

GREEN DANUBE

**Integrated transnational policies and practical solutions
for an environmentally-friendly Inland Water Transport system
in the Danube region**

Work Package 3 – Air emission assessment
(1.01.2017 – 30.08.2018)

**Partners involved: CER, DDNI, DCC,
ACTEDJ, BDCA, BMA, CRUP, DC, DDBRA,
DDNI, DST, MT, OVF, PDM, PLOVPUT, REC**

Constanta 23-24 February 2017



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(ERDF, IPA)

Act. 3.1 Set up assessment criteria

D.3.1.1 List of the assessment criteria for the selection of critical environmental areas on the Danube river

D 3.1.2 Working methodology for performing the measurements in the selected areas with procedures, required equipment, parameters, data types, existing standards, emission factors etc. for performance the measurements in selected Danube areas

Act. 3.2: Performance measurements of air pollutant emissions in the selected critical environmental areas

D 3.2.1 Report on the results of measurements performed in the selected Danube areas

Act. 3.3: Analyzing, interpreting and reporting of the measurements results

D 3.3.1 Consolidated report summarizing the interpretation of the measurements results and the information regarding the data on the vessel traffic and the pollution caused by the industry and by the other sources from each area.



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In order to make improvements in the air quality, the amount of pollutant emissions in the air must be measured, what will be done in Danube selected areas based on a working methodology which will be jointly developed with the involved partners.

The pollutant emissions monitoring will be performed in this WP by collecting samples and measuring air emission main factors in the selected Danube areas in order to determine the level of pollutant emissions generated, mainly, by the operation of inland vessels.

The results of measurements performed will be included in a consolidated report.

The final database will be compared with existing data statistics in the other transport sectors and in the conclusions of the report will be underlined the most vulnerable area with highest level of air pollution and it will be proposed solutions for reduction of air pollutant emissions to be used in subsequent ultimate emission reduction Strategy.

Involved Target Groups and other Stakeholders



- Ministries of Environment and Waters,
- National public authorities and administrations in charge with monitoring environment pollution and water management,
- Danube port administrations,
- National environment guards,
- International organizations as policy decision makers,
- International associations for research and protection of Danube ecosystem.
- (others?)

Act. 3.1 Set up assessment criteria

D.3.1.1 List of the assessment criteria for the selection of critical environmental areas on the Danube river:



- Location (national or border area);
- Intensity of inland navigation vessels traffic;
- Urban or rural crowded areas in the proximity;
- Existence of navigation infrastructure (locks, bridges, port terminals, berthing areas, etc.);
- Designation of the areas as protected/ natural park/national park/natural setting etc.
- Existence of a strong industrial developments and other pollution sources (road transport, railways, etc.) in the proximity and their impact on pollution measurements;
- Existence of an intensive agriculture development in the proximity;
- Existence of available statistics, if any, according to which human health is in danger;

If tourism is developed in that area

- An inherent ecological, geological or hydrological sensitivity to change that may be adversely affected by any change
- Need for preservation of biodiversity and landscapes



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Selection of critical environmental areas



PDM (Austria) partner - proposed to look at areas where vessels movements are more intense, e.g. ports located near to cities, locks etc. and to consider the Clean Power for Transport Package and its objectives on the selection of critical environmental areas. This was also suggested by **DDNI** in the early stages of the development of criteria. A map of traffic intensity along the study area will help the consortium in choosing the right (representative) location for measurements, especially due to the (very) limited number of points.

ACTEDJ (Romania) and **CRUP** (Croatia) agrees with the suggested criteria.

Selection of critical environmental areas - continuation

BDCA (Bulgaria), agrees with suggested criteria and the proposals consist on a draft table with some example of areas places along Bulgarian Sector of the Danube, for common analysis on the selection of critical environmental areas.

