INTRODUCTION TO THE EU STRATEGY FOR THE DANUBE REGION (EUSDR), ITS ACTIVITIES AND IMPORTANCE OF PLASTIC POLLUTION

Viktor György Oroszi, PhD
EUSDR national coordinator

Ministry of Foreign Affairs and Trade of Hungary

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Viktor.Oroszi@mfa.gov.hu

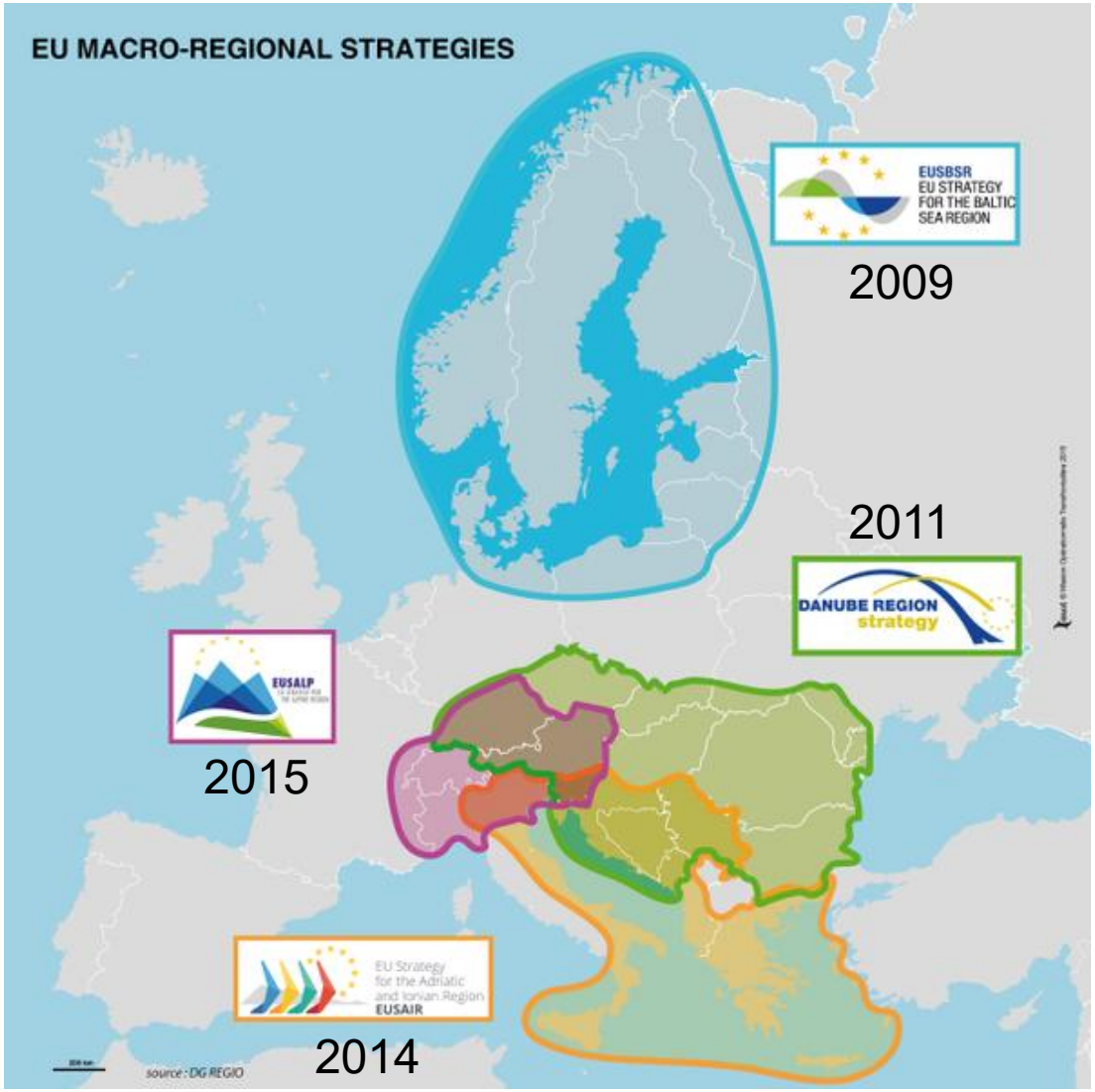
Briefly about the Danube River

- The most international river in the World – covering territories of 19 countries (5 share less than 2000 km^2 from the catchment area) and the river crosses 10 countries and 4 capitals
- Catchment area: 804.087 km^2 (310.460 sq mi)
- Length: 2857 km (1775 miles)
- Average discharge (at the Danube mouth): 6500 m^3/s
- The Danube River Protection Convention was signed in 1994 (Sofia) by the 14 main Danube river countries.

Macro-regional Strategies of EU

- EUSDR was adopted under the Hungarian EU Presidency in 2011
- 2nd macro-regional strategy of the EU
- Currently Bosnia and Herzegovina is presiding the EUSDR

EUSDR is the single macro-regional strategy of EU established on the basis of a river basin.



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The EU Strategy for the Danube Region (EUSDR)

DANUBE REGION strategy
Prosperity through Diversity

9 EU Member States

- Austria
- Bulgaria
- Croatia
