

# DIKTAS II

Implementation of the strategic action program (SAP) of the Dinaric karst aquifer system:  
improving groundwater governance and sustainability of related ecosystems.



2 nd in-person EXPERT MEETING

10-11 November 2025

Sarajevo, Bosnia and Herzegovina



## 2.2. NATIONAL POLICY WITH FOCUS ON SANITARY PROTECTION ZONES IN PROJECT COUNTRIES

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- 1 Introduction
- 2 Analysis of national legislation
- 3 Harmonization of SPZ
- 4 Analysis of different approaches to groundwater protection in other countries with karst areas
- 5 Further activities

## 1. INTRODUCTION

Sanitary protection zones as part of drinking water protection- legislation from late 70-ies in former Yugoslavia

- Ex Yugoslav Republic- Croatia, B&H and Montenegro- took over this legislation;
- Albania Water Act from 2012.

WFD introducing new approach, which is not completely compatible with existing legislation-

- Drinking Water Protection Areas (DWPA) ≠ Safeguard Zones

## 2. ANALYSIS OF NATIONAL LEGISLATION

### Current legislation related to sanitary protection zones

COUNTRY	Name	Valid	www
ALBANIA	Law No. 111/2012	2012	<a href="https://ampeid.org/documents/albania/law-no-111-2012-on-the-integrated-management-of-water-resources/">https://ampeid.org/documents/albania/law-no-111-2012-on-the-integrated-management-of-water-resources/</a>
	DCM No 379	2016	<a href="https://shendetesia.gov.al/wp-content/uploads/2023/12/VKM-nr.-379-dat%C3%AB-25.5.2016-P%C3%ABr-miratimin-e-rregullores-%E2%80%9CCil%C3%ABsia-e-ujit-t%C3%AB-pijsh%C3%ABm%E2%80%9D.pdf">https://shendetesia.gov.al/wp-content/uploads/2023/12/VKM-nr.-379-dat%C3%AB-25.5.2016-P%C3%ABr-miratimin-e-rregullores-%E2%80%9CCil%C3%ABsia-e-ujit-t%C3%AB-pijsh%C3%ABm%E2%80%9D.pdf</a>
BOSNIA AND HERCEGOVINA	Water Act Rulebook on SPZ	2006 2012	<a href="http://www.voderna.gov.ba/wp-content/uploads/2020/11/pravilnik-o-zastitnim-zonama.pdf">Zakon o vodama („Službene novine Federacije Bosne i Hercegovine, broj: 70/06) – Federalno ministarstvo okoliša i turizma – Bosna i Hercegovina</a> <a href="https://fmpvs.gov.ba/wp-content/uploads/2020/11/pravilnik-o-zastitnim-zonama.pdf">https://fmpvs.gov.ba/wp-content/uploads/2020/11/pravilnik-o-zastitnim-zonama.pdf</a>
	Water Act Rulebook on SPZ	2006-12-17 2016	<a href="http://www.voderna.gov.ba/images/PDF/zakoni/zakon_o_vodama_preciscen.pdf">http://www.voderna.gov.ba/images/PDF/zakoni/zakon_o_vodama_preciscen.pdf</a> <a href="http://www.voderna.gov.ba/images/PDF/pravilnici/Pravilnik_ZoneSanitarne76_2016.pdf?lang=lat">http://www.voderna.gov.ba/images/PDF/pravilnici/Pravilnik_ZoneSanitarne76_2016.pdf?lang=lat</a>
CROATIA	Water Act Rulebook on SPZ	2019- 21-23	<a href="http://www.voderna.gov.hr/Zakon_o_vodama">Zakon o vodama - Zakon.hr</a>
		2011-2013	<a href="http://www.voderna.gov.hr/Pravilnik_o_uvjetima_za_utvrdivanje_zona_sanitarne_zastite_izvorista">Pravilnik o uvjetima za utvrđivanje zona sanitarne zaštite izvorišta</a>
MONTENEGRO	Water Act Rulebook on SPZ	2007-11-15-16-17- 18 2024	<a href="http://www.voderna.gov.me/Zakon_o_vodama">Zakon o vodama</a> <a href="http://www.voderna.gov.me/Pravilnik_o_odredjivanju_i_odrzavanju_zona_i_pojava_sanitarne_zastite_izvorista_i_ogranicenjima_u_tim_zonama">Pravilnik o određivanju i održavanju zona i pojaseva sanitarne zaštite izvorišta i ograničenjima u tim zonama</a>

