

ICARO



Ministry for the Environment  
Land and Sea



UNITED NATIONS  
ECONOMIC COMMISSION FOR EUROPE

## DANUBE PROJECT AND ITS ACHIEVEMENTS

**Joint management of transboundary emergencies  
from spills of hazardous substance into the Danube  
River**

Sofia, 17-18 Nov 2009

**Handling, transport and storage of hazardous substances is a key element in the management of the risk in the Danube river basin**



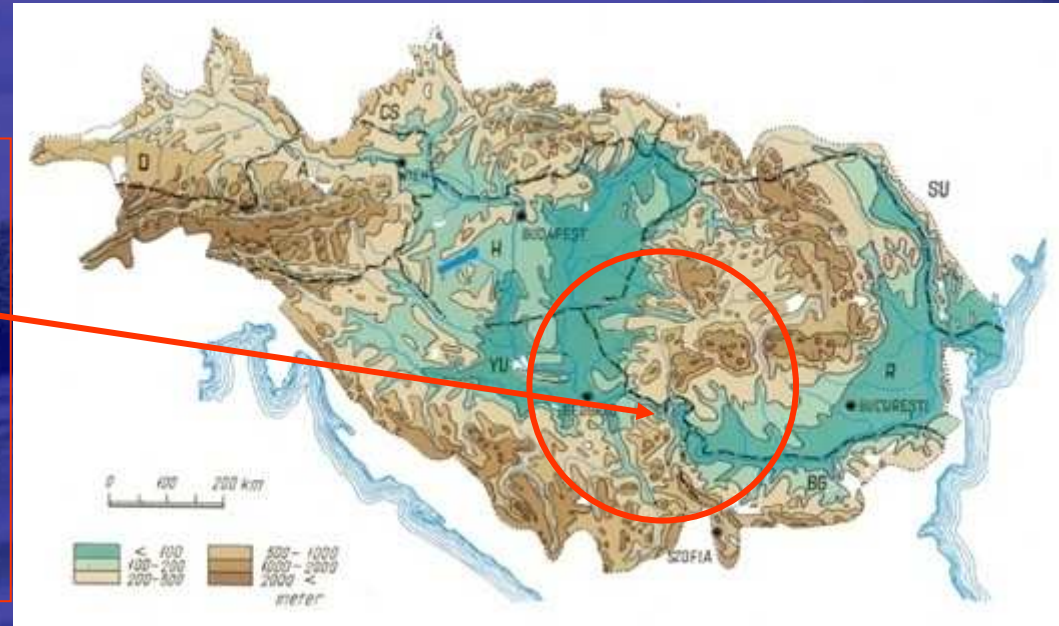
**Spill**

**The events of accidental pollution recorded in the past stress the need for clear definition and design of the management of an emergency due to spill of a dangerous substance**



## Project

Joint management of transboundary emergencies from spills of hazardous substance into the Danube River .

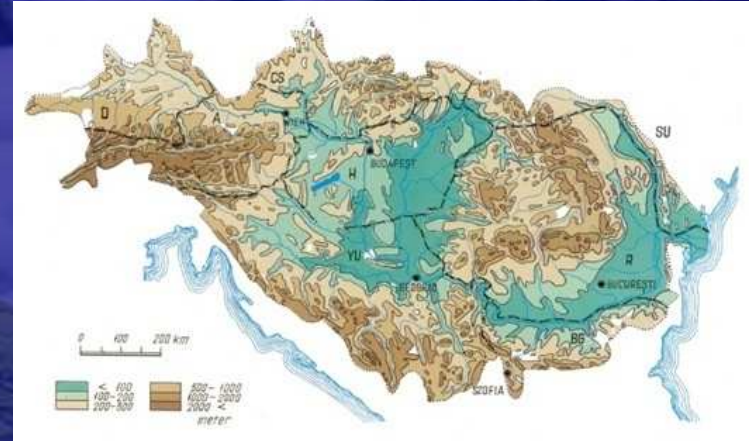


## Objectives

- ❁ Assist the authorities responsible for crisis management in Bulgaria, Romania and Serbia in taking steps aimed at further strengthening their effectiveness in organizing emergency preparedness and response.

# Project phases

The project follows four main phases



Year 2009



## SITE OF PRAHOVO, SERBIA

- Fuel tank farm
- Loading jetty to unload naval tanker into the storage tanks
- Operator on site controls each operation
- The circuit is provided with automatic and semi-automatic preventive measures



## REFERENCE SCENARIO

### Source terms

- Sudden rupture of loading arm (diameter of 200 mm)
- Release of 118 kg/s of diesel oil on the Danube river

### Mitigating measures

- Continuous presence of operators in the jetty
- Possibility to stop the pumps and isolate the line

Release time = 3 minutes

Total released amount = 21250 kg of diesel oil

## ENVIRONMENTAL FATE

Border with Romania → less than  
800 m

Prahovo, Serbia

### Elements that influences dispersion

- Water flow rate (speed, turbulence, variability during the year, etc.)
- River characteristics (depth, presence of tributaries, etc.)
- Meteorology: Wind speed and temperature

Border with Bulgaria →  
12500 m

Puntatore 44°15'09.07" N 22°39'41.33" E elev 39 m

© 2009 Cnes/Spot Image  
Streaming 100%

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Alt 17.78 km

## Three main fields of development

### NOTIFICATION

Procedure for information exchange at national and international level between RS, RO and BG

### EMERGENCY MANAGEMENT

Identification of manpower and devices for efficient and timing intervention to contain and remove oil spill

### MODELLING

Use of dedicated tools for real-time estimate of the environmental fate of the oil spill



## NOTIFICATION

### ■ Findings of the main workshop (June 2009):

Two main systems are applicable in the three Countries:

- PIAC (from ICPDR);
- IAN (from UN/ECE Convention).

