

Implementation of the Flood Directive in Romania

Gheorghe Constantin

Director

Ministry of Water and Forest



Floods in Romania 2002-2012

- 183 fatalities – biggest no. in UE
- -68000 evacuated people – third place in UE
- -107.95 mil Euro from EU Solidarity Fund – four place in UE
- -Total cost of flood impact 6300 mil. Euro – seven place UE
- -43,900 houses damaged – biggest no. in UE

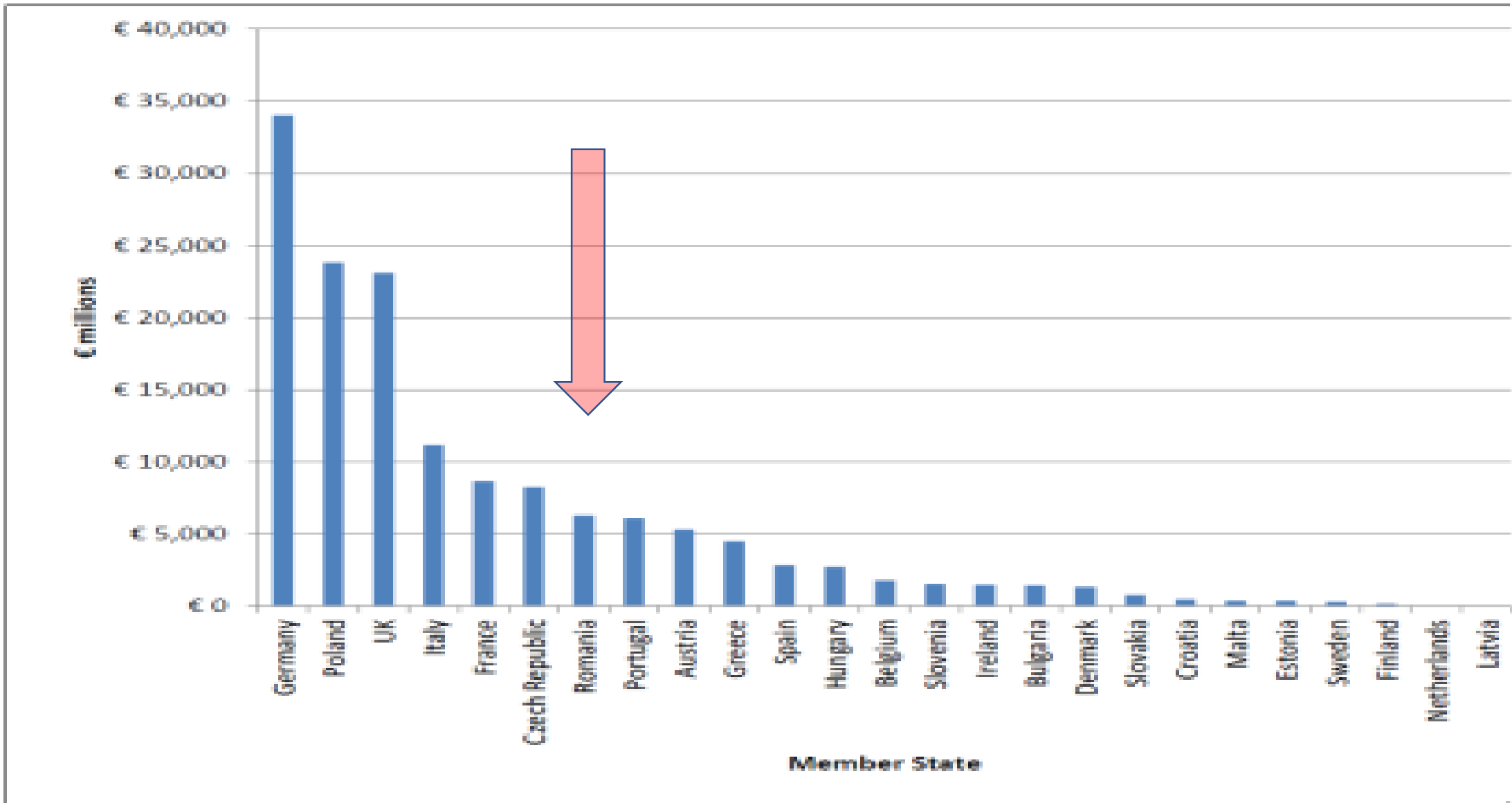


Figure 3-1: Total extrapolated costs per Member State, from largest to smallest costs

Damages 2002-2012 according to the European study: about 4.1 billion euros

Damages 2005 - 2015 according to the Romanian synthesis reports: about 13.5 billion lei ~ 3 billion euros

