

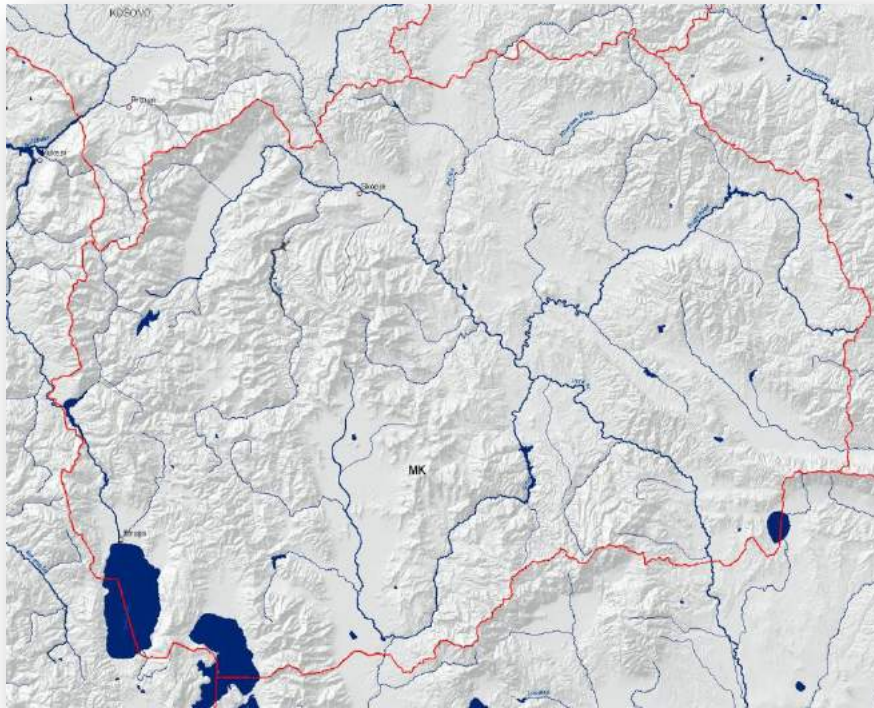


## **Outstanding Balkan River landscapes – a basis for wise development decisions**

**Macedonia**

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## 1. Hydromorphological intactness of rivers

There are four classes characterising the different levels of hydromorphological intactness: Class 1 shows in blue colour (near-natural conditions). Class 2-3 is characterised by slightly to moderately modified status, indicated in light green. Class 4 for river stretches which are extensively altered are orange and class 5 (red) indicates stretches with severe modifications in particular impoundments. Lakes and rivers outside of the project areas are visualised in dark blue.

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#### Hydromorphological assessment









-  Class 1: Near-natural
-  Class 2-3: Slightly to moderately modified
-  Class 4: Extensively modified
-  Class 5: Severely modified/ Impoundment
-  Poljes, floodplains, estuaries/deltas (no assessment)
-  Reservoirs mostly used for hydropower
-  Other rivers and lakes (no assessment)
-  State boundaries
-  Major cities