## ALBANIA

### **Law No. 111/2012** ON INTEGRATED MANAGEMENT OF WATER RESOURCES,

- Article 34 **Protected areas** shall include a) **hygiene and sanitation areas for the protection of water resources**, designated for the production of drinking water
- Article 57 **Hygiene and Sanitary Protection Zones**
  - 3 zones of protection:
    - I. Immediate/ Strict sanitary protection zone;
    - II. Near/Close sanitary protection zone;
    - III. Remote sanitary protection zone.

### Decision of the Council of Ministers (**DCM**) **No. 379**, dated 25 May 2016, titled — “Regulation on Drinking Water Quality”

- aligns Albanian law with EU Drinking Water on the quality of water intended for human consumption;
- establishes three sanitary protection zones
- Quality standards and monitoring requirements aligned with the EU standards

ZONE	Description	Typical Restrictions
<b>ZONE I – IMMEDIATE (STRICT) PROTECTION ZONE</b>	The area immediately surrounding the spring or well, usually fenced and directly controlled by the water supplier.	All activities are prohibited except those related to water extraction and maintenance; access only to authorized personnel.
<b>ZONE II – NEAR (CLOSE) PROTECTION ZONE</b>	Surrounds Zone I; designed to prevent local pollution from human or agricultural activity.	Prohibited: waste disposal, use of fertilizers or pesticides, discharge of wastewater, construction, industrial activity, livestock grazing, and drilling of new wells.
<b>ZONE III – REMOTE (CATCHMENT) PROTECTION ZONE</b>	The broader catchment or recharge area contributing to the source.	Strictly regulates land use — agriculture, urban development, and industrial facilities must not endanger groundwater or surface water quality.

# BOSNIA AND HERCEGOVINA

## FEDERATION B&H

### ***WATER ACT*** (“Official Gazette of FBiH” No. 70/06)

- **Article 65 Protected areas** are: 1 areas intended for the abstraction of drinking water
- **Article 66 Areas of protection of sources of drinking water**, protection of water sources is being implemented by establishing **sanitary protection zones**
- **Article 68 Decision on the protection of water sources**

### ***RULEBOOK ON ZSP*** (“Official Gazette of FBiH” No. 88/12)

- GW sources in alluvial and **karst aquifers**
- III-IV zones of Sanitary protection
  - I. ZONE- the strictest prohibitions and restrictions;
  - II. ZONE - strict prohibitions and restrictions;
  - III. ZONE – moderate prohibitions and restrictions;
  - IV. ZONE - preventive prohibitions and restrictions;



## ZONE Typical Restrictions

- ZONE I** All activities are prohibited except those related to water extraction and maintenance; access only to authorized personnel.
- construction and enlargement of settlements
  - activities which cause increased erosion
  - carrying out of investigation works for oil, gas and other substances which are dangerous for water;
- ZONE II**
- construction of transformer stations;
  - construction of new and extension of existing graveyards;
  - construction of plants for urban wastewater treatment and sludge processing
  - construction of plants for animal waste treatment;
  - surface and subsurface exploitation of mineral raw materials
  - excavations in the water-bearing layer
  - opening and operation of quarries and borrow pits;
  - blasting works;
  - construction of military ranges;
- ZONE III**
- construction and operation of sanitary landfills;
  - development of oil and gas wells;
  - construction of refineries and chemical plants;
  - construction of nuclear power plants;
  - storage of industrial raw materials and chemicals dangerous for water;
  - storage and disposal of radioactive substances;
  - discharge of untreated urban wastewater;
  - disposal of any solid, construction, urban or other waste;
  - carrying out of investigation works and exploitation of radioactive substances;
- ZONE IV**
- construction of plants for metal, rubber, leather, food and paper industries;
  - construction of thermal power plants;
  - construction of industrial sewerage systems and industrial wastewater treatment plants;
  - construction of highways and railroads;
  - road transportation of chemicals, fuels and dangerous substances;
  - construction of petrol stations;
  - intensive livestock and poultry production;
  - intensive livestock grazing
  - disposal of industrial waste which is dangerous for water;
  - construction and operation of airports;
  - construction of pipelines for transportation of dangerous liquids;
  - construction of storage tanks and PUMPING SITES for oil and oil derivatives;
  - storage of fertilizers and pesticides;
  - agricultural production with intensive utilization of fertilizers and pesticides;
  - irrigation with treated wastewater.
  - storage and disposal of radioactive substances;
  - discharge of untreated industrial wastewater and cooling water;
  - uncontrolled logging.

