REGIONAL STRATEGY FOR SUSTAINABLE HYDROPOWER IN THE WESTERN BALKANS

Demonstration of HDS-GIS in Support of the Project

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1st Workshop, Podgorica, 30-31 March 2017

Table of contents

- Introduction

- Outline of GIS application (common platform)

- Background data

- HPP projects

- Demonstration of GIS contents and capabilities / covered by online presentation

- Reporting and filtering

- Conclusions

- Major next steps

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Introduction
Objectives for GIS Application

- Hydropower development is strongly related to geographic context (HPPs, rivers, digital elevation model - DEM, protected areas, etc.)

- Objectives that lead to creation of this application:

  – Storing of data (central GIS database)

  – Understading of spatial relationships between different data that influence the assessment leading to proper decisions

  – Presentation of data and results of the study

- The GIS application consists of web-based GIS viewer GDi LOCALIS Visios with advanced functionality, running on top of Esri ArcGIS platform

- Geographic content related to the Study is embedded into the existing web GIS application already developed for the purpose of previous IPF3 projects

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Outline of GIS Application
Common platform

Outline of GIS Application
Application login and main components

- The application is currently available on GDI web server

- User manual for the application (prepared for the REG.CON study) may be distributed to assigned users

- The WB6 region is in focus and the visibility is adjusted to the study needs (set for the user group)

Outline of GIS application
Users and user rights

- Authorisation to view and edit data will be defined in line with wider agreement on the project level; any agreement on this needs to be technically implemented – not subject to this Workshop

- Assumed user levels:

  – „view" and „view and edit" users in the development stage

  – full contents „view" and „view and edit" users in the final and contents update stages

  – limited contents „view" users – several limitation levels

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Outline of GIS application
Major components of the HDS-GIS

- ## Hydro Power Plants
  both existing and planned

- ## Background data
  support data to the
  performed analyses

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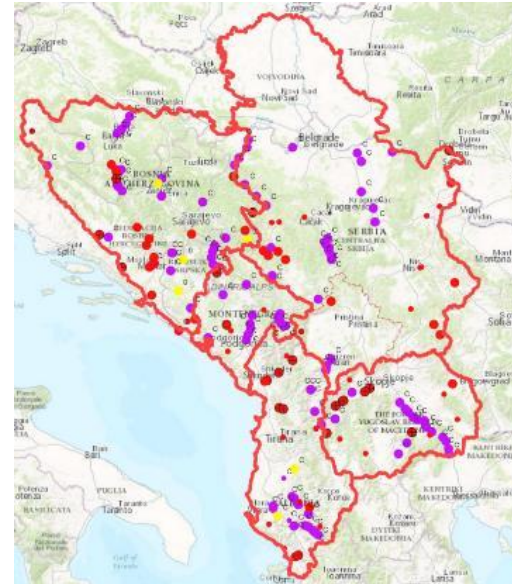
Background Data
Sources and quality issues

- Background data may be in form of vectors or „dummy" backgrounds, such as maps

- Background data are:
  - data integrated from other projects or publicly available databases
  - data officially received from institutions contacted throughout the study
  - data produced by the IPF team experts

- The PTEs checked the quality of the background information and selected a set of data which should be used and presented in the GIS application

- Improvement and extension of some data was done to meet the needs of the project

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Background Data
Major applied information

- Rivers – based on CCM2 database, improved and extended by additional rivers and tributaries

- Classification of hydrographic elements (drainage basin, watershed, river basin, (sub) river basin, river, tributaries), based on ECRINS

- Protected areas, based on data acquired from national institutions and open source information

- Ichtiology (hucho hucho, migratory and other threatened species)

- Electrical network data (transmission only)
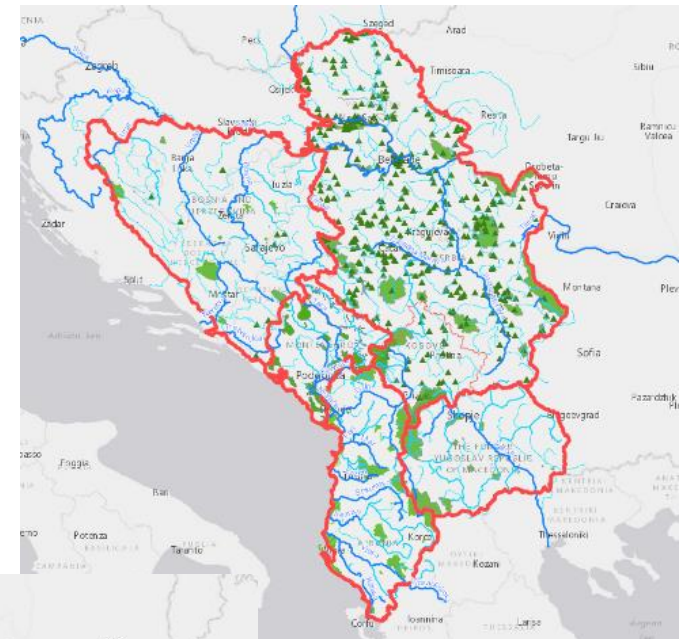
- Other data (roads network, precipitation, DEM, etc.)

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Background Data
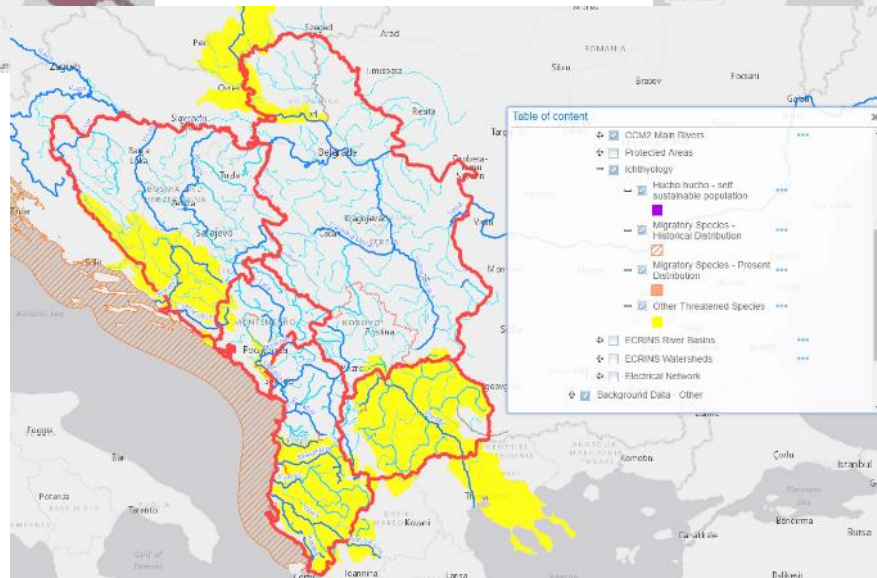## Major applied information - screenshots