Annual Average Damages (AAD): 300-400 mil Euro

Avoided AAD - 1-1,5 bil Euro

Bucuresti 1864



Satumare 1970



Medias 1975



Banat 2005



Siret 2008,2010



Vedea 2014







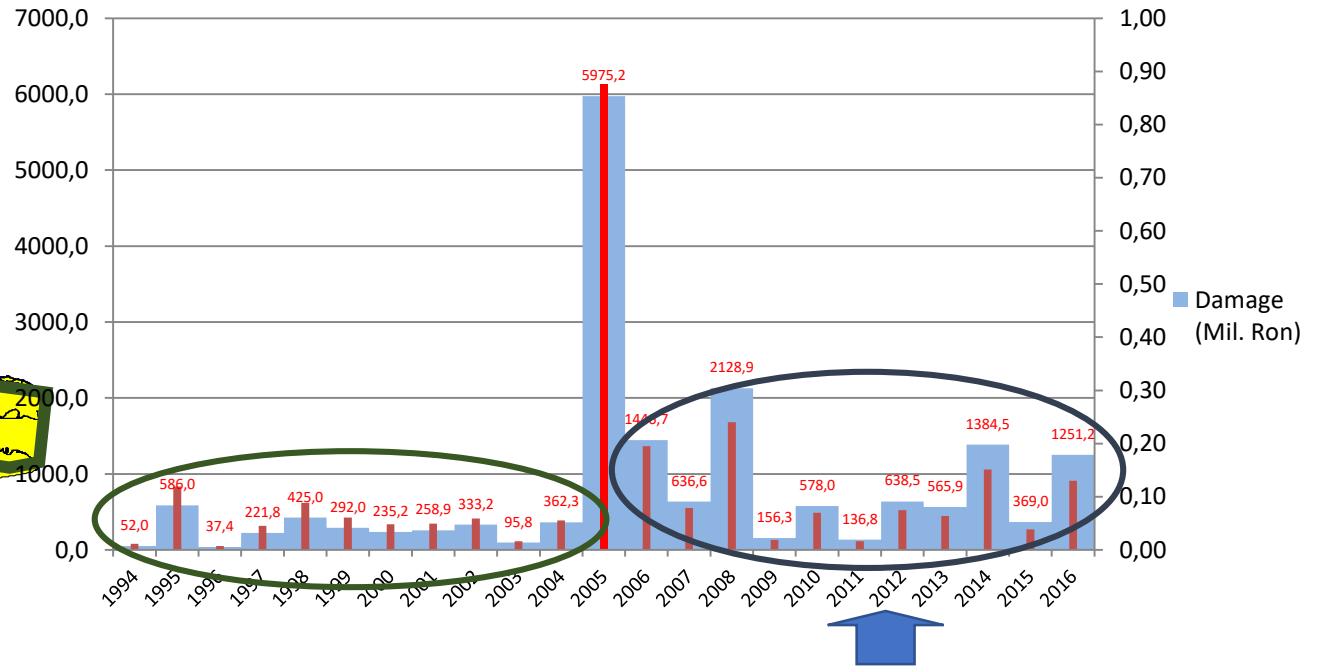
1. History of flood-related actions in Romania

Vulnerability degree at the counties level
in the period 1992-2004 and flooding events 2005,2006,2008, 2010, 2014,2016



-  Strong affected areas in 2005
-  Strong affected areas in 2006
-  Strong affected areas in 2008
-  Strong affected areas in 2010
-  affected areas in 2014, 2016

- Dm – Average Damages (Bil. ROL)**
Dtot- Total Damages (Bil. ROL)
-  Very high vulnerability
 -  High vulnerability
 -  Average vulnerability
 -  Less vulnerability



Climate change effect?
Anthropic influence?
Damage quantification error?

Sendai Framework for Disaster Risk Reduction:
"Disaster databases are a disaster"

The main types of floods in Romania (fluvial, pluvial, coastal)



2010: Dorohoi, Ezer reservoir -
spillway :
water from downstream to
upstream



Pluvial: Flash floods effects in
Suceava county



Fluvial: Siret river,
new Movileni reservoir,
first flood 2014

Effects of floods



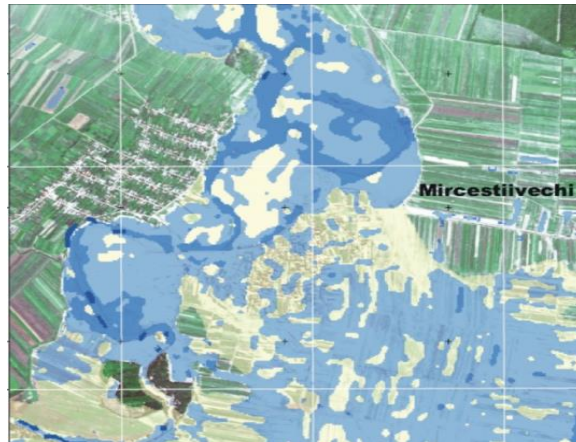
Effects of a flash-flood in the Nehoiu sub-basin, Carpathian sector of Buzau river basin



Effects of the flood in May, 2005 - breaking a bridge over Bâsca Chiojdului River, Buzau R.B.



