21
DD23 - 20
Legend
Sediment sample station
Nuphar lutea, Stratiotes aloides
Nuphar lutea, Stratiotes aloides, Hydrocharis morsus-ranae, Salvinia natans
Submerged vegetation (Ceratophyllum sp., Myriophyllum sp., Elodea canadensis)
Salvinia natans, submerged vegetation (Ceratophyllum sp., Myriophyllum sp., Elodea canadensis)
Reed islet (Phragmites australis)
Open water
0 200 400 600 800 Meters

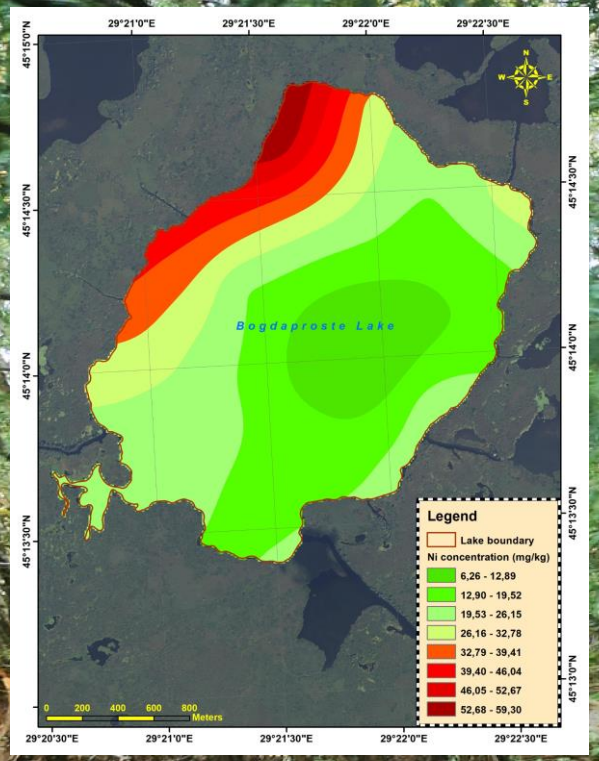

Matita Lake
DD23-76
DD23-77
DD23-78
DD23-89
DD23-88
DD23-90
DD23-91
DD23-92
DD23-94
DD23-93
DD23-95
Legendă
Sediment sample station
Nuphar lutea, Nymphaea alba
Nuphar lutea, Stratiotes aloides, Trapa natans
Trapa natans, Salvinia natans
Trapa natans, Salvinia natans, Hydrocharis morsus-ranae
Trapa natans, Salvinia natans, Stratiotes aloides
Open water
0 250 500 750 1,000 Meters