Protected areas

(Sub)River Basins

Protected species
(Ichtiology)

Hydro Power Plants
Considered groups of HPPs

- All considered HPPs, where some data have been collected and stored are grouped under certain criteria

- Size of HPP - small (<10MW) and large (>10MW)

- HPP implementation status
  - Planned HPPs
  - HPPs under construction
  - Existing HPPs, with or without plans for refurbishment (all capacities)

Hydro Power Plants
Set of collected data

- Data collected by Project Team Experts and national support experts

- Overall set of collected data exceeds the scope of data set presented in GIS – all information stored in a spreadsheet form

- The following groups of information are collected

  - TAB 1 / BASIC INFORMATION

  - TAB 2 / HYDROLOGY / WATER-MANAGEMENT

  - TAB 3 / TEHNICAL INFORMATION

  - TAB 4 / ECONOMIC & FINANCIAL

  - TAB 5 / ENVIRONMENTAL & SOCIAL

  - TAB 6 / MATURITY

  - TAB 7 / OTHER ASPECTS

  - TAB 8 / MCA RESULTS

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Hydro Power Plants
Some data properties

- All projects / HPPs have unique ID to be referred to

  WB6.HMP.000

- „Location" – coordinates, given in WGS84 system, refer to location of HPP „machine house"

- Additional location information, where necessary – dam

- Some data are relevant for existing HPPs only, other data are for planned HPPs only – to be taken into account

- Etc.

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Demonstration of GIS Contents and Capabilities
Summary – background data and HPPs