- Czech Republic
- Germany (Baden-Württemberg, Bayern)
- Hungary
- Romania
- Slovak Republic
- Slovenia

5 EU Accession Countries

- Bosnia and Herzegovina
- Moldova
- Montenegro
- Serbia
- Ukraine (4 districts)

- 14 countries
- More than 100 million inhabitants
- 10% of the territory of Europe

Harmonization of territorial development under 4 pillars and 12 priority areas

DANUBE REGION strategy
Prosperity through Diversity

Connecting the Danube Region		
PA 1/a	To improve mobility and multimodality - Inland waterways	Austria and Romania
PA 1/b	To improve mobility and multimodality - Road, rail and air links	Serbia, Slovenia and Ukraine
PA 2	Sustainable energy	Czeczh Republic and Hungary
PA 3	Culture and Tourisms	Bulgaria and Romania

Building Prosperity in the Danube Region		
PA 7	Knowledge society	Serbia and Slovakia
PA 8	Competitiveness of enterprises	Baden-Württemberg and Croatia
PA 9	People and Skills	Austria, Moldova and Ukraine

Protecting the Environment		
PA 4	Water quality	Hungary and Slovakia
PA 5	Environmental Risks	Hungary and Romania
PA 6	Biodiversity	Germany and Croatia

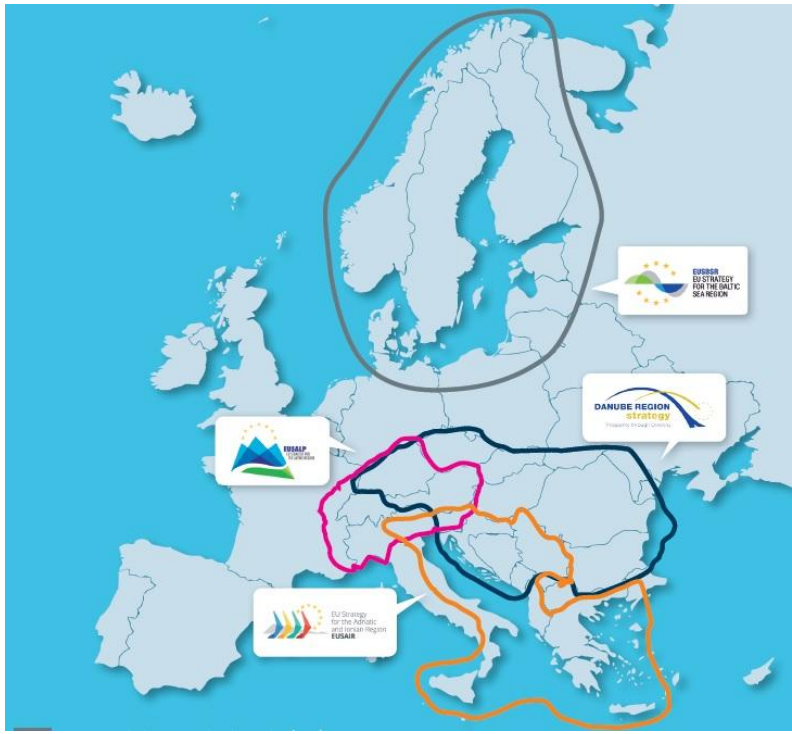
Strengthening the Danube Region		
PA 10	Institutional capacity and cooperation	Austria and Slovenia
PA 11	Security	Bulgaria and Germany

