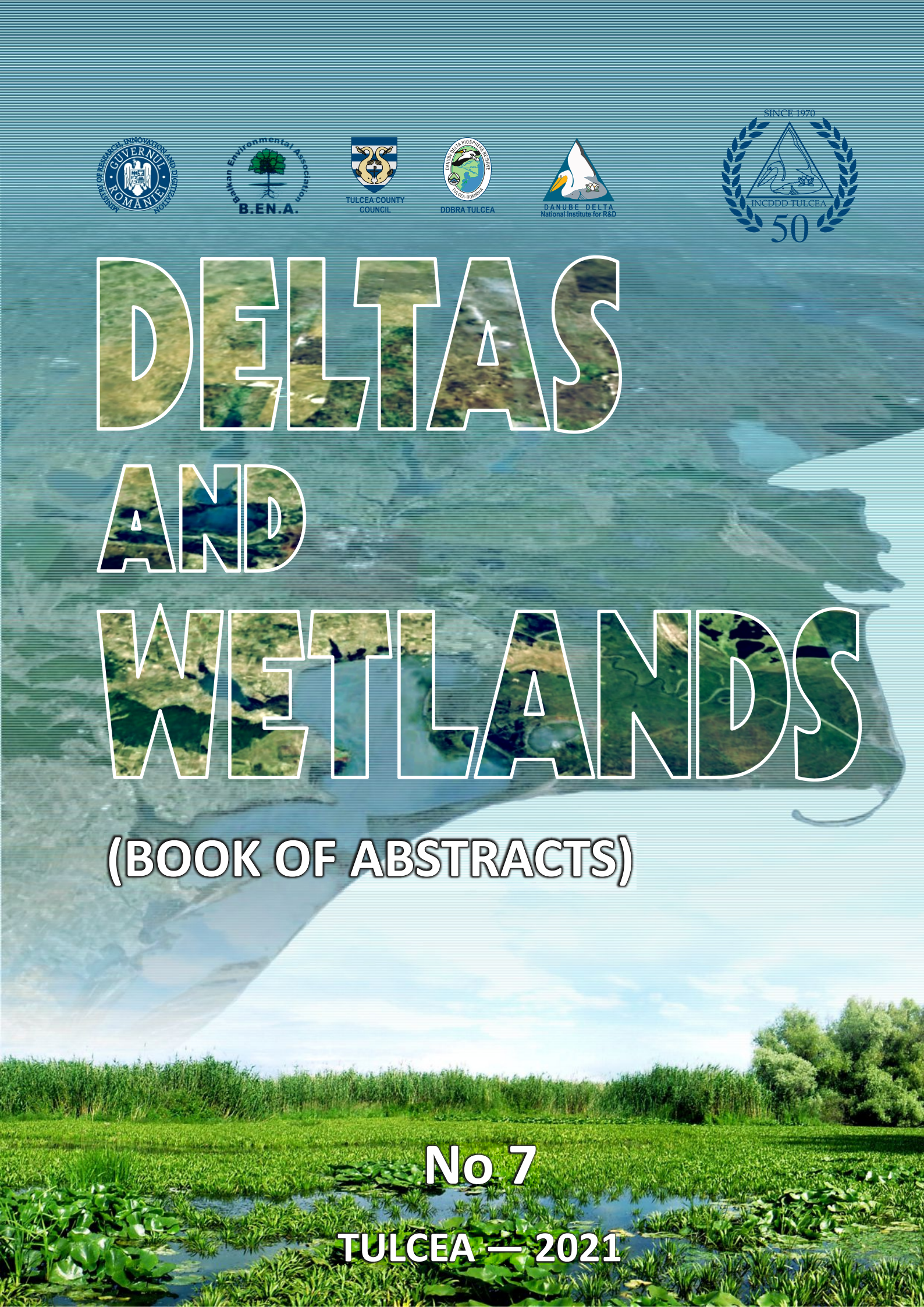
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DELTAS AND WETLANDS
(BOOK OF ABSTRACTS)
No 7
TULCEA — 2021

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„Deltas & Wetlands" DDNI Scientific Event Community, 28-th edition

Deltas & Wetlands DDNI International Symposium

Tulcea, September 13 - 18, 2021

✓ **September 13, 2021 (Monday)** - Arrival of participants

✓ **September 14, 2021 (Tuesday)**

- 9.30 - 10.00 - Registration of participants *(Romanian time)*
  Venue: „Mihail Kogălniceanu" City Hall / 20 Păcii Street, Tulcea

Ceremony celebrating 50 years of activity of DDNI

- 10.00 - 10.30 - **Opening ceremony** (**Dr. Biol. Marian Tudor**, General Director of DDNI)
- 10.30 - 11.00 - Ceremony for awarding the Diploma of excellence for 50 years of cooperation ICEM - DDNI to **Dr. János Botond Kiss**, **Dr. Victor-Henrich Baumann**
  - Ceremony of awarding the Diploma of excellence for the contribution to the development of DDNI to **Dr. Mircea Staraş**, **Eng. Romulus Ştiucă**, **Dr. Alexandru Volcov**, **Dr. Ion Munteanu**
  - Ceremony of awarding the Diploma of excellence for the entire research career in the Danube Delta to **Dr. Vasile Oţel**
- 11.00 - 11.10 - ***Coffee break***

Celebrating Ecology Day

- 11.10 - 11.40 ***Keynote Speakers***
  - **Acad. Prof. Dr. Dan Bălteanu**, Romanian Academy, Institute of Geography, President of „**Terra in the future**" National Committee - Research for global sustainable development
  - **Dr. Elena Mateescu**, National Meteorological Administration
  - **Mr. Bart Fokkens:** ***30 years of Romanian-Dutch cooperation in the field of ecological restoration - the basis of future routes*** *
- 11.40 - 11.55 - **50 years of cooperation DDNI - ICEM Tulcea**, **Dr. János Botond KISS**, **Dr. Victor-Henrich Baumann**
- 11.55 - 12.10 - **30 years of DDNI - DDBRA partnership**, **Governor Atena-Adriana Groza** (DDBRA)
- 12.10 - 12.30 - **The state of the environment in DDBR**, **Dr. Biol. Marian Tudor** (General Director of DDNI), **Dr. Eng. Iulian Nichersu** (Scientific Director of DDNI)
- 12.30 - 12.45 - **The state of marine and coastal environment in 2020,** **Dr. Valeria Abaza** (General Director of NIMRD), **Dr. Laura Boicenco** (NIMRD)
- 12.45 - 13.00 - **Reviewing of DDBR Management Plan and Regulations**, **Dr. Ion Grigoraş** (DDNI)
- 13.00 - 14.30 - ***Lunch***
- 14.30 - 18.30 - **Green Deal Challenges - Decarbonising Danube Delta:** ***3D Initiative workshop***
  - **Welcome Speeches & Intro**
    - **László Borbély** - State Counsellor, National Coordinator for SDGs, Department of Sustainable Development, Romanian Government *
    - **Prof. Dr. Dragoş Mihael Ciuparu**, Strategy of the Ministry of Research, Innovation and Digitalization for the period 2021-2024, State Secretary, Ministry of research, innovation and digitalization
    - **Magdalena Andreea Străchinescu Olteanu**, DG MARE (EC)
    - **Chris Frean, Head of Economic Diplomacy**, **on behalf of Her Majesty Ambassador to Romania Andrew Noble**

Session 1 **Setting the scene: Implementing the Green Deal in Danube Delta**

- **Chair: Dr. Iulian Nichersu** (DDNI)
- 14.50 - 15.00 The Journey to Green Deal Strategy & Romanian Approach

- 15.00 - 15.10 Romanian initiatives for Green Mobility
  Prof. Dr. Florin Nemţanu, University „Politehnica" Bucharest
- 15.10 - 15.35 - *Case study*: Sulina - **Valentin Moldoveanu** (First Vice-President of the Balkan and Black Sea Commission, Manager of Association Danube Delta Local Group for Sustainable Fisheries), **Dr. Iulian Nichersu** (DDNI), **Dragoş Balaican** (DDNI)
  - *Case study:* Gura Portiţei / **Dr. Delia Dimitriu** / MMU, **Dr. Raluca Nicolae** / Geostud & **Gabriel Diţu** / Sat Vacanţă Gura Portiţei
  - **Q&A Session**

Session 2 **European Case-studies**

Chair: Dr. Iuliana Nichersu, * **Co-chair: Prof. Dr. Florin Nemţanu**

- 15.45 - 15.55 **Danubius-RI** - Integrated knowledge for sustainable management and protection of River-Sea Systems, **Prof. Dr. Adrian Stănică** (General Director GEOECOMAR Bucharest), **Prof. Dr. Gheorghe Ungureanu** (University of Bucharest)
- 15.55 - 16.05 **MARSPLAN-BS** - long-lasting mechanism for the Black Sea Basin cross-border cooperation on maritime spatial planning - **Dr. Iulian Nichersu** (DDNI), **Dr. Laura Alexandrov** (NIMRD), **Dr. Margarita Stancheva** (CCMS Bulgaria) *
- 16.05 - 16.15 Cross-border initiatives (Romanian-Bulgarian Experience)
  Dr. Valeriu Alexandru Vilag, COMOTI *
- 16.15 - 16.25 R&D projects and telemetry case studies in EU
  Dr. George Suciu, BEIA Consult International *
- 16.25 - 16.35 Recreational transport in Danube Delta using hydrogen fuelled boats - HORIZON 2020, Feasibility Study - **Dragoş Macovei**, Gust of Change
- 16.35 - 16.45 Transformative and captivating paradigms for a Smart and Sustainable Mobility, **Prof. Dr. Margarida Coelho**, Aveiro University *
- 16.45 - 16.55 Integrated innovation processes as structured basis for local based approaches in regional decarbonisation
  Dr. Eng. Iuliana Nichersu, **Katrin Hochberg**, Steinbeis Europa Zentrum *
  - **Q&A Session**
  - ***Coffee break***

Session 3 **Pathways to implementation, gaps & challenges**

Panel discussion with experts & EC - *Round table*

Chair: Dr. Delia Dimitriu, Manchester Metropolitan University, UK
Co-chair: Prof. Dr. Florin Nemţanu, University „Politehnica" Bucharest

- 17.15 - 17.40 Green economy vs. blue economy
  Green Deal support for innovation actions,
  Magdalena Andreea Străchinescu Olteanu, DG MARE (EC)
  Maria Manuel, Sofia Ventura - Aveiro Port (Portugal)
  Maria Tzankova, ADRM "Danube", Bulgaria *
- 17.40 - 17.50 Climate change & circular economy
  Dr. Graeme Heyes - Manchester Metropolitan University, UK *
- 17.50 - 18.00 The role of circular economy in decarbonising Danube Delta
  Dr. Eng. Raluca Ioana Nicolae, Ec. Ana-Maria Brăileanu - GEOSTUD
- 18.00 - 18.10 Local based solutions (EDAPHIC-BLOOM Danube), **Dr. Iulian Nichersu** (DDNI), **Prof. Dr. Costel NEGREI** (University of Bucharest) *

Conclusions & follow-up

- 18.10 - 18.20 **Dr. Delia Dimitriu** (Manchester Metropolitan University)
  Building upon current knowledge & way forward

- 19.00 - ***Festive dinner*** - ***Ceremony celebrating 50 years of activity***

✓ September 15, 2021 (Wednesday)

- 8.30 - 9.30 - Registration of participants
  ***Venue*: „Mihail Kogălniceanu" City Hall** / 20 Păcii Street, Tulcea
- 9.30 - 10.00 - **Sect. I, Biodiversity & nature conservation, natural resources & Socio-economic aspects**
  ***Keynote Speaker*:**
  - **Prof. Dr. Florian Wittmann:** ***Wetlands Biodiversity Conservation: Threats and chances of sustainable development - lessons learned from the Amazon*** *
- 10.00 - 12.00 - **Sect. I, Presentations**

10.00 - 10.15	Prof. Dr. Sinisa Ozimec	Freshwater fish diversity of the Danube River in Croatia
10.15 - 10.30	Prof. Dr. Ming Jiang *	Marsh Resources Inventory and Ecological Function Evaluation in China
10.30 - 10.45	Mihai Doroftei, Covaliov Silviu, Oprea Adrian, Sîrbu Culiță, Trifanov Cristian, Mierlă Marian, Hanganu Jenică, Sârbu Ion	Endangered plant species and habitats in DDBR – conservation management and perspectives
10.45 - 11.00	Dragan Prlic	Comparative analyses of the vascular flora of Kopački rit and the Danube Delta
11.00 - 11.15	Bisinicu Elena	The contribution of mesozooplankton to the trophic spectrum of *Alosa tanaica* from the Romanian Black sea waters
11.15 - 11.30	Miklosova Viktoria *	Evaluation of ecosystems services of river arm Klatovske Rameno national reserve
11.30 - 11.45	Miruna Vizireanu, Alexandra Telea, Sebastian Topliceanu, Dan Cogălniceanu	Behavioral changes induced by predators in spadefoot toad juveniles (genus *Pelobates*)
11.45 - 12.00	Michelangelo Morganti,* Giuseppe Bogliani, Lucian Bolboacă, Benedetta Catitti, Alexandru Dorosencu, Emanuele Fasola, Martin Gruebler, Urs Kormann, Juan Monrós, Diego Rubolini, Fabrizio Stefani, Enrico Viganò, Mauro Fasola	The Purpurea project: satellite tracking of Purple herons along a wide longitudinal gradient
12.00 - 12.15	Bolz Ralf Michael	Entomological aspects in nature conservation