- Description of the region

- Hydrology data

- Geography of the Region

- Existing HPPs

- Planned HPPs

- Environmentally protected areas in the Region and ichtiology

- Grid connections

- Results of the MCA and performance of projects
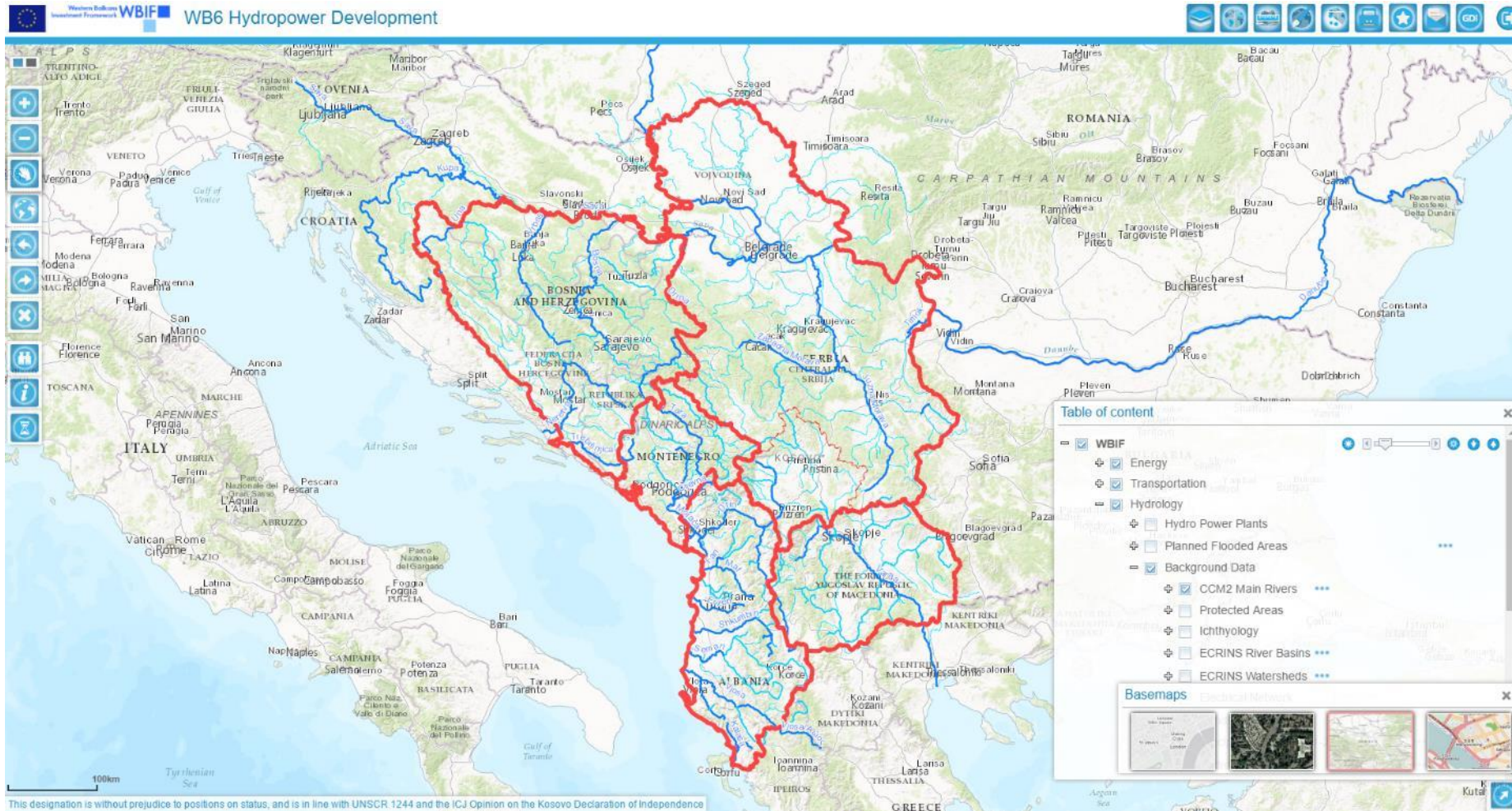
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Demonstration of GIS contents and capabilities
Study region – WB6 Region
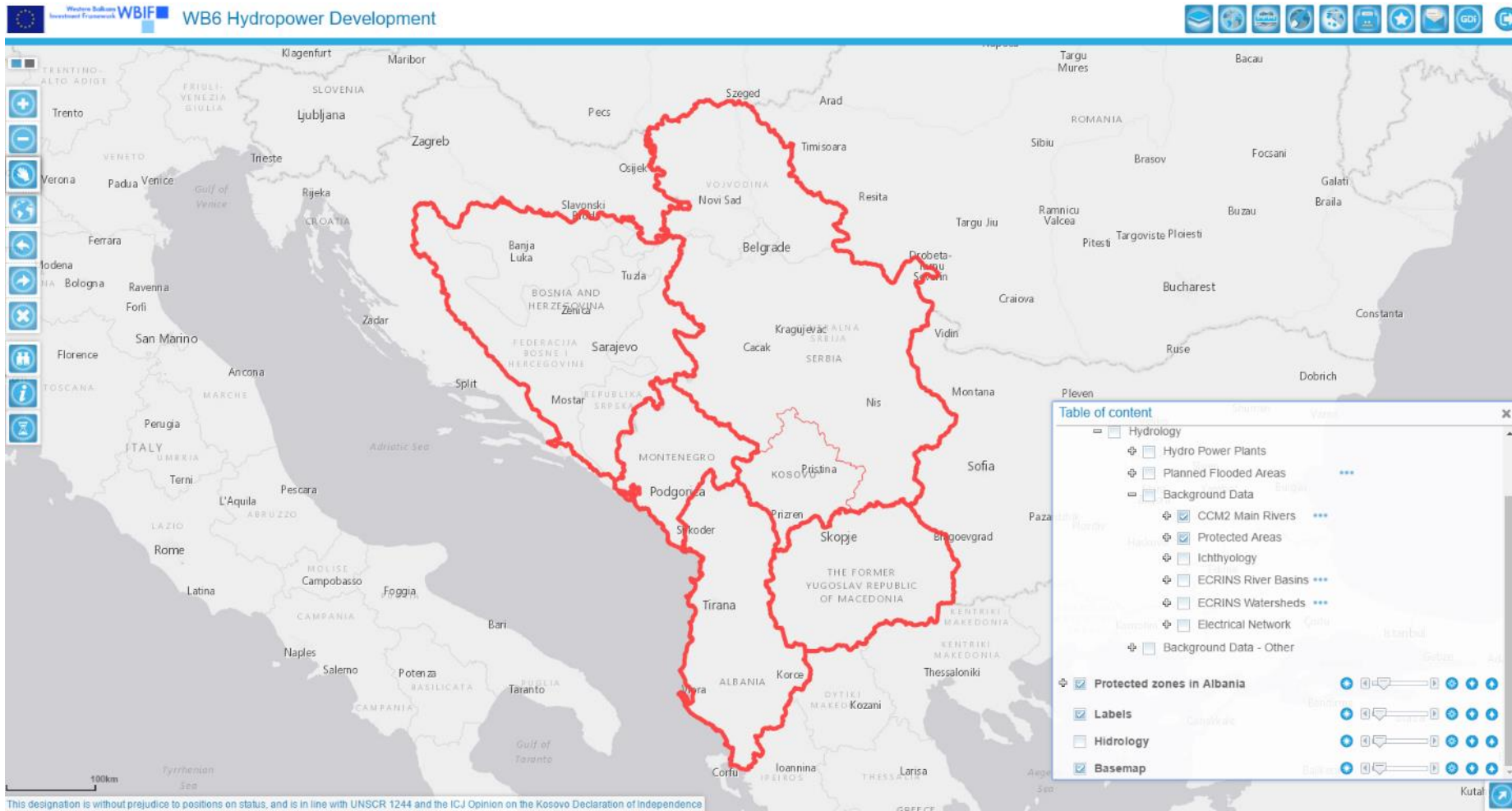
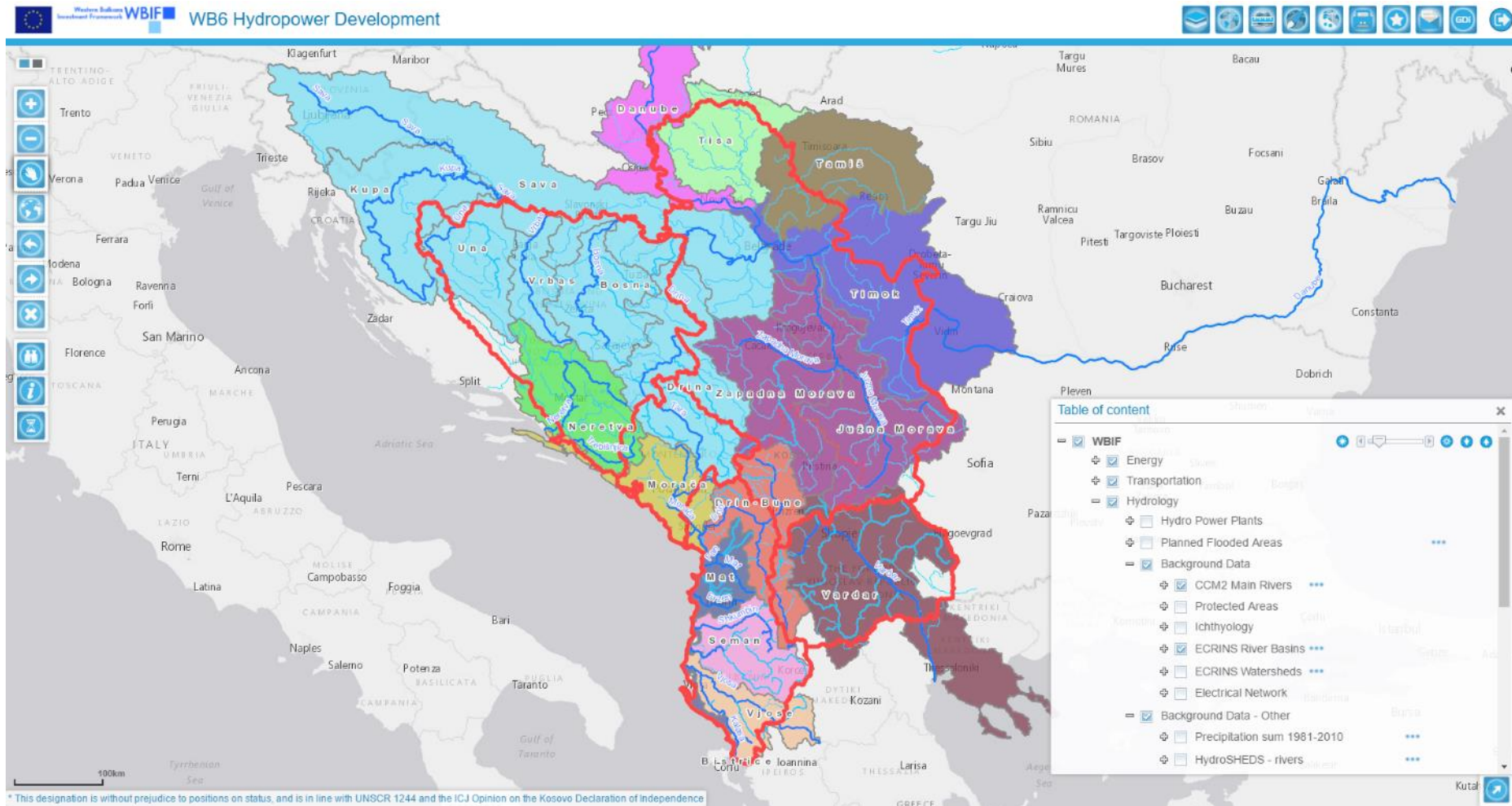# Demonstration of GIS Contents and Capabilities
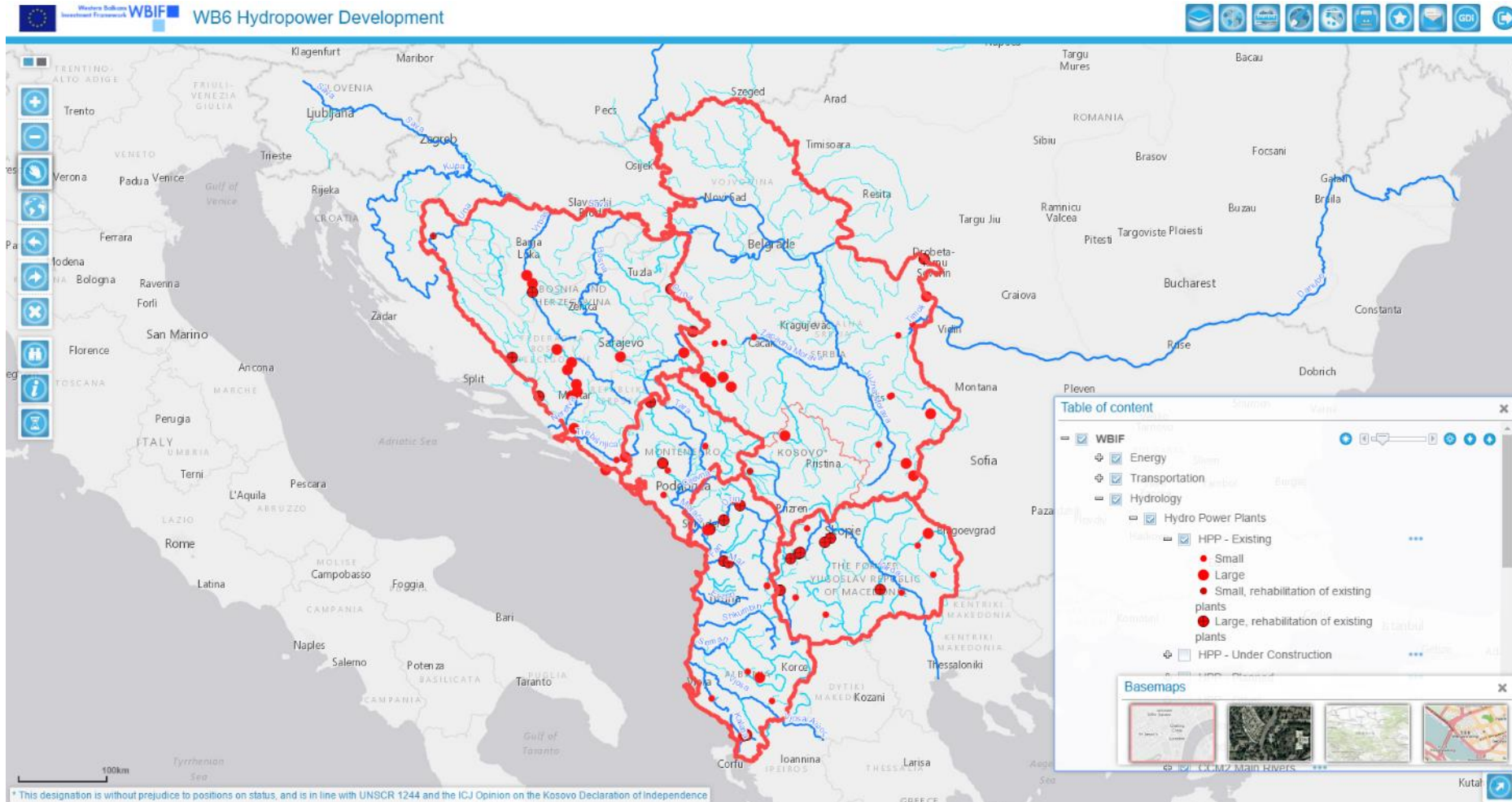## River systems of the Region