Fig. 1: Legend for the hydromorphological assessment map on next page



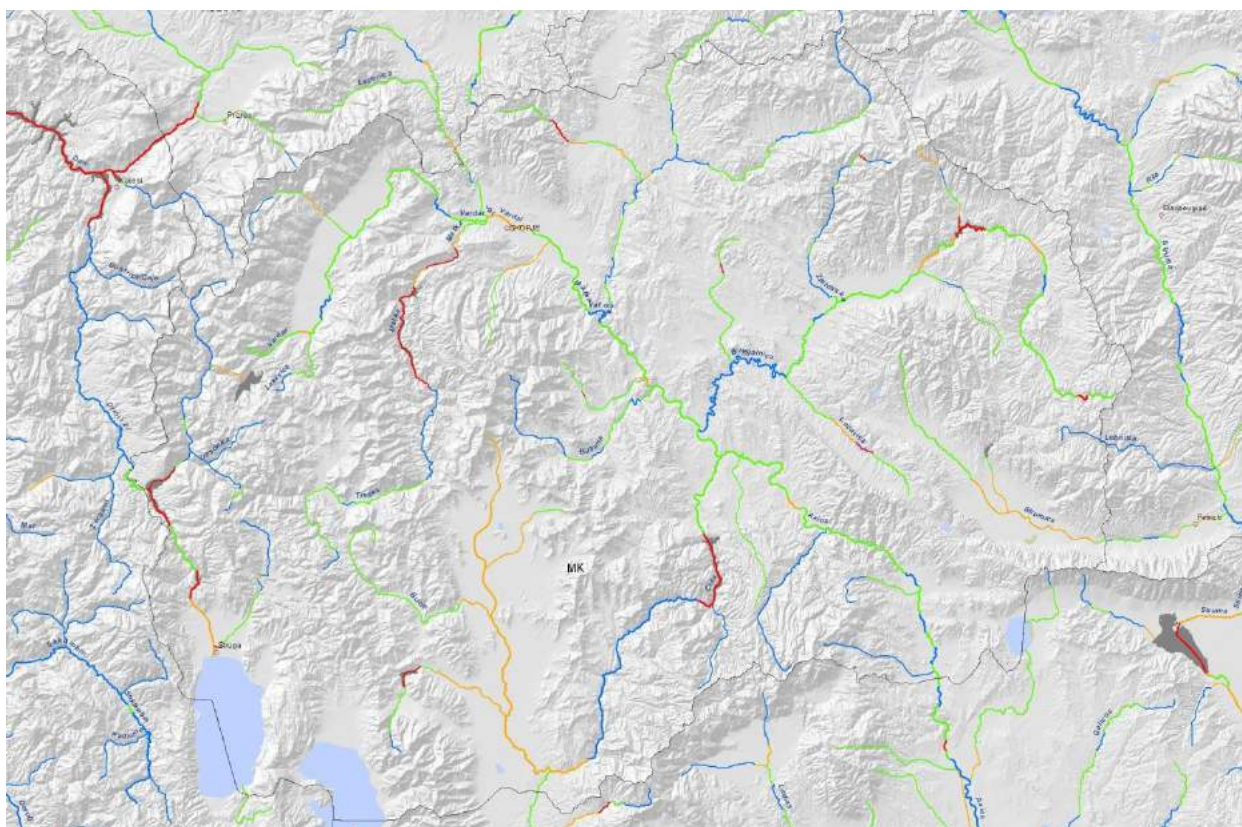


Fig. 2: Hydromorphological assessment for MK.

Macedonia provides a great diversity of riverine landscapes from high mountain headwaters, over lake tributaries to tectonical lowlands (Pelagonia) in junction with a different degree of alteration (from large barrages and dams to pristine breakthrough stretches and valuable cultural river landscapes with meadows and floodplain forests). Crna Reka river is the best example turning from good to impounded and pristine stretches followed by the strongly regulated (class 4 orange) lowlands of Pelagonia which host a great potential for restoration.