## BOSNIA AND HERCEGOVINA

### REPUBLIKA SRPSKA



### **WATER ACT** (“Official Gazette of RS” No. 50/06, 121/12 & 74/17)

- **Article 70 Protected Areas-** water for intendant for human consumption
- **Article 73 Areas of protection of sources of water for drinking and human use,** the protection of water sources is carried out by determining and establishing **sanitary protection zones**
- **Article 75 Decision on source protection**

### **RULEBOOK ON ZSP** (“Official Gazette of RS” No. 76/16)

- GW sources for public water supply
- III zones of Sanitary protection
  - I. ZONE- Immediate Protection Zone;
  - II. ZONE - Narrow Protection Zone;
  - III. ZONE – Wide Protection Zone;



Zone	Description	Key Measures	Typical Prohibitions
<b>Zone I – Immediate Protection Zone</b>	Area immediately around the water intake/extraction (spring, well, borehole) for public water supply.	<ul style="list-style-type: none"> <li>• Fencing and marking the area.</li> <li>• Access restricted to authorized persons.</li> <li>• Continuous water-quality monitoring.</li> <li>• Maintenance of intake structure and sealed protection.</li> </ul>	<ul style="list-style-type: none"> <li>• Construction of new buildings or facilities not related to water supply.</li> <li>• Storage or use of hazardous chemicals, fuels, fertilizers.</li> <li>• Waste disposal or infiltration of wastewater.</li> <li>• Traffic, tourism or agricultural operations that may impair water quality.</li> </ul>
<b>Zone II – Narrow Protection Zone</b>	Area from which water reaches the intake relatively quickly via groundwater or surface flow (catchment area with short travel time).	<ul style="list-style-type: none"> <li>• Controls on land use (agriculture, existing buildings) under strict supervision.</li> <li>• Wastewater must be treated, infiltration avoided.</li> <li>• Sealing of potential contaminant entry points (sinkholes, uncontrolled discharge).</li> <li>• Regular inspection and monitoring of soils/groundwater/surface water.</li> </ul>	<ul style="list-style-type: none"> <li>• New construction without sanction or design compatible with protection requirements.</li> <li>• Application of pesticides and mineral fertilizers without restrictions.</li> <li>• Septic tanks or discharge of untreated wastewater.</li> <li>• Landfills or major infrastructure without protective measures.</li> </ul>
<b>Zone III – Wide / Outer Protection Zone</b>	Larger catchment and recharge area of the water source, where contaminants can reach the intake over longer travel times and via complex paths.	<ul style="list-style-type: none"> <li>• Land-use planning to ensure compatible activities.</li> <li>• Environmental monitoring (soil, water, land use).</li> <li>• Public awareness and coordination across municipalities.</li> <li>• Inclusion in spatial plans and water-protection programmes.</li> </ul>	<ul style="list-style-type: none"> <li>• Uncontrolled discharge of wastewater.</li> <li>• Dumping of solid or liquid wastes.</li> <li>• Major industrial or agricultural activities without protective and monitoring systems.</li> <li>• Installation of infrastructure interfering with recharge or flow without assessment.</li> </ul>

## CROATIA

### **WATER ACT** (“Official Gazette of RC” No. 66/2019, 84/2021, 47/2023)

- **Article 70 Protected Areas-** water for intendant for human consumption
- **Article 73 Areas of protection of sources of water for drinking and human use,** the protection of water sources is carried out by determining and establishing **sanitary protection zones**
- **Article 75 Decision on source protection**