- 12.15 - 12.30 - ***Coffee break***
- 12.30 - 13.00 - **Sect IV, Geographical Information System and Application System Modeling**
  ***Keynote Speaker*:**
  - **Prof. Dr. Mihai Datcu:** ***Remote-sensing / Data mining for assessing environmental impacts*** *
- 13.00 - 14.30 - ***Lunch***
- 14.30 - 15.00 - **Sect. IV, Presentations**

14.30 - 14.45	Jonathan Cooper *	Rain on grid models for pluvial flood assessment in the inhabited areas of the Danube Delta
14.45 - 15.00	Ion Grigoraş	Using segmentation in mapping DDBR Natura2000 habitats
15.00 - 15.15	Marian Mierlă	Climate change in Danube Delta Biosphere Reserve

- 15.15 - 15.50 - **CORINE Land Cover (CLC). Regenerating farming** *(presentations & debates)*
  Keynote Speaker:
  - **Dr. Jenică Hanganu:** ***Progress in supporting Copernicus activities for the period 2017-2021***
- 16.15 - 17.15 - **Posters** presentations & **Business** approaches & Coffee:
  Venue: **Avramide HOUSE, 32 Progresului Street, Tulcea**
  - **Equipment and solutions for water and environment** - **MDS Electric SRL** Bucharest
  - **Integrated monitoring of environmental factors** - **TehnoINSTRUMENT IMPEX SRL** Ploieşti
- 17.15 - 18.15 - **PICO:** - **Best projects of DDNI** - Compendium of R&D projects, Dr. Marian Tudor, Dr. Iulian Nichersu, Dr. Irina Cernişencu
  - **Scientific works of young researchers**:

Silviu Covaliov	Comparative study on the vegetal natural resources from deltaic ecosystems in different conservation regime in the Somova-Parcheş complex and surroundings
Anca Crăciun	Ecological impact assessment of the ecological restoration projects on the ecosystem services in the Danube Delta
Daniela Nicoleta Holoştenco	Genetic aspects of critically endangered sturgeon populations in the context of the ongoing supportive stocking in the Lower Danube River
Cristian Trifanov, Dan Dumitriu, Marian Tudor, Alin Mihu-Pintilie, Cristian Stoleriu, Marian Mierlă	Bathymetric data on St. Gheorghe arm

- 19.00 - ***Dinner***

✓ **September 16, 2021 (Thursday)**

- 9.00 - 09.30 - ***Venue*: „Mihail Kogălniceanu" City Hall** / 20 Păcii Street, Tulcea
  - **Sect. II Environmental factors, Ecological restoration and Anthropic Impact**
  Keynote Speaker:
  - **Prof. Dr. Richard Preziosi:** ***Approaches to improving resilience and biodiversity in coastal ecosystems*** *
- **9.30 - 11.00** - **Sect. II, Presentations**

9.30 - 9.45	Prof. Dr. Costin Lianu	Resilient agriculture based on agroecological approaches. The role of Living Labs in the Danube Delta based on Bio Danubius cluster experience
9.45 - 10.00	Eng. Laurent Vonwiller, * Prof. Dr. Costin Lianu	Bio Danubius project to promote the standard of organic agriculture and protect the Danube Delta Biosphere and the surrounding area
10.00 - 10.15	Prof. Dr. Arch. Petrişor Alexandru-Ionuţ *	Long term wetland-related land cover and use changes in Romania
10.15 - 10.30	Prof. Dr. Weiguo Zhang *	Recent morphological changes in the Yangtze River delta and driving factors
10.30 - 10.45	Prof. Dr. Zacharaoula Andreopoulou *	Green tourism development in natural ecosystems and sustainability: Information Technology IT practice in European Union policy
10.45 - 11.00	Ovidiu Roşu	Reproductive management of the feral horse population of Letea Sandbank – Danube Delta

11.00 - 11.15	Zafirakou Antigoni, Karakatsani Z., Emmanouil C. and A. Kungolos *	Detection of PPCPs in WWTPs inflows and outflows

- 11.15 - 11.25 - ***Coffee break***
- 11.25 - 11.55 - **Sect III**, **New Research approaches in EU climate change challenge. Carbon neutral 2050**

  Keynote Speaker:
  - **Prof. Dr. Andrew Tyler**: ***Development & application of Earth observation for monitoring River - Sea Systems and the development of a green recovery platform*** *
- 11.55 - 12.10 - Dr. Mariana Golumbeanu, Dr. Eng. Vasile Pătraşcu, Dr. Valeria Abaza: * Black Sea CONNECT - Education and Innovation for Blue Growth
- 12.10 - 13.00 - **International Conference on Fisheries and Aquaculture in the Peripheral Marine and fish products trade sector (DACIAT)**
- 13.00 - 14.30 - ***Lunch***
- 14.30 - 15.30 - **Parallel event:** Roundtable of debates
  BELMONT - Creating Interfaces
  Citizen Science: Creating interfaces by using active participation through Living Labs for developing knowledge on food-water-energy Nexus
- 15.30 - 15.45 - ***Coffee break***
- 15.45 - 17.30 - **Parallel events:** Roundtables of debates
  1. ***„Opportunity for fish repopulation in DDBR"***
  2. ***„Reconstruction vs. Nonintervention in DDBR"***
  - **Dr. Eng. Iulian Nichersu** - *Convener*
- 17.30 - 18.30 - **Conclusions & Awards**
- 19.00 - ***Dinner***

✓ **September 17, 2021 (Friday)**

- 9.00 - 19.00 - Field trip in the Danube Delta Biosphere Reserve
  Ceremony celebrating 50 years of activity
  - ***Improving the existing competences and developing new ones in the aquaculture and fish products trade sector*** **(Final Conference - DACIAT)**

✓ **September 18, 2021 (Saturday)**

- Departure of participants

*** - online participation**

POSTERS:

I. Biodiversity and nature conservation, natural resources & Socio-economic aspects

1.	Tomaskinova Judita	Management effectiveness evaluation in wetlands of Protected Area Horna Orava (Slovakia)
2.	Totoiu Aurelia, Victor Niţă, Neculai Patriche, Victor Cristea	Parasitic diseases reported in fish populations from the Romanian Black Sea coast
3.	Drăgan Ovidiu	The necessity to integrate Citizen Science into non-native fish species monitoring and inventory
4.	Sabina E. Vlad, Florina Stănescu, Dan Cogălniceanu	Comparing two methods for age assessment in Spur-thighed tortoise (*Testudo graeca*)
5.	Stănescu Florina	The symphony of a bog – testing passive acoustic monitoring tools at Pește̦ana, Haţeg Geopark
6.	Plăiaşu Rodica, Băncilă Raluca Ioana, Memedemin Daniyar, Manu Minodora, Lăcătuşu Anca Rovena, Skolka Marius, Stănescu Florina, Cogălniceanu Dan	Drivers of ground-dwelling invertebrate community composition and structure in a peat bog
7.	Victor Niță, Magda Nenciu	The Constanța Aquaculture Demonstrative Center (ADC), a tailored service aimed at fostering Romanian mariculture
8.	Năstase Aurel, Iani Marian, Honţ Ștefan, Paraschiv Marian, Cernisencu Irina, Năvodaru Ion	Fish biodiversity from Danube river and Delta arms in DDBR area
9.	Doroşencu Alexandru, Bolboacă Lucian, Mauro Fasola, Enrico Viganò, Michelangelo Morganti	A Romania first: Eight Purple-herons fitted with GPS trackers in Danube Delta Biosphere Reserve
10.	Cristina Despina, Adrian Burada, Liliana Teodorof, Daniela Seceleanu-Odor, Mihaela Țigănuș, Mihaela-Iuliana Tudor, Orhan Ibram, Valentina Andreea Calmuc, Aurel Nastase, Anca Crăciun, Dragos Balaican, Ion Marian Iani	Food habits of the population from Danube Delta Biosphere Reserve territory and adjacent areas
11.	Alexe Vasile, Sandor Attila David, Marinov Mihai, Bolboacă Lucian-Eugen, Dorosencu Alexandru-Alexandru, Marta Peraita, Kiss Botond, Dumitru Murariu	New data on the diet of White-tailed Sea Eagle (*Haliaeetus albicilla*) in Danube Delta Biosphere Reserve and its surroundings (România)
12.	Marta Peraita, Alexandru Cătălin Doroșencu, Lucian Eugen Bolboacă, Mihai Marinov, Vasile Alexe	The Great Reed Warbler (*Acrocephalus arundinaceus*) breeding population in ROSPA0031 Danube Delta and Razim-Sinoe Complex
13.	Ştefan Răileanu, Lucian Bolboacă	Study on the spread of babesiosis and heartworm disease on the territory of Dobrogea (the deltaic region and the North-Dobrogean Plateau)

II. Environmental factors, Ecological Restoration & Anthropic Impact

14.	Török L., Bratfanof E., Török Zs.	Comparative analysis of the significance of urban lakes in the perception of young people from Cluj Napoca, Sibiu and Tulcea
15.	Dragomir Elena Camelia, Dragomir Elena Camelia, Tănasă Veronica, Iordache Bogdan, Neculai Patriche, Maria Crivineanu	Evaluation of physico-chemical water parameters from the recirculating aquaponic system RAS
16.	Damir Nicoleta-Alexandra, Coatu, E. Pantea, M. Galațchi, E. Botez	Assessment of polycyclic aromatic hydrocarbons content in marine organisms of commercial interest at the Black Sea Romanian coast
17.	Valentina Andreea Calmuc, Madalina Calmuc, Maxim Arseni, Adrian Burada, Catalina Iticescu, Puiu-Lucian Georgescu	Spatial and seasonal variations of sediment pollution indices in the Lower Danube River
18.	Mădălina Calmuc, Valentina Andreea Calmuc, Maxim Arseni, Adrian Rosu, Puiu-Lucian Georgescu, Cătălina Iticescu	Methods for sampling and separation of microplastics from the Lower Danube River water
19.	Ion Ioana	Biosynthesis of the silver nanoparticle using Chlorella Sorokiniana
20.	Adrian Burada, Liliana Teodorof, Cristina	

	Despina, Daniela Seceleanu-Odor, Mihaela Țigănuș, Mihaela-Iuliana Tudor, Orhan Ibram, Valentina Andreea Calmuc, Aurel Năstase, Anca Crăciun, Ion Marian Iani	Variability of heavy metals concentrations in some fish species from the Danube Delta Biosphere Reserve
21.	Catianis Irina, Constantinescu Adriana Maria, Ispas Bogdan, Pojar Iulian, Grosu Dumitru, Dobre Oana	Assessing and mapping spatial distribution of the main lithological components of recent sediments in Fortuna Lake, Danube Delta Biosphere Reserve, Romania
22.	Cernişencu Irina, Cristina Despina, Victoria Hanganu, Mihai Doroftei, Marian Mierlă, Cristian Trifanov, George Popescu, Silviu Covaliov	BSB ECO MONITORINGBSB MONITORING - Joint Monitoring for Environmental Protection in BSB countries - Project Number: BSB-884
23.	Ștefan Honţ, Marian Paraschiv, Finn Økland, Gorcin Cvijanovic, Marija Smederevac Lalic, Mirjana Lenhardt, Edith Hoedl, Marian Iani	Preliminary results on the assessment of Danube River fish species migration behavior in relation to the Iron Gate I and II dam using acoustic telemetry equipments
24.	Matei Simonov, Iuliana-Mihaela Tudor, Marian Mierlă, Alexandru Bănescu, Ciprian Anore	Comparative analysis of the seasonal hydrological characteristics of the Danube and Danube Delta lakes
25.	Dragoş Balaican, Iulian Nichersu, Edward Bratfanof, Matei Simionov	Food-Water-Energy Nexus visibility at local level. Co-creative approaches involving citizen science through multiple stages of research

III. New Research approaches in EU climate change challenge. Carbon Neutral 2050

26.	Gresita Constantin Irinel	Risk Monitoring for Hydrotechnical Constructions
27.	Gabriel Lupu, Silviu Covaliov, Matei Simionov, Raluca (Bozagievici) Călin	IASON - Invasive alien species observatory and network development for the assessment of climate change impacts in Black Sea deltaic protected areas

IV. Geographical Information System and Application System Modeling

28.	Panait Valentin	Analyzing of the lower sector of the Danube evolution based on logistic map
29.	Iordache Gabriel, Catianis Irina, Pop Ioan Cornel	Morphological changes of the Danube riverbed in the Ceatal Izmail bifurcation area
30.	Laura Alexandrov, Vesselina Troeva, Dan Vasiliu, Bogdan Ghinea, Dragos Niculescu, Dragos Vintila, Alina Spinu, Jeni Bujini, Margarita Stancheva, Tatiana Begun, Mihaela Mureşan, Vlad Rădulescu	Present and future conditions analysis of maritime space, under the maritime spatial planning process
31.	Răzvan Mateescu, Dragoş Niculescu, Elena Vlăsceanu	COSMOMAR *"Constanta Space Technologies Competence Centre dedicated to the Romanian Marine and Coastal Regions Sustainable Development"*
32.	Alina Spinu, Silica Petrişoaia, Dan Diaconeasa, Luminiţa Buga	A short and long term evaluation of along shore geomorphological changes in the Danube Delta