Country	PIAC	IAN
Serbia	Ministry of Agriculture and Water	Not in use (planned for 2010)
Romania	Ministry for the environment	General Inspectorate for emergency situations
Bulgaria	Center of notification of the ministry for emergency situations	Center of notification of the ministry for emergency situations

**Transboundary notification is done only at national level and that only verified data are notified**

## EMERGENCY MANAGEMENT

### ■ Findings of the main workshop (June 2009):

Main devices available in the three Countries:

- Floating barriers, oil dispersant;
- Boats, trained personnel and scuba divers.

Country	Technical devices	Manpower
Serbia	Directly in Prahovo site. In Belgrade (4 hours to be on site)	Local team and from Belgrade (4 hours to be on site)
Romania	Turnu Severin and other downstream sites (1-2 hours to be on site)	Turnu Severin and other downstream sites (1-2 hours to be on site)
Bulgaria	Vidin (downstream the site)	Vidin (downstream the site)

## MODELLING

### ■ Findings of the main workshop (June 2009):

Availability of following types of software:

- DBAM from ICPDR (specifically developed for spills in the Danube);
- International free models (tailored for oil spill in the sea).

Country	DBAM	Type
Serbia	Available but no application	--
Romania	Applied several time in the Ministry for the Environment	Old version working in Windows 3.1 in dedicated computer
Bulgaria	Available but no application	--

**For the project development, it was established to test DBAM official model, using the available updated version of the software DBAM (Windows XP and similar).**

## TEST DEFINITION – Notification

- Notification path
- Local notification from Prahovo to Belgrade;
- International notification from Belgrade to Sofia and Bucharest
- Use of IAN system (UN/ECE convention);
- Use of PIAC system (ICPDR).



# TEST DEFINITION – Emergency Management



## TEST DEFINITION – Modelling



Use of DBAM model in three Countries

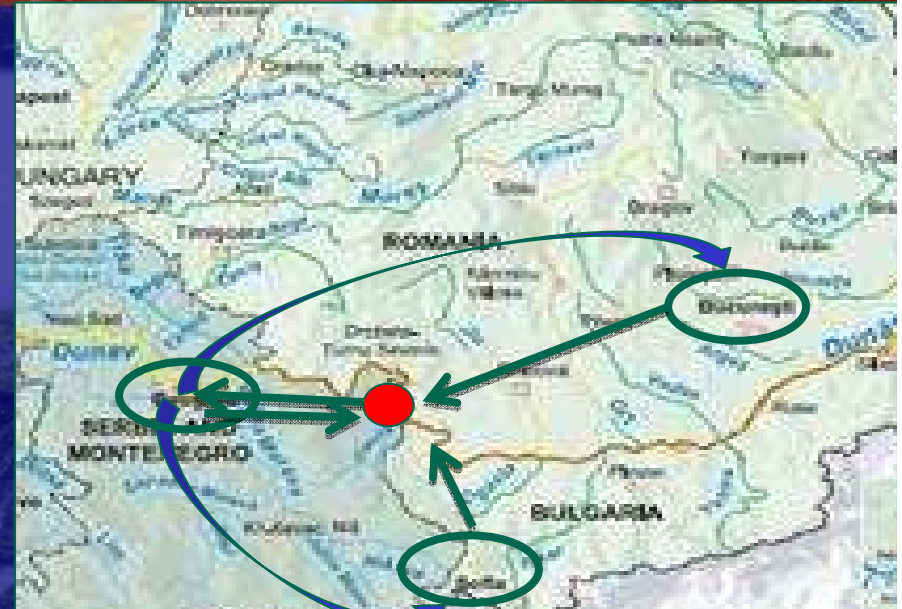
9.00 – Release of wood chips into the water in Prahovo site