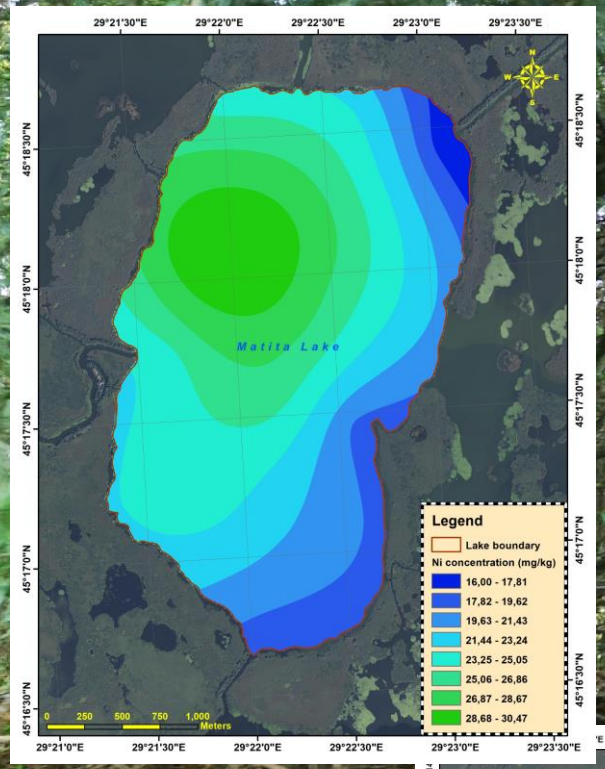

Ciorticuț Lake
DD23-60
DD23-59
DD23-61
DD23-62
DD23-63
DD23-66
DD23-65
Corciuvate Lake
DD23-64
DD23-67
DD23-68
Babina Lake
DD23-69
DD23-72
DD23-71
DD23-70
DD23-73
DD23-75
DD23-74
Legend
Sediment sample station
Nuphar lutea
Nuphar lutea, Nymphaea alba
Nuphar lutea, Ceratophyllum sp.
Nuphar lutea, Nymphaea alba, Typha sp.
Nuphar lutea, Nymphaea alba, Trapa natans, Typha sp.
Nuphar lutea, Nymphaea alba, Stratiotes aloides, Salvinia natans
Trapa natans, Salvinia natans, Stratiotes aloides
Reed islet (Phragmites australis, Typha sp.)
Open water
0 300 600 900 1,200 Meters

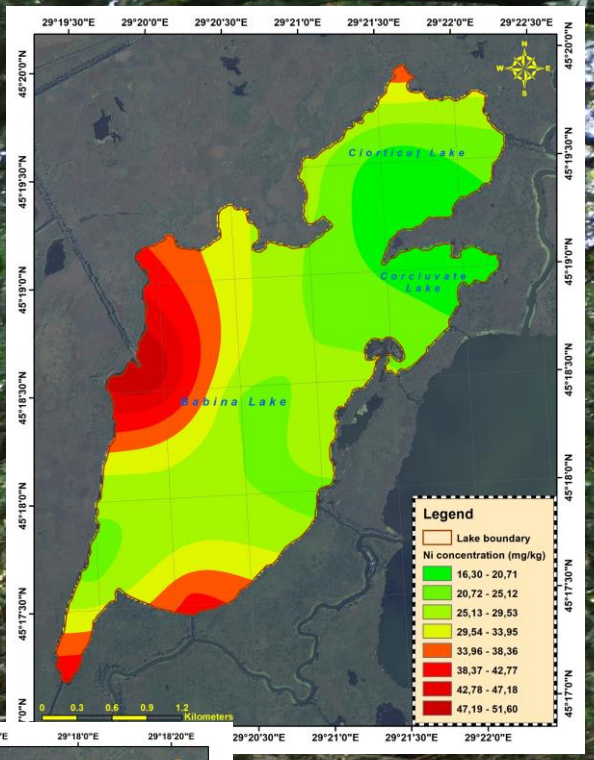

Merhei Lake
DD23-80
DD23-85
DD23-81
DD23-84
DD23-83
DD23-86
DD23-87
DD23-82
Legend
Sediment sample station
Nuphar lutea
Nuphar lutea, Nymphaea alba
Nuphar lutea, Nymphaea alba, Stratiotes aloides
Reed islet (Phragmites australis, Tyhpa sp.)
Open water
0 400 800 1,200 1,600 Meters