REC (Hungary) has the following remarks:

Because the measurements will be performed only at 4 selected locations along the Danube, **we need to be very careful with the development of the selection criteria** and also with the selection, as we will have only these four 'shots';

Measurements make sense basically in two different types of areas:

natural, environmentally/ecologically sensitive areas;

urban / industrial areas;



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REC (continuation)

Based on the previous point it is logical that for the two different types of areas we cannot have the same selection criteria. Instead we **will need two customized sets of criteria**. For instance, in case of urban areas ecological sensitivity is not a relevant criterion. In contrast, in case of a natural area, navigation infrastructure and the level of industrial activity is irrelevant;

It needs to be determined which criteria to be used in which case and how. Are the criteria weighted and if yes how, do we use a point system or a matrix, etc.;

Selection of critical environmental areas - continuation



REC (continuation)

The developed database (under Activity 3.3) will include data on vessel traffic, data on background pollution sources, etc. This means that availability of relevant data will be a key criterion for selection, particularly in case of urban areas, as here the data measured by the project will not mean a lot in the absence of data on emission from other sources (e.g. source apportionment including urban and regional background). In addition, we should take into consideration that data availability will be different in urban and in natural areas;

Given the small number of planned measurement points and the fact that data availability can be a problem, as a first step **REC** propose **to select at least 6-8 locations**, perform an initial analysis of data availability and based on this narrow it down to the final four locations