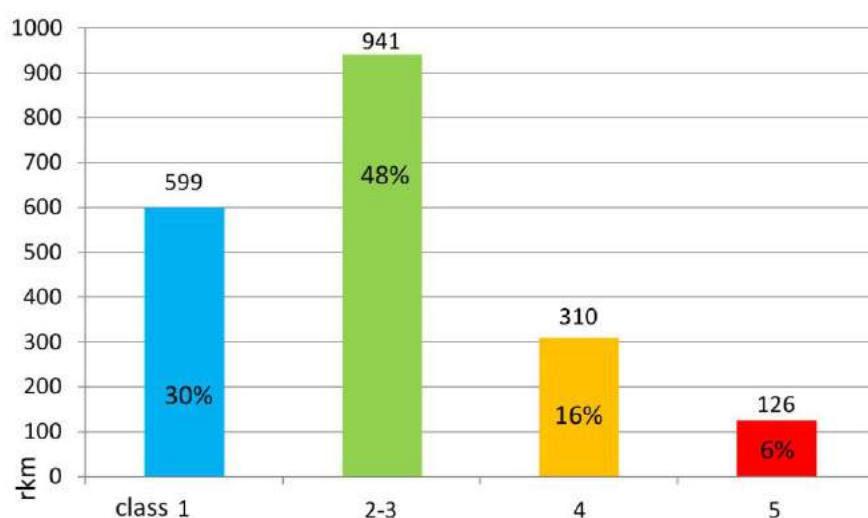


Fig. 3: Hydromorphological assessment in rkm and percentage for MK.

## *2. Protected areas, karst poljes, estuaries/deltas and important floodplains*

The inventory of protected areas contains in particular Natura2000 for EU Member States (EC 2010) and Croatia (State Institute for Nature protection Croatia 2010), national parks, biosphere reserves, nature reserves, EMERALD network areas (as far as available) and Important Bird Areas as well as Ramsar sites for other countries.

Major important floodplains were used continuously, meaning for the large rivers such as Danube, Drava and Sava they are subdivided in upper, middle and lower parts. In addition the map includes all assessed karst poljes, estuaries/deltas as well as other wetlands.