Every 30s monitoring of the position of the wood chips



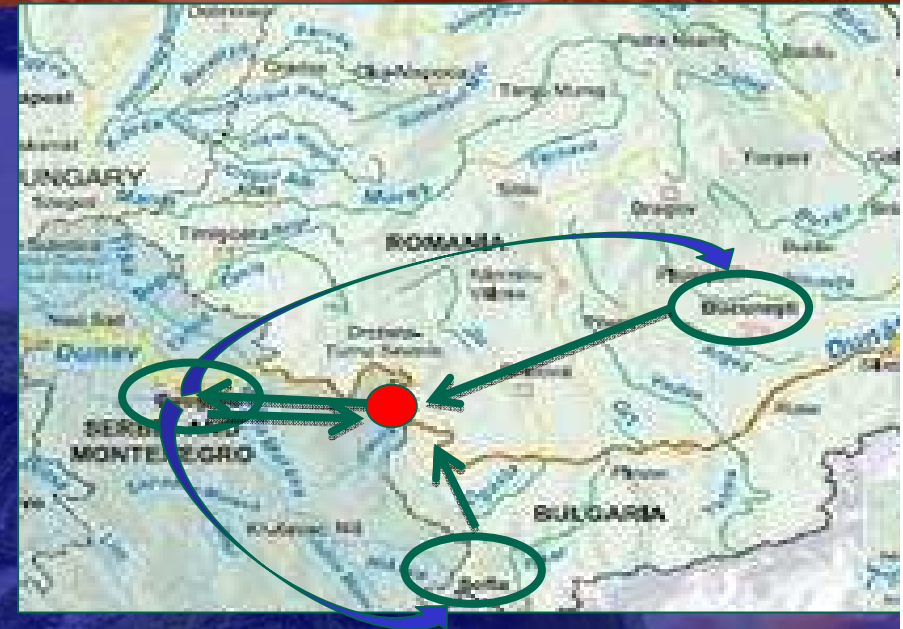
## TEST RESULTS – Notification

- Phone notification functioned well between local and national levels in Serbia;
- Internal notification functioned well in Romania (response was started following a notification on emergency from border police), the international notification was rather weak, the messages were only transmitted without any evaluation by Romanian point of contact;
- Preparation of early warning report took relatively long time for Serbia;
- Early warning notification with IAN System was sent by Serbia without indicating recipients, due to which Bulgarian and Romanian points of contact missed it;
- Early warning with PIAC was sent successfully via internet to Bulgaria and Romania and was confirmed by both recipient countries, sms did not work, ICPDR did not receive any message via PIAC;



## TEST RESULTS – Notification

- Romania did not send any message to Bulgaria using PIAC despite such a requirement;
- The information reports sent with IAN System were received successfully by Bulgaria and Romania; but the reports missed information on type of emergency, and some other input was not clear;
- Bulgarian point of contact tried to reach by phone Serbian point of contact to clarify on some inputs, but did not succeed.





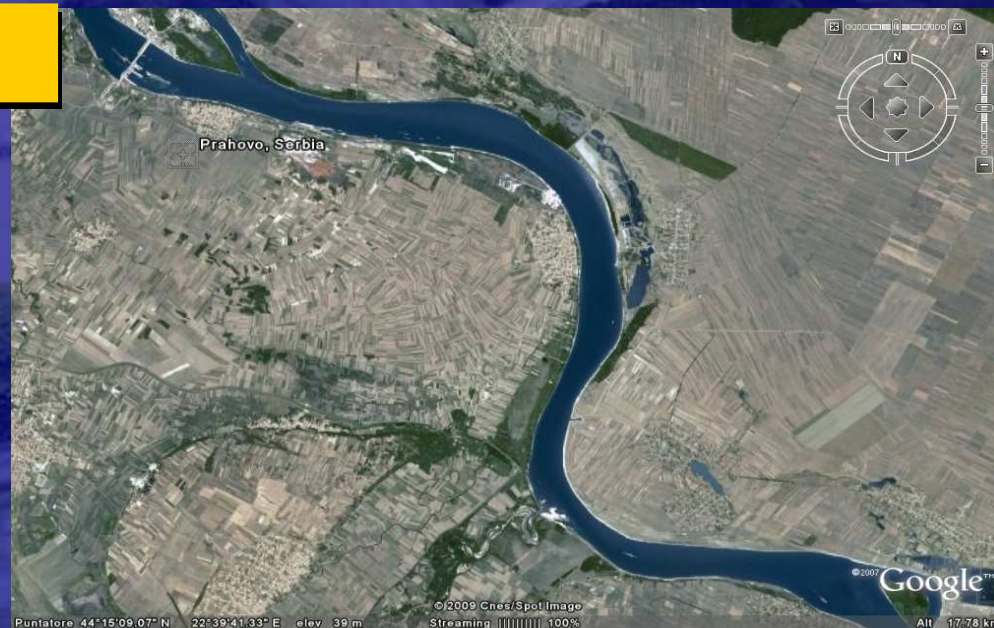
## TEST RESULTS – Emergency Management

- Cooperation between each country response forces and their border policy functioned well (in Romania the boat of border police was used to help in installing floating barrier);
- The operation section at Danube in Serbia was not particularly good for containing the simulated oil spill, although it was a good place for the response team to access the river from the bank;
- Equipment used was not very efficient (in Romania floating barrier was difficult to maneuver, skimmers were not too useful because an appropriate tank for collecting oil was lacking)
- The response forces personnel followed on the procedures, team leaders performed well, but no back up/replacement teams would have been available for major accidents