Demonstration of GIS Contents and Capabilities
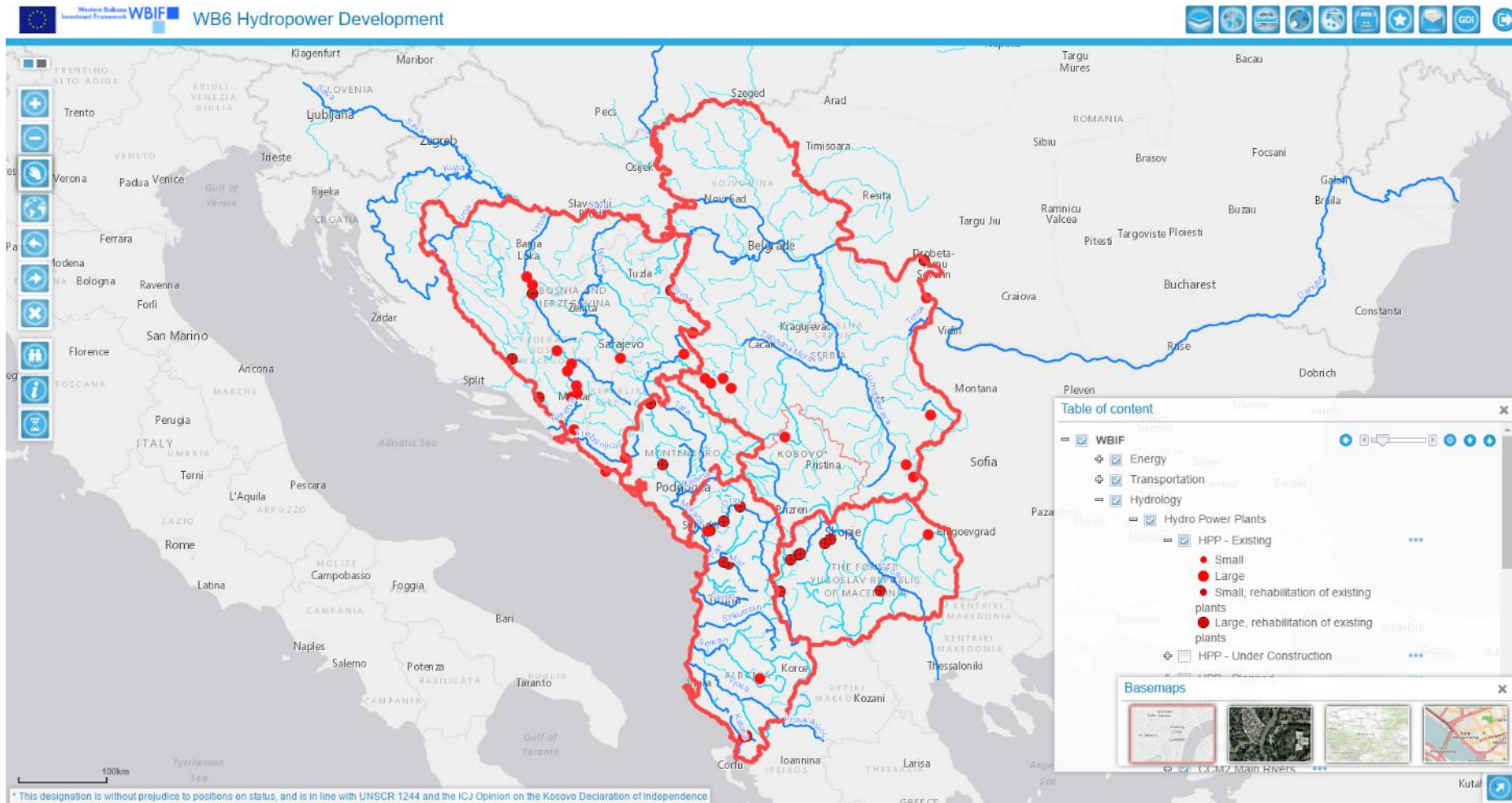## Major river basins and (sub)river basins