### **RULEBOOK ON ZSP** (“Official Gazette of RC ” No. 66/2011, 47/2013)

- GW sources for public water supply, aluvial and karst aquifers
- III zones of Sanitary protection
  - I. ZONE- Strict Protection Regime and Control Zone;
  - II. ZONE - Strict Restriction and Control Zone; PONORS
  - III. ZONE – Restriction and Control Zone;
  - IV ZONE- Restriction Zone;
  - Water reserve



unesco



ZONE		RESTRICTIONS
I	I A	Must be enclosed with a fence, entrance allowed only to employees
<b>ZONE OF STRICT PROTECTION REGIME</b>		
	I B	All activities which are not related to water supply are prohibited
II		<ul style="list-style-type: none"> <li>• agricultural production, with the exception of ecological production without utilization of manure</li> <li>• livestock production, with the exception of farms up to 20 livestock units;</li> <li>• construction of new and extension of existing graveyards;</li> </ul>
<b>ZONE OF STRICT RESTRICTION</b>		<ul style="list-style-type: none"> <li>• discharge of treated and untreated wastewater from roads;</li> <li>• construction of any industrial plants;</li> <li>• logging, with the exception of salvage logging;</li> <li>• recycling facilities and waste handling stations.</li> </ul>
III		<ul style="list-style-type: none"> <li>• any temporary and permanent waste disposal;</li> <li>• construction of pipelines for transportation of liquids which can cause water pollution;</li> </ul>
<b>ZONE OF RESTRICTION AND CONTROL</b>		<ul style="list-style-type: none"> <li>• construction of petrol stations without double walled storage tanks;</li> <li>• subsurface and surface exploitation of mineral raw materials, with the exception of geothermal water.</li> </ul>
IV		<ul style="list-style-type: none"> <li>• discharge of untreated wastewater,</li> <li>• construction of buildings for utilization, treatment and disposal of dangerous waste;</li> <li>• storage of radioactive substances and substances which are dangerous and polluting for water and aquatic environment;</li> <li>• construction of petrol stations without protective buildings for storage tanks for oil derivatives;</li> </ul>
<b>ZONE OF RESTRICTION</b>		<ul style="list-style-type: none"> <li>• drilling of investigation and exploitation boreholes for oil and natural gas;</li> <li>• construction of roads, parking lots and airports without collection systems and treatment plants;</li> <li>• utilization of powdered explosives (in bulk) for large-scale blasting.</li> </ul>
<b>RESERVE</b>		If areas of water collection, retention and runoff towards sources are located in mountain areas, outside of protection zones, passive protection measures in place for sanitary protection zones IV, III and II can be implemented.

## MONTENEGRO

**WATER ACT** (“Official Gazette of MN” No. 27/07, 73/10, 32/11, 47/11, 48/15, 52/16, 55/16, /17, 80/17 & 084/18)

- **Article 49 Water for human consumption:** In each water area, the following are determined:- water bodies that are used or are intended to capture water for human use in an average quantity greater than 10 m<sup>3</sup>/day or for supplying more than 50 inhabitants, **including sanitary protection zones;**
- **Article 56 Source protection,** and the Decision on source protection
- **Article 57 three Sanitary protection zones**

**RULEBOOK ON ZSP** (“Official Gazette of MN” No. 13/24)

- GW sources in aluvial and **karst aquifers**
- III zones of Sanitary protection
  - I. ZONE- Immediate Protection Zone;
  - II. ZONE - Narrow Protection Zone;
  - III. ZONE – Wider Protection Zone;