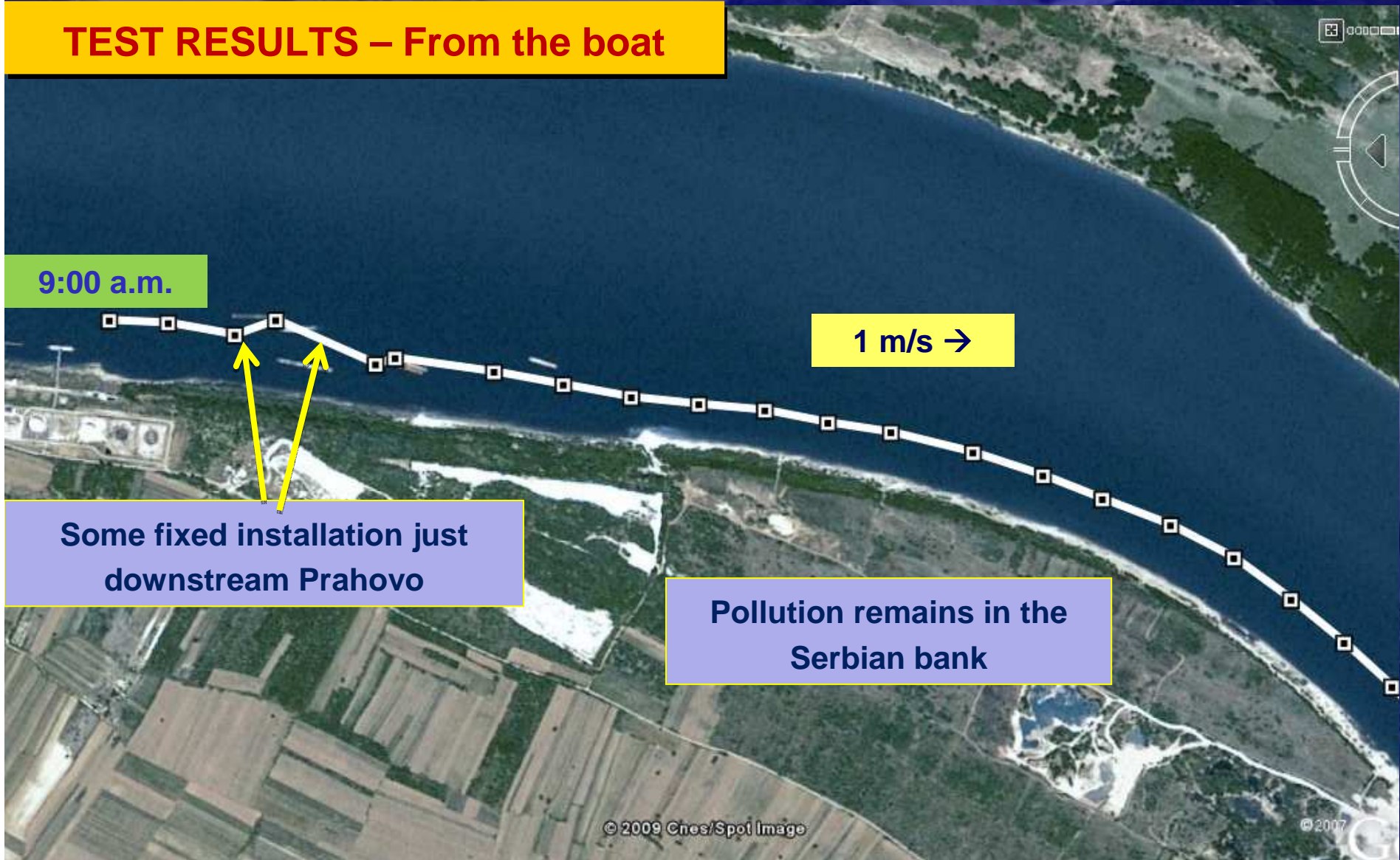


## TEST RESULTS – Modelling

- To have used ICPDR's Danube Basin Alarm Model (DBAM) software,
- To have missed some data to be inserted into the model which should allow better predication of the movement of spill (e.g. Serbia did not have meteorological information for the downstream area of Prahovo);
- Bulgaria informed that the modelling rather misguided in their case