Demonstration of GIS Contents and Capabilities
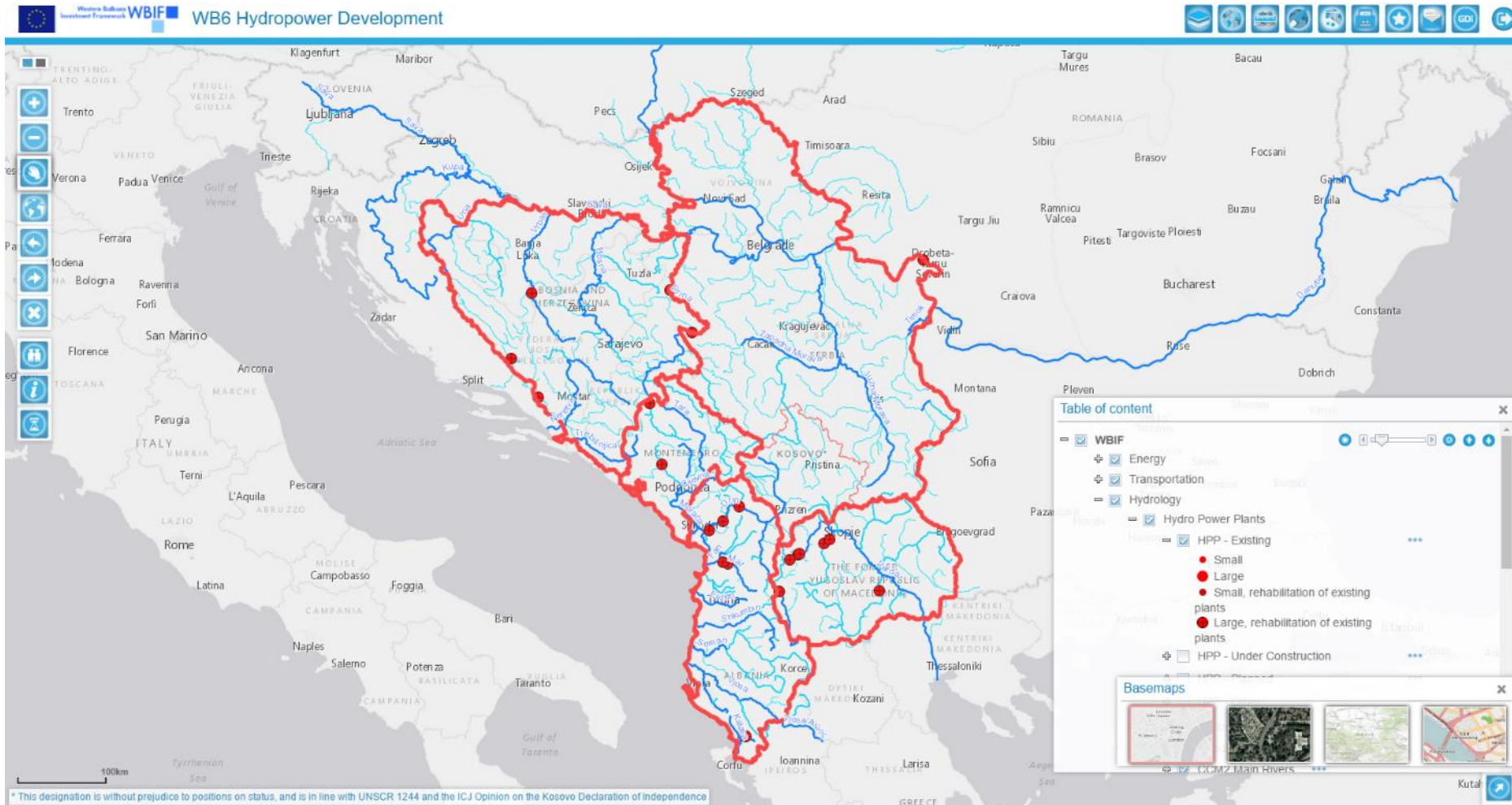## Existing hydro power plants (small and large scale ->10 MW)