Zone	Description (Karst Aquifer Context)	Typical Prohibitions / Restrictions
<b>Zone I – Immediate/Strict Protection Zone</b>	The area immediately around the intake (spring, borehole, gallery) in a karst system, often including the sinkholes, conduits, direct recharge features. Travel time of water to intake: very short (hours to days).	<ul style="list-style-type: none"> <li>- Construction of any new buildings not related to water supply.-</li> <li>Storage or use of hazardous substances (fuels, chemicals, large fertilizers).-</li> <li>Waste disposal, infiltration of untreated wastewater.-</li> <li>Heavy traffic, quarrying, blasting, any major alteration of land surface.-</li> <li>Uncontrolled entrances to caves/conduits that may lead into the source catchment.</li> </ul>
<b>Zone II – Narrow Protection Zone</b>	The area contributing rapid groundwater or surface flow to the karst source via conduits or sinkholes; transit times may be days to weeks.	<ul style="list-style-type: none"> <li>- New infrastructure without hydrogeological assessment.-</li> <li>Industrial, large livestock or chemical-intensive agriculture.-</li> <li>Installation of large septic systems or infiltration basins.-</li> <li>Activities that open or modify major conduits or swallow-holes.-</li> <li>Use of large scale chemical fertilizers/pesticides without controls.</li> </ul>
<b>Zone III – Wider Protection Zone</b>	The broader recharge/catchment area of the karst aquifer feeding the source; travel times may be weeks to months. Covers all significant inflow areas, often complex in karst.	<ul style="list-style-type: none"> <li>- Discharge of untreated or insufficiently treated wastewater.-</li> <li>Landfills or major waste dumps.-</li> <li>Major construction altering surface hydrology without mitigation.-</li> <li>Intensive agriculture or forestry without protective buffer zones.-</li> <li>Activities that may damage the integrity of the karst system (e.g., large scale underground works, mining) without full assessment.</li> </ul>

## SANITARY PROTECTION ZONES IN BORDER AREAS OF BIH AND RC

“Prijedlog sustava zaštite i metode istraživanja za zaštitu krških vodonosnika u graničnim područjima Bosne i Hercegovine i Hrvatske“ iz 2010. godine.

*“Recommendation of the Protection System and Investigation Methods for Protection of the Karstic Aquifers in the Border Areas of Bosnia and Herzegovina and the Republic of Croatia”*

- ▶ Working group for the update of the document was established in 2024

**PRIJEDLOG SUSTAVA ZAŠTITE KRŠKIH VODONOSNIKA U GRANIČNIM PODRUČJIMA BOSNE I HERCEGOVINE I HRVATSKE, 2024.**

Recommendation of the Protection System for Protection of the Karstic Aquifers in the Border Areas of Bosnia and Herzegovina and the Republic of Croatia

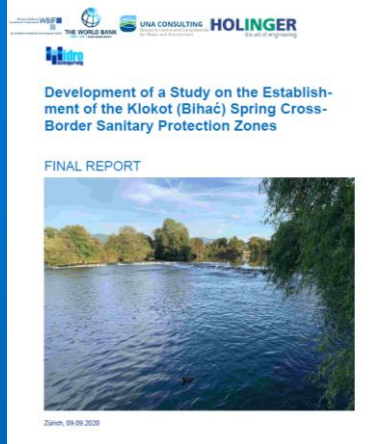
► Working group for the update of the document was established in 2024

## **PRIJEDLOG SUSTAVA ZAŠTITE KRŠKIH VODONOSNIKA U GRANIČNIM PODRUČJIMA BOSNE I HERCEGOVINE I HRVATSKE, 2024.**

Recommendation of the Protection System for Protection of the Karstic Aquifers in the Border Areas of Bosnia and Herzegovina and the Republic of Croatia

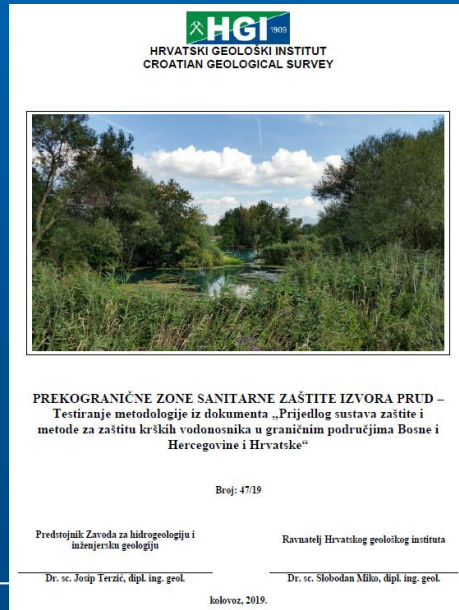
	ZONE SANITARNE ZAŠTITE	VRIJEME TEČENJA DO VODOZAHVATA	PRIVIDNA BRZINA (cm/s)	POTREBNE HIDROGEOLOŠKE PODLOGE
ZONA NAJSTROŽIJIH ZABRANA I OGRANIČENJA	I	NEPOSREDNO PODRUČJE CRPILIŠTA	MORA BITI OGRAĐENO	MJERILO 1:1.000
ZONA STROGIH OGRANIČENJA*	II	24 SATA	> 3 cm/s	MJERILO 1:5.000
ZONA OGRANIČENJA I KONTROLE	III	1-10 DANA	1-3 cm/s	MJERILO 1:25.000**
ZONA OGRANIČENE ZAŠTITE	IV	10-50 DANA	< 1 cm/s	MJERILO 1:50.000**