Plastic pollution of waters from a global perspective

- **Plastics are the** largest, most harmful and most persistent fraction of marine litter, **accounting for at least 85 percent of total marine waste** (UNEP data).
- **Emissions of plastic waste into aquatic ecosystems are projected to nearly triple** from some 9-14 million tons per year in 2016 to a projected 23-37 million tons per year **by 2040 without meaningful action** (UNEP estimation)
- Over **74% of emissions occurring between May and October**. The **top 20 polluting rivers mostly located in Asia** (Lebreton et al. 2017).
- Recent model approach (Meijer et al. 2021) estimate that **more than 1000 rivers account for 80% of the global riverine annual plastic emissions into the ocean.**
- **Plastic recycling rates are less than 10 per cent** and plastics-related greenhouse gas emissions are significant. At the same time, the estimated **global cost of municipal solid waste management is set to increase** from US$ 38 billion in 2019 to US$ 61 billion in 2040.

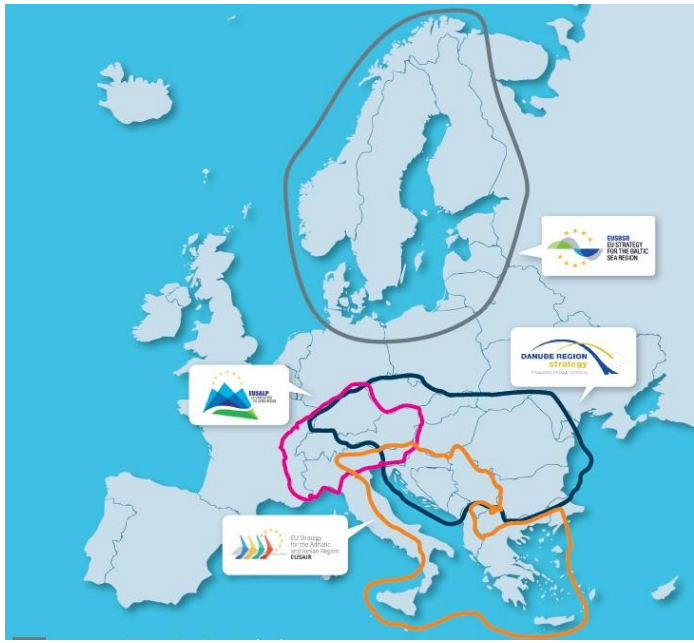
Plastic pollution of waters from an EU perspective

- 20–31 tonnes flows into the North Sea every year from the **Rhine River** (Van der Wal et al. 2015)
- In the Italian **Po River**, sampled concentrations differed by one order of magnitude between winter and spring, emphasising **seasonality of freshwater contamination** in rivers (Vianello et al. 2015).
- The average litter density for beaches was found by the **DeFishGear project** to be 0.67 items/m^2; for coastal **Adriatic waters** 332 ± 749 items/km^2 and for the seafloor 510 ± 517 items/km^2.



Plastic pollution of waters from an EU perspective

- The **BLASTIC project** (2016-18), an **EUSBSR Flagship** under Policy Area Hazards, aimed to reduce plastic waste and thereby, the inflow of hazardous substances into the Baltic Sea by mapping and monitoring the amounts of litter in the aquatic environment.
- Once a **PE/PP microplastic particle enters the Baltic Sea**, it **stays in average** about **14 days in the water column** before it is washed ashore. Microplastics from urban sources cause average concentrations of 1.4 PE/PP particles/m^2 sea surface (20–500 µm size range) and 4 particles/m^2 sediment surface of PET at the sea floor are during summer. **Accumulation at the shoreline is the major sink for microplastics** (Schernewski et al. 2020).