Demonstration of GIS Contents and Capabilities
Existing hydro power plants (large scale only, 55 HPPs)
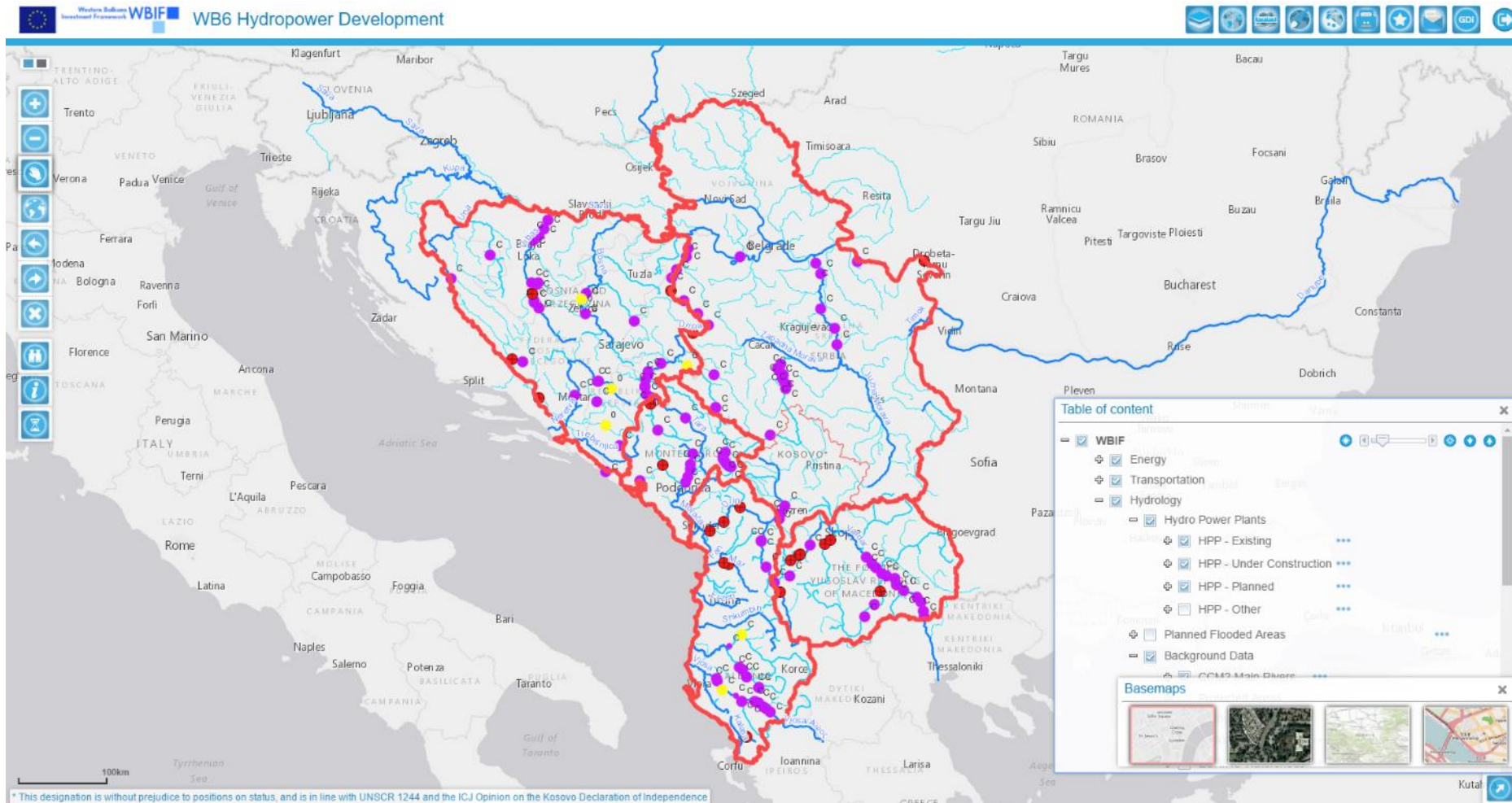
Demonstration of GIS Contents and Capabilities
Existing hydro power plants (>10 MW)– with refurbishment projects
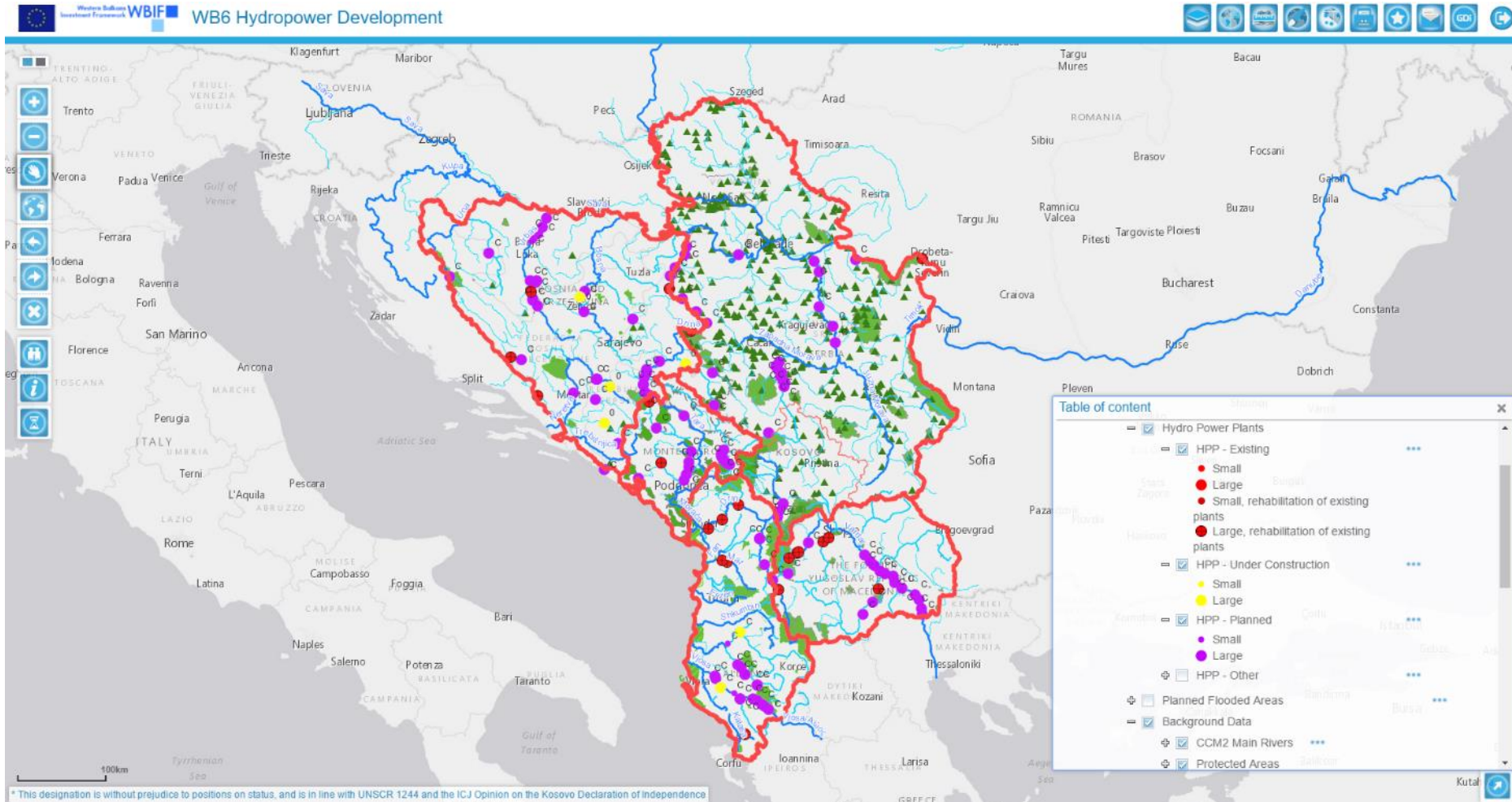
Demonstration of GIS Contents and Capabilities
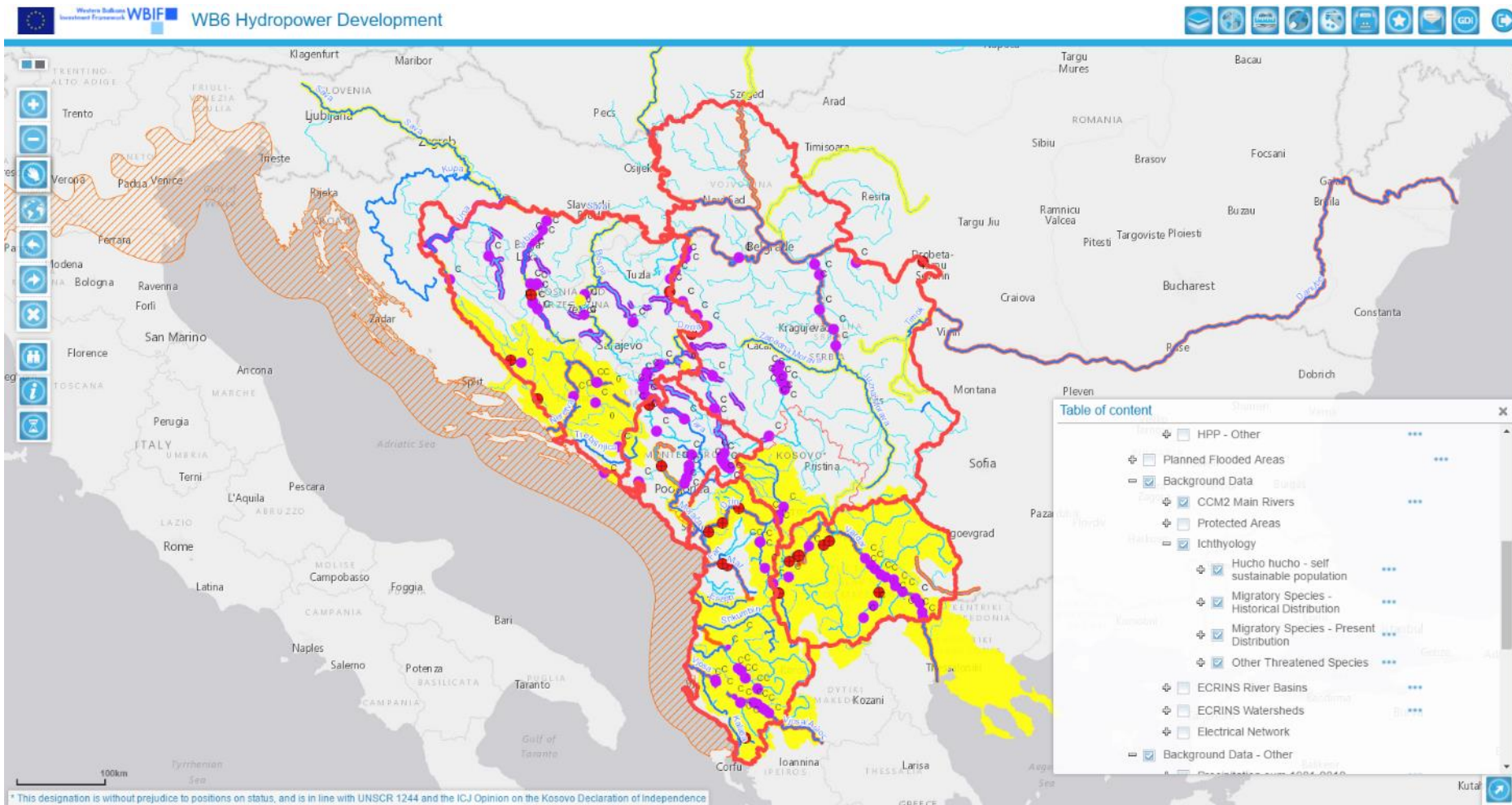## Hydro power plant projects added