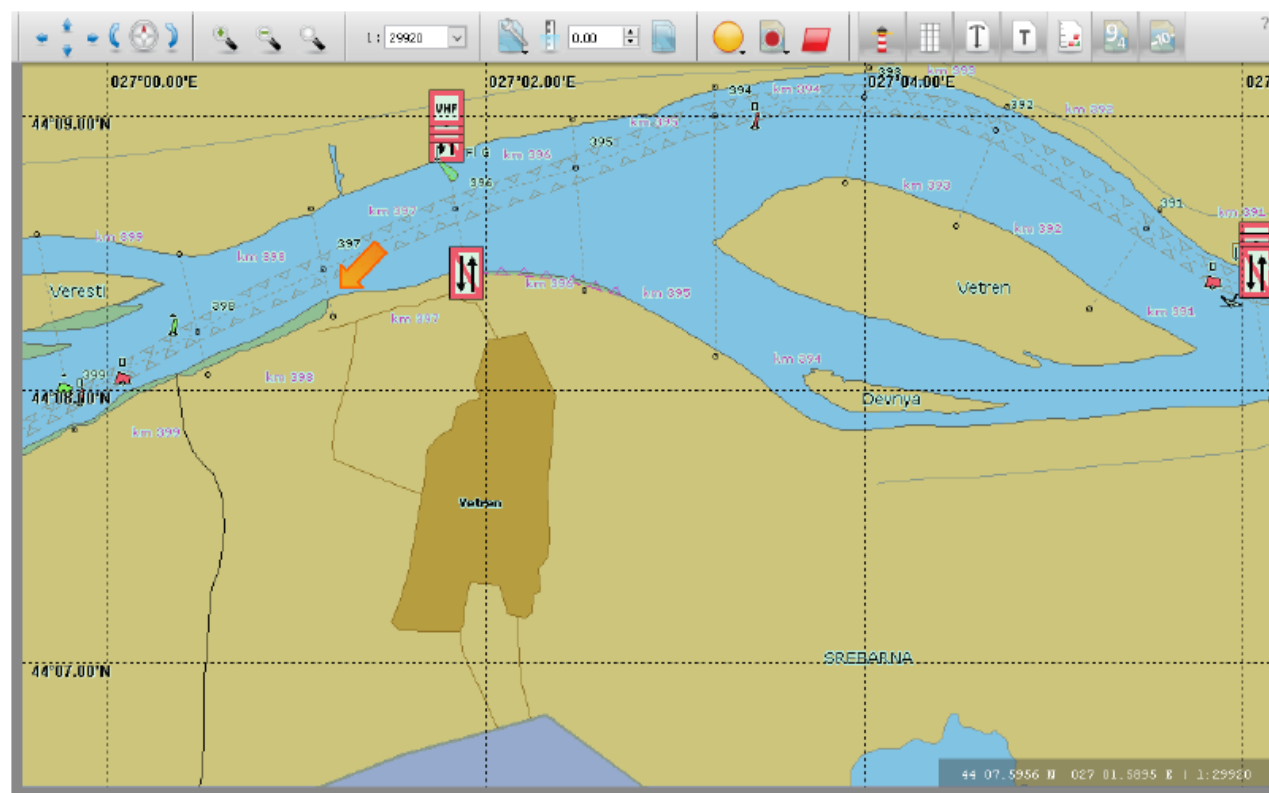
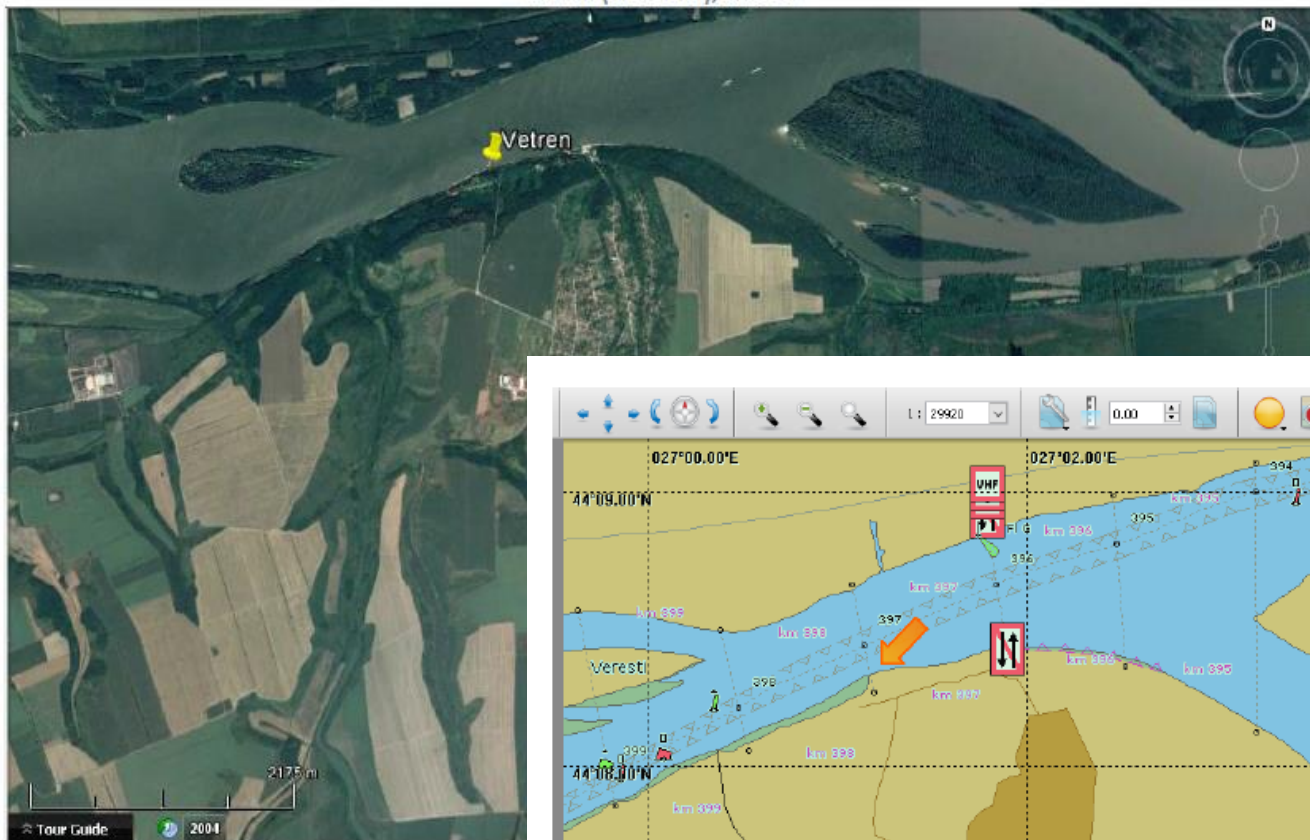


DCC partner (Serbia) considered that ‘the natural sensitive area and the criterion for tourism has both sides – one is pollution caused by tourism activities (which is not quite substantive since tourism is not hugely developed) and the other one is that you can better promote destination with clean air especially when we already speak about national parks (IWT pollution there can have not so huge health problem but aesthetically it is not good to see pollution coming from ships while enjoying in the nature.)’