# KLOKOT, UNA



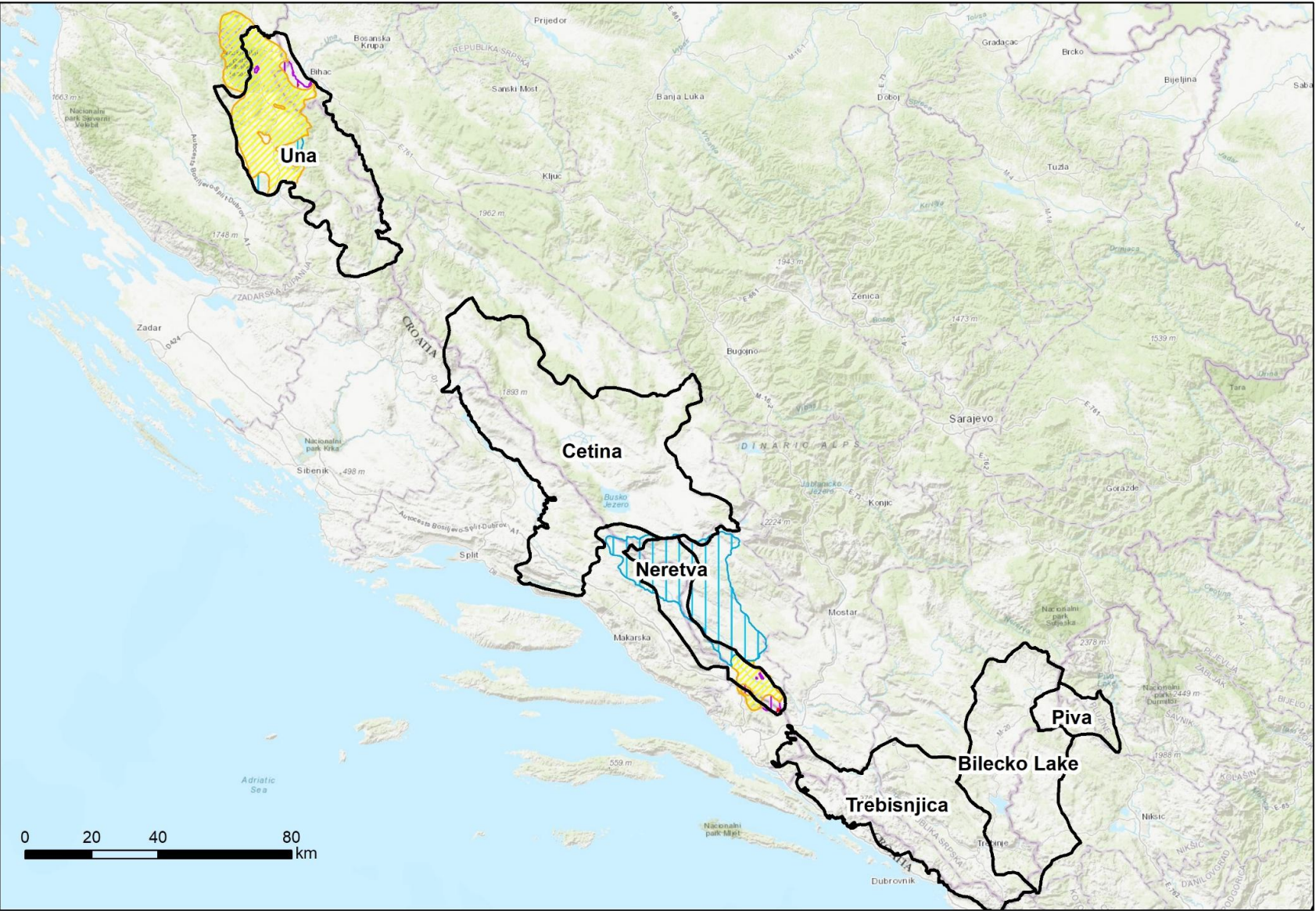
Development of a Study on the Establishment of the Klokot (Bihać) Spring Cross-Border Sanitary Protection Zones, 2020, financed by WB