Putna river floods, outside Subcarpathians, during the July 2005 event

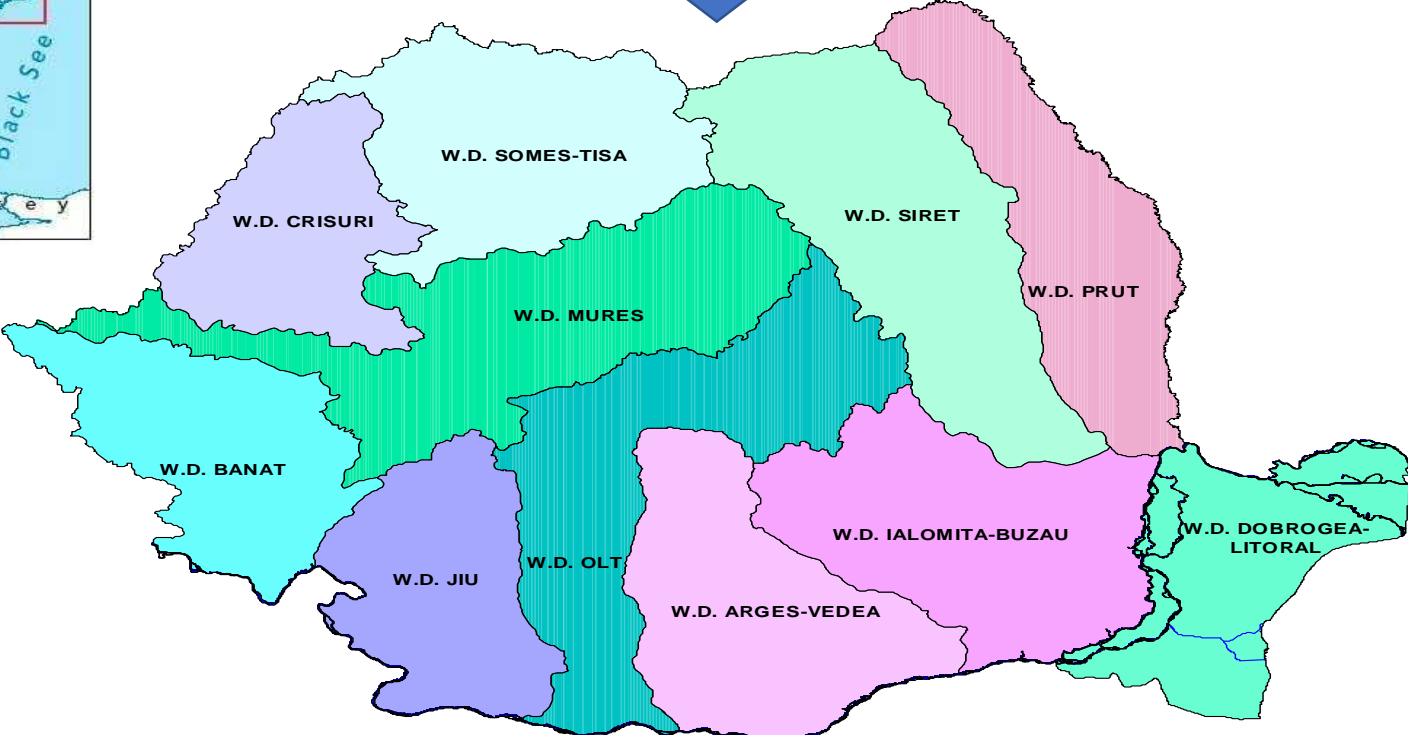


Brief History of water planning and strategies in Romania



97.8 % of Romania surface is in the Danube river basin
30% of Danube river basin is in Romania

Water Management sector organized on river basin approach



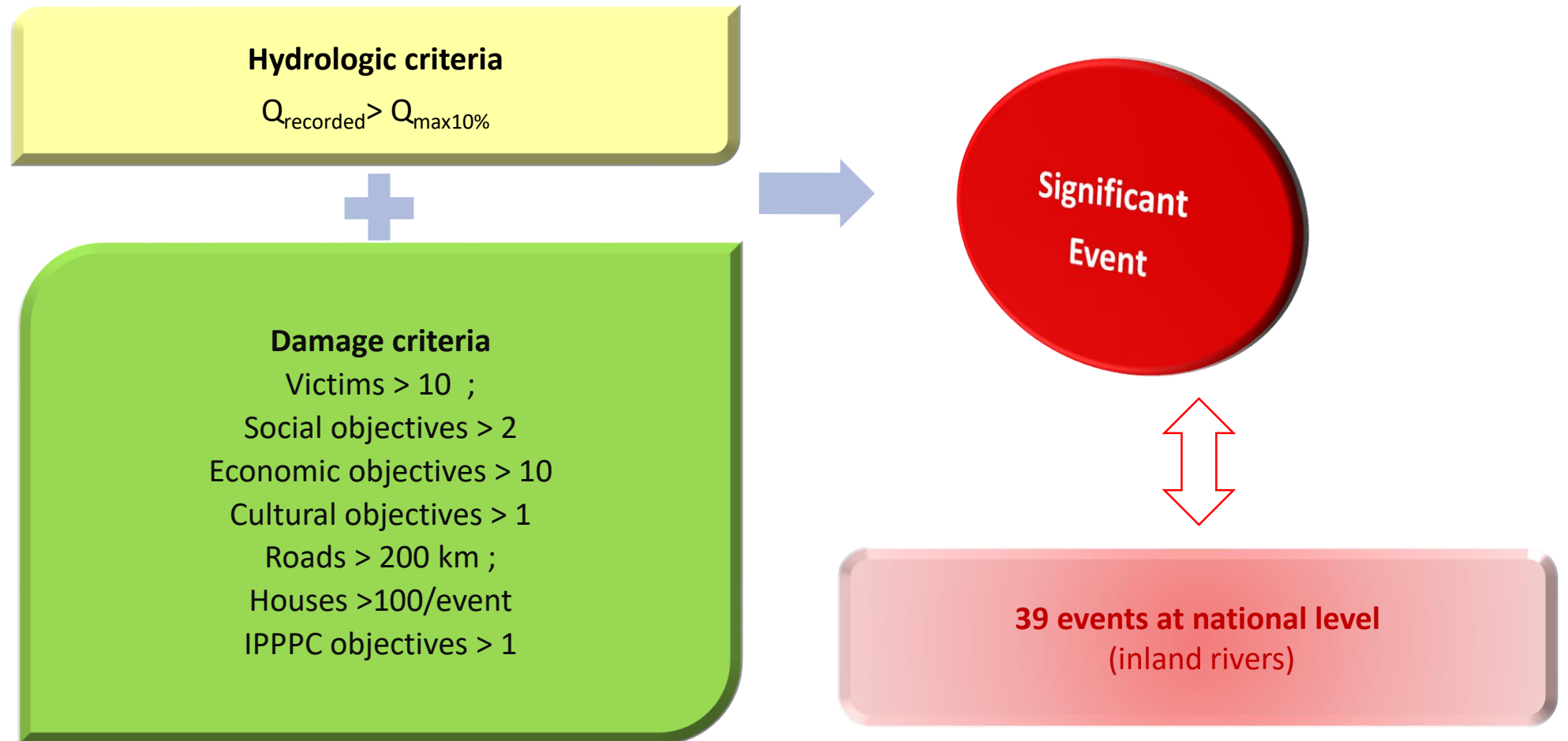
Implementation of the Flood Directive in Romania

- With the support and cooperation at the European level (Working Group Floods)
- Coordinated at the Danube River Basin level (within ICPDR Flood Expert Group)
- Coordinated at the bilateral level with the neighbouring countries
- Developed at the national level

Preliminary Flood Risk Assessment

- Information obtained from the archives of different institutions;
- SPOT images - acquired by MMP (at the level of 2007)
- Documentation and reports elaborated within the project
Contributions to the development of the flood risk management strategy - PHARE 2005/017-690.01.01
- Results of DANUBE FLOODRISK - (South - East Europe Transnational Cooperation Programme) project.
- The specialty literature (egg. Floods of 1970 and their impact on agriculture in the western part of RS Romania, Water Cadastre, etc.).