# TEST RESULTS – From the boat



# TEST RESULTS – From the boat

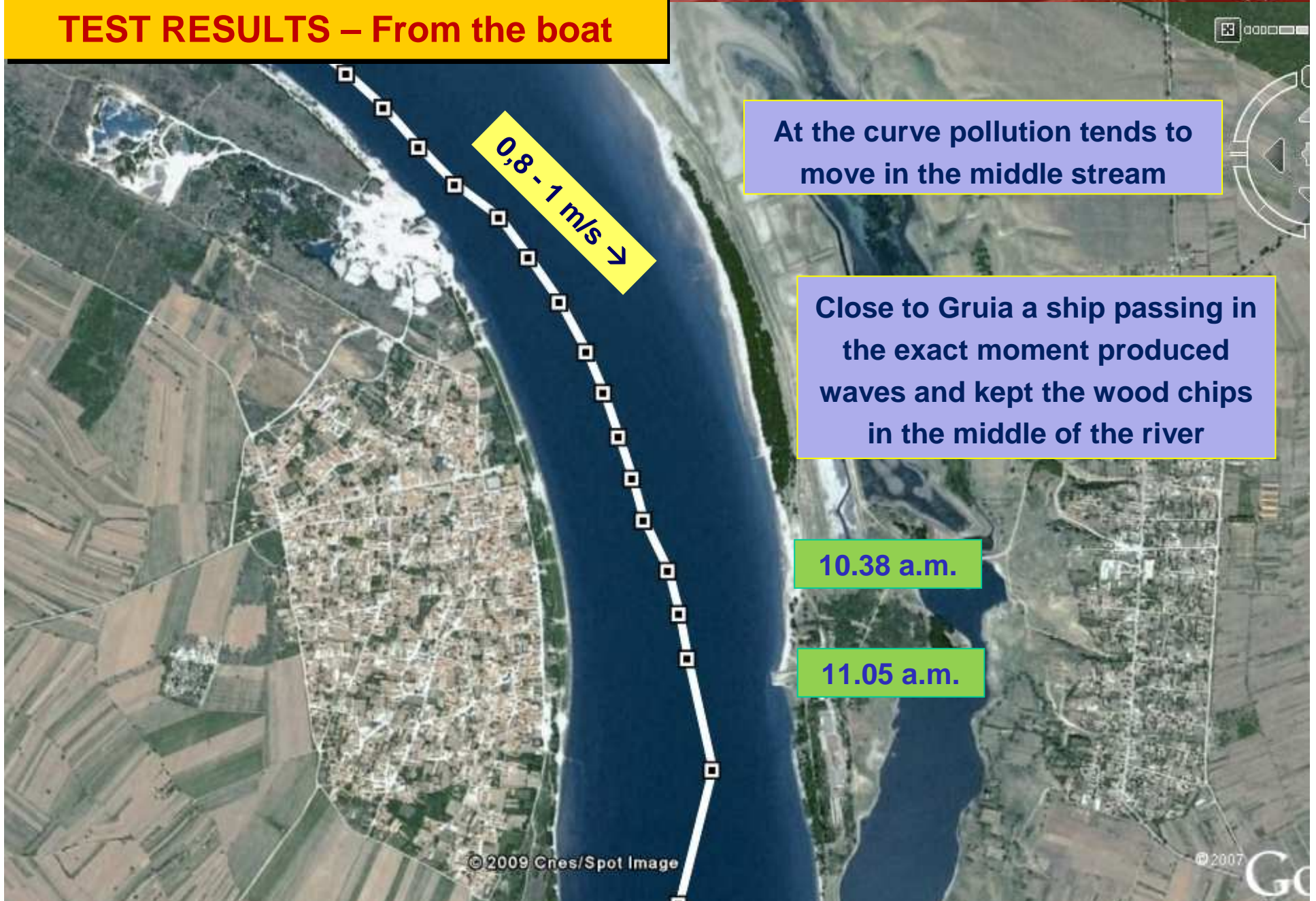
Zoom

Prohovo loading /  
unloading area

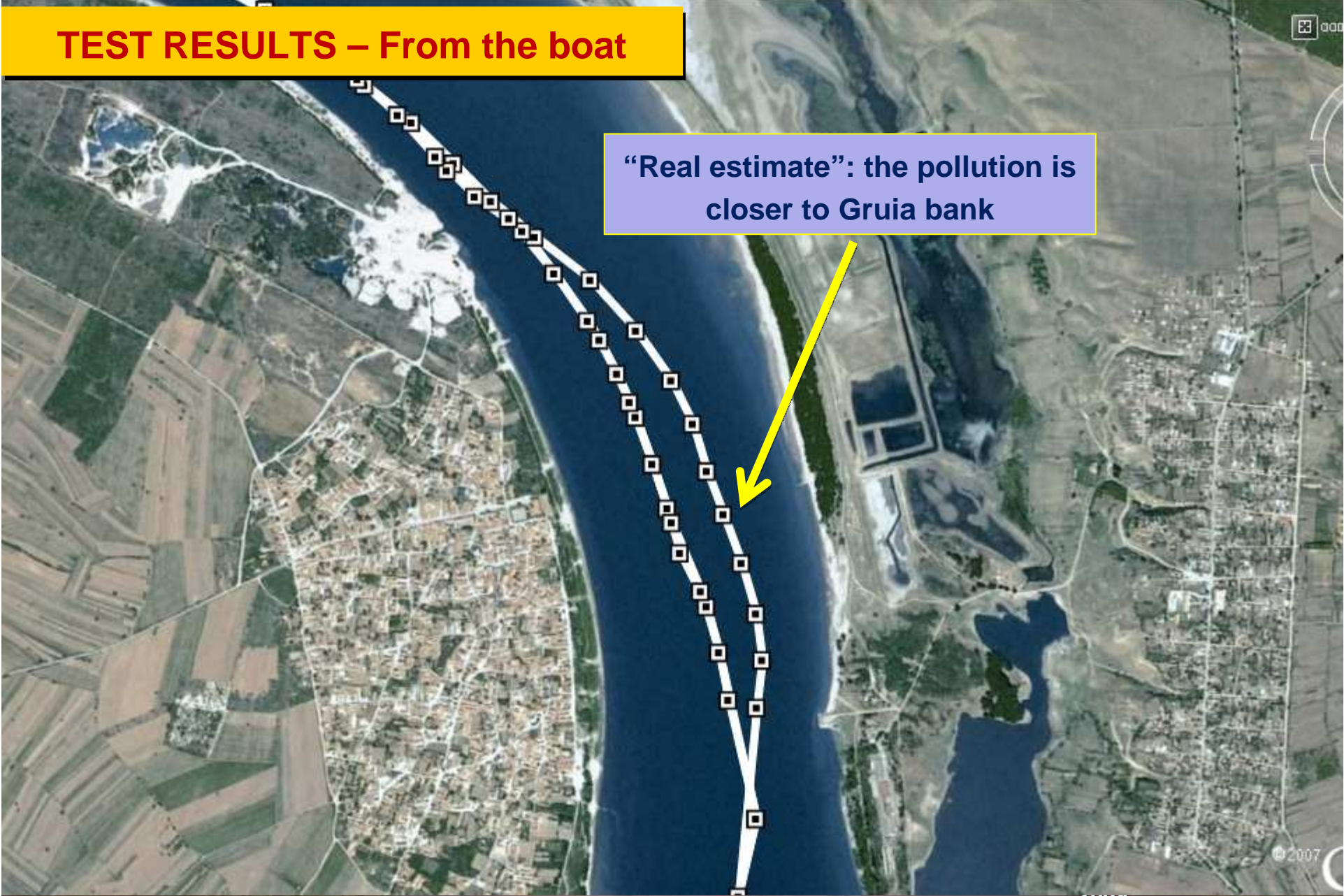
1 m/s →

9:00 a.m.

Fixed installation  
downstream the site

**TEST RESULTS – From the boat**

**TEST RESULTS – From the boat**



“Real estimate”: the pollution is closer to Gruia bank