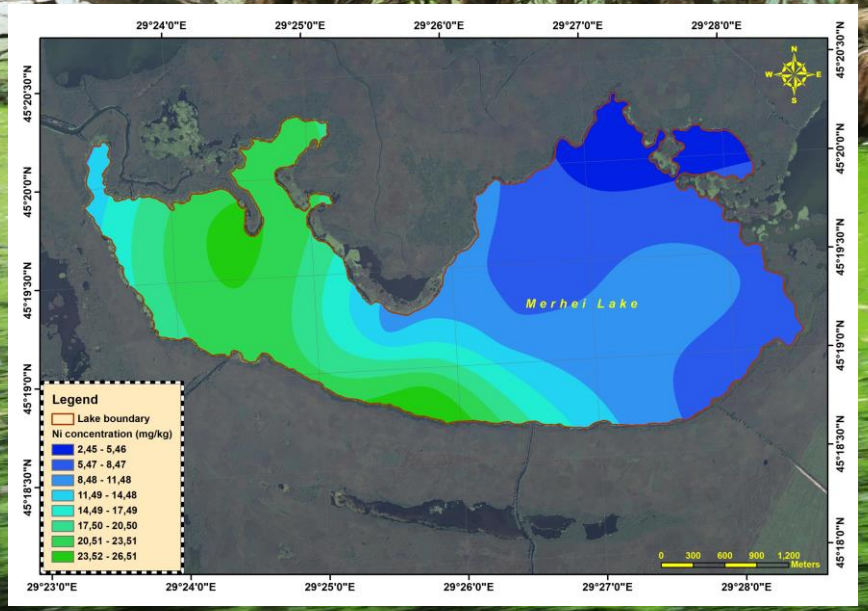

Redacinos Lake
DD23-49
DD23-40
DD23-39
DD23-45
DD23-48
DD23-37
DD23-44
DD23-41
DD23-46
DD23-47
DD23-42
DD23-38
DD23-43
Legend
Sediment sample station
Stratiotes aloides, Trapa natans, Salvinia natans, Ceratophyllum sp.
Stratiotes aloides, Ceratophyllum sp.
Trapa natans, Salvinia natans, Stratiotes aloides
Nuphar lutea, Stratiotes aloides
Nuphar lutea
Nymphaea alba, Stratiotes aloides
Reed islet (Phragmites australis)
Open water
0 125 250 375 500 Meters

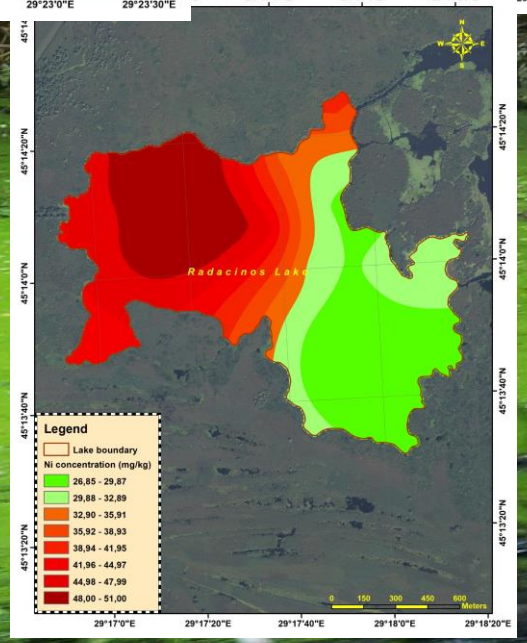

Trei Ozere Lake
Legend
Lake boundary
Ni concentration (mg/kg)
13,69 - 20,00
20,01 - 23,44
23,45 - 26,88
26,89 - 30,32
30,33 - 33,75
33,76 - 37,19
37,20 - 40,63
40,64 - 44,08
0 200 400 600 800
Meters

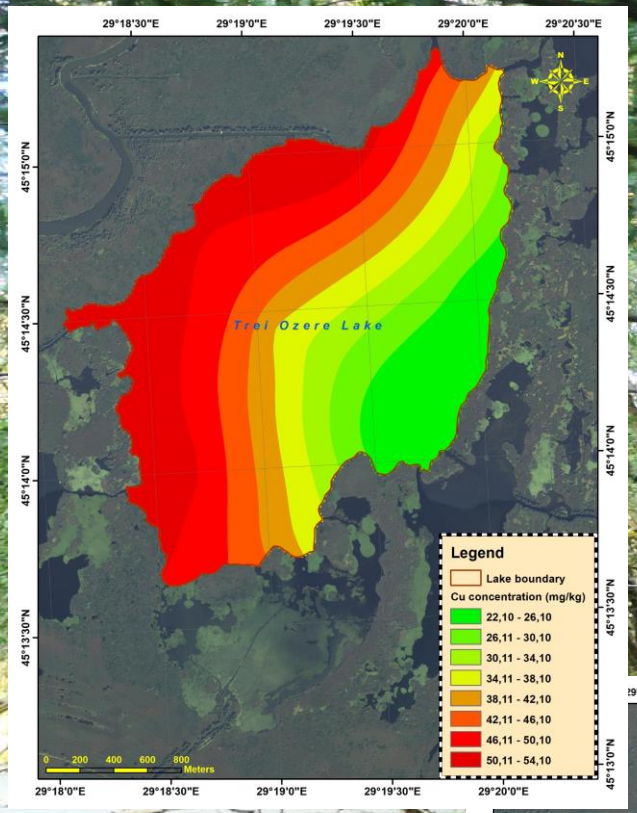

Bogdaproste Lake
Legend
Lake boundary
Ni concentration (mg/kg)
6,26 - 12,89
12,90 - 19,52
19,53 - 26,15
26,16 - 32,78
32,79 - 39,41
39,40 - 46,04
46,05 - 52,67
52,68 - 59,30
0 200 400 600 800
Meters