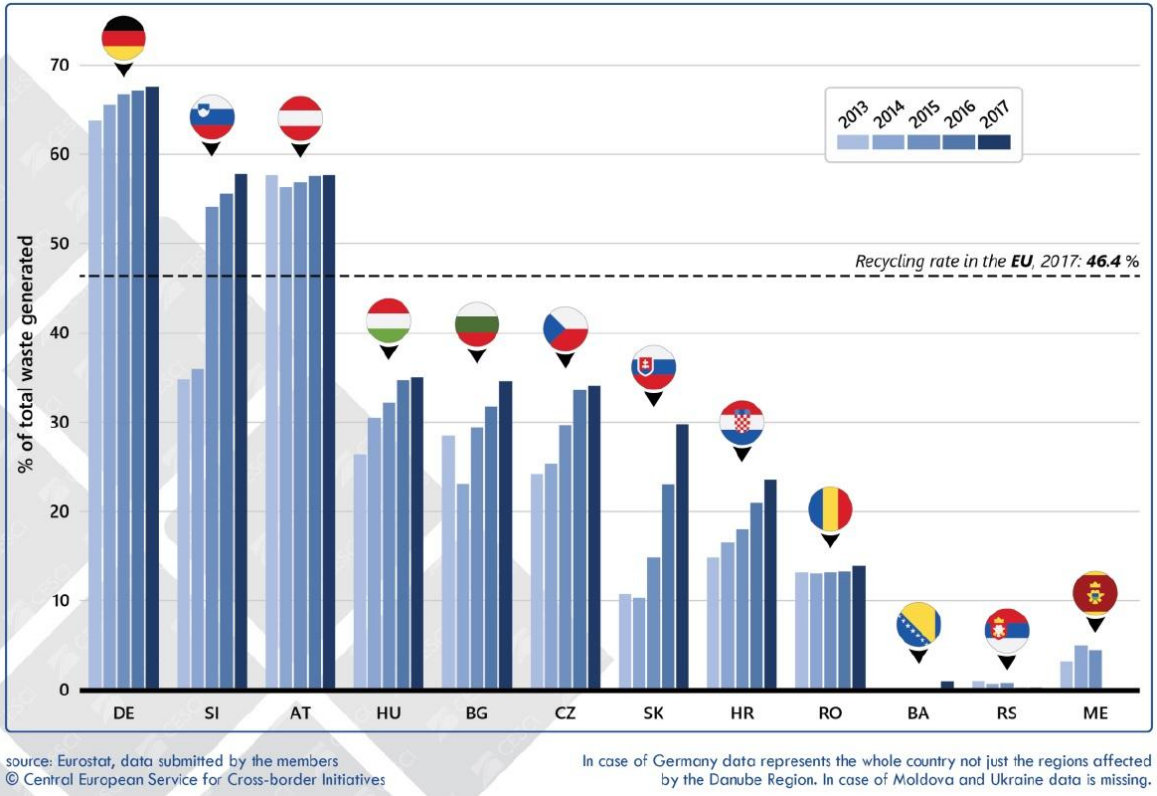


Danube region perspective

- 9 EU countries
- 5 EU accession countries

Different levels of waste generation and wastewater management

Communal waste recyling in the DRB 2013-2017 (CESCI)



Danube region perspective

- Since 2004 the Hungarian Water Directorates are measuring the communal waste pollution intensity of the Upper-Tisza River entering Hungary from Ukraine and Romania
- Waste problem is a constant topic of Ukrainian-Hungarian transboundary water-commission meetings
- A high-level roundtable conference on March 2009 about 'Solid communal waste treatment and preventing transboundary water pollution' called attention to the importance of this problem, and it was further investigated under the UNDP/GEF Tisza MSP demonstration project