In order to set up the criteria for critical environmental areas along the Danube River, it should be considered, at least one or more of the following reasons:

Example Areas along Bulgarian part of Lower Danube (of which to select one, where to execute air emission survey within Green Danube project)

Name	Vetren (close to Srebarna Protected Area (Bulgaria)	Kalimok-Brushlen	Persin Island	Nikopol Ferryboat Terminal	River Port of Lom
Location (km)	km 397	km 454	km 565	km 599	km 741
General description	In the neighborhood of Srebarna Protected Area (Bulgaria)	Protected Area	Part of Persina National Park (Bulgaria), protected area wetland	Ferryboat Terminal	River Port
1. Location (national or border area);	Border area BG-RO	Border area BG-RO	Border area BG-RO	Border area BG-RO	Border area BG-RO
2. Intensity of inland navigation vessels traffic;	High	High	High	High	High
3. Urban or rural crowded areas in the proximity;	village of Vetren, 500 m, Srebarna – 5 km town of Silistra- 16 km	No	town of Belene, 6 km town of Svishtov, 10 km	Yes, town of Nikopol, 1-2 km away	Yes, town of Lom adjacent
4. Existence of navigation infrastructure (locks, bridges, port terminals, berthing areas, etc.);	16 km from port of Silistra	Berths in Tutrakan, 6 km away	Pontone bridge, 20 km from a port	Ferry slip structure	River port
5. Designation of the areas as protected/ natural park/national park/natural setting etc.	In the Neighborhood of a Nature Reserve	Nature Park	Nature Park	No	No
6. Existence of a strong industrial developments and other pollution sources (road transport, railways, etc.) in the proximity and their impact on pollution measurements;	Some roads, low impact on measurements expected	No, low to none impact on measurements	Nuclear Power Plant Belene Project (suspended), low to none impact on measurements	Yes, roads, urban area at 2-3 km, expected medium impact on measurements	Yes, roads, urban area at 2-3 km, expected medium impact on measurements
7. Existence of an intensive agriculture development in the proximity;	Yes, surrounded by arable land	Yes, surrounded by arable land	Yes, partly surrounded by arable lands	Yes	None
8. Existence of available statistics, if any, according to which human health is in danger;	No	No	No	No	No
9. If tourism is developed in that area	No	No (however good potential available)	Partly, good potential available	No	No
10. An inherent ecological, geological or hydrological sensitivity to change that may be adversely affected by any change	Protected species, birds				
11. Need for preservation of biodiversity and landscapes	Yes	Yes	Yes	No extra needs	No extra needs
12. Access condition (by car, by boat ...), permit required to dispose measurement equipment	Free access, gravel road No permission needed	Free access, gravel road, No permission needed	Free access, gravel road No permission needed	Asphalt road, Permission needed (but easy to get one),	Asphalt road, Permission needed (but easy to get one)