Criteria used for Preliminary Flood Risk Assessment



Criteria used for Preliminary Flood Risk Assessment

Floods for which criteria from hazard point of view were established

- floods produced on large hydrological areas ;
- local floods;
- floods caused by natural blockages (ice jam, grease ice etc.);
- floods caused by artificial blockages (accidental or controlled dike/dam breach, blockages at bridges and foot bridges)

Criteria for identification of significant floods from the hazard point of view

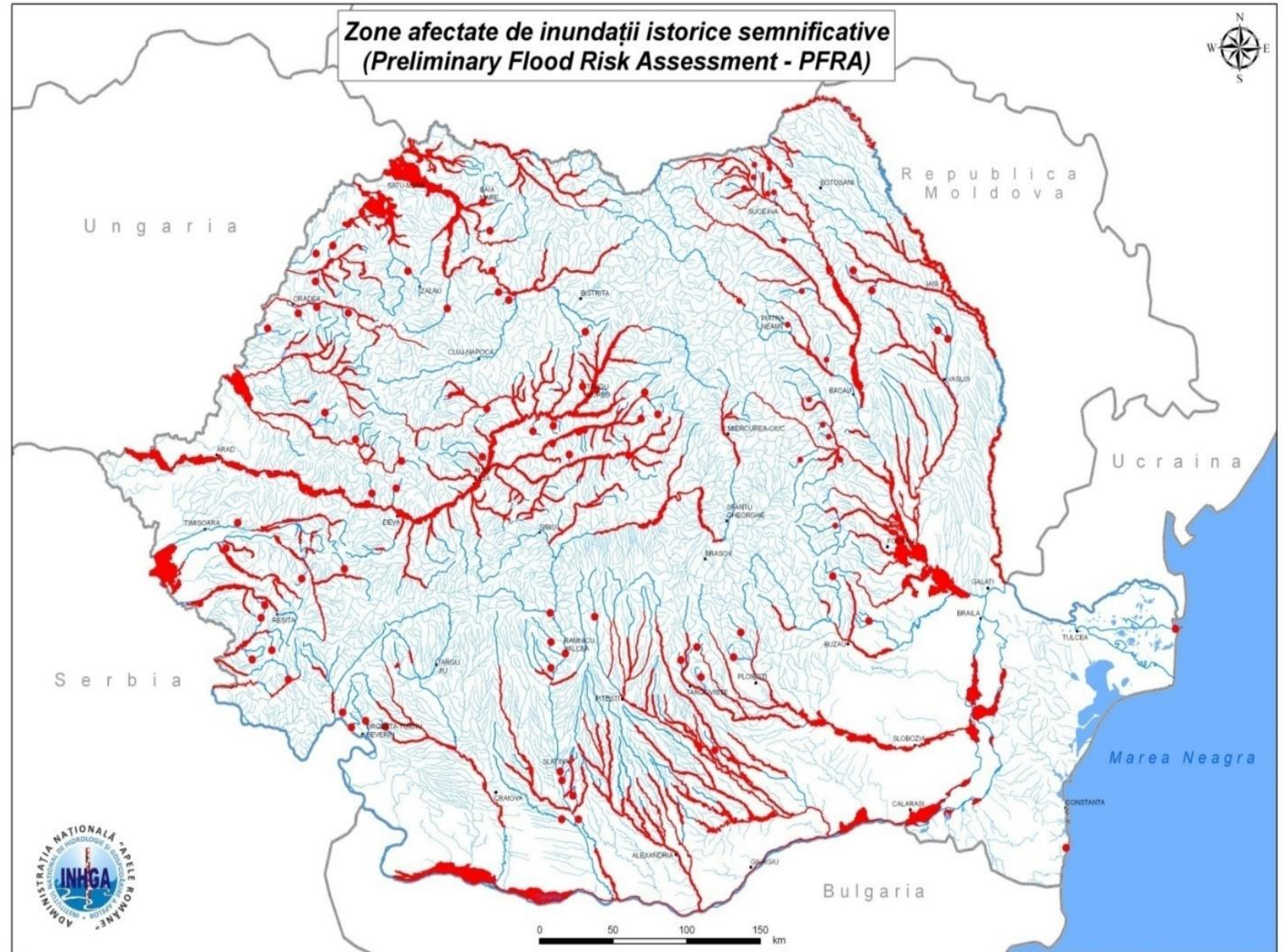
- a) Peak discharge recorded $> Q_{\max 10\%}$; $Q_{\max 10\%}$ represents the peak flow with the probability $> 10\%$;
- b) Peak discharge recorded $> Q_{\text{FQ}}$; Q_{FQ} represents the actual discharge corresponding to flood quota;
- c) floods produced at hydrometric stations with catchment areas greater than 100 km^2 and/or which are located in areas where relatively large floods could produce;
- d) floods produced especially on the main river and important tributaries, at a larger number of hydrometric stations
- e) big floods, produced on the tributaries of the main river;