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2.	Bisinicu Elena, Nita Victor, Totoiu Aurelia, Harcota George-Emanuel, Tiganov George, Cristea Victor	THE CONTRIBUTION OF MESOZOOPLANKTON COMMUNITY TO THE TROPHIC SPECTRUM OF *ALOSA TANAICA* FROM THE ROMANIAN BLACK SEA WATERS
3.	Crișan Vlad, Dincă Lucian	THE DESCRIPTION OF FORESTS FROM THE DANUBE DELTA
4.	Despina Cristina, Burada Adrian, Teodorof Liliana, Seceleanu-Odor Daniela, Țigănuș Mihaela, Tudor Mihaela-Iuliana, Ibram Orhan, Calmuc Valentina Andreea, Nastase Aurel, Crăciun Anca, Balaican Dragos, Iani Ion Marian	FOOD HABITS OF THE POPULATION FROM DANUBE DELTA BIOSPHERE RESERVE TERRITORY AND ADJACENT AREAS
5.	Doroftei Mihai, Covaliov Silviu, Oprea Adrian, Sîrbu Culiță, Trifanov Cristian, Mierlă Marian, Hanganu Jenică, Sârbu Ion	ENDANGERED PLANT SPECIES AND HABITATS IN DDBR – CONSERVATION MANAGEMENT AND PERSPECTIVES
6.	Dorosencu Alexandru, Bolboaca Lucian, Michelangelo Morganti	A ROMANIA FIRST: EIGHT PURPLE-HERONS FITTED WITH GPS TRACKERS IN DANUBE DELTA BIOSPHERE RESERVE
7.	Drăgan Ovidiu	THE NECESSITY TO INTEGRATE CITIZEN SCIENCE INTO NON-NATIVE FISH SPECIES MONITORING AND INVENTORY
8.	Dragan Prlić, Siniša Ozimec	COMPARATIVE ANALYSES OF THE VASCULAR FLORA OF KOPAČKI RIT AND THE DANUBE DELTA
9.	Ioana Ion, Marinescu Virgil Emanuel, Lungu Magdalena Valentina, Delia Patroi, Ciprian Mihai Mitu, Marin Mihai, Cirstea Diana, Tsakiris Violeta, Lucaci Mariana, Caramitu Alina, Nicula Nicoleta Oana	BIOSYNTHESIS OF THE SILVER NANOPARTICLE USING CHLORELLA SOROKINIANA
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11.	Morganti Michelangelo, Bogliani Giuseppe, Bolboacă Lucian, Catitti Benedetta, Dorosencu Alexandru, Fasola Emanuele, Gruebler Martin, Monrós Juan, Diego Rubolini Juan, Stefani Fabrizio, Viganò Enrico, Fasola Mauro	THE PURPUREA PROJECT: SATELLITE TRACKING OF PURPLE HERONS ALONG A WIDE LONGITUDINAL GRADIENT
12.	Năstase Aurel, Iani Marian, Honț Ștefan, Paraschiv Marian, Cernișencu Irina, Năvodaru Ion	FISH BIODIVERSITY FROM DANUBE RIVER AND DELTA ARMS IN DDBR AREA

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14. Plăiaşu Rodica, Băncilă Raluca Ioana, Memedemin Daniyar, Manu Minodora, Lăcătuşu Anca Rovena, Skolka Marius, Stănescu Florina, Cogălniceanu Dan	DRIVERS OF GROUND-DWELLING INVERTEBRATE COMMUNITY COMPOSITION AND STRUCTURE IN A PEAT BOG
15. Vlad Sabina E., Stănescu Florina, Cogălniceanu Dan	COMPARING TWO METHODS FOR AGE ASSESSMENT IN SPUR-THIGHED TORTOISE (*TESTUDO GRAECA*)
16. Opačak Anđelko, Jelkić Dinko, Ozimec Siniša	FRESHWATER FISH DIVERSITY OF THE DANUBE RIVER IN CROATIA
17. Răileanu Ștefan, Bolboacă Lucian	STUDY ON THE SPREAD OF BABESIOSIS AND HEARTWORM DISEASE ON THE TERRITORY OF DOBROGEA (THE DELTAIC REGION AND THE NORTH-DOBROGEAN PLATEAU)
18. Stănescu Florina	THE SYMPHONY OF A BOG – TESTING PASSIVE ACOUSTIC MONITORING TOOLS AT PEȘTEANA, HAŢEG GEOPARK
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20. Totoiu Aurelia, Nita Victor, Tenciu Magdalena, Patriche Neculai	PARASITIC DISEASES REPORTED IN FISH POPULATIONS FROM THE ROMANIAN BLACK SEA COAST
21. Vizireanu Miruna, Telea Alexandra, Topliceanu Sebastian, Cogalniceanu Dan	BEHAVIORAL CHANGES INDUCED BY PREDATORS IN SPADEFOOT TOAD JUVENILES (GENUS PELOBATES)

Section I:

Biodiversity and nature conservation, natural resources & Socio-economic aspects

1. NEW DATA ON THE DIET OF WHITE-TAILED SEA EAGLE (HALIAEETUS ALBICILLA) IN DANUBE DELTA BIOSPHERE RESERVE AND ITS SOURROUNDINGS (ROMÂNIA)

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White-tailed Sea Eagle is the largest raptor that inhabits the Danube Delta and its surroundings. Perfectly adapted, with hereditary hunting strategies, but also mastered in its long life that can exceed two decades, this top predator can use almost any prey in the studied area. Between 2016 and 2018, we harvested food scraps from the Danube Delta Biosphere Reserve and the surrounding areas from 19 areas. A total of 28 samples were collected, from 3 nests in 2016, from 15 in 2017, and from 10 nests in 2018. Thus, out of a total of 186 prey animals identified from the remains collected from the 19 areas of the R.B.D.D. and the surrounding areas, the basic food of the White-tailed Sea Eagle seems to be fish, with 57% (n = 106), followed by birds with 36% (n = 67) and only 7% (n = 12) mammals. Out of the total of 106 prey animals belonging to the ichthyofauna, we determined 7 species of fish and one genus: a number of 30 were represented by Cyprinus carpio, 27 specimens of Carassius gibelio, 10 of Esox lucius, 5 of Silurus glanis, 3 of Stizosteidon lucioperca and Rutilus rutilus, 1 of Abramis brama, and the remaining 27 were Cyprinidae sp. Of the 67 species of prey identified in the Aves class, we identified 22 species of birds and 3 up to genera: 9 specimens were Fulica atra, 8 were Anser anser and Anas platyrhychos, 5 were Phalacrocorax carbo, 5 Podiceps nigricollis and Podiceps cristatus, 4 Columba palumbus, 3 Anas querquedula, 2 Phalacrocorax pygmeus, Cygnus olor and Perdix perdix, one specimen of Tachybaptus ruficollis, Ardea cinerea, Anas strepera, Anser albifrons, Chroicocephalus ridibundus, Rallus aquaticus, Picus viridis, Pica pica, Corvus frugilegus and Corvus cornix and one specimen of Podiceps sp., Aythya sp., Acrocephalus sp. These could only be identified up to genera. Out of a total of 12 species of mammalian prey, 5 species of mammals and 2 to genera could be identified: 5 specimens of Ondatra zibethica, 1 of Canis aureus, one of Rattus norvegicus, Felis silvestris, Erinaceus roumanicus and up to genus 2 specimens of Ovis / Capra and a Canis sp.

2. THE CONTRIBUTION OF MESOZOOPLANKTON COMMUNITY TO THE TROPHIC SPECTRUM OF *ALOSA TANAICA* FROM THE ROMANIAN BLACK SEA WATERS

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Alosa tanaica, a species belonging to Clupeidae family reaches a maximum size of 20 cm, has a strong lateral compressed body covered with deciduous cycloid scales. In the first three years of life it mainly feeds on mesozooplankton organisms, after this age becoming a predatory species.
Mesozooplankton organisms, due to the very important role they play in the nutrition of fish larvae and juvenile fish, through their cycle of reproduction, growth and survival rate influence the state of fish stocks and have long-term effects on the demographics of fish populations and on their composition and productivity. In the autumn season an expedition was carried out in order to collect data for the mesozooplankton community and for *Alosa tanaica* fish population. A number of 14 mesozooplankton samples were collected and for *Alosa tanaica* 20 trawlings were made.
The analyzes carried out showed a variation of *Alosa tanaica's* length and tweight, 72 females and 48 males being studied. The trophic spectrum identified was formed by Decapoda group, being followed by Copepoda and Cladocera. The mesozooplankton component was represented by 16 species, fodder component being dominant, the development of *Alosa tanaica* stocks being closely related to the food availability.
Keywords: mesozooplankton, Alosa tanaica, trophic spectrum, fish population

3. THE DESCRIPTION OF FORESTS FROM THE DANUBE DELTA

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Forests from the Danube Delta are managed by the Tulcea Forest District, belonging to Tulcea County Forest Administration, which manages 103.922 hectares (namely 12,2 % of the County's surface). The analyzed data represents 4479 sub parcels and 6476 stand elements that occupy a surface of 18.006 hectares according to Tulcea Forest District's management plan from 2004. Forests with a special protection function occupy over 11.000 hectares from the entire district's surface. As far as the composition is concerned, Euro-American poplars and willows are leading the classification, occupying 5132 and 4991 hectares. As regards the age, more than 5000 hectares are situated in the 21-30 category, followed by 2478 hectares in the 11-20 category, even though they include two ash poplar stands of 190 years of age and two oak stands of 185 and respectively 180 years of age. Subsequently, the relatively young landforms and the limitative site conditions determine higher percentages of stands situated in the inferior production classes (namely 40% for the 3d production class, 27% for the 4th production class and 24% for the 5th production class).
Keywords: forest, Danube Delta, poplar, willow

4. FOOD HABITS OF THE POPULATION FROM DANUBE DELTA BIOSPHERE RESERVE TERRITORY AND ADJACENT AREAS

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The investigations carried out in this study had as main objective the identification of the changes regarding the food habits in the last 15 years and the state of human health, individually perceived. It is the first time in the last 23 years that such a study has been conducted.
The statistical data were based on a number of 195 participants, aged between 18 and 89 years (respecting gender equality), who have permanent residence in the Danube Delta Biosphere Reserve and its adjacent areas, respectively: Maliuc, Tulcea, Salcioara, Jurilovca, Partizani, Niculitel, Posta, Periprava, Sulina, Chilia Veche, CA Rosetti, Grindu şi Beștepe. Information collection was done through direct interviews, the applied questionnaire having an average application time between 15 and 25 minutes and it was done in the presence of a Danube Delta National Institute for Research and Development representative. The statistical analysis on the health status of the Danube Delta inhabitants in recent years has been supplemented with available public data.
Obtained results showed that 53% of respondents reported major changes in the percentage of fish and fish products consumed in the last 15 years, while 47% of respondents believe that their diet remained the same. Unhealthy food habits, which are based on high-fat foods, were reported by a category of 14% of respondents.

5. A ROMANIA FIRST: EIGHT PURPLE-HERONS FITTED WITH GPS TRACKERS IN DANUBE DELTA BIOSPHERE RESERVE

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Animal tracking technologies now allow approaching the species conservation and their habitat management from a more complex and research based perspective.
The Purple Heron is a highly specialised species in ecological terms, because it only nests in wetlands that are well preserved. The mission, undertaken at the end of May 2021 succeeded to equip a total of 8 adult birds with GPS transmitters in order to improve ecological knowledge of the species. This research is fundamental in understanding the behaviour of the Purple Heron during reproduction, therefore in summer and migration. Based on the data collected by these birds we were able to identify: specific feeding patterns,; whether individuals from the same colony all feed in the same location; whether individuals show feeding sites

fidelity over time; the size of the Purple heron's territory during the breeding season; and where the birds go outside of their breeding season.
The research has been carried out by the National Research Council -Water Research Institute from Italy in colaboration with Danube Delta National Institute for Research and Development , as part of the "Purpurea" project, coordinated by our Italian Partner.
The fact that Purple Heron is a highly specialized wetland species with a high mobility during breeding season and is a Trans-Saharian migrator and therefore is prone to the effects of climate change, make's it a valuable environmental indicator. All animal traking data are hosted on Movebak and all the tracks are visible real time on the Android/Ios app for mobile phones 'AnimalTracker'.