Demonstration of GIS Contents and Capabilities
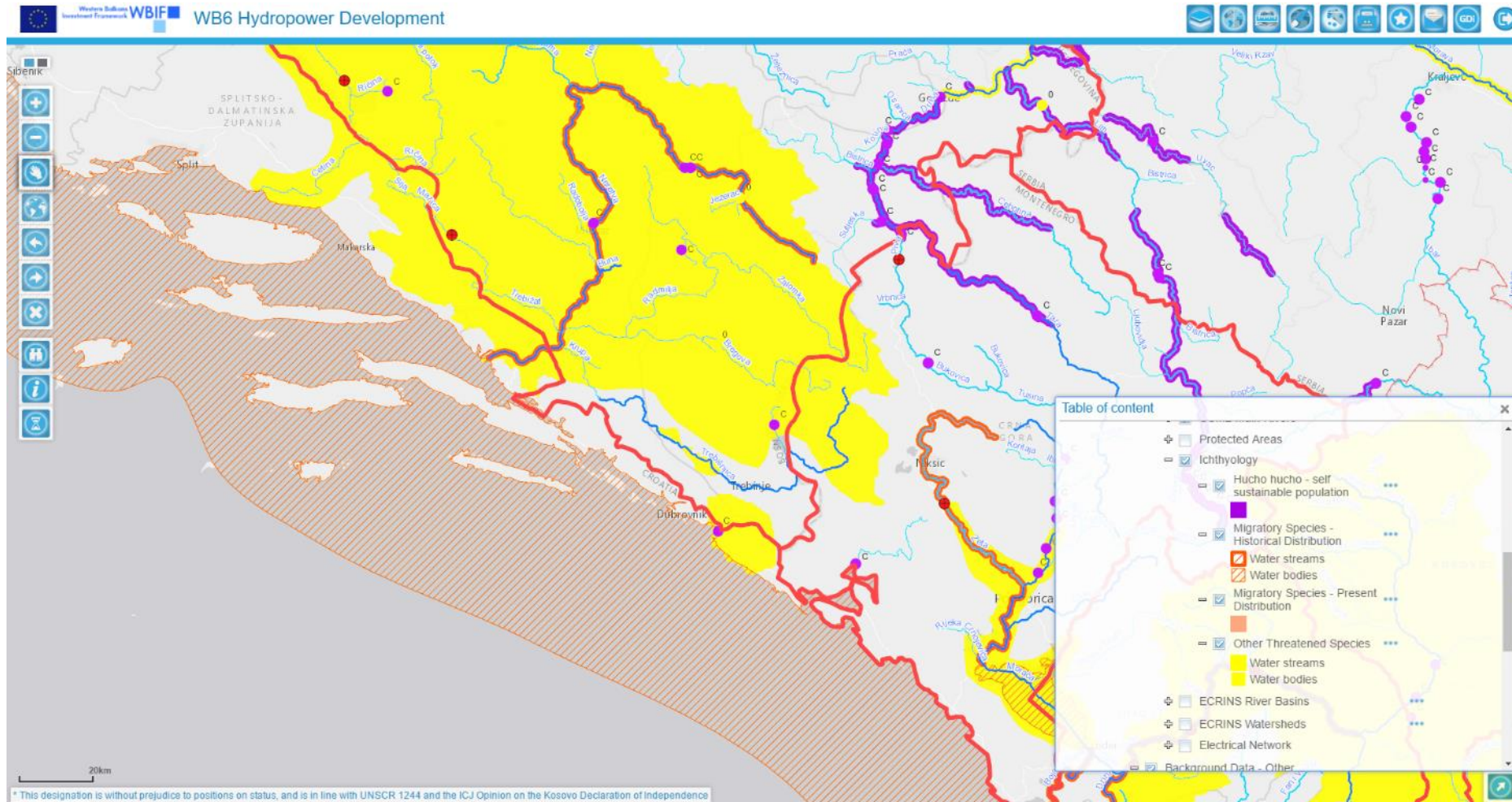## Protected areas