# PRUD, NERETVA



PREKOGRANIČNE ZONE SANITARNE ZAŠTITE IZVORA PRUD – Testiranje metodologije iz dokumenta „Prijedlog sustava zaštite i metode za zaštitu krških vodonosnika u graničnim područjima Bosne i Hercegovine i Hrvatske“, HGI 2019. Financed by CW

# 3. HARMONIZATION OF SPZ

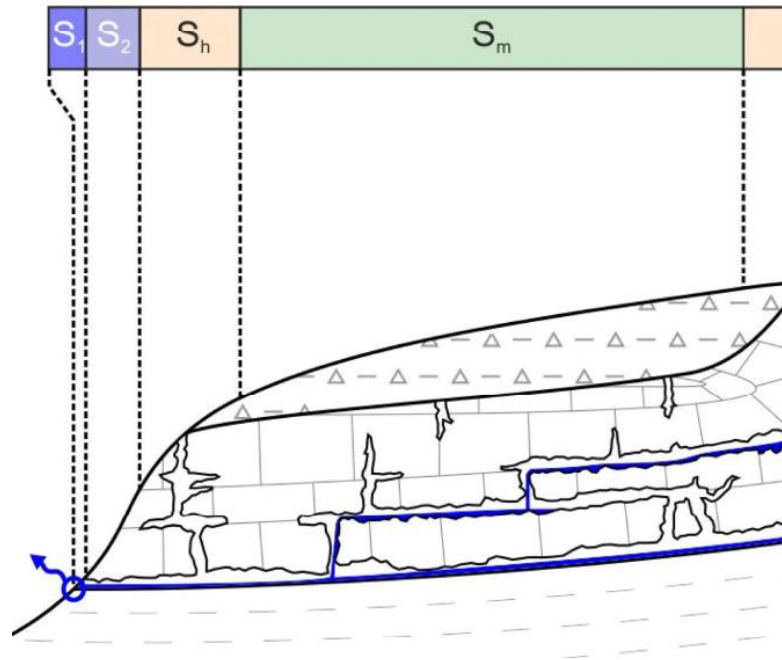


# 3. HARMONIZATION OF SPZ

ZONE	CROATIA			B&H		MONTENEGRO	*ALBANIA	
				Federation	*Republika Srpska			
I	IA	min 10 m			min 25 m (extremely 10 m)	7 days (min 50 m; exceptionally 10 m)	Min 10 m**	Min. 10-15 m**
	IB	Flooding zone						
II	1 day	>3 cm/s	Inner part of the catchment area (hydrological)	1 day	Extremely > 2.5 km/day	90 days (min 250 m; exceptionally 20 m)	Area from which pollution can reach the source**	90 days ** (min 100 m out of I zone)
III	1 - 10 days	1 - 3 cm/s	Main part of the catchment area	1 - 10 days	Extremely 1 - 2.5 km/day	180 days (min 200 m; exceptionally 50 m)	Complete catchment area	Extremely 1 - 2.5 km/day**
IV	10-20 days (< 20 l/s)	< 1 cm/s	Complete catchment area	Complete catchment area	No	No	No	No
	20-40 days (20-100 l/s)							
	40-50 days (>100 l/s)							
RESERVE	Zone of accumulation and retention			No	No	No	No	No

# 4. ANALYSIS OF DIFFERENT APPROACHES TO GROUNDWATER PROTECTION IN OTHER COUNTRIES WITH KARST AREAS

Grundwasser-leitertyp	Locker-gestein	Karst / Kluft		
		schwach heterogen	stark heterogen	
Grundwasser-schutz-zonen	S1	S1	S1	Vorschriften
	S2	S2	S2	
	S3	S3	Sh	
			Sm	