**TEST RESULTS – From the boat**

11.05 a.m.

0,7 – 0,8 m/s



After the curve river flow rates slows down

Pollution tends to reach again the Serbia bank

Simulation stopped just before the entrance of Timok river (BG border)

Timok river  
12.22 a.m.

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Google

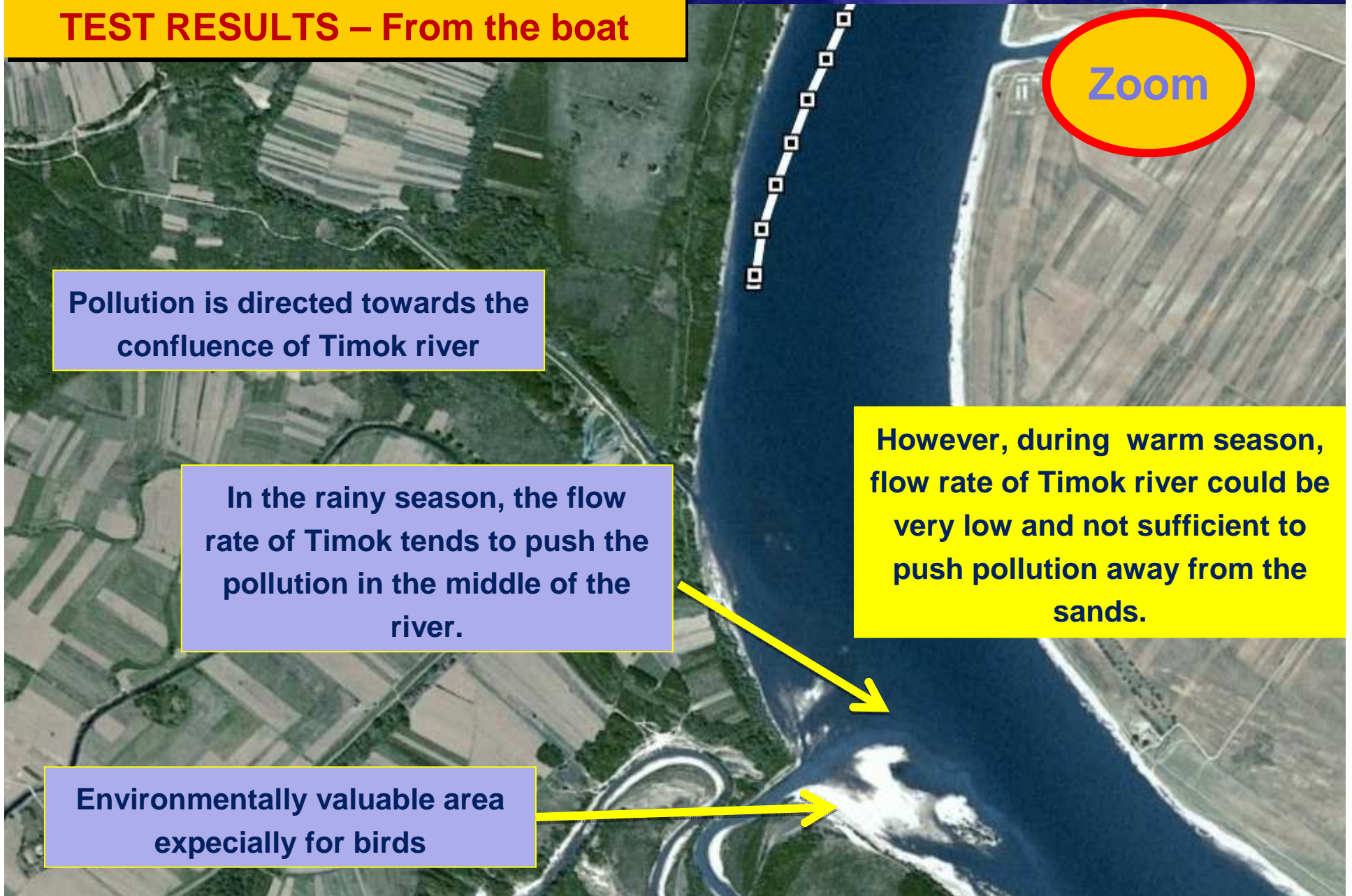
**TEST RESULTS – From the boat****Zoom**