Plastic pollution of the Tisza River (Photo by FETIVIZIG)

Danube region perspective

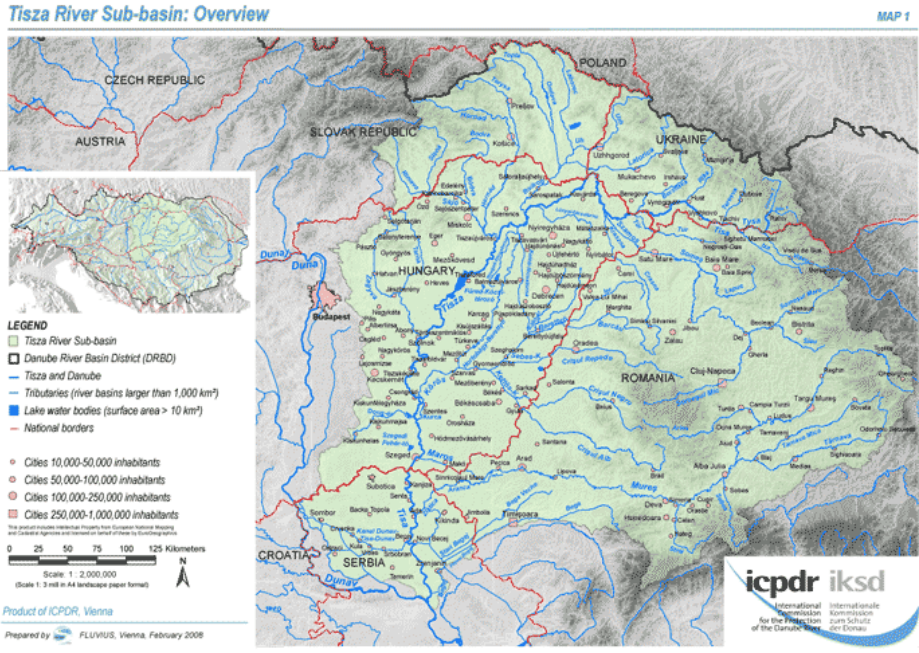
- **The first documented study** dealing with the plastic pollution **of the Danube took place in 2010-12 at the Austrian part** of the river, downstream Vienna and found mean plastic abundance of more than 17 pieces/m^3
- It was estimated that the **Danube River releases 530–1,500 tonnes of plastic into the Black Sea annually** (Lechner et al. 2014)
- **In 2018 the Regional Action Plan on Marine Litter in the Black Sea was adopted** by the Black Sea Convention and tasked to further elaborate on Marine Litter Monitoring Guidelines.

Plastic pollution of the Tisza River (Photo by FETIVIZIG)

JOINTISZA (Strengthening cooperation between river basin management planning and flood risk prevention to enhance the status of waters of the Tisza River Basin)

Interreg
Danube Transnational Programme
JOINTISZA

- Partnership: 11 partner 4 countries & 5 Associated partner + US Army Corps. of Engineers
- Budget: 2.25 M EUR
- Duration: 2017/01 – 2019/9
- River Tisza is the largest tributary of the Danube (shared by 5 countries)
- Aim: to update the Integrated River Basin Management Plan (ITRBMP)
- ITRBMP was adopted by the ministers of the 5 Tisza countries in Sep. 2019



JOINTISZA project – ITRBMP joint programme of measures

- However, in the Upper-Tisza region 174 registered waste dumps (technical protection?, loaded in 75-85%) and 213 illegal landfills were mapped in 2016 containing several million tons of waste that poses a risk on downstream countries.
- This pressure and its impacts on water quantity management is addressed in all Tisza countries with proposal of measures in the updated ITRBMP

Table VII.5. TRB solid plastic waste measures summary table

Title of proposed measure	Status of the measures estimated towards the end of 2021				
	Ukraine	*Romania*	*Slovakia*	*Hungary*	*Serbia*
Education and awareness raising measures	OG	CO	OG	OG	PG
River clean-up actions to installing collection and recycling facilities	OG	CO	OG	OG	CO
Selective collecting of the solid plastic waste	–	CO	–	CO	–

Note: CO – Completed; OG – Ongoing; PG – Planning ongoing.