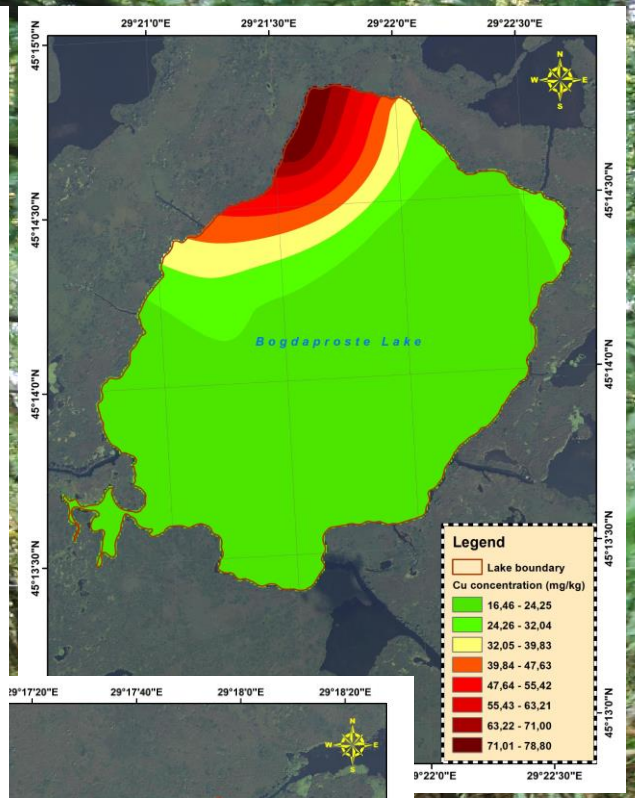

Matita Lake
Legend
Lake boundary
Ni concentration (mg/kg)
16,00 - 17,81
17,82 - 19,62
19,63 - 21,43
21,44 - 23,24
23,25 - 25,05
25,06 - 26,86
26,87 - 28,67
28,68 - 30,47
0 250 500 750 1,000
Meters

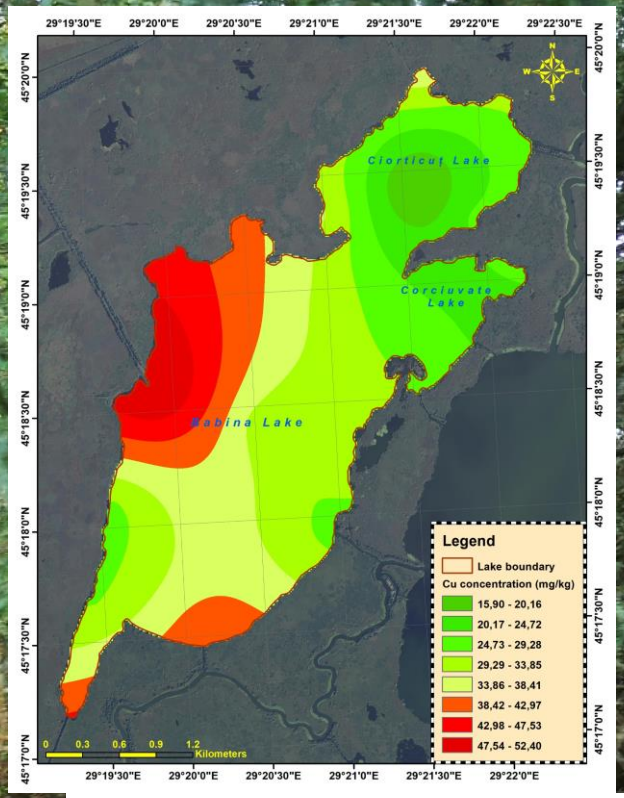

Ciorticuț Lake
Corciuvate Lake
Babina Lake
Legend
Lake boundary
Ni concentration (mg/kg)
16,30 - 20,71
20,72 - 25,12
25,13 - 29,53
29,54 - 33,95
33,96 - 38,36
38,37 - 42,77
42,78 - 47,18
47,19 - 51,60
0 0.3 0.6 0.9 1.2
Kilometers