Pollution is directed towards the confluence of Timok river

In the rainy season, the flow rate of Timok tends to push the pollution in the middle of the river.

However, during warm season, flow rate of Timok river could be very low and not sufficient to push pollution away from the sands.

Environmentally valuable area especially for birds





## TEST RESULTS – From the boat

9:00 a.m.

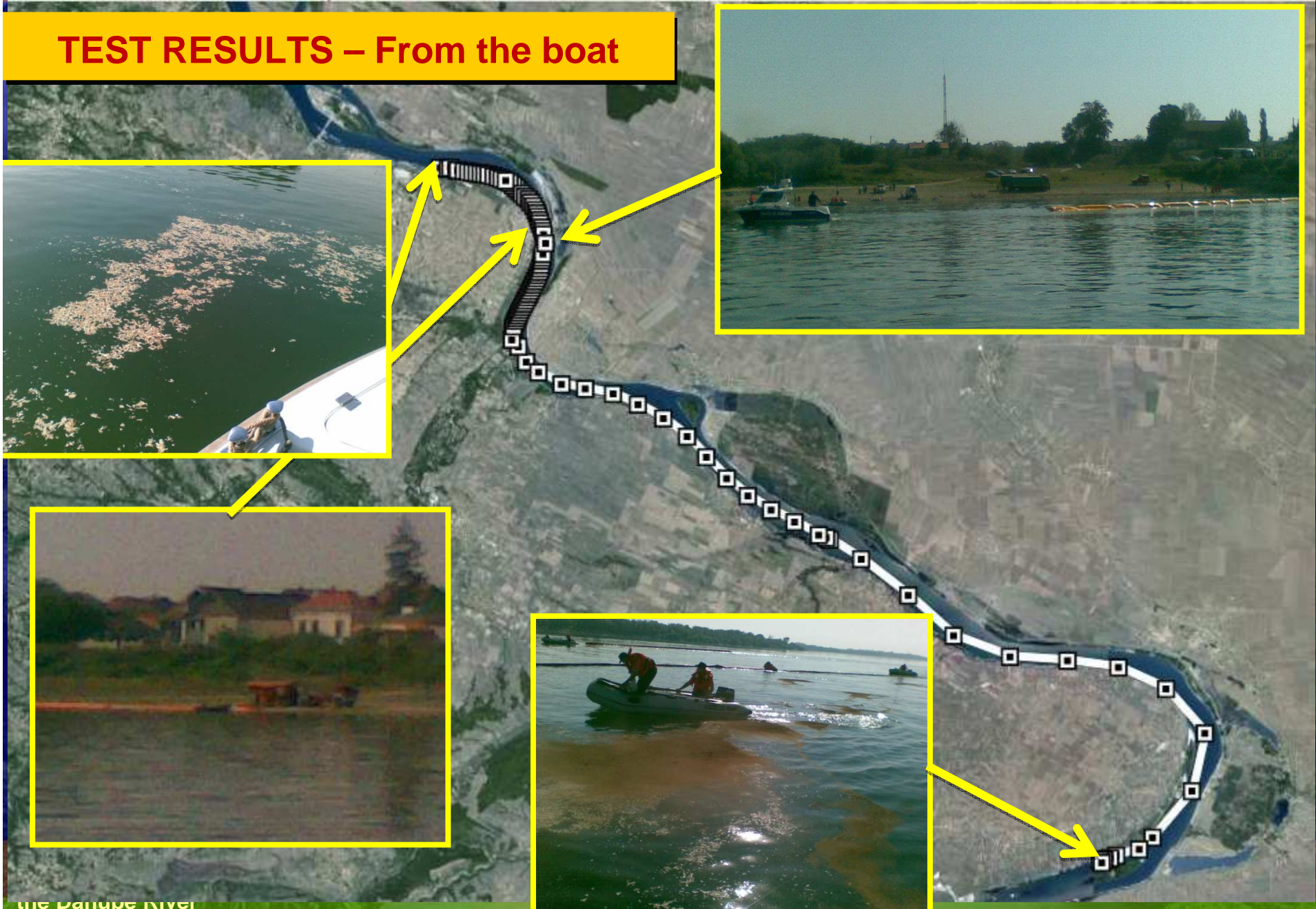
Pollution very close to Timok river (bird area)