- EUSDR PA4-5 arranged the first international **boat** and **won the 6th PET Cup cleanup action in 2018** thanks to the **JOINTISZA** project - connecting 13 experts of the crew from 8 countries of 4 continents

Danube region perspective

- **Tiny Plastic Puzzle project** by Wessling Hungary Ltd. measured 45 particles/m^3 microplastic upstream from Budapest and 55 particles/m^3 downstream
- The SK-AT CBC financed **PlasticFreeDanube project** measured the macroplastic pollution composition along the Danube from Vienna to Gabcikovo between 2017-2021
- The **ICPDR Joint Danube Survey 4** was performed **in 2019** and comprised **the first ever comprehensive screening of microplastics along the whole Danube**. The JDS4 outcomes were used for the 2021 update of the Danube River Basin Management Plan.

Microplastics in mussels along the Danube (Source: ICPDR JDS4)

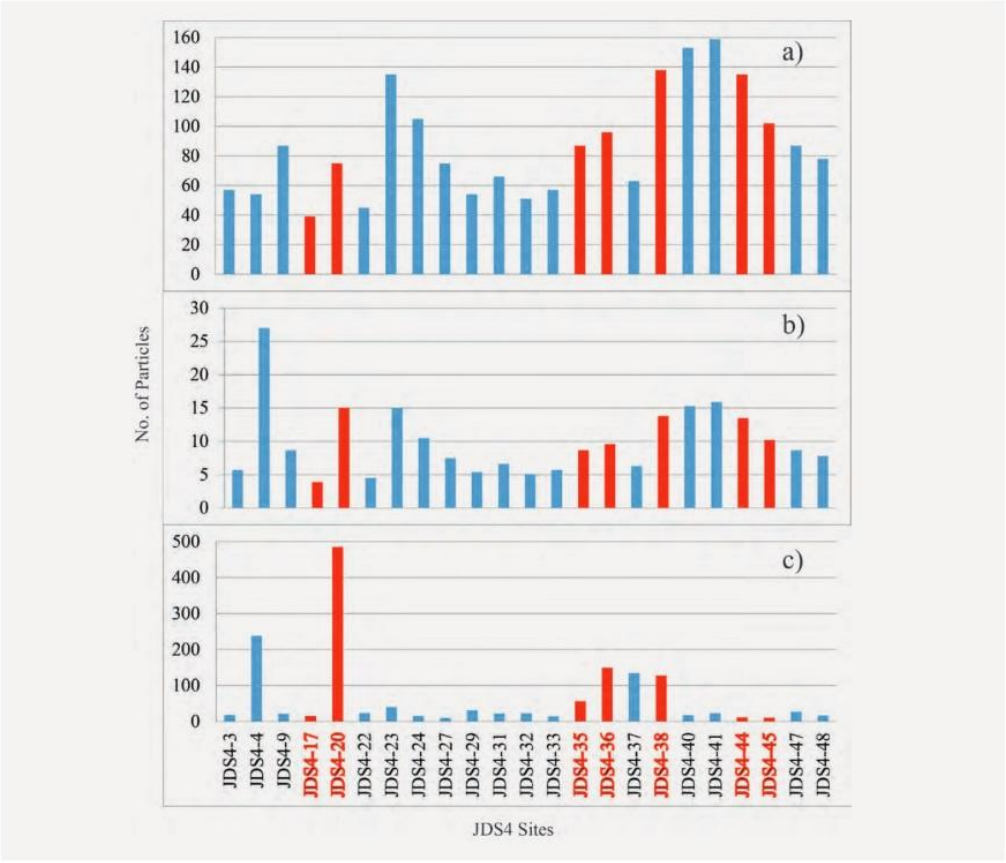
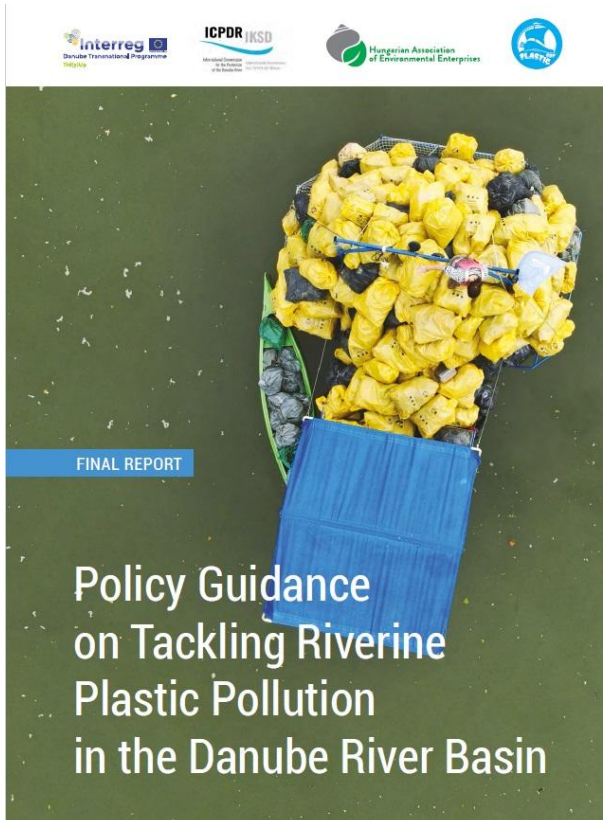