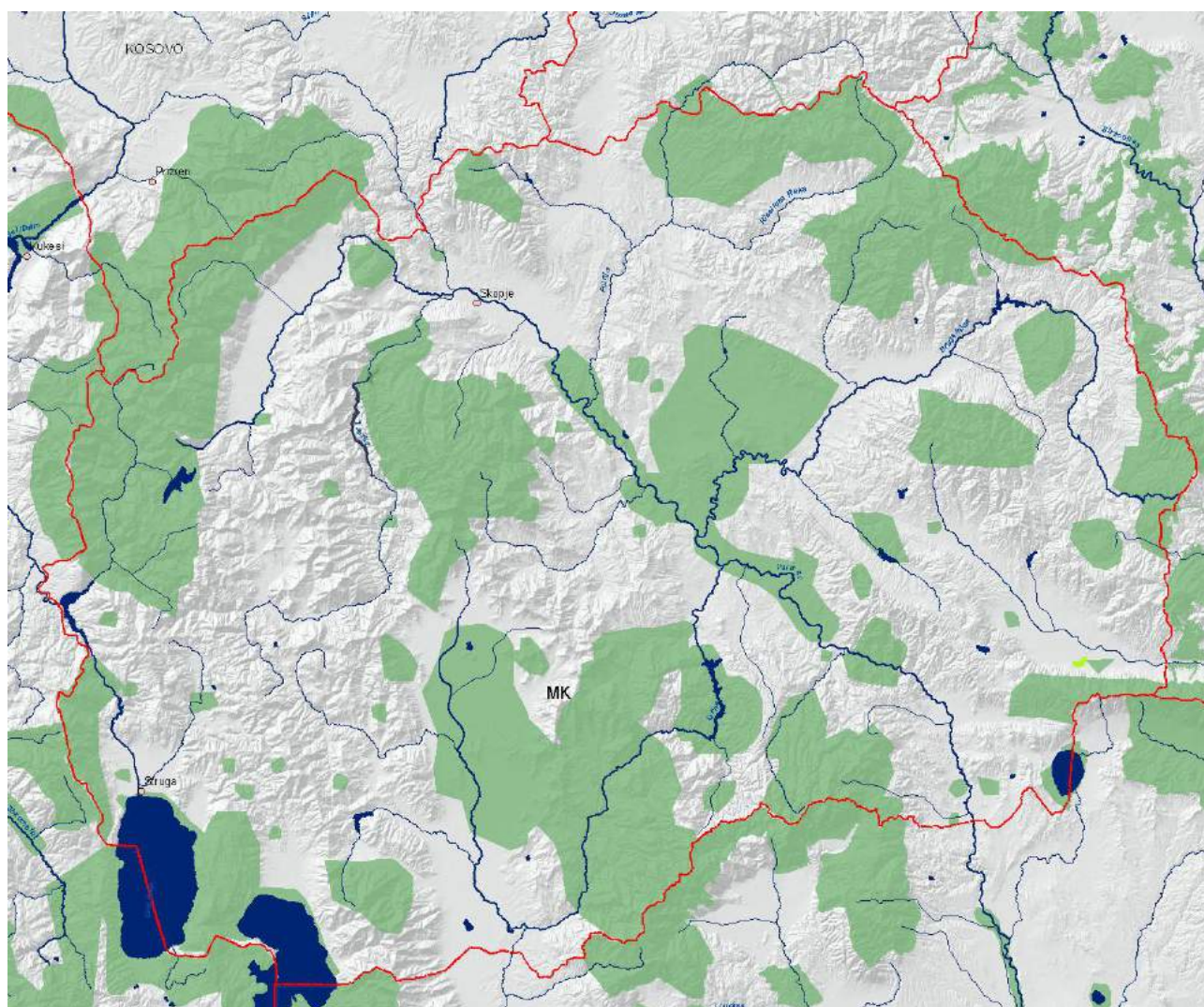


Fig. 4: Protected areas (incl. planned and proposed areas) in dark green (light green are poljes and large floodplain areas)



### 3. Conservation value of rivers

The conservation value is assessed in three levels: Very high conservation value (in blue), high conservation value (in dark green) and low conservation value (in light green). Karst poljes, major floodplains as well as deltas and estuaries with very high conservation value are visualized in dark blue-green and high conservation value in light green and low in light turquoise. Karst poljes and deltas are from particular interest for nature protection, therefore nearly all fall in the first two conservation classes.

	<b>Hydro-morphological assessment class</b>	<b>Conservation value</b> (assessment as result of overlay of hydromorphological assessment + protected areas + floodplains)
<b>Class 1</b>	Near-natural	<b>Very high</b>
<b>Class 2-3</b>	Slightly to moderately modified	<b>High</b> (river stretches crossing important floodplains/poljes/estuaries/deltas <b>or</b> overlapping with protected areas <b>or</b> both belonging to the “Very high” conservation value stretches)
<b>Class 4</b>	Extensively modified	<b>Low, but important for longitudinal continuum</b> (river stretches crossing important floodplains/poljes/estuaries/deltas <b>or</b> overlapping with protected areas <b>or</b> both belonging to the “High” conservation value stretches)
<b>Class 5 Impoundments</b>	Severely modified	<b>Not assessed</b>

Fig. 5: Definition of conservation value (additional biological data will be included in the study update 2012)

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Conservation value for rivers (left) and poljes, estuaries/deltas and floodplains (right)