At normal river flow rate, it would take at least 10 hours to oil spill to reach Vidin area

Test area in Bulgaria (Vidin)  
40 km downstream border

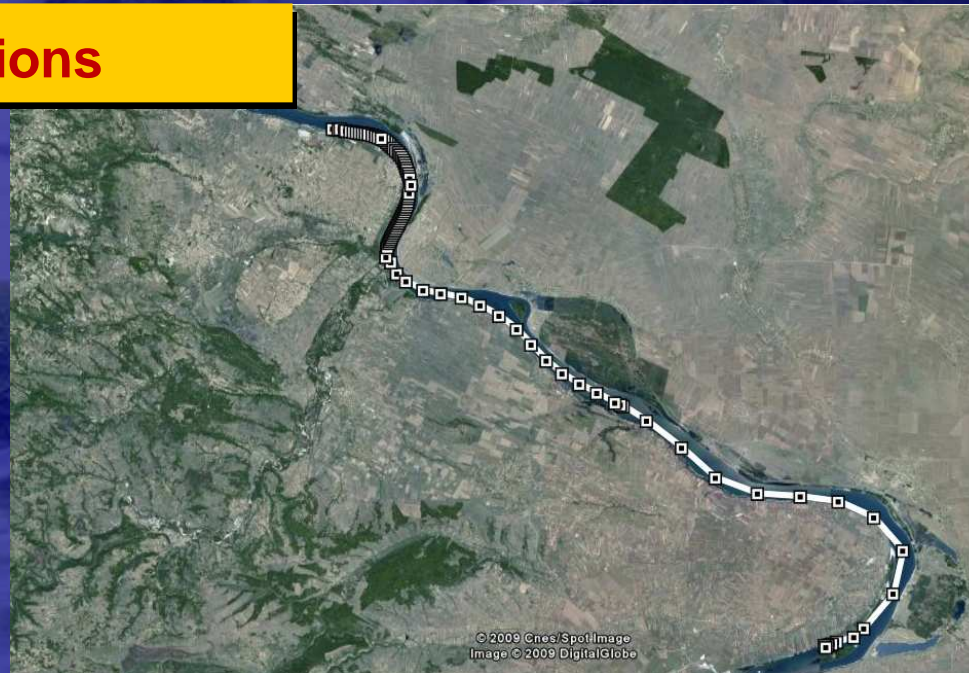
14.44 a.m.

# TEST RESULTS – From the boat



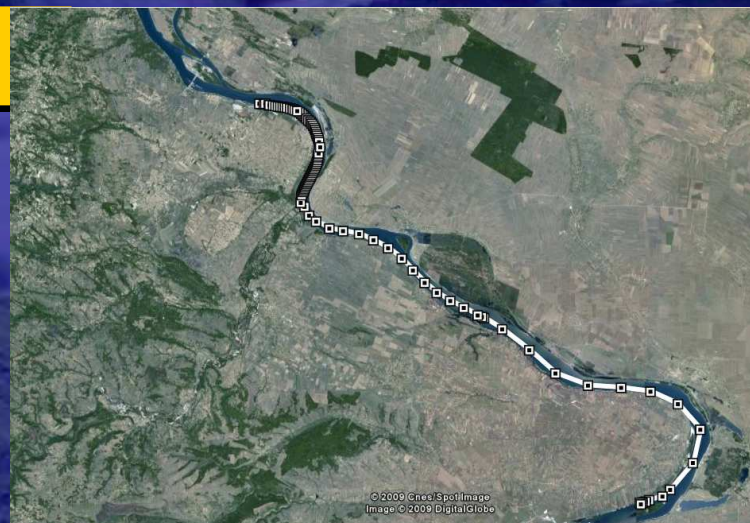
## TEST RESULTS – Considerations

- The area of potential impact in Romania (Gruia) is too close to organize the proper emergency management from the region (Turnu Severin);
- Time to leave Serbia is too short to put in force an efficient action co-ordinated from Belgrade;
- Vidin location in Bulgaria is considered too far from the border with Serbia for an effective protection of the Danube bank;
- Timok river confluence is valuable environmental area to be protected.



## TEST RESULTS – Mid term propositions

- Nominate focal points at local level for joint management of emergencies;
- Consider establishing a joint working group for improving the joint management, thus each country should nominate its representatives to the group;
- Exchange offsite contingency plans and to harmonize these plans by the working group; in case the plans are yet non existing, they should be developed on country basis based, among others, on the data collected in the exercise;
- Discuss splitting the Danube River between Prahovo and Vidin into operation section for response, based on predicted movement of spills, so that the response would be most effective;
- Develop possible scenarios for emergencies and optimize the emergency preparedness for them; and
- Hold regularly, as far as the resources allow it, exercises to test on changes introduced to the procedures.





**THANK YOU !!!**