Inventory of affected areas by significant floods



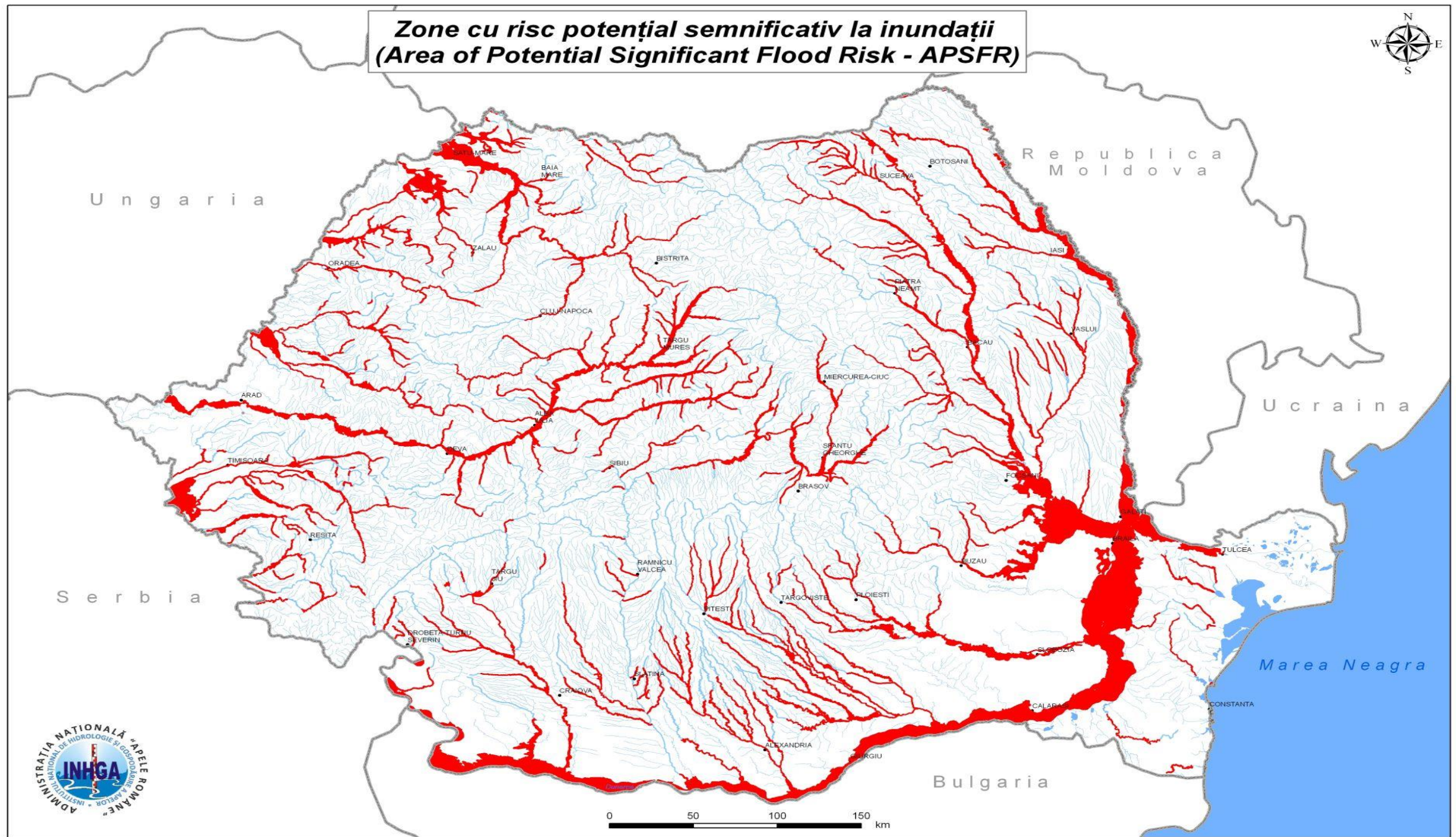
375 areas with significant flood risk on inland rivers and 24 on the Danube



Areas of potentially significant flood risk (APSFR)

- ✓ It was based on the significant past floods, where the selection criteria of events have already been applied
- ✓ If there was a potential flood-prone area, but there were no known historical events (particularly spatial covering), a specific GIS procedure was used to assess these areas
- ✓ Such areas were the ones embankment rivers
- ✓ Existing projects developed for flood strategies were used
- ✓ To apply selection criteria to APSFR areas, some socio-economic indicators were used:
 - ✓ localities
 - ✓ network of roads and railways
 - ✓ industrial areas
 - ✓ protected areas
 - ✓ flood defense infrastructure, etc.

**Zone cu risc potențial semnificativ la inundații
(Area of Potential Significant Flood Risk - APSFR)**



SCENARIOS

INTERNAL RIVERS (Scenarios 0.1%, 1%, 10%)

- result of the **Programme National Plan for floods prevention, protection and mitigation** (P.P.P.D.E.I.) - financed through state budget and Environmental SOP (covers ~70 % of reported APSFR) – NIHWM scientific coordination.
- **343 river courses => 16.400 km covered by FHRM**

DANUBE RIVER (Scenarios 0.1%, 1%, 10%)

- result of the **Danubefloodrisk project** (South East Europe – Transnational Cooperation Programme - 2009 – 2011).
- **1074 km river length covered by FHRM**

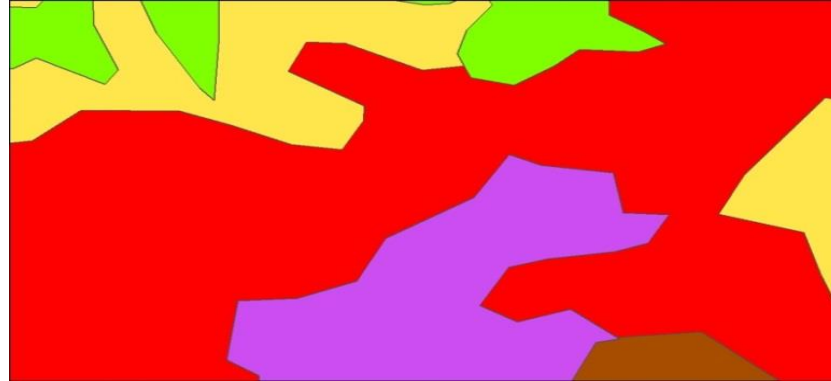
Improvements in knowledge

Example 1: CORINE Land Cover

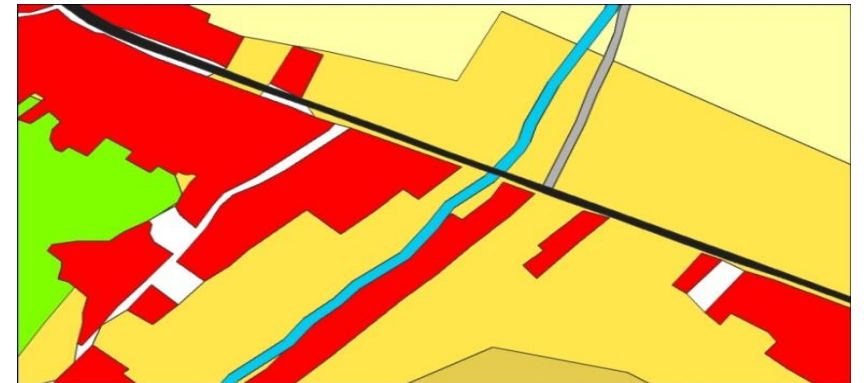
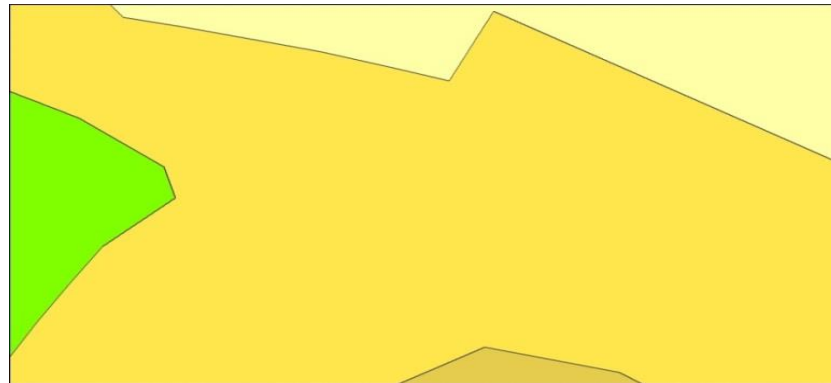
2006