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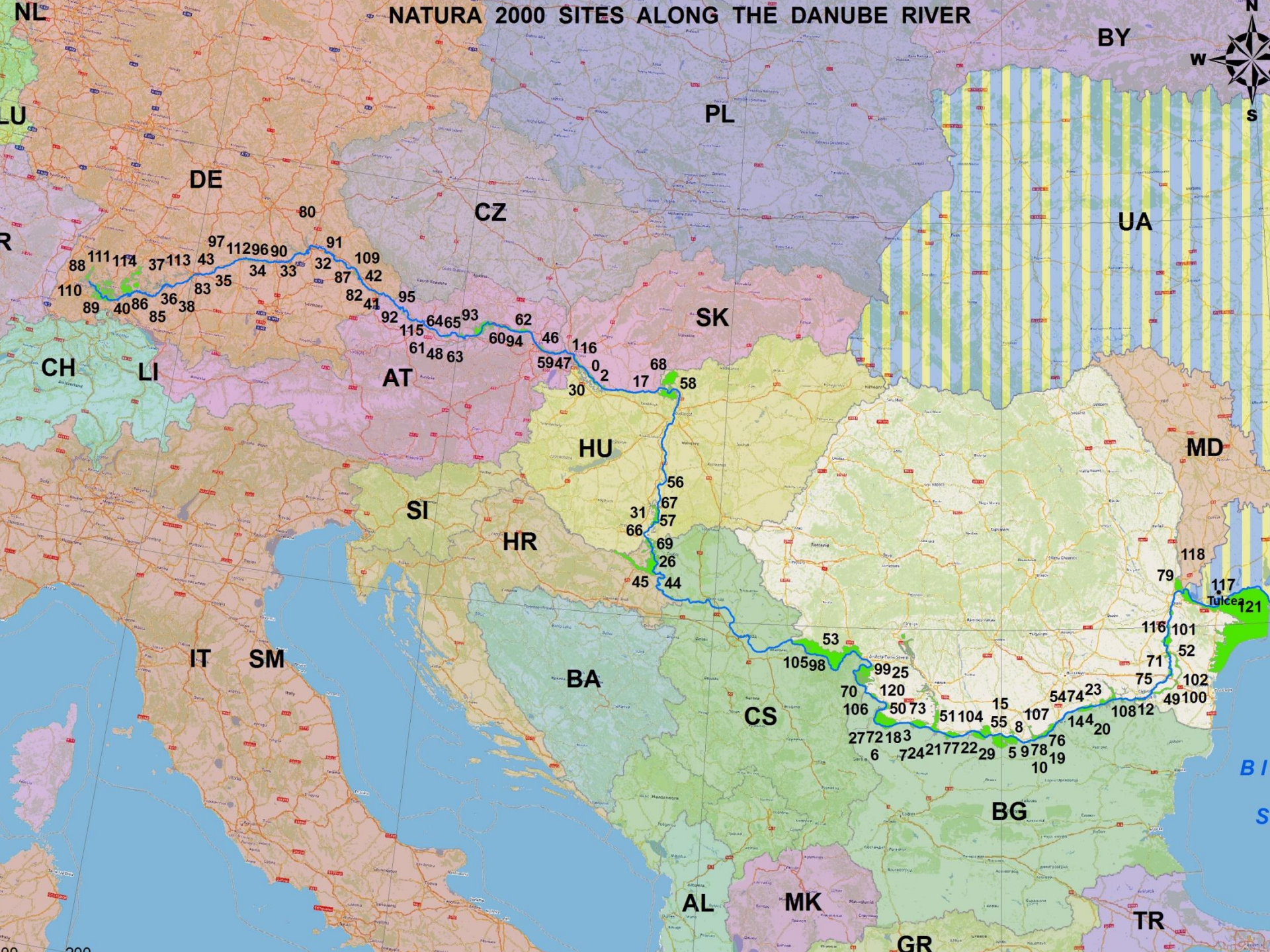