2025 | Umwelt-Wissen Wasser

## Methode zur Kartierung der Vulnerabilität

Ausscheidung von Grundwasserschutz-zonen in Karst-gebieten

Schweizer Eidgenossenschaft  
 Confédération suisse  
 Confederaziun Svizra  
 Confederaziun Svizra

Bundesamt für Umwelt BAFU

# 4. ANALYSIS OF DIFFERENT APPROACHES TO GROUNDWATER PROTECTION IN OTHER COUNTRIES WITH KARST AREAS

ZONE	SLOVENIA	ITALY	FRANCE	AUSTRIA	SWITZERLAND	GERMANY
I	The narrowest	ZTA (Immediate)	Immediate	Inner	S1 (min 10 m)	Capture zone ( min 30 m)
II	Narrow	ZR (Intermediate) (100 days)	Respect	Secondary (100 days)	S 2 (min 100 m, min 100 days)	Narrower protection zone (50 days)
III	Wider	ZP (catchment)	Catchment	Outer	S3 (in karst Sm and	Further protection zone (III A & IIIB)

## COMPONENT 2, OUTCOME 2, Output 2.2 Sanitary protection zones legislation

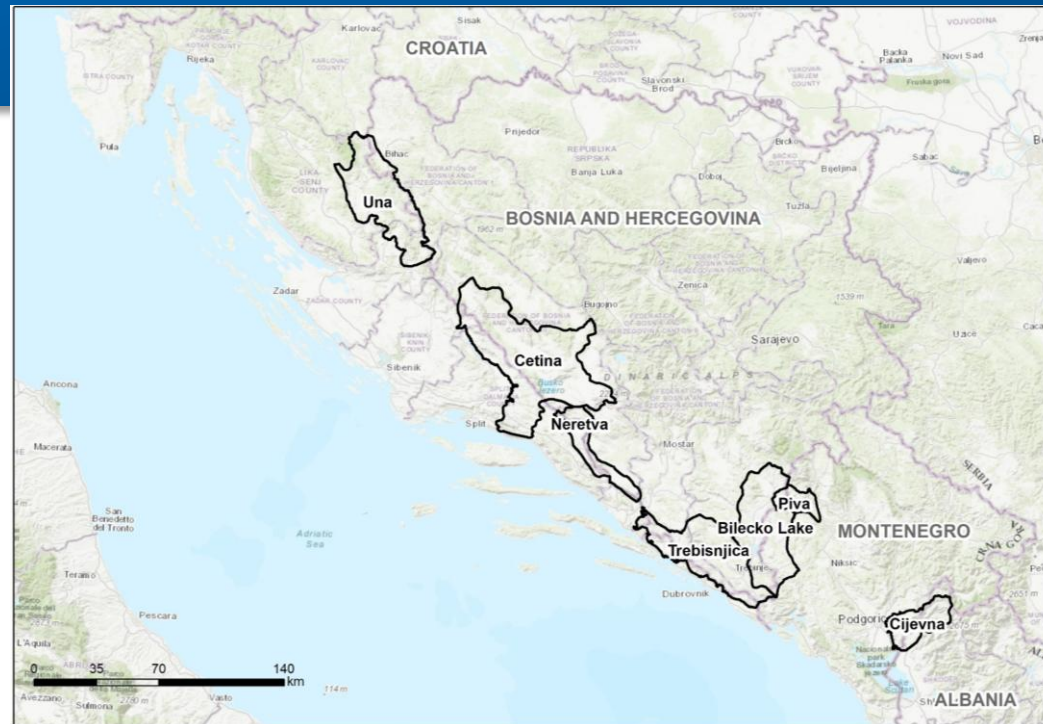
- Analysis of national legislation
- Analysis of current status
- Analysis of different approaches to groundwater protection in other countries with karst areas

## COMPONENT 4, OUTCOME 5, Output 5.2 The DIKTAS Rulebook and guidelines on DIKTAS proposal for delineation of sanitary protection zones

and measures for solid and liquid waste disposal.

Adoption of harmonized criteria for the delineation of sanitary protection zones and setbacks (springs, sinkholes and other karstic features, wells).

# Thank you



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Educational, Scientific  
and Cultural Organization