Figure 4: Total number of particles per site, mean No. of particles per individual and mean No. of particles per biomass (g wet weight); sites on tributaries and side arms are presented in red colour.

EUSDR related projects in the Danube region

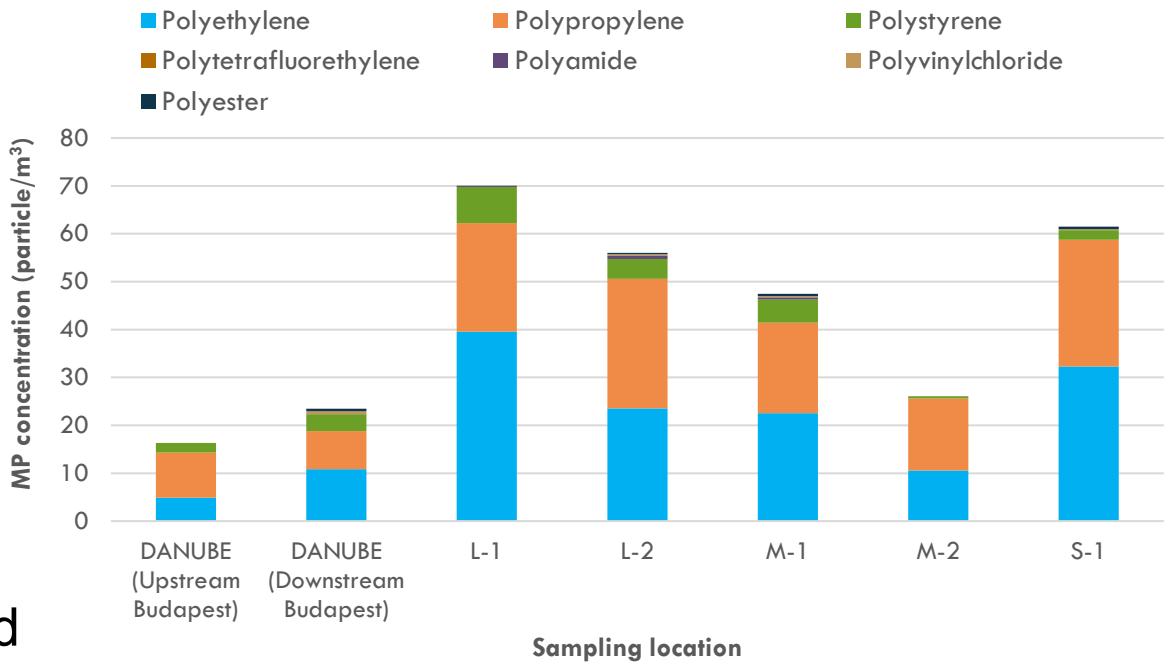
- In 2018 EUSDR PA4 organized an international **roundtable discussion on plastic pollution** in Budapest
- „**Plastic Pollution of rivers in the Danube Region**" brochure was published by EUSDR PA4
- **2/2020 waste elimination machine chain and early warning camera system** was **introduced** on the Tisza River in Vásárosnamény (~1 billion HUF)
- **7/2020 Letter of the President of Hungary** Mr Áder to the UA President Mr Zelenszkij regarding plastic pollution
- The EUSDR PA4 transnational flagship project - **Tid(y)Up** was implemented (2020-2022) to map & measure the plastic waste along the Tisza and Danube and create an integrated action plan
- The **Waste Management Strategy of Zakarpattya Region** was prepared by Tisza EGTC in 2022