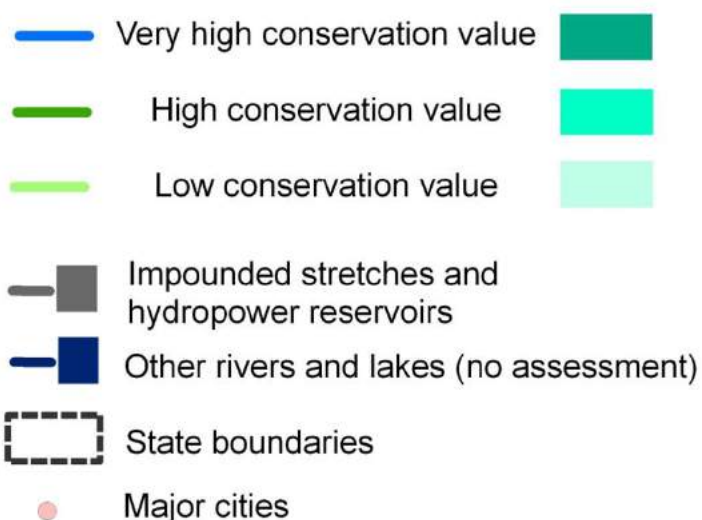


Fig. 6: Legend for the map on conservation value on next page

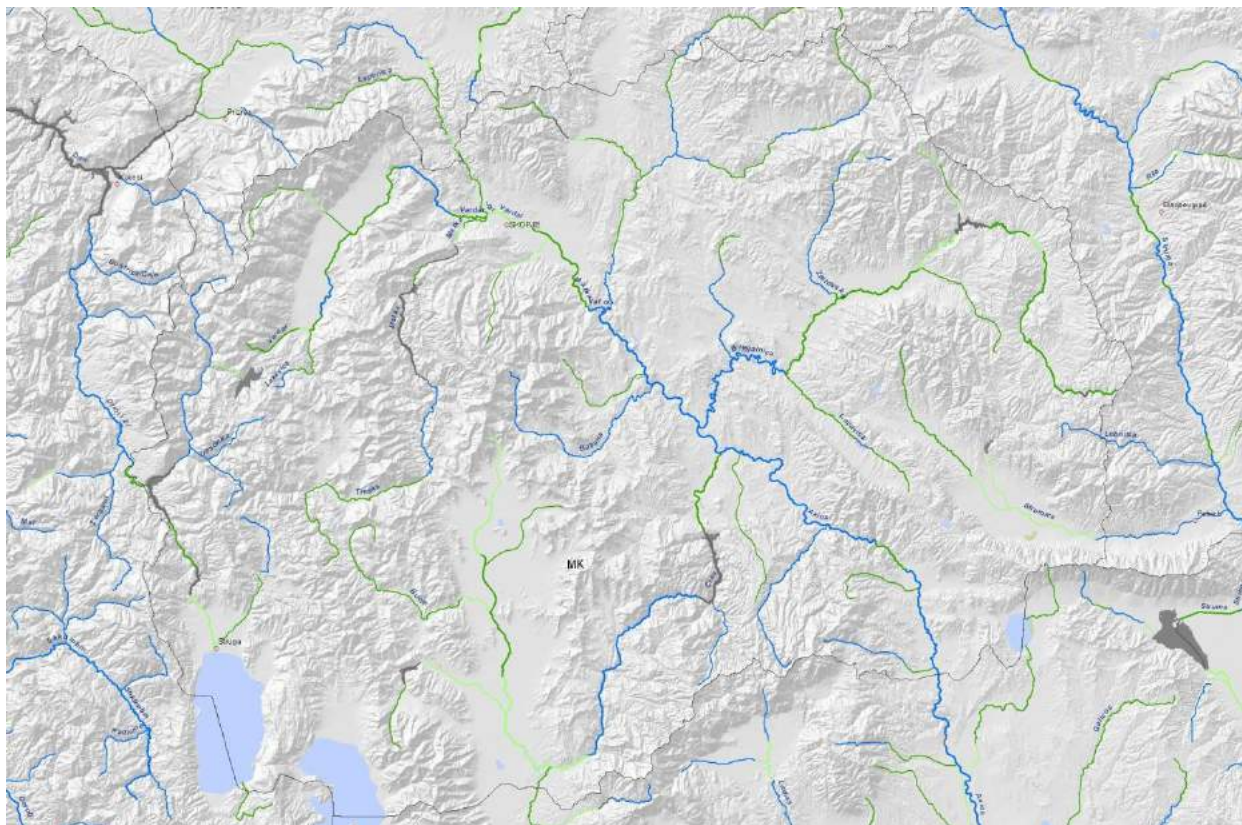


Fig. 7: Conservation value for MK.

Macedonia still host many river stretches in the highest conservation value. Impressive are some breakthrough valleys and smaller tributaries as well as cultural landscapes with pastures and orchards along smaller rivers.