6. ENDANGERED PLANT SPECIES AND HABITATS IN DDBR – CONSERVATION MANAGEMENT AND PERSPECTIVES

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Proliferation of human activities, resulting in habitat loss, habitat fragmentation, pollution, and the introduction of exotic species, has contributed to changes in species and habitats diversity and integrity. The aim of this paper is to expose how far Danube Delta Biosphere Reserve (DDBR) endangered plant species and habitats may be accounted as endangered, emphasizing distribution and population size at national level. This was done with reference to the total number of recent relevees and the degree to which we can estimate the completeness of distribution knowledge. One of the objectives of the working group was to develop a species and habitats management measures that will lead to conservation and useful monitoring. Species inventories include all surveys undertaken to determine the presence of any native, exotic or invasive species. Historically, there has been too little data to allow resource managers to evaluate the state of the DDBR's biodiversity. Only in occasional cases have inventory and monitoring projects been designed to give statistically complete valid checklists over time. However, expansion of anthropogenic activities and increasingly more efficient methods of resource extraction have made it imperative for scientists and land managers to develop a clear picture of the status and trends of a wide array of species.

7. THE NECESSITY TO INTEGRATE CITIZEN SCIENCE INTO NON-NATIVE FISH SPECIES MONITORING AND INVENTORY

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Many non-native fish species have been introduced into Romanian freshwaters in recent decades, their distribution, rate of spread or impact are insufficiently studied. In recent years citizen science has grown in importance and number of participants and can help fill these gaps in our knowledge. Until now distribution records from social media platforms have not been formally included into databases to contribute to a better mapping at the national level.
Maps depicting the distribution of non-native fish species are incomplete or even misleading if we rely solely on published literature. Given the rapid increase in the rate of introduction and spread it is important to make effective use of the data provided by Citizen Science. This method may be the only realistic means to attain the geographic reach necessary to document ecological trends and answer management problems related to non-native fish species spread and impact. It also helps improve public participation and enhace scientific literacy.This methodology has been and continues to be effectively utilized in other countries to include the general public in the monitoring of these non-notive species.

8. COMPARATIVE ANALYSES OF THE VASCULAR FLORA OF KOPAČKI RIT AND THE DANUBE DELTA

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Two most recognisable wetland areas in the Danube River catchment are: Kopački rit in the middle part of the Danube River, and Danube Delta in the area of the mouth into the Black Sea. Due to biological and ecological values, these areas are protected at national level as Nature Park Kopački rit in Croatia, and Danube Delta Biosphere Reserve in Romania. Both areas are designated as Wetlands of International Importance (Ramsar sites), and part of the UNESCO World Network of Biosphere Reserves. They are also included within Natura 2000 sites under the EU Birds and Habitats Directives. Vascular flora of Kopački rit and Danube Delta has been analysed, based on available data. Flora diversity of Kopački rit comprise 554 species (11.08% of Croatian flora), 306 genera and 97 families, and of Danube Delta 1,031 species (27.2% of Romanian flora), 435 genera and 113 families. Among the families, Asteraceae and Poaceae are the most numerous, as well as genus Carex, in both areas. Life-form analyses indicated domination of hemicryptophytes (39%) and phanerophytes (11%) in Kopački rit, and of therophytes (38%) and hemicryptophytes (33%) in Danube Delta. Plants from the East European-Pontic floristic elements were dominant in Danube Delta (25%), then in Kopački rit (2%). There are 56 alien species, of which 26 invasive alien species in flora of Kopački rit, and 163 alien species, of which 36 invasive alien species in flora of Danube Delta. Alien species are more frequent (15.8%) in Danube Delta then in Kopački rit (10.1%).

9. BIOSYNTHESIS OF THE SILVER NANOPARTICLE USING CHLORELLA SOROKINIANA

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In the present study, silver nanoparticles have been biosynthesized using a fresh green alga Chlorella Sorokiniana. The synthetised silver nanoparticles are smaller than 80 n min diameters, are aggregated in a 3D cluster with cauliflower morphology and size between 200-500 nm. Chlorella Sorokiniana, in generally, is used as a food supplement in human and animal nutrition and by functionalization of it with silver nanoparticles, we expand the field of application by adding antifungal and antibacterial properties usable in treating humans, animals and plants. Keywords: silver nanoparticles, Chlorella Sorokiniana Acknowledgements: The work was supported by the Projects from position no. 41 of the JINR Order Dubn

10. EVALUATION OF ECOSYSTEM SERVICES OF RIVER ARM KLÁTOVSKÉ RAMENO NATIONAL NATURE RESERVE

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Presented work focuses on: defining the characteristics of landscape-ecological complexes of the model area as material carriers of ecological functions and thus providing an objective basis for assessing the ecosystem services (ES) of the area of interest, the suitability of the landscape-ecological complexes (LEC) for selected human activities, and to interpret LEC as a potential for the ES and to compare 3 different ES assessment procedures.
The core of the work is the assessment of the LEC potential for the ES of the National Nature Reserve of the river arm Klatovské rameno in Žitný ostrov island. The theoretical-methodical basis of the thesis was a geosystem approach to landscape structure and LANDEP methodology. According to these methodologies, from the point of utility features within analyzes, syntheses and interpretations, we have defined the primary landscape structure as the permanent potential of the country for ecosystem services (localization criteria), the secondary structure as the existing physical and biological condition (selective criteria), and the tertiary

structure as socio-economic and legal prerequisites for real use of LEC potential for ES (implementation criteria). We have determined the suitability of LEC for selected human activities within the landscape-ecological assessments and propositions to determine the most appropriate land use as well as proposals for ecostabilization measures.
The results were applied in the interest area by GreenFrame, Spreadsheet and LANDEP methodology. The results were significantly different, mainly because of a different approach to the assessment of the evaluated subject of the ES. The results of the ES evaluation can be considered as backgrounds, arguments and criteria for solution of the interests collision of nature and landscape conservation with the interests of agriculture, urbanization, transport, recreation and other industries. At the same time, they provide background material for planning of ecologically optimal organization, land use and conservation and other planning procedures.

11. THE PURPUREA PROJECT: SATELLITE TRACKING OF PURPLE HERONS ALONG A WIDE LONGITUDINAL GRADIENT

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Purple herons (*Ardea purpurea*) are mid-sized waterbirds inhabiting well-conserved wetlands of most of Eurasia. Due to their high ecological requirements and their long-distance migratory habits, purple herons are severely threatened by global change. However, due to their elusive and partially nocturnal habits, several aspects of the ecology of purple herons remain unsolved to date. These include information on year-round movement ecology, as well as on migration timing and performance. Since 2018, the Purpurea project joined the effort of several European research groups to deploy with GPS/GSM 33 adult purple herons, belonging to five different populations distributed over a wide longitudinal gradient: one population in Eastern Spain (Valencia), three populations sparsed over northern Italy and a further population in the Danube Delta (Romania). The project is still in the data collection step: many birds are still transmitting their locations, that sum up to the 400.000 already collected, most of which are associated with accelerometer and altitudinal data. Preliminary findings showed that purple herons have superb migratory performances, easily crossing the Mediterranean sea and the Sahara desert in one or a few nights of flight, always supported by tailwinds. Coastal wetlands of Western Africa emerged as the main wintering site for both Italian and Spanish herons. A few inland wetlands in Morocco and northern Africa are frequented by purple herons of different populations during both autumn and spring migration, emerging as a key stopover area for the species, and probably for other waterbirds. These first examples show how the outcomes of the Purpurea project goes well beyond the pure research interest, aiming to contribute to the long-term conservation of migratory birds in the years to come.

12. FISH BIODIVERSITY FROM DANUBE RIVER AND DELTA ARMS IN DDBR AREA

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In the summer-autumn of 2019 fish fauna was surveyed in different sites of Danube River of delta arms of DDBR: Unique/United Danube upstream of first split in Chilia and Tulcea branches), Sf. Gheorghe, Sulina, Chilia arms and several nearby networking canals. In all sampling sites it were recorded 59 fish species included *Ameiurus melas, A. punctatus* (this meaning new records of two non-native silurids species were observed also by fishermen first time in Danube Delta Biosphere Reserve – DDBR), more, *Clarias gariepinus* (or more likely hybrid between *C. gariepinus* and *Heterobranchus longifilis* due to presence of small adipose fin) should be mentioned as present in DDBR from 2021, escaped from net cage near Crisan locality. From 68 total number of fish species, 59 fish species are captured or observed în the area, 14 populate Anexes of

Habitate Directive. In 2019 fish fauna was dominated in abundance by *Alburnus alburnus, Blicca bjoerkna* and *Carassius gibelio*, but in biomass by *Blicca bjoerkna*, *Scardinius erythrophthalmus, Cyprinus carpio, Carassius gibelio* and *Silurus glanis* with differences between sampling methods.

13. THE CONSTANȚA AQUACULTURE DEMONSTRATIVE CENTER (ADC), A TAILORED SERVICE AIMED AT FOSTERING ROMANIAN MARICULTURE

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Since 2017, the Aquaculture Demonstrative Center (ADC), established under the coordination of the GFCM within NIMRD "Grigore Antipa", has been acting as a regional hub able to respond to Black Sea countries' needs and expectations for aquaculture development, working in two directions: providing training and supporting the industry/authorities by scientific consultancy. So far, three training courses have been performed in the frame of the Constanța ADC, in 2018, 2019 and 2020, focusing on shellfish culture technologies, legislation, pathologies etc. Another major outcome of the ADC was the settlement of the microbiological classification of Black Sea waters. NIMRD elaborated, thus, within the ADC, the Shoreline Survey which was made available to the National Sanitary-Veterinary and Food Safety Authority, to carry out the microbiological classification, currently completed. The ADC's efforts and consultancy materialized, in the summer of 2021, in the installation of the first operational mussel farm at the Romanian coast in the Agigea area, in compliance with EU regulations on water classification, which will allow the economic operator to market the harvest obtained from the longlines. This research - industry partnership was sealed by a collaboration protocol between the ADC and the economic operator. The remaining drawback is the complicated legislative framework for aquaculture licensing procedures, particularly the concession of the water (Black Sea surface), in order to locate the aquaculture facilities. NIMRD, through the ADC, performs sustained efforts to the competent authorities to solve this problem, which would definitely boost the development of shellfish mariculture in the area.
Keywords: training, ADC, microbiological classification, legislative framework, partnerships

14. DRIVERS OF GROUND-DWELLING INVERTEBRATE COMMUNITY COMPOSITION AND STRUCTURE IN A PEAT BOG

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Peatlands are one of the most valuable wetlands on Earth providing important ecosystem services: they are natural terrestrial carbon sinks, play a major role in preserving global biodiversity and help address climate change (Joosten et al., 2012). Drainage, agricultural conversion and mining are some of the human activities which severely damaged peatlands (Cris et al., 2014). Conservation and restoration of this type of ecosystem require identification of the peatland biodiversity loss drivers and understanding the relationship of plant and animal species essential for the process of peat formation (Parish et al., 2008). We characterized invertebrate communities and soil parameters along humidity transects in Peşteana peat bog (Haţeg Geopark, Romania). The results showed overlap in the taxa composition of ground-dwelling invertebrate assemblages along transects. Peşteana peat bog harbors a diverse invertebrate community with highly characteristic taxa for marsh habitat and "dryland" taxa in the hilly meadow. The main factors affecting taxa composition were the depth of soil organic layer, soil compaction and vegetation cover. The maximum invertebrate abundance was observed in habitat patches with high vertical heterogeneity (forest and hilly meadow).

15. COMPARING TWO METHODS FOR AGE ASSESSMENT IN SPUR-THIGHED TORTOISE (*TESTUDO GRAECA*)

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Age-related parameters are key to a better understanding of life-history adaptations and trade-offs. In ectothermic vertebrates like amphibians and reptiles, age assessment is possible through skeletochronology, a technique that allows counting lines of arrested growth in the osseous tissue. While the method can be applied for most amphibian and reptile species on phalanges or vertebrae from the tail tip, without sacrificing the animal, this is not possible in chelonians. We compared two age assessment techniques in the Spur-thighed tortoise (*Testudo graeca*): one that can be applied only on bones of dead specimens (invasive), and one that implies counting growth annuli on the dermal plates of the shell of either live or dead specimens (non-invasive).
For this purpose, we used bone samples and shells from 29 dead tortoises (9 juveniles and 20 adults) collected in the field. The studied specimens are part of a Spur-thighed tortoise population which is subject to a long-term capture-mark-recapture study started in 2010, located within Histria archaeological site, in the Southern part of the Danube Delta Biosphere Reserve. Additionally, we analysed the growth annuli of 35 young living tortoises (curvilinear carapace length < 200mm), using digital photographs taken at the first capture and at recaptures, for validating the method.
We found that both methods have a higher success rate of determining age when applied on young tortoises, since in older individuals (> 13 years) the annuli are closer to each other and thus more difficult to count in both keratin formations and bone tissue.

16. FRESHWATER FISH DIVERSITY OF THE DANUBE RIVER IN CROATIA

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The Danube River in part of its middle course flows throughout the Republic of Croatia, in length of 137.5 km. Taxonomic diversity, composition, threats and protection status of the freshwater fish fauna of the Danube River in Croatia, were analysed. Actual diversity comprises 81 species or 59 % of the known freshwater fish fauna of Croatia, arranged into 27 families and 13 orders. The most numerous families are: Leuciscidae (18 species), Percidae (9), Acipenseridae and Cyprinidae (6 species each). There are 8 species endemic for the Danube catchment, 18 alien species and 2 invasive alien species of Union concern: *Lepomis gibbosus* and *Pseudorasbora parva*. Recent findings of alien fish species had been recorded: *Morone saxatilis* x *M. chrysops* (in 2010), *Polyodon spatula* (in 2011), and *Clarias gariepinus* (in 2016). Number of threatened species included in Red Book of Freshwater Fish in Croatia is 37, of which the most (16 species) in category of vulnerable species, and 5 species from the Acipenseridae family in category of regionally extinct species. Strictly protected species in the Republic of Croatia are 23 species, while 8 species are included as target species for three sites of the ecological network Natura 2000 in Croatia. Freshwater fish fauna of the Danube River in Croatia possess an important biological and ecological value, as well as large potential for the economic exploitation, based on the sustainable management with fish stocks and conservation of endangered species.