Policy Guidance how to tackle riverine plastic pollution - developed in 2024 within the Tid(y)Up project and adopted by ICPDR

EUSDR related projects in the Danube region

- In 2021 an EUSDR HU investigation on the microplastic elimination **effectiveness of 5 UWWTPs** along the Hungarian Section of the Danube
- UWWTPs reduce the microplastic content of the influent raw wastewater significantly, but the treated effluent wastewater that is released to the environment is still containing more microplastics, than the receiver river water.



Average microplastic concentration in WWTP effluent and Danube River samples

Currently running projects related to plastic polluton

EUSDR supports the implementation and capitalization of the following projects:

- Aquatic Plastic project (01/2024-06/2026) 9 countries 13 partners
- Microdrink project (01/2024-06/2026) 8 countries 11 partners
- Microplastics HU-SRB CBC project (7/2024-6/2026)
- DALIA project (2023-2027) – pilot action on river clean-up along the Bodrog river

Latest activities of EUSDR PA4 related to plastics

- International Conference on Microplastics in drinking water – from source to tap (Budapest, 3/10/2024)

Recommended next steps (defined by the participants):

- European Commission to consider including **microplastics on the watch list for drinking water monitoring.**
- Water treatment plant operators to prepare for implementing quaternary treatment to remove microplastics and micropollutants.
- Researchers to continue developing and **standardizing methods for sampling and analyzing microplastics in water**.
- EU Danube Strategy to consider further discussions about **sharing microplastics data and research across projects**.
- Project teams to increase collaboration and networking between different microplastics research projects.
- Researchers to conduct **more studies on the health impacts of microplastics exposure**.
- Water utilities to **evaluate technologies for removing microplastics during wastewater treatment**.
- Policymakers to **consider regulations on primary microplastics sources like textiles and tires**.
- Researchers to further **investigate microplastics in river sediments and floodplains**.
- Project teams to **engage more citizen scientists** in microplastics monitoring efforts.
- Researchers to **develop better models for predicting microplastics transport** in river systems.
- Water managers to **improve monitoring of microplastics in drinking water sources**.
- Researchers to **study** formation of **“plastisphere” microbial communities on microplastics**.Policymakers to evaluate **options for reducing microplastics in sewage sludge applied to land**.
- Conference organizers to consider a future event focused on microplastics in bottled water.

Forthcoming activity

M4 Plastics - Measuring, Monitoring, Modeling and Managing of Plastics in Flowing Waters workshop (Budapest, 29-31/10/2025) is co-financed by EUSDR PA4

- Citizen science
- future of laboratory plastics research
- plastics transport modelling challenges
- Laboratory visits
- Visiting the Riversaver Centre of Plastic Cup Society

MINISTRY OF
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OF HUNGARY

DANUBE REGION strategy
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Thank you for the kind attention!

Viktor György OROSZI
EUSDR national coordinator
viktor.oroszi@mfa.gov.hu

For more information please visit our website:
https://danube-region.eu/