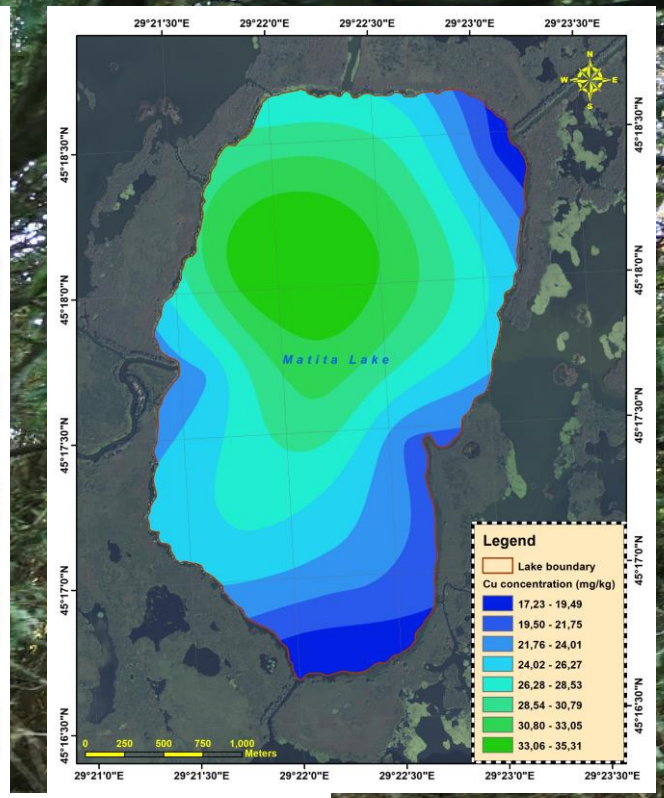

Merhei Lake
Legend
Lake boundary
Ni concentration (mg/kg)
2,45 - 5,46
5,47 - 8,47
8,48 - 11,48
11,49 - 14,48
14,49 - 17,49
17,50 - 20,50
20,51 - 23,51
23,52 - 26,51
0 300 600 900 1,200
Meters

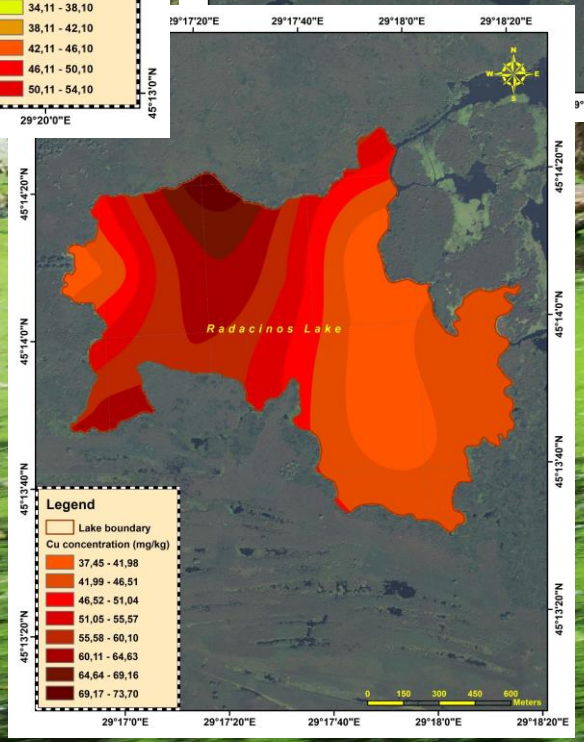

Radacinos Lake
Legend
Lake boundary
Ni concentration (mg/kg)
26,85 - 29,87
29,88 - 32,89
32,90 - 35,91
35,92 - 38,93
38,94 - 41,95
41,96 - 44,97
44,98 - 47,99
48,00 - 51,00
0 150 300 450 600
Meters