17. STUDY ON THE SPREAD OF BABESIOSIS AND HEARTWORM DISEASE ON THE TERRITORY OF DOBROGEA (THE DELTAIC REGION AND THE NORTH-DOBROGEAN PLATEAU)

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In the Danube Delta and in the neighboring regions there is a problem related to parasitic diseases transmitted by arthropod vectors as well as certainties related to the positivity of diagnostic tests related to babesiosis and heartworm disease.
Due to the fact that these diseases also have zoonotic potential, it is important to detect both regions with high endemicity and the circumstances in which some animal populations become ill and manifest clinically at certain times of the year.
The investigations carried out for this study took place between March and May 2020. Considering a series of ecological and epidemiological particularities, 21 sampling points from 12 territorial-administrative units of the Danube Delta Biosphere Reserve and its proximity were selected.
Blood samples were collected by venipuncture from the following groups of domestic mammals: sheep, cattle, goats and horses. Also, samples were collected from domestic and wild carnivores.
The animals located in the isolated areas of the Danube Delta (outside the localities) were introduced in containment works and those in the Pontic regions were restrained in lathes or stables in the case of ruminants and muzzles in the case of carnivores.
Heartworm disease had the maximum prevalence in Canides, respectively 20% of the total of 200 samples collected from this species. Babesiosis prevalence was: 3% for sheeps, 1% for horses, and 3% for cattles

18. THE SYMPHONY OF A BOG – TESTING PASSIVE ACOUSTIC MONITORING TOOLS AT PEȘTEANA, HAŢEG GEOPARK

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Most classical biodiversity monitoring methods are costly and invasive since they imply the presence of human observers and often the removal of individuals. Passive acoustic monitoring is a non-invasive tool developed and significantly improved during the last decades, with affordable costs for biodiversity studies. I used two automated audio recorders with omnidirectional microphones to record the specific soundscape of a peat bog and its immediate surroundings - Mlaștina Pește ana, a natural protected area within Haţeg UNESCO Global Geopark (Romania). One-minute recordings were collected hourly, daily, for 11 months (sampling rate: 44.1 kHz). Pre-visualization and filtering was done in Raven Pro v.1.5, while data analysis was performed in R Studio v.1.1.423. Filtering of the background noise was not possible without exclusion of several taxa vocalizing within the lower frequency bands (e.g., amphibians, ravens, boars). I tested the applicability of readily available alpha-diversity acoustic indices (Acoustic Complexity, Diversity, Evenness, Entropy, Bioacoustic Index), and used the Normalized Difference Soundscape Index to quantify the anthropophonies. Diversity indices were affected by geophonies (e.g., rain, wind) and sudden noises (e.g., branch falling), thus recordings containing them should be excluded from analyses. Bioacoustic patterns were best represented by the Bioacoustic, Acoustic Diversity and Evenness indices. The highest anthropophonic disturbance occurred from November through January. I identify and propose a novel component of anthropophonies: tradiphonies - sounds associated to traditional activities in rural landscapes (e.g., pastoralism, folklore). Tradiphonies, along with biophonies, bring uniqueness and a sense of belonging to rural landscapes, and should be integrated into conservation programs.

19. MANAGEMENT EFFECTIVENESS EVALUATION IN WETLANDS OF PROTECTED AREA HORNA ORAVA (SLOVAKIA)

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The management effectiveness of five phases of the Protected Area Horna Orava's life cycle was evaluated. The Protected Area Horna Orava belongs to Natura 2000 with ten Special Areas of Conservations (SACs), of which up to eight are wetland habitats. Larger wetland habitat complexes are protected even under the Ramsar Convention. Our results indicate that the weakest phase is the Detailed Planning Phase with 43% management effectiveness. The total management effectiveness is 54%, showing major deficiencies. There was a total absence of actions in the context of building social networking (0%) during the Networking Phase. Both evaluated fields of activity, linking with financing (Business Plan) and design of (Regional) Economic Programmes, were managed marginally and showed significant deficiencies across management effectiveness indicators, hence lacking basic requirements to operate effectively, at 13% and 25% effectiveness respectively. Based on results, specific recommendations have been proposed to maximize the value-generating potential of Horna Orava through increased management efficiency.

20. PARASITIC DISEASES REPORTED IN FISH POPULATIONS FROM THE ROMANIAN BLACK SEA COAST

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Diseases represent a limiting factor for fish populations, the fish health being important for their growth and development. Between 2016 and 2019, Sprattus sprattus, Engraulis encrasicholus, Trachurus mediteraneus ponticus, Psetta maxima maeotica, Platichthys flesus luscus, Pegusa lascaris were analyzed in order to identify fish parasites.
Parasitic diseases were represented by infestations with ectoparasites (Trichodina domerguia, Cryptocaryon irritans, Mazocraes alose, Cystoopsis acipenseris) and endoparasites (Eimeria clupearum, Stepahanostomum sp., Lecithaster tauricus, Buceporpecumum, Contracepumum sp. Anisakis sp., Porrocaecum sp.).
The parasitological analyzes revealed that sprat and anchovy were highly parasited by nematodes, but without endangering natural populations and without causing significant mortality. An alarm signal is turbot parasitation with the flat worm Botriocephalus scorpii, located in the fish stomach and causing severe injuries.
Keywords: endoparasites, ectoparasites, disease, fish health, fish population

21. BEHAVIORAL CHANGES INDUCED BY PREDATORS IN SPADEFOOT TOAD JUVENILES (GENUS PELOBATES)

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We studied the behavioral adaptations for avoiding competition and predation in juveniles of two species of spadefoot toads (genus Pelobates). Pelobates balcanicus and P. fuscus are only active at night, occupy the same habitat and have a similar trophic spectrum. The species differ in size, P. balcanicus being significantly larger than P. fuscus, and often preying on both adults and juveniles of the latter species and on its own juveniles. We conducted an experimental study on the behavioral responses of the juveniles of both species to the presence of adults of P. balcanicus. All animals used in the experiments originated from an area where both species occur in sympatry. Juvenile activity pattern was monitored individually under controlled and standardized laboratory conditions while visually exposed to the presence of a P. balcanicus adult. The experimental terrariums were split in two parts by an opaque (i.e. control) or transparent glass wall, separating a juvenile from the adult. The movements ofjuveniles were recorded for 14 hours, under infrared red, using Dlink 933L cameras and D-ViewCam™ software. Analysis of the video recordings (distance travelled, speed, time spent outside, etc.) was done using ImageJ software. Juveniles of P. balcanicus showed a significant decrease both in terms of distance and duration of activity when visually exposed to adults. In contrast, there were no significant differences in P. fuscus juveniles in terms of distance or duration. We observed interspecific differences in the response of juveniles, with P. fuscus moving for a significantly longer period of time and over larger distances.

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Section II:

Environmental factors, Ecological Restoration & Anthropic Impact

1. THE STATE OF MARINE AN COASTAL ENVIRONMENT IN 2020

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The monitoring of marine and coastal environment and report on its every year status started in the early 2000's. The reported data is part of the national report on the state of environment and represent the contribution of NIMRD to this process. 2020 was characterized as the hottest year in the history of meteorological measurements. Water temperature was 2.86°C higher than the averages of the last 60 years, increasing with more than 1.0 °C in only 5 years. To better illustrate the climate changes occurring in the marine environment, the sea level was 17.32 cm higher that multiannual average of the period 1933-2019. As result, the Oxygen content was 95.8%, registering a continuous decreasing trend in the last 10 years. In 2020 in the coastal waters, high concentrations of nutrients, both nitrates and phosphates have been observed. The biological components (phytoplankton, zooplankton, benthos) maintained the same tendency as in previous years. Their status is assessed according to the requirements of MSFD, based on certain indicators. However, it must be noted that algal blooms had lower intensity and frequency compared to previous years. In 2020, catches of marine living resources recorded an increasing trend, for almost all commercial species, except for Rapa whelk and gobies due to decreasing of fishing effort, coupled with high proportion of the species with populations outside the safety limits. In conclusion, the evolution of the monitored biotic parameters confirmed the restoration trend of the marine environment in recent years, although the system remains sensitive to changes.

2. FOOD- WATER- ENERGY NEXUS VISIBILITY AT LOCAL LEVEL. CO-CREATIVE APPROACHES INVOLVING CITIZEN SCIENCE THROUGH MULTIPLE STAGES OF RESEARCH

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The "Belmont-Creating Interfaces" project (2018-2021) addresses the capacity to build the Food-Water-Energy Nexus in the urban environment, facilitating cooperation and exchange of knowledge between the participating parties (authorities, researchers, business and citizens). The Nexus concept describes interconnections and interdependencies existing or possible within the Food-Water-Energy system at different administrative levels. The project is part of the Europe 2020 strategy and Europe's sustainable development strategies.
This analysis should aim at reducing the total human pressure on ecosystems, including unsustainable land use and excessive use of natural resources and ecological space. In addition to changing current practices, efforts should also focus on plans to restore degraded ecosystems to improve spatial structures and improve ecosystem functions. Improving the functionality of the FEW relationship involves an Urban Living Lab (ULL) process that materializes descriptive and analytical research through a systematic approach and focuses rather on the analysis of interactions and cause-effect relationships.
"Creating Interfaces" project aims to make more understandable the concept of FWE -nexus to the local stakeholders (city government, science, business and citizens) and also to facilitate knowledge exchange and cooperation among them. It proposes a co-creation approach through Urban Living Labs and Citizen Science, to find solutions to the questions raised by research in three mid-size cities next to water: Tulcea (Romania), Wilmington (USA) and Slupsk (Poland).

3. VARIABILITY OF HEAVY METALS CONCENTRATIONS IN SOME FISH SPECIES FROM THE DANUBE DELTA BIOSPHERE RESERVE

Burada Adrian, Teodorof Liliana, Despina Cristina, Seceleanu-Odor Daniela, Țigănuș Mihaela, Tudor Iuliana-Mihaela, Ibram Orhan, Calmuc Valentina Andreea, Nastase Aurel, Crăciun Anca, Iani Ion Marian
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Through this study, a comparative analysis was performed regarding the variability of heavy metals in fish species caught in 2020 and their comparison with values recorded in 2016. Measurements were made on a number of 297 individuals (approximately 10 specimens for each fish species) from 28 species to which were added the results recorded in 2016, represented by a batch of 280 individuals from the same number of species. The analyzed fish specimens were measured individually, weighed (total mass) and separated by species. Equal parts of muscle tissue were collected from each fish sample to make a representative sample. Acid mineralization was required to determine the content of heavy metals in fish species, which was performed using Anton Paar microwave oven, Multiwave 3000. Heavy metal content was analyzed by ICP-MS Elan DRC-e, applicable for determination of low concentrations of a large number of elements, according to European Standard SR EN ISO 17294-2-2017. The obtained results were reported to the maximum allowed limits that showed exceedances for the concentrations of lead and cadmium in both benthic and pelagic fish species. Differences were observed in accumulation of heavy metals in the muscle tissue of the fish species studied in the Danube Delta Biosphere Reserve. These differences can be attributed mainly to the diet of the species, their trophic level but also to the gradients of contamination in aquatic ecosystems.

4. METHODS FOR SAMPLING AND SEPARATION OF MICROPLASTICS FROM THE LOWER DANUBE RIVER WATER

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Due to its small size (< 5mm), persistence and behavior as a transport vector for pollutants, monitoring of microplastics (MPs) occurrence in aquatic ecosystems is critical. In order to perform a quantitative evaluation of microplastics in water, sampling and separation of MPs are two essential steps. The lack of standardized protocols necessary to assess the presence of MPs in freshwater has led to different methods being presented in the specialized literature with their advantages and disadvantages. In this paper, a customized method for sampling microplastics from the Lower Danube River water was applied. The equipment used for sampling consists of a pump with a flow rate of 5 liters/second and a net with 125µm mesh. The main advantages of this method are: sampling from different depths and determining the exact volume of filtered water. The separation step they were successfully performed using 30% H2O2 for organic digestion and ZnCl2 for density separation. The methods presented in this study have proven to be effective in preparing microplastics for qualitative and quantitative analysis.