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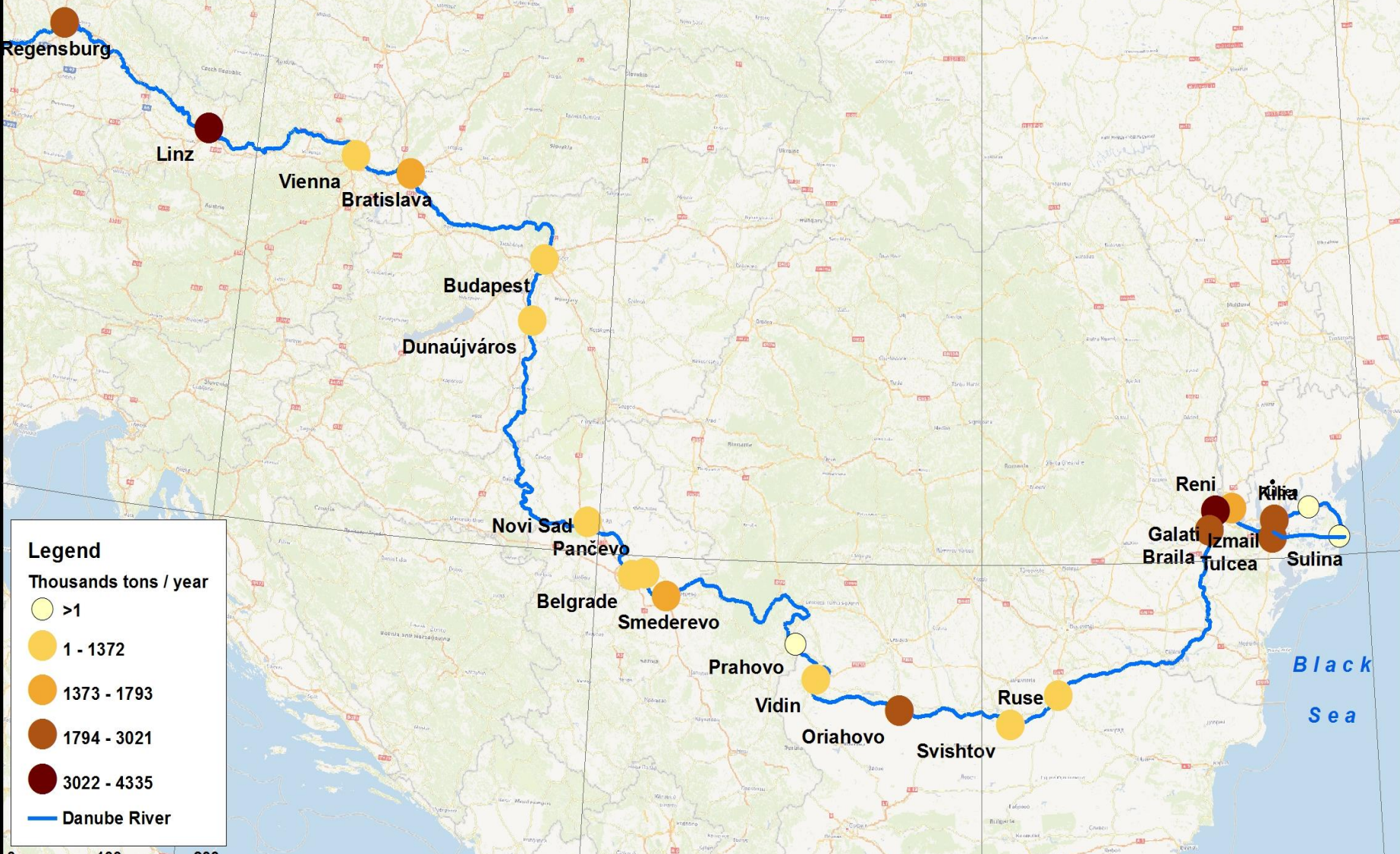


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NATURA 2000 SITES ALONG THE DANUBE RIVER



MAIN PORTS ALONG THE DANUBE RIVER AND TONS TRANSPORTED



Legend

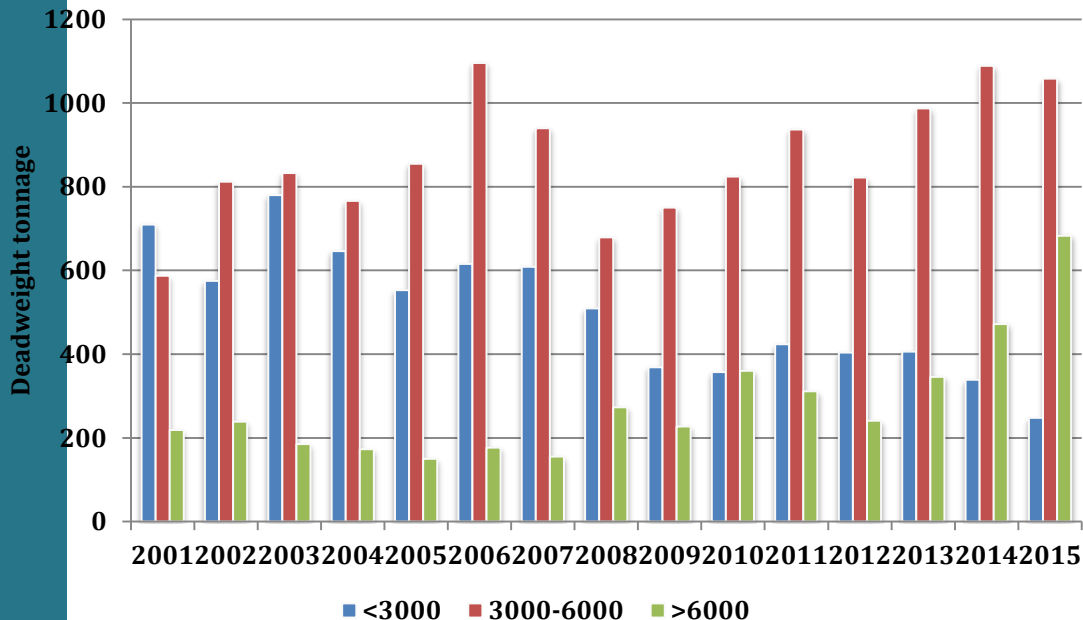
Thousands tons / year

- >1
- 1 - 1372
- 1373 - 1793
- 1794 - 3021
- 3022 - 4335
- Danube River



Source: Catchment Characterisation and Modelling 2 (CCM2) (Environment European Agency)