2014

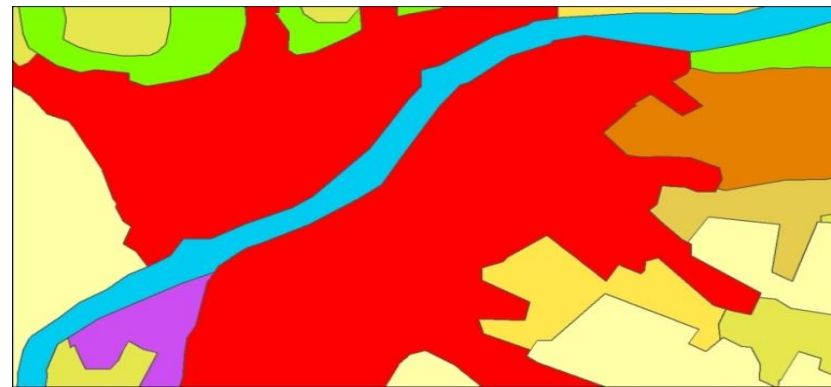
small and medium rivers



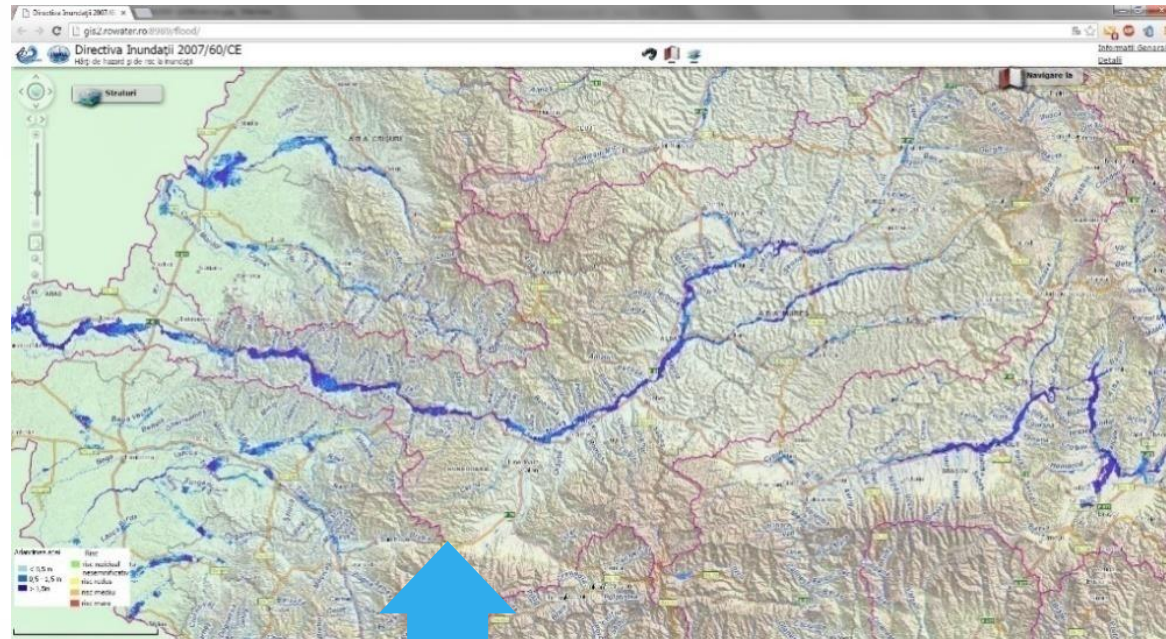
county and national roads



streets and other use



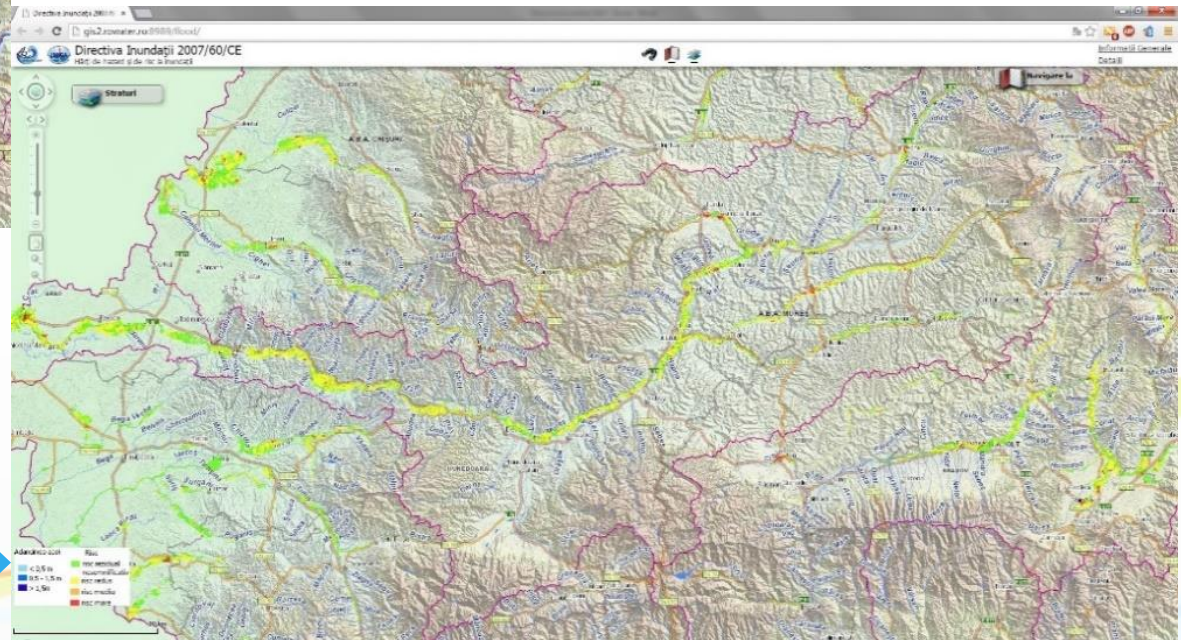
Flood Hazard Risk Maps



HAZARD MAPS

RISK MAPS

5 METHODOLOGY SETS
FOR EACH R.B.A.



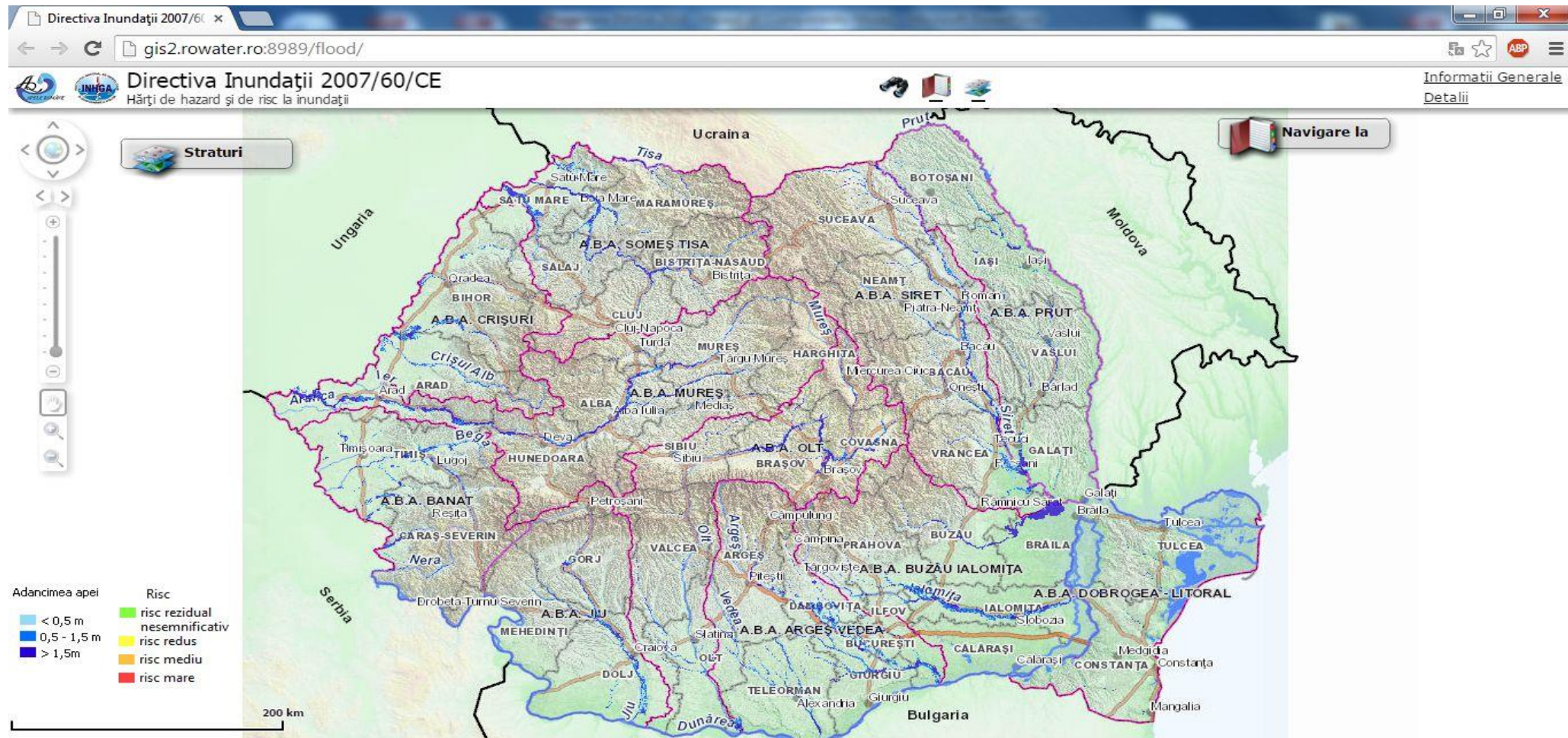
METODOLOGII SUPTOR
HĂRȚI DE HAZARD ȘI RISC LA INUNDAȚII

REALIZATE ÎN CADRUL TEMEI
STUDIULUI PENTRU IMPLEMENTAREA DIRECTIVEI 2007/60/CE
"EVALUAREA ȘI MANAGEMENTUL RISCULUI LA INUNDAȚII"

2014

PT 10/08/14

Increased information and awareness



FLOOD HAZARD MAPS - PORTAL

Floods Hazard Risk Maps knowledge and awareness



Almost 4 % (~ **818.000 inhabitants**)
of total population of Romania
is situated in flooded area.

Potentially affected population is
distributed in **3547 localities**
scattered throughout the country.