5. SPATIAL AND SEASONAL VARIATIONS OF SEDIMENT POLLUTION INDICES IN THE LOWER DANUBE RIVER

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The assessment of the heavy metal content in the surface sediment is an aspect of utmost importance due to the toxic potential of such sediments on the aquatic biota. Sediment pollution indices represent a useful tool for establishing sediment quality. In the present study, two indices, namely Geo-accumulation Index (Igeo) and Potential Ecological Risk Index (RI) were calculated based on the heavy metal concentrations measured in the surface sediments in the sector of the Danube River that crosses three major cities in Romania (Braila, Galati and Tulcea). The main purpose of this paper is to study the spatial distribution and seasonal variation of pollution indices, taking into account the concentrations and toxic potential of the following heavy metals: Cd,

Ni, Pb, Cu and Zn. The results of this study highlight spatial and seasonal variations in concentrations for all 5 heavy metals measured in sediments. Furthermore, according to the Geo-accumulation Index, moderate sediment pollution was recorded for the metals Cd and Ni.

6. ASSESSING AND MAPPING SPATIAL DISTRIBUTION OF THE MAIN LITHOLOGICAL COMPONENTS OF RECENT SEDIMENTS IN FORTUNA LAKE, DANUBE DELTA BIOSPHERE RESERVE, ROMANIA

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Main lithological components were determined in surface and core sediment samples collected in the Fortuna Lake to evaluate their concentration and spatial distribution. Fortuna Lake is one of the important freshwater lakes in the western part of the fluvial-delta plain, in terms of ecology, biodiversity, limnology, and hydrology. Like many other transitional lacustrine environments of the Danube Delta Biosphere Reserve, this lake is sensitive to both natural and human-induced changes. Particularly, this lake is threatened by the natural situation resulting from hydrological inputs and by the extensive growth of emergent vegetation in its catchment. In certain instances, these natural processes could be exacerbated by human activities. The main aim of this study was to gain a complete picture of the spatial distribution of the lithological components in Fortuna Lake bed-sediments. Therefore, 20 sampling sites were randomly distributed within the lake. The bed-sediment samples were analysed for their main lithological components by Loss on Drying, respectively Loss on Ignition Method, and a grain size analysis was performed. Analytical results were processed using Golden Surfer Mapping Software to show areas of prevalent organic/mineral content accumulation. Customary Kriging method was used to interpolate the spatial distribution of the investigated lithological components within the lake, providing the possibility to distinguish the sampling stations in relation to their geographical position and lithological content. Additionally, to bring to a better understanding related to the vertical (in-depth) distribution of the lithological components, 3 sediment short cores were retrieved from different sectors of the lake. The spatial and vertical distribution of the lithological components within the lake indicated that the highly organic-rich sediments are located in areas characterized by low energy conditions, whereas the mineral-rich sediments were identified in sectors marked by relatively higher energy conditions. The total organic matter was the most enriched component in the lake sediments due to autochthonous input derived from in-situ basin processes and biological production. Poor water circulation or under low-flow condition are additional factors influencing organic matter accumulation in sediments. The grain size results revealed sediments specific to the lacustrine environment i.e., muds consist predominantly of siltic fraction with a subordinate sand content. In terms of the natural evolution related to Fortuna L. the general tendency is of a progressive natural siltation enhanced by low water circulation and vegetation growth. Key words: bed-sediment, core-sediment, physical-chemical characteristics, organic matter, grain size lacustrine, transitional environment *Acknowledgements:* The research leading to these results was supported by the Ministry of Education and Scientific Research - ”Program Nucleu: 13N/08.02.2019 - PN 19 20 02 03

7. THE ECONOMIC AND ECOLOGICAL EFFECT OF SPECIAL FOLIAR FERTILISATION TO SUNFLOWER CROP

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The paper presents the results obtained by application of special foliar fertilisers, under pedoclimatic conditions in Iasi.
These fertilisers have determined a significant specific yield increase and have assured a high environmental protection effect, quantified as the net exports of macronutrients from soil with yield increases.

8. RESILIENT AGRICULTURE BASED ON AGROECOLOGICAL APPROACHES. THE ROLE OF LIVING LABS IN THE DANUBE DELTA BASED ON BIO DANUBIUS CLUSTER EXPERIENCE TA

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Agroecological approaches for climate change mitigation, resilient agricultural production and enhanced biodiversity are essential for the wetlands. The paper investigates agroecological living labs activities in the Danube Delta with specific focus on farming system diversification, biodiversity maintenance and climate change adaptation techniques.

9. ASSESSMENT OF POLYCYCLIC AROMATIC HYDROCARBONS CONTENT IN MARINE ORGANISMS OF COMMERCIAL INTEREST AT THE BLACK SEA ROMANIAN COAST

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Polycyclic aromatic hydrocarbons (PAHs) are pollutants that can affect the environment, being mainly generated during the incomplete combustion of organic materials (e.g. coal, oil, gasoline and wood) and due to their properties and adverse environmental impact, polycyclic aromatic hydrocarbons are included in the list of priority pollutants of concern.Marine organisms are able to accumulate large amounts of organic pollutants in their tissues, but this accumulation varies by species and can be transferred to the food chain, sometimes exceeding accepted thresholds for human consumption. This paper aims to assess the polycyclic aromatic hydrocarbons bioaccumulation in commercial fish and shellfish, sampled during 2016-2018 from different areas along the Romanian Black Sea coast. In order to assess potential correlations between lipids and the accumulation of polyaromatic hydrocarbons lipid content was measured. Comparative analysis of the polycyclic aromatic hydrocarbons concentrations with regulated levels for these compounds in mollusks and fish for human consumption, highlights that values for benzo[a]pyrene, as an indicator of contamination were enrolled within the limits imposed by legislation. Some exceedings of the benzo[a]pyrene maximum permissible levels were recorded in mollusks species (Mytilus galloprovincialis, Rapana venosa) and pelagic fish species (Trachurus mediterraneus ponticus).
Keywords: polycyclic aromatic hydrocarbons, Romanian Black Sea coast, marine organisms, PAHs

10. EVALUATION OF PHYSICO-CHEMICAL WATER PARAMETERS FROM THE RECIRCULATING AQUAPONIC SYSTEM RAS

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The DWC recirculating aquaponic system developed for research in this scientific paper was prepared in order to support two sections: fish breeding represented by the species Cyprinus carpio, Linnaeus 1758 and plant growth represented by the species Lactuca sativa L. Physico-chemical parameters of water supply / discharge of the aquaponic system designed for experiments were determined daily. Samples were taken from the entry and from the exit of water into the system, dissolved oxygen, pH, organic matter, temperature being determined. The temperature and pH of the water did not change significantly. There was a decrease in the value of oxygen at the evacuation compared to the supply, the values of the organic substance increasing after the water passed through the recirculating system. Following the analyzes performed, it was found that they were within the normal limits necessary for the physiological needs of carp breeding in optimal conditions.
Keywords: aquaponic, parameters, physicochemical, carp, evacuation

11. **PRELIMINARY RESULTS ON THE ASSESSMENT OF DANUBE RIVER FISH SPECIES MIGRATION BEHAVIOR IN RELATION TO THE IRON GATE I AND II DAM USING ACOUSTIC TELEMETRY EQUIPMENTS**

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The dam's construction without fish passes had a major impact, obstructing migratory fish populations from moving between different parts of the river systems and utilize they key habitats. Fish species and fish populations are depending on long migrations are most seriously affected by river fragmentation. Building well-functioning fish passage systems for migratory fish species at Iron Gate I (rkm 943) and Iron Gate II (rkm 863), is crucial for strengthening and re-establishing Danube's River migratory fish populations. Between March and May 2021, 112 fish specimens were captured downstream Iron Gate II dam. All the fish was previously tagged with 69 KHz ultrasonic transmitters an released upstream Iron Gate II dam reservoir (53 fish) and downstream Iron Gate II dam (59 fish). Some of the acoustic transmitters are equipped with depth sensors, which provide information of water depths used by fish. Fish movements was recorded by a network of 18 ultrasonic automatic Vemco VR2w receivers (10 downstream the iron gate II dam and Gogosu branch, 6 in the IG II lake and 2 receivers at the Iron Gate I dam) with a 15 months battery life, positioned in Danube River. Downloading and interpreting recorded data by these receivers will be an important starting point for "We Pass 2" project that will begin in fall of 2021, when will be realized high resolution recordings of 3D fish movements, for finding the best technical solution for their passing upstream or downstream of dams.

12. **LONG TERM WETLAND-RELATED LAND COVER AND USE CHANGES IN ROMANIA**

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Starting from the importance of wetlands, assessed through the perspective of the ecosystem services provided, but also from the fact that the chaotic development of Romania, characteristic to transition countries, resulted into important land cover and use changes, this study aims to assess the effect of these transitional dynamics against the wetlands. The study uses geospatial data, analyzed based on computing the area covered by different uses or affected by changes. The findings indicate an alarming trend, consisting of a continuous loss of the wetland areas. While the limitations inherent to using CORINE data do not allow for discerning the intricate mechanisms of change, the overall picture requires immediate action on behalf of the authorities for avoiding further losses.

13. **CLIMATE CHANGE VULNERABILITY AND RISK ASSESSMENT FOR PROPOSED SOLUTIONS WITHIN DANUBE DELTA LIOP PROJECT**

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In order to raise awareness, the current programming period (2014-20020) included the climate change requirements into the preparation and implementation of programs and projects by analyzing how climate risk management and project adaptation issues are concerned. Climate change vulnerability and risk assessment involves identifying the climatic hazards to which the project is vulnerable, assessing the level of risk and integrating adaptation measures to reduce this risk to an acceptable level. The main pillars of the assessment are represented by the sensitivity analysis, evaluation of exposure, vulnerability analysis, risk assessment and identification and evaluation of adaptation measures / options. The article presents a case study of climate change vulnerability assessment for the Prevention and diminishing of the effects of floods over settlements in the Danube Delta Project (under LIOP financing) and how the results of the assessment are used to inform the decision-making process as the project develops. Eight climatic hazards which proved to be relevant for the project investments were analyzed in the case study, such as extreme temperatures and precipitation, floods, water availability / drought, sea level rise, water/soil salinity, coastal erosion and wind regime. For the

climatic parameters identified as generating a high and medium vulnerability for the project, a risk assessment is conducted and an action plan for adaptation measures is proposed.

14. COMPARATIVE ANALYSIS OF THE SEASONAL HYDROLOGICAL CHARACTERISTICS OF THE DANUBE AND DANUBE DELTA LAKES

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This study was carried out in the framework of "Assessment of the ecological status of aquatic ecosystems and the territory of the Danube Delta Biosphere Reserve" which aims to study the water quality in the Danube Delta Biosphere Reserve. The main objective of this study is to analyze and compare the seasonal characteristics of the hydrological parameters in the Danube and Danube Delta Lakes. The hydrological measurements were performed in the network of supply and drainage channels from 6 lakes, selected as representative for the 6 hydrographic units of the reservation: Parcheș, Furtuna, Merhei, Uzlina, Roșu, and Razim. The analysis is based on hydrologic measurements performed in 16 cross-sections along the Danube and 60 cross-sections in Danube Delta Lakes. For the data acquisition, there were 5 expeditions, each consisting of two weeks of field trips. The analysis is performed for a period of three years: 2019, 2020, and 2021. The hydrological measurements were performed for the 3 distinct hydrological conditions (for the high, medium, and low levels of the Danube), at the same time as the physical-chemical and biological water sampling took place. This identifies the dependence of biotic components and chemical parameters depending on the characteristics of the water flow regime and sediment transport. Water flow data and sediments transported in suspension are the data underlying the calculation of the volumes of water and sediments that enter the hydrographic network of the DDBR and those that transit the arms of the Danube and are discharged into the Black Sea.

15. CHALLENGES AND OPPORTUNITIES FOR AGRICULTURE TELEMETRY USING DATA FROM IOT, DRONES AND SATELLITES

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Recent environmental changes have influenced the processes in agriculture, causing transformations of systems for irrigation management, disease warning and optimal harvesting. The purpose of this paper is to present measurements of ground telemetry stations and drones using IoT (Internet of Things) to gather real-time data from sensors in agriculture, while investigating how sensor data can be fused with datasets from EO (Earth Observation) satellite applications using the Arrowhead framework. The main parameters measured are air temperature, relative air humidity, leaf wetness, rain quantity, solar radiation, wind speed and direction. The BEIA telemetry system has been initially designed for AgroExpert, the national phytosanitary network in Romania, and is further being developed for Crop Science Division of Bayer. Furthermore, we show how the automatic system is able to continuously monitor the environment in Romania and big data processing software can be used for extracting non-trivial correlations from ground/drone telemetry and EO data. This work is a general overview of the results for telemetry and EO integration in Romania and could support ESA (European Space Agency) in defining future investments in EO research and innovation in the region for precision agriculture.

16. Comparative analysis of the significance and importance of urban lakes in the perception of young people from Cluj Napoca, Sibiu and Tulcea.

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In the present study, the authors conducted an assessment of the level of youth perception on urban lakes in three cities (Cluj-Napoca, Sibiu and Tulcea) in Romania.
In order to highlight the extent to which young people appreciate the value and benefits that the conservation of urban lakes can bring to local communities, this paper aims at a comparative analysis of their significance and importance for this category of the population.