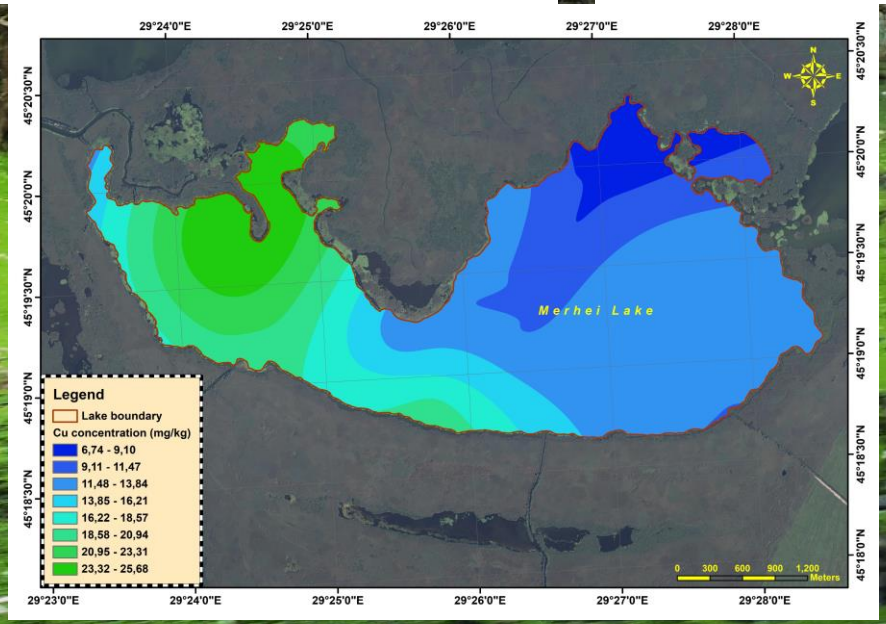

Trei Ozere Lake
Legend
Lake boundary
Cu concentration (mg/kg)
22,10 - 26,10
26,11 - 30,10
30,11 - 34,10
34,11 - 38,10
38,11 - 42,10
42,11 - 46,10
46,11 - 50,10
50,11 - 54,10
0 200 400 600 800
Meters


Bogdaproste Lake
Legend
Lake boundary
Cu concentration (mg/kg)
16,46 - 24,25
24,26 - 32,04
32,05 - 39,83
39,84 - 47,63
47,64 - 55,42
55,43 - 63,21
63,22 - 71,00
71,01 - 78,80


Ciorticuț Lake
Corciuvate Lake
Babina Lake
Legend
Lake boundary
Cu concentration (mg/kg)
15,90 - 20,16
20,17 - 24,72
24,73 - 29,28
29,29 - 33,85
33,86 - 38,41
38,42 - 42,97
42,98 - 47,53
47,54 - 52,40
0 0,3 0,6 0,9 1,2
Kilometers


Matita Lake
Legend
Lake boundary
Cu concentration (mg/kg)
17,23 - 19,49
19,50 - 21,75
21,76 - 24,01
24,02 - 26,27
26,28 - 28,53
28,54 - 30,79
30,80 - 33,05
33,06 - 35,31
0 250 500 750 1,000
Meters


Radacinos Lake
Legend
Lake boundary
Cu concentration (mg/kg)
37,45 - 41,98
41,99 - 46,51
46,52 - 51,04
51,05 - 55,57
55,58 - 60,10
60,11 - 64,63
64,64 - 69,16
69,17 - 73,70
0 150 300 450 600
Meters


Merhei Lake
Legend
Lake boundary
Cu concentration (mg/kg)
6,74 - 9,10
9,11 - 11,47
11,48 - 13,84
13,85 - 16,21
16,22 - 18,57
18,58 - 20,94
20,95 - 23,31
23,32 - 25,68
0 300 600 900 1,200
Meters

Determinarea potenţialului de fitoremediere al *Phragmites australis*

- Potențialul de fitoremediere va fi estimat prin calcularea factorului de bioacumulare (**BAF**) și a factorului de translocare (**TF**).
- **BAF -** reprezinta raportul dintre concentrația unui metal în rădăcini ($\mathbf{C_{radacina}}$) și forma sa disponibilă în substrat ($\mathbf{C_{substrat}}$), si indică rata de acumulare a metalului în rădăcinile plantelor.
- **TF1** - reprezintă raportul dintre concentrația unui metal în tulpina ($\mathbf{C_{tulpina}}$) concentrația acestuia în rădăcini ($\mathbf{C_{radacina}}$).
- **TF2 -** reprezintă raportul dintre concentrația unui metal în frunze ($\mathbf{C_{frunza}}$) și concentrația acestuia în rădăcini ($\mathbf{C_{radacina}}$).

$$\mathbf{BAF=C_{radacina}/C_{substrat}\ ;\ TF1=C_{tulpina}/C_{radacina}}$$

$$\mathbf{TF2=C_{frunza}/C_{radacina}}$$


VĂ MULȚUMESC!