**Distribution of localities at the level of
the 41 counties**

Flood Risk Management Program



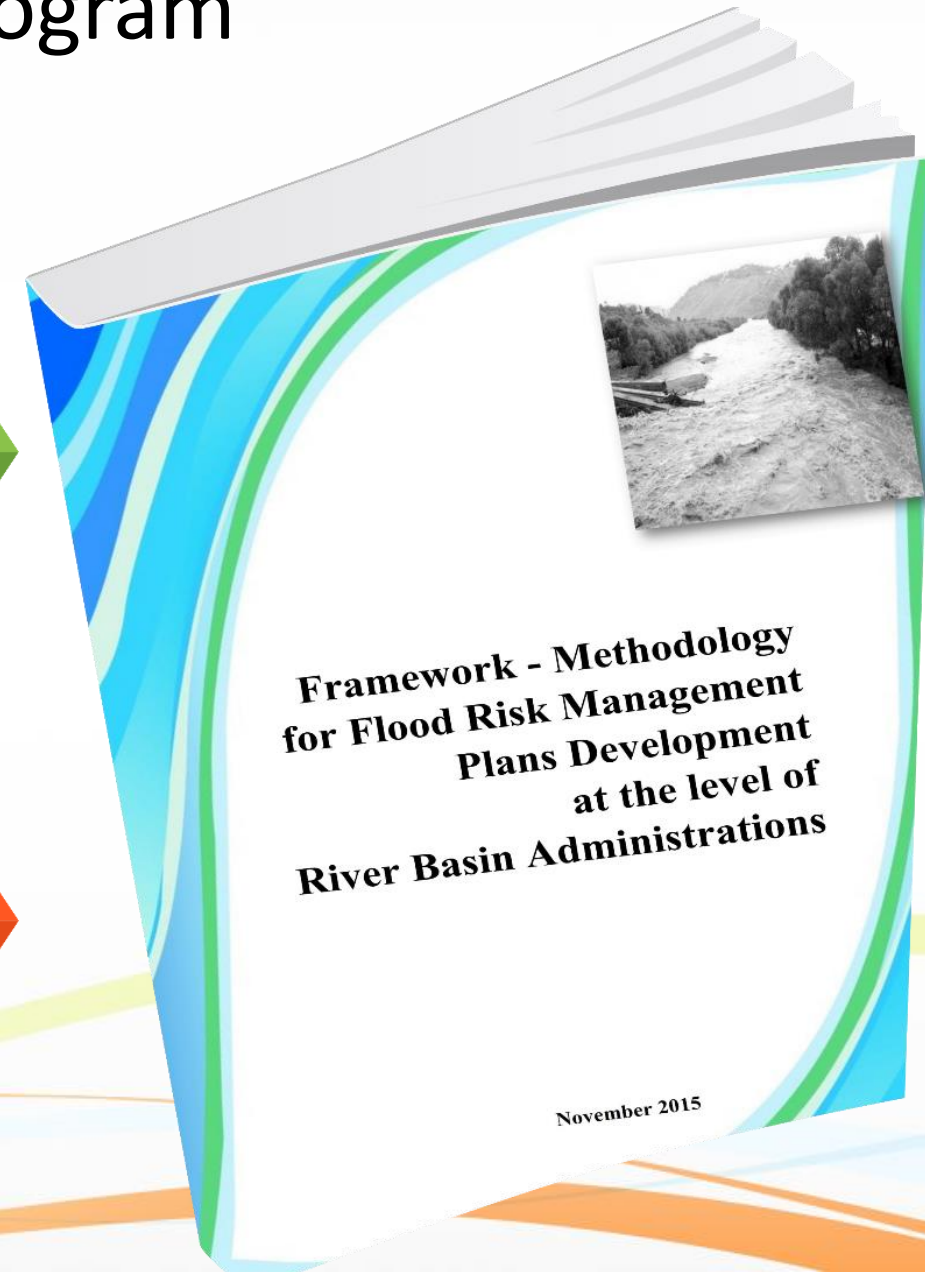
Establishment of
an unitary content plan

Setting flood risk management objectives
and associated quantifiable indicators

Developing a catalog of
potential measures
at national level

Identification of indicators to assess
progress of implementation
of the proposed measures

Defining criteria for
major integrated projects



**Framework - Methodology
for Flood Risk Management
Plans Development
at the level of
River Basin Administrations**

November 2015

Coordination with the Water Framework Directive

- Increasing awareness concerning ecological aspects in relation between WFD and FD;
- First time when in approved FRMP's was included wetlands and nature based solution; (previous "Scheme don't include such aspects; only water quality aspects related with WWTP and IPPC)
- In the Technical Committee for approval of investments was involved at RWNA level biologists and chemists from RBMP Department;
- Improvement of stakeholder consultation, but still is needed to create additionally mechanisms and platforms;

-

TYPES OF MEASURES CONSIDERED

Green Roofs



Rainwater Harvesting



Permeable Paving



TYPES OF MEASURES CONSIDERED

Floodplain reconnection
and restoration



Re-meandering



Wetland restoration
and creation



Involvement of citizens

FLOODS DIRECTIVE GENERAL OVERVIEW

CONSULTATION AND INFORMATION OF THE PUBLIC



TV and Radio appearances

Leaflet

River Basin Committees



WEB Site posting



Newsletter

Questionnaires



1. Care este domeniul dvs. de activitate?
 - Agricultură;
 - Transport;
 - Operatori de apă;
 - Autorități publice naționale (minister, agenți economici);
 - Autorități publice locale (primării, consiliile județene);
 - Organizații profesionale;
 - Institute de cercetare;
 - Mass-media;
 - Învățământ;
 - ONG-uri;
 - Mediul privat (investitori, asiguratori, firme de consultanță);
 - Armată (Jandarmerie/Politie/Pompieri/IGSU);
 - Biserici;
 - Persoane casnice (riverane);
 - Altele, Care?
2. Care sunt documentele pe care le-ați studiat în proiectul Planului de management al riscului la inundații?
 - Informare cu privire la Planul de Management al Riscului la Inundații;
 - Versiunile preliminare ale celor 11 Planuri de Management al Riscului la Inundații;
3. Care au fost sursele de informare prin care ați obținut aceste documente?
 - Pagina de internet a autorității responsabile;
 - www.rovaterfabia.ro

Impact of the Flood Directive

- Increase in knowledge about flood risk and flood hazard
- Better coordination at the basin and national level
- Starting working with nature
- Increased local authorities and public involvement
- Modernizing the forecast and assessment system

Challenges ahead

- Climate change
- Implementation of the Program of measures
- Increase resilience
- Land planning



Thank for your kind attention!