Data collection was carried out in the frame of RainSolutions project. The targeted audiences consisted of young people between 15 to 25 years. Survey participants were grouped by gender, education and health status. The surveys were held during May and August 2019, being conducted by face-to-face meetings, online dissemination of questionnaire and WhatsApp interviews.
The quantitative analysis highlighted the following aspects:

- the segment of the population included in the age category 15 - 25 years, regardless of sex, in good and very good health, considers that Lake Ciuperca is important for the local community because it can bring long-term benefits;
- for a relatively small proportion of respondents in the 15- to 25-year-old age group, Lake Binder is an abandoned area that cannot be considered a recreation area or an iconic area for the city;
- in the case of Gheorghieni Lake, it was found that in the analyzed population group, the significance of the recreation and leisure area dominates as an option, Gheorghieni Lake being a modernized one since 2013

17. BIO DANUBIUS PROJECT TO PROMOTE THE STANDARD OF ORGANIC AGRICULTURE AND PROTECT THE DANUBE DELTA BIOSPHERE AND THE SURROUNDING AREA

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In 2018, discussions took place within the Bio Danubius Cluster and led to the conclusion that organic agriculture implementing strong sustainability criteria even above level of EU organic regulation may bring advantages such as: • An efficient contribution to the protection of the danube Delta • An efficient support for organic agriculture in the zone in search of export markets Sustainability criteria for the cluster members were developed. Furthermore, an inventory of problems related to environmental problems (eutrophication, emissions, contaminations, erosion etc.) as social problems (depopulation, lack of infrastructure etc.) was completed and the need to find good solutions stressed. The plan is to foster Organic Farming and Food processing not only in the Biosphere reserve but at least in the whole Tulcea province. Criteria were developed to foster good practices in crop management, energy consumption, waste management and reduction emissions in soils, water and air, mitigating also climate change effects, defending the rich bio diversity of the zone and the Tulcea province, implementing new methods and techniques such as Agro-ecology, mixed cropping, agro-forestry etc., looking also to develop measures fostering rural development. These measure and criteria can be developed to a standard with clear criteria and control mechanisms (certification rules etc.) which may register and document progresses of a sustainable management of Agriculture and Food Production in the Danube Delta Zone. The project was somehow blocked in 2020 due to the CoOID situation and internal discussions within the Bio Danubius cluster, which led to the ongoing reorganization of the Cluster. However, today it seems possible to develop it further, based among other factors in the Green Deal plans of the European Union.

18. GREEN TOURISM DEVELOPMENT IN NATURAL ECOSYSTEMS AND SUSTAINABILITY: INFORMATION TECHNOLOGY IT PRACTICE IN EUROPEAN UNION POLICY

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Green tourism represents an innovative model of socio-economic development in harmony with natural resources, ecosystems and landscape while it enhances traditional culture. Green tourism activities constitute a valuable policy tool for regional populations that enhances sustainability and local development in natural ecosystems' areas. Sustainability, as the equilibrium in-between environment, economy and wellbeing of the society, has been globally the focus in all national, international and transnational strategies the last 20 years. Regional sustainable development along with green regional policies have been fundamental components in European Union legislation, initiatives, funding and European environmental policy. The original idea of a green tourist destination, that was fully convergent to the cultural identities of the natural ecosystem, now, contributes effectively to the work of local environment protection Research evidence shows that tourism can be harmful to local environments and economies, while travel accounts for 8% of greenhouse gases. Simultaneously, IT has become perhaps the single most important new determinant in tourism's demand and

supply structures. Therefore, IT is employed within all sectors of tourism with special impact and it can affect environmental and socio-economic decision-making, short-term and long-term planning and development of new processes and structures, in regard to social media, audiovisual guides, virtual reality technologies, IoT apps (Internet of Things), smart services and devices, wireless technologies and mobile services, destination management platforms, etc. or other green technologies such as proper waste management, energy sustainability and renewable energy sources, low carbon impact technologies, intelligent building, energy saver technologies, smart transportation, continuous monitoring and awareness etc on the basis of IT for all involved stake-holders.

19. RECENT MORPHOLOGICAL CHANGES IN THE YANGTZE RIVER DELTA AND DRIVING FACTORS

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The Yangtze River delta is one of the large river deltas in the world. It shows significant delta morphology change and human use over the last 100 years under influence of strong human activities both in the catchment and at the delta. At present, the delta is facing a reduced fluvial sediment load, which starts since the 1980s due to damming and soil conservancy in the catchment. However, delta morphological change is not solely caused by a reduction of fluvial sediment supply, but also impacted by human activities at the delta. With the rapid population growth on the delta, tidal wetland of the Yangtze delta has been reclaimed for agriculture, industrial use and water reservoir since the 1950s. This results in a loss of tidal wetland and growth of land in the Yangtze delta, further promoting population growth on the coastal zone. In addition, the channels has been dredged and engineered for navigation channel. In together, these human activities has significantly changed the shoal-channel pattern in the Yangtze delta, including narrowing and deepening of ebb channels in the inner estuary. It is also recongnized that delta morphologcial change to fluvial sediment decline and local pressures is spatial heterogeneous, which means site-specific management measures are needed to enhance delta resilience.

20. BIOSYNTHESIS OF THE SILVER NANOPARTICLE USING CHLORELLA SOROKINIANA

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In the present study, silver nanoparticles have been biosynthesized using a fresh green alga Chlorella Sorokiniana. The synthetised silver nanoparticles are smaller than 80 n min diameters, are aggregated in a 3D cluster with cauliflower morphology and size between 200-500 nm. Chlorella Sorokiniana, in generally, is used as a food supplement in human and animal nutrition and by functionalization of it with silver nanoparticles, we expand the field of application by adding antifungal and antibacterial properties usable in treating humans, animals and plants.
Keywords: silver nanoparticles, Chlorella *S*orokiniana, cluster of silver nanoparticles
Acknowledgements: The work was supported by the Projects from position no. 41 of the JINR Order 322 / 21.05.2018 and position 3 of the JINR Order 365 / 11.05.2021

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Sectiunea III:

- New Research approaches in EU climate change challenge. Neutral carbon 2050

1. THE POTENTIAL OF SMART MOBILITY AND MAAS TO DECARBONIZE ROAD TRANSPORT

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According to the European Commission Sustainable and Smart Mobility Strategy, the objectives by 2030 are that at least 30 million zero-emission cars will be in operation on European roads, 100 European cities will be climate neutral and automated mobility will be deployed at large scale. By 2050 the intention is that nearly all cars, vans, buses and new heavy-duty vehicles will be "zero-emissions". However, the dependency from conventional fuels is still a reality for road transport. About 73% of greenhouse gases emissions from transport sector are related with road transport in Europe.
The main objectives of this seminar will be threefold: 1) to describe some of the emerging mobility paradigms, namely in what concerns smart mobility; 2) to present results from research projects related with digitalization of transport, automated vehicles and MaaS developed by the Smart Mobility research team of the Department of Mechanical Engineering of the University of Aveiro, Portugal.

2. Climate Change Adaptation & Mitigation: ***Challenges and Opportunities at Jurilovca & Gura Portitei***

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The impact of climate change is linked to places & regions and translated into climate adaptation and mitigation. This paper is presenting a case-study at Jurilovca (fishermen village)-Gura Portitei (resort), two places situated at the lower part of Danube Delta, connected and impacted by tourism interests.
Partnership and shared activities between the two places underlines a strong local community spirit of a multicultural society and engagement with hospitality and jobs.
However, the power of a place is converted not only in well-being and opportunities, but also in threats, as Gura Portitei is situated between The Black Sea and Danube Delta and sea-level rise may impact upon the place. Existing flooding risks is present and procedures to a strong climate adaptation strategy and action plan are needed, as well as practical measures like strengthening banks and sea shore.
Mitigation actions will involve opportunities to decarbonize an integrated transport (i.e. road & waterborne) and the use of an existing solar source for local needs at Gura Portitei, while exploring opportunities for an on shore wind turbine.
The paper presents a proposal for a study in the region, conducted in partnership by MMU, GEOSTUD & Sat Vacanta Gura-Portitei, on *Flood and Coastal Erosion Risk Management: Strategy & Action Plan.* Engaging with key stakeholders in shaping appropriate policy, will lead to setting effective guidance and recommendations for all actors involved.

3. IASON - INVASIVE ALIEN SPECIES OBSERVATORY AND NETWORK DEVELOPMENT FOR THE ASSESSMENT OF CLIMATE CHANGE IMPACTS IN BLACK SEA DELTAIC PROTECTED AREAS

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Under a global changing environment, the Black Sea is found in between the European and Asian crossroad and in the transition between the Mediterranean and North. A great number of stakeholders have developed economic activities around the Black Sea coastline, especially at the deltas, which are known for their density in population and growth potential (such as fishing, fisheries and aquacultures, tourism and recreation, farming etc.). Historically, the Black Sea is under the invasion of alien species from the Indian Ocean and Mediterranean Sea due to various reasons such as shipping and global warming and at present, mediterraneanisation of the Black Sea is being discussed widely in the scientific community due to climate change. Invasive Alien Species (IAS) is the central point on which the project IASON makes focus, because if not sufficiently monitored and assessed they may alter dramatically not only the ecosystem balance but also a range of already well-established socio-economic activities. The overall objective of the project is to establish and perform joint monitoring actions on IAS in Black Sea deltaic ecosystems of five countries (Romania, Ukraine, Greece, Turkey and Georgia) and assess their response under current and predicted climatic conditions. The specific objectives of the project are to: - Develop and implement joint monitoring and risk assessment procedures on IAS in the project's protected areas and motivate and assist countries in creating their IAS inventories; - Improve long-term cross-border collaboration, information and research capacity through the access and use of innovative technologies on IAS monitoring; - Improve cooperation on IAS monitoring through the involvement of the public at various levels of the project.

4. WILLINGNESS TO PAY FOR ENVIRONMENTAL SERVICES PROVIDED BY FORESTS: AN EXAMPLE FROM THE TROPICAL RAINFOREST OF ECUADOR

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Forest ecosystems supply valuable services to humanity and their potential to provide lies at the boundaries of geographical, economic, socio-cultural and perceptual values. In particular, tropical forests are known to hold an increased biodiversity which is related to their ability to provide ecosystem services. Nevertheless, such forests are increasingly threatened by deforestation as an effect of land reforms, land use change and extractive industries. At the same time, local, indigenous communities are basing their subsistence living on products and services that are provided by the forest ecosystems they are inhabiting. As such, territorial planning and land use should be designed also by taking into account the believes of these people which are known to be linked and committed to the conservation of their forests. As the conservation measures were identified to be those able to satisfy the locals' interests, and since the availability of conservation funds and programs is limited in the area, this study evaluated the informal commitment of indigenous people to contribute by voluntary payments on the conservation of tropical forests and it was designed at two scales: the general landscape and punctual features contained by such ecosystems. Data has been collected by the means of face-to-face, door-to-door questionnaire survey on a representative sample (451 respondents) to see what is the value they place on the conservation of their forests, what are the reasons that could limit their commitment and what are the most valued features in their forest ecosystems. The findings have indicated that more than half of the people asked would be willing to engage themselves or their families in voluntary payments for conservation but the amounts that could be raised by doing so were low, disabling for the moment, the development of local conservation activities. Reasons such as limited economic possibilities, distrust or disinterest were found to be among those preventing locals to commit themselves, even if they have responded that the conservation of their forest and water resources is crucially important for them. Punctual features such as the (provision of) wood and food were found to be among the most valued by a commitment to pay in addition to the conservation of forest, reflecting, therefore the value that locals place on these provisioning services. These findings may represent very well a base point in understanding what locals are valuing most as well as an important source of data for the local decision-makers.

5. RISK MONITORING FOR HYDROTECHNICAL CONSTRUCTIONS

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Water resources have always been essential for human activity for both agriculture and industry. Among the water sources, rivers are the most handy to be used by creating water accumulations for different purposes, from water supply to cities, irrigation, industry, to electricity generation. But for this it is necessary the human intervention by building dams - large hydrotechnical constructions with high investment volume and long service life. these constructions are subjected to many types of tests throughout their existence, which is why there is a risk of their destruction with catastrophic effects, both in material damage and in loss of human lives. For this reason, they need to be monitor in time so that in the event of a risk of failure, their managers can intervene in a timely manner to avoid aggravation of problems. Monitoring the vertical and horizontal deformations of such constructions by geodetic methods is the only option to determine the absolute displacements that have appeared in the body of a hydrotechnical construction. The methods used involve the precision geodesic instrumens and rigorous calculations from which results the evolution in space of the geodesic landmarks mounted on the body of the dam compared to landmarks located outside the area of influence of the dam. The present paper will present the evolution in time of the horizontal and vertical deformations of the Isalnita dam, Jud. Dolj, Romania.

6. CONSEQUENCES OF EXCESSIVE PRUNING OF TREES LOCATED IN PARKS ON THE WOOD QUALITY. DEFECTS AND STRUCTURAL CHANGES

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Trees, like any living organism, undergo various transformations throughout their existence. When these transformations are greatly influenced by the actions of the anthropogenic factor, they can lead to consequences with a strong impact on the quality of the wood and of the stability of the trees. For this reason, the article targets trees from parks, subjected to pruning cuttings, sometimes applied excessively. The purpose of the article is to highlight the state of the trees from parks as a result of the applied pruning works, using visual assessments and detailed analyzes regarding the speeds of sound transfer through wood, made with the Arbotom sound tomograph. As a result of the research carried out, it has been found that the pruning works (when performed improperly) can influence, in a negative way, the further development of the tree, reducing its capacity of defence against the external stress factors, be they biotic or abiotic, all these leading to the appearance of defects, to the deterioration of the quality of the wood and, implicitly, to problems related to the stability of the tree or parts of the tree.