Background source: Open Street Map OSM-WMS Univ. Heidelberg



TRAFICUL NAVELOR INTRATE-IEȘITE PE CANALUL SULINA
IN ANUL 2015

Luna	Total nave intrate-ieșite	din care:		Total tone marfă	din care :	
		nave intrate	nave ieșite		marfă intrată (tone)	marfă ieșită (tone)
Ianuarie	127	67	60	261.417	39.035	222.382
Februarie	165	66	99	339.240	15.608	323.632
Martie	166	81	85	328.905	35.948	292.957
Aprilie	151	71	80	264.917	30.942	233.975
Mai	199	94	105	388.258	68.671	319.587
Iunie	159	78	81	287.552	63.006	224.546
Iulie	161	79	82	301.444	60.537	240.907
August	164	83	81	333.001	60.151	272.850
Septembrie	181	90	91	288.723	29.106	259.617
Octombrie	190	88	102	373.290	57.126	316.164
Noiembrie	170	87	83	363.191	85.627	277.564
Decembrie	156	69	87	317.934	39.465	278.469
TOTAL	1989	953	1036	3.847.872	585.222	3.262.650

http://www.afdj.ro/sites/default/files/trafic_nave

example: Number of the ship traffic _input-output
in Sulina channel in 2015



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A preliminary list of areas might be:

- Maritime Danube (and this would need to consider two routes of entry of ships, namely the Sulina channel and Bastroe and agglomeration areas of ships in major ports for loading and unloading), including a potential reference area, with very low pollution such as St. Gheorghe;
- One of the islands in the lower Danube area, perhaps islands near Danube-Black Sea Chanel to capture the contribution of traffic on this channel;
- Oriahovo-Vidin area;
- A particular area, perhaps that one suggested by CERONAV upstream, on the border with Serbia (National park).
- The Regensburg-Linz region, with the largest volume of goods trafficked.

Other areas that will arise from consultations between partners while taking into account the measurements duration and budget.

CONCLUSIONS and DISCUSSION



This exercise is extremely useful for two reasons: first for testing the proposed criteria in practice and second for giving preliminary results (locations) to be considered in the decision making process. The exercise may result in overlapping sampling points proposed by different partners, giving the indication that specific point meets the criteria from more than one point of view.



Act. 3.1 Set up assessment criteria for selection the critical environmental areas on the Danube River

D.3.1.1 List of the assessment criteria for the selection of critical environmental areas on the Danube river

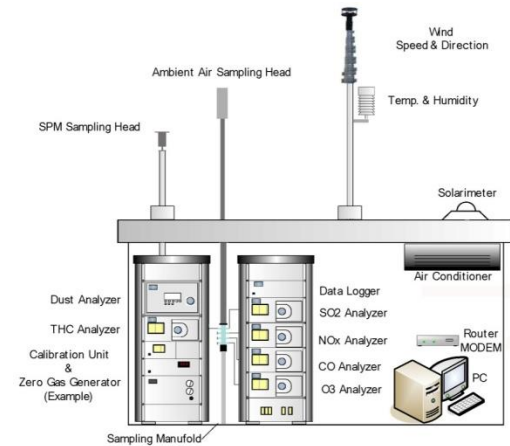
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EQUIPMENT and DATA TYPES



Main Air Pollution Parameters: according to ISO 17025 standard

- CO (Carbon monoxide)
- NO_x (Oxides of nitrogen)
- PM (Particulate matter, PM₁₀, PM_{2.5})
- SO₂ (Sulphur dioxide)
- CO₂ (Dioxide carbon).
- Others (?)
- Sensors for Meteorology