Demonstration of GIS Contents and Capabilities
Ichtiology – hucho hucho, migratory and other threatened species

Demonstration of GIS Contents and Capabilities
Ichtiology – hucho hucho, migratory and other threatened species

Reporting and Filtering
GIS application outputs and advanced options

- ## Planned outputs - to be finalised in later stages:

  - Project fiches for selected projects
    (annexes to BRs)

  - Export of filtering results
    (such as „champion" projects) –
    in form of xls-tables with selected set of data

  - Export of maps with selected filtered data
    (with use of different colours for different
    levels of data)

- ## Filtering of data can be used to filter out
  any required set of data on the predefined
  set of criteria

Western Balkans Investment Framework (WBIF)

Regional Hydropower Development in the Western Balkans (WBEC-REG-ENE-01)

Project Fiche

TAB 1	BASIC INFORMATION	Attribute values
	Project ID	WB6.HMP.176
	Project name	Skakala
	Owner / Promotor	EP HZ HB d.d
	Country	BIH
	Location (coordinate)	43.3619, 17.8106
	Plant size	Large
	Installed capacity - Pmax (MW)	26.4
	Average annual electricity output - Wmax (MWh)	124,300
	Capacity factor - Wmax/Pmax*8760 (%)	53.75
	Plant type	ROR
	Generation type	BL
	Available documentation	Predstudija izvodljivosti, Građevinski fakultet Mostar; INDIKATIVNI PLAN RAZVOJA OBJEKATA ZA PROIZVODNJU ELEKTRIČNE ENERGIJE RAZDOBLJE 2016. - 2025., EPHZHB d.d. MOSTAR, 12/2014
	Comment	0

TAB 2	HYDROLOGY / WATER-MANAGEMENT	Attribute values
	Drainage basin	ADRIATIC SEA
	Watershed	NERETVA
	River basin	Neretva /BIH,CRO/
	Sub-river basin	
	River	Neretva
	Tributary 1	
	Tributary 2	
	Medium flow (m³/s)	194.7
	Cummulative effects within HPPs chain	5 HPPs in cascade
	Available documentation	INDIKATIVNI PLAN RAZVOJA OBJEKATA ZA PROIZVODNJU ELEKTRIČNE ENERGIJE RAZDOBLJE 2016. - 2025., EPHZHB d.d. MOSTAR, 12/2014
	Comment	

TAB 3	TECHNICAL INFORMATION	Attribute values
	Designed head (m)	11
	Designed flow (m3/s)	
	Configuration & turbine types	3xKaplan
	Grid connection level, line and point (SS)	110 kV
	Dam type	concrete
	Dam height (m)	
	Available documentation	INDIKATIVNI PLAN RAZVOJA OBJEKATA ZA PROIZVODNJU ELEKTRIČNE ENERGIJE RAZDOBLJE 2016. - 2025., JP EPHZHB d.d. MOSTAR, 12/2014
	Comment	

TAB 4	ECONOMIC & FINANCIAL	Attribute values
	Total investment cost (mil.EUR)	80.71
	Year when Investment was evaluated	2009
	Producer price in industry index change prior to year	1.019834711
	Normalised total investment cost for referent year (mil.EUR)	82.3108595

WB6.HMP.176

Page 1 of 2

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Conclusions

- The GIS application is used for storing of data (central GIS database), understading of spatial relationships between different data and presentation of data and results of the Study (workshops and reports)

- The application is currently available on GDI web server and will be available for viewing based on the eventual agreement with the Client (DG NEAR)

- The currently stored data can be used to present different background data and hydro power plants, including results of the MCA analysis

- Reporting will include preparation of project fiches

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Major Remaining Steps

- Completion of up-to-date HPP data

- Ranking of data based on results of the MCA analysis and input of more detailed information on „A" projects

- Grid connection data to be presented graphically

- Reports and optimal filtering criteria

- Definition of users and data sets to be made available

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WBIF-IPF 3 Consortium

www.wbif-ipf.com