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Sectiunea IV:

Geographical Information System and Application System Modeling

1. PRESENT AND FUTURE CONDITIONS ANALYSIS OF MARITIME SPACE, UNDER THE MARITIME SPATIAL PLANNING PROCESS

Alexandrov Laura[1], Troeva Vesselina [2], Vasiliu Dan [3], Ghinea Bogdan [4], Niculescu Dragos [1], Vintila Dragos [5], Spinu Alina [1], Bujini Jeni [3], Stancheva Margarita [6], Begun Tatiana [3], Muresan Mihaela [3], Radulescu Vlad [3]

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In the implementing process of the Maritime Spatial Planning Directives 2014/89/EU in Romania, under the MSP authority coordinated by the Ministry of Development, Public Works and Administration, the analysis of present and future conditions of maritime space is an essential need, starting from knowledge gaps identification, harmonisation of data collection, boosting the development of shared transboundary planning. The MARSPLAN BS II Project proposes these objectives, according to the MSP Methodology, to support the development of national and transnational maritime spatial plans, the capacity strengthening of local authorities, the development of a common MSP strategy for the cross-border area between Romania and Bulgaria, addressing to Land-Sea Interaction, and Multi-Uses concept. For the analysis of the existing conditions of the maritime space the collection and mapping of marine ecological, geological, underwater cultural characteristics and maritime activities were realized, followed by the identification of possible conflicts and compatibility elements between the existing uses. The analysis of future conditions includes the current trends of the spatial and temporal needs of the existing human uses to forecast their effects and to elaborate future alternative scenarios, aiming the planning of new activities development on maritime space. The optimal scenario provides the basis for identifying the maritime spatial planning measures. The MARSPLAN BS II'objectives answer to all MSP Directive' steps concerning capacity building, knowledge exchange, cross-border cooperation in the Black Sea region and relationships increasing between public and consultative bodies, researchers and experts from different maritime fields. Combining efforts in the development of national and cross-border MSP process it is also planned to be expanded the geographical scope by involving more national, EU and non-EU member states stakeholders, mainly from the Black Sea Region.
Keywords: Black Sea, Maritime Spatial Planning, maritime spatial analysis, maritime spatial scenarios, MSP Methodology, Maritime Spatial Plan

2. USING SEGMENTATION IN MAPPING DDBR NATURA2000 HABITATS

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Present object feature mapping concept. Create python module for high resolution orthophoto images segmentation in order to provide object basis for Natura 2000 habitat mapping. Develop python module for QGIS in order to provide user interface to implement object feature mapping concept for habitats in Danube Delta Biosphere Reservation

3. PROGRESS IN SUPPORTING COPERNICUS ACTIVITIES FOR THE PERIOD 2017-2021

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Here we are summarizing the progress of the work within Specific contract under Framework Service Contract EEA/IDM/R0/16/009/Romania in supporting Copernicus activities for the period 2017-2021. The main activities detailed in the presentation are for the deliverable 1.1 – Verification reports (5) HRLs 2018 + SWF 2015 and deliverable 1.2 - Report detailing the ready to use LU datasets + refined excel sheet. The aim of this activity (Task 1.1) was post-production verification for HRLs 2018 and SWF 2015 in order to Identify systematic classification errors in HRL 2018 primary status products and identification of false changes in 2015-2018 change products. The following products were verified:1) Degree of Imperviousness status 2018 & change 2015-2018 (IMD, IMCC); 2) Tree Cover Density status 2018 (TCD); 3) Dominant Leaf Type status 2018 & change 2015-2018 (DLT and DLTC); 4) Grassland status 2018 & change 2015-2018 (GRA and GRAC); 5) Water & Wetness status 2018 (WAW; 6) Small Woody Features status 2015 (SWF). The scope of the activity 1.2 was Improvement of data availability, accessibility and usability to land use data and other landscape characteristics. Updated excel file include 28 important resources titles relevant for the production of CLC +. Most of the data have a temporal fervency and cover information of the land cover data from the year 2008 to 2018. The scale of the data is from 1:5000 to 1:25,000 with some exception, e.g. SIGSTAR-200 that is the digital version of "Romania's Soil Map at Scale 1: 200,000. The coverage of most of the data is for whole country and is in compatible shape format and CRS system for transformation in other standard formats.

4. MORPHOLOGICAL CHANGES OF THE DANUBE RIVERBED IN CEATAL IZMAIL BIFURCATION AREA

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The purpose of this study was to analyze the morphological changes occurred within the Danube riverbed, in the area of Ceatal Izmail bifurcation. Obtained data derived from topographic surveys performed upon the hydrological context in regimes of both high and low water of Danube. The data were processed and graphically represented using GIS techniques (ArcGIS and Global Mapper). The data were processed and graphically represented using GIS techniques (ArcGIS and Global Mapper). Three monitoring bathymetric profiles (2018 and 2019) were carried out on each branch of the bifurcation (i.e., the Unique Danube, Chilia Branch and Tulcea Branch), subsequently linked to the river banks by topographic surveys. Thus, a topo-bathymetric profile of the Danube riverbed has resulted. The interpretation of the obtained data allowed the delimitation of the areas characterized by erosion and deposition on each analyzed section. Specifically, on the Unique Danube, we observed an asymmetry of the valley towards to the right bank, where it was identified strong erosion, as evidenced on the all processed transversal sections, and an area with deposition on the Ukrainian river bank. The sediment deposition phenomenon may be associated with the young riparian vegetation developed on the left bank of the Danube. The profiles related to the Chilia Branch, showed a strong asymmetry of the valley towards the left bank, there where the erosion phenomenon is present, and the sediment deposition was identified on the right bank. Also, on the first profile, at the entrance to the Chilia Branch, it was identified as an area with strong erosion of the riverbed, in the central part of the section, possibly generated by eddy currents around the jetty-structure. As well, behind the jetty-structure in the riverbed an area with sediment deposition was noticed, there where an islet appeared over the time. On the Tulcea branch, we have found an asymmetry of the valley towards the left bank, where the erosion phenomenon of the banks and the riverbed was identified, in contrast to the right bank, where the sediment depositions are observed. Considering that this area is characterized by dynamic hydro-morphological environmental conditions, achievement of detailed study concerned the Ceatal Izmail bifurcation is very important.

5. COSMOMAR "CONSTANTA SPACE TECHNOLOGIES COMPETENCE CENTRE DEDICATED TO THE ROMANIAN MARINE AND COASTAL REGIONS SUSTAINABLE DEVELOPMENT"

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Since 2013, the development of a Competence Center in Spatial Technologies for the South-East Region of Romania is the overall goal of the STAR Project, similar untitled. The main aims of it, are:
- the use of space technologies and remote sensing data towards monitoring and rapid assessment of the marine and coastal environment state, towards development of environmental friendly bio-technologies and materials with applicability in spatial programs,
- the support of local and regional small, medium and big enterprises development in accessing opportunities of the EU spatial programs.

The main component of the proposed project herewith, COSMOMAR, is to develop a multidisciplinary remote sensing center for the coastal surveillance, as a main tool of ICZM and MSP implementation (governance, environmental conservation and protection) on the Romanian coastal and maritime zones.

The project results, encompassing the activity of the center, are related to the development of several projects' series for Earth Observation/EO services and applications within Romanian coastal and maritime areas. The projects component of the RS Center, related to the selection, training and certification of experts and consultants to assist the companies from the region specialized in manufacturing or services for integration in the programs coordinated by ROSA or ESA, it is presented as a complementary one. Three ESA founded projects within present work will be presented.
Keywords: Remote sensing, RS competence center, data flux, center activities, EO services.

6. CLIMATE CHANGE IN DANUBE DELTA BIOSPHERE RESERVE

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The paper presents some indices of climate in order to highlight the change in Danube Delta Biosphere Reserve. The indices that were taken into account are not those that are evident such as temperatures (minimum, average and maximum) or precipitation. This paper is focusses on the index that refers to the number of the tropical nights. This index is taking into account the nights (summer nights) when the minimum temperature is 20 °C or above this value. The data used is from ROCADA (Romanian Climatic Dataset), gridded data for the entire Romanian territory that were clipped for the territory of Danube Delta Biosphere Reserve. The data refers to the period between 1961 and 2013. These data are daily measured and interpolated data in order to cover the entire Romanian territory. The resolution of the gridded data is about 0.1 °. The approach studied the date when the first tropical night happened, the sum of the tropical nights per summer season and also the sum of the Celsius degrees of the total tropical nights from all summer night for the period taken into account. These three derived indices could tell more about the changes in climate within the studied region. This information is useful in the first place for the administrator of the region, then for the local communities and for the scientific community that studies the life entities within the studied area.

7. A LOW-COST METHOD TO MEASURE CANOPY DEVELOPMENT WITH APPLICATION IN PHENOLOGY

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The dynamics in forest canopy development on spatial and temporal scales has many applications in several disciplines, including ecology and phenology. As such, accurate and easy-to-use methods are needed to account for this dynamic and to infer parameters directly used in many scientific fields. While there are some established methods to measure some parameters such as the leaf area index, these are using either expensive equipment or they are resource intensive from other points of view. This study aimed to test the capabilities given by a regular mobile phone camera, iLastik and ImageJ freeware software packages to account for the dynamics in the canopy development over a spatial and temporal scale. At the spatial scale, four transects were placed perpendicularly on a forest road, and five points were selected on each of them at the edge, 10, 20, 40 and 80 m from the road, to capture photographs with the field of view oriented to the sky, from a determined distance from the ground. At temporal scale, this experiment was replicated three times, on 17th and 25th of April and 5th of May, respectively, to account for foliar development. The taken photographs were then used as an input to a supervised classification carried on in the iLastik software to differentiate between the open sky and canopy. Based on the classification results, ImageJ software was used to binarize the classified photos and to distinguish the share of canopy and sky respectively. The results were promising in two aspects. First of all, a visual inspection of the classification algorithm has revealed that there was a nearly perfect categorization of the features taken into account. Then, the statistical analysis of punctual (transect) and aggregated data (study sample) has revealed that accurate differentiations are possible on the temporal scale as an effect of foliar development and growth. While in this study the intended use of the method was that to account for the edge effect generated by the forest roads on the canopy development, the potential applications could span over the needs of various disciplines and research fields.

8. ANALYZING OF THE LOWER SECTOR OF THE DANUBE EVOLUTION BASED ON LOGISTIC MAP

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This study aims to use the logistic map in order to determine the speed of evolution of the various components of the lower Danube sector. Due to the ability of logistic map to capture the speed of evolution of some processes, and the degree of self-similarity of the data, a similar study was an older desire of ours.
As a large area of land generally remains uncovered by studies and it is difficult to obtain data collected at the same time, all this leads to a degree of inconsistency in the data obtained. The analysis based on these data sets revealed on the one hand how the evolution speed of the lower sector of the Danube changed, on the one hand and the search oscillations, on the distribution in space of the human settlements. Within the lower Danube sector, 8 clusters were identified based on the spatial distribution. All these played a feed-back role. Since the Neolithic Period, small islands appered in the area between Dinogetia and Aegyssus Promotory.
However, the presence of human settlements in the area of the Letea sandbank indicates the presence of fresh water, wood (for construction and fire) and access to the sea, so it is very possible that the Letea and Caraorman sandbanks were occupied of forests in the Byzantine Period.Basis of the distribution of human settlements, the evolution of Danube lower sector can be described. Within this paper, the "behavior" of the Danube, in the area of its lower sector, was analyzed on the basis of the logistic map of the human settlements distribution.

9. RAIN ON GRID MODELS FOR PLUVIAL FLOOD ASSESSMENT IN THE INHABITED AREAS OF THE DANUBE DELTA

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This article provides a detailed record of the hydraulic model constructed for different locations in the Danube Delta as part of the commission to appraise flood relief scheme options for the Prevention and diminishing of the effects of floods over settlements in the Danube Delta (under LIOP financing). The purpose of the modelling was to describe the baseline pluvial risk and to develop and appraise options for pumping regime. Eleven separate rain-on-grid models have been prepared in order to determine the local response to rainfall. A grid size of 5m has been used to represent the 2D domain in the models based on LiDAR data with high accuracy. For pluvial data depth-duration-frequency curves data has been converted to rainfall hyetographs. TUFLOW which is a computational engine that executes 2D hydrodynamic calculations, was used as modelling tool. The benefit of the direct rain on grid modelling approach and the TUFLOW model build is that the dynamic link between rainfall, surface infiltration, overland flow, drainage ditches and pumping station operation can be modelled. This dynamic model enables a better understanding of storage on the land surface and within drainage ditches for managing and communicating risk and to optimize pump operations and in turn design efficient operating rules to minimize energy use and greenhouse gas emissions. The TUFLOW models can be expanded to assess full integration of flooding from the main Danube watercourses through overtopping or breach of levees, making them suitable for holistic assessment of current and climate change flood risk.

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