Main Air Pollution Parameters: according to ISO 17025 standard



- CO (Carbon monoxide) limit detection 2 ppb
- NO_x (Oxides of nitrogen) limit detection 0,5 ppb
- PM (Particulate matter, PM₁₀, PM_{2.5}) limit detection 0,001 mg/m³
- SO₂ (Sulphur dioxide) limit detection 1 ppb
- CO₂ (Dioxide carbon)
- Others (?)
- Sensors for Meteorology



Existing standards



Analyzer	European Norm	US-EPA Designation
APNA-370 NO _x	EN14211 August 2006	RFNA-0506-157 May 2006
APSA-370 SO ₂	EN14212 August 2006	EQSA-0506-159 May 2006
APMA-370 CO	EN14626 February 2006	RFCA-0506-158 May 2006
APDA-371/372	EN12341 for PM10 EN14907 for PM2,5	

AP-370 Series are in compliance with European and US Regulations



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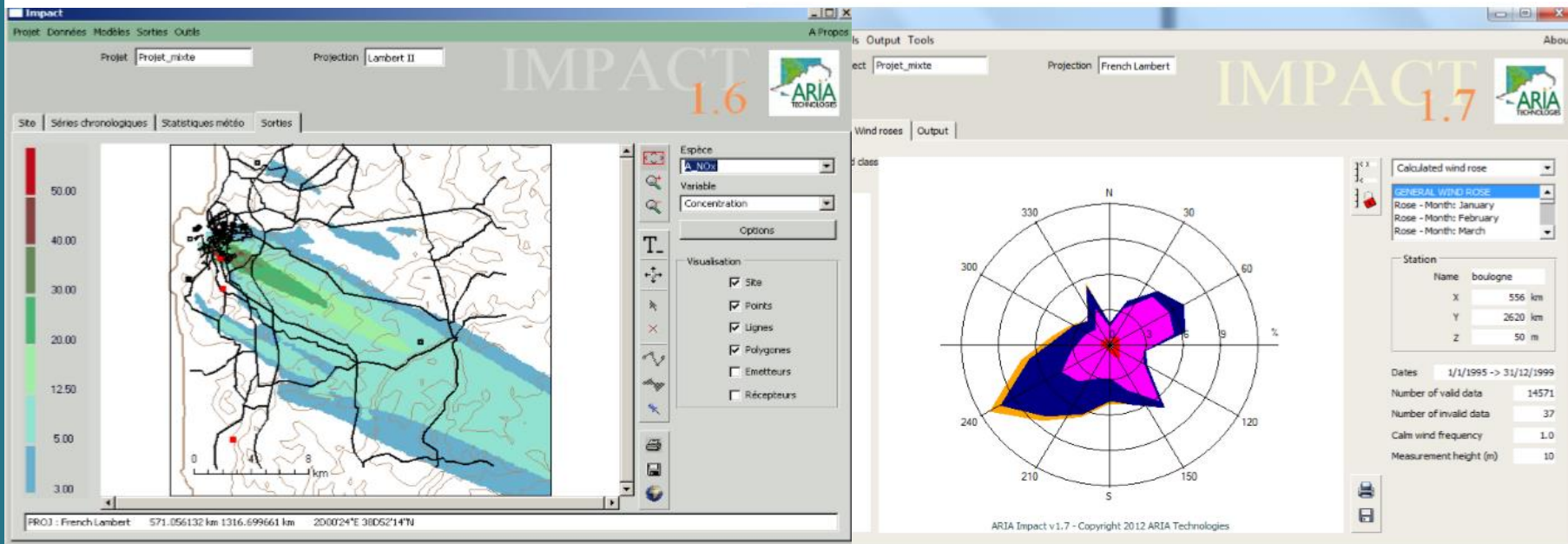
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Data transfer

A data acquisition system stores data, calculates defined averages, controls the quality assurance and prepares alarm messages. Data transfer itself happens via modem or network



Modeling data using “ARIA” soft





Procedures/protocols

1. Location(where)
2. Timing(when) – Campaign 1, 2, 3
3. Team(who will participate)
4. Transport(on the ground and on the water)
5. Protocols
6. Budget (price/km...)



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Thank You!



DDNI

Email mihaela.tudor@ddni.ro

Phone +40741084991

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