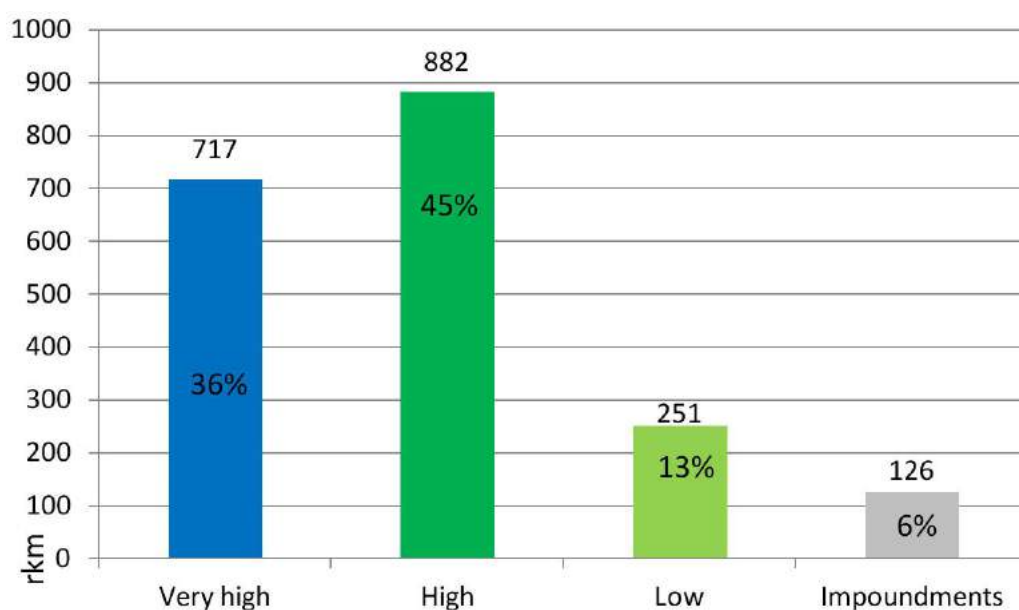


Fig. 8: Conservation value in rkm for MK.

#### 4. Hydropower plants

Hydropower plants were recorded firstly along the “status type” into “existing/operating”, “under implementation” and “planned”. Further dams are classified in three size classes: 1-10 MW, 10-50 MW, and > 50 MW.

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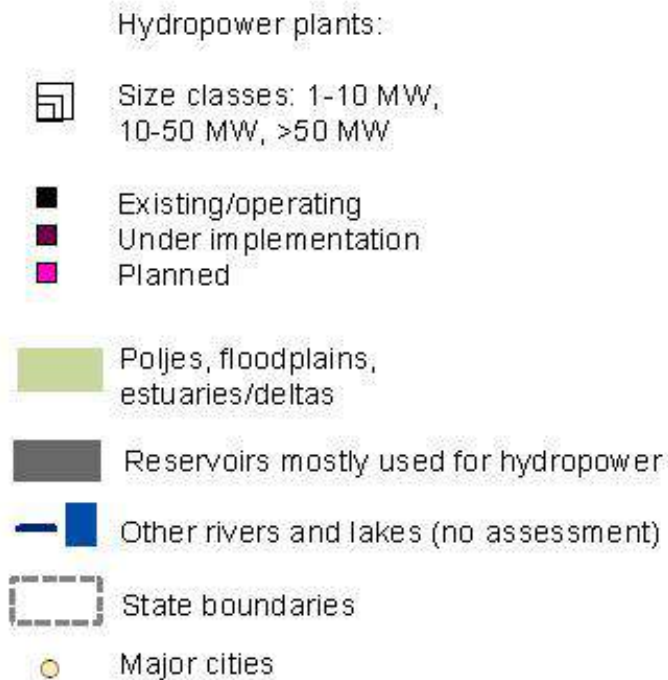


Fig. 9: Legend for the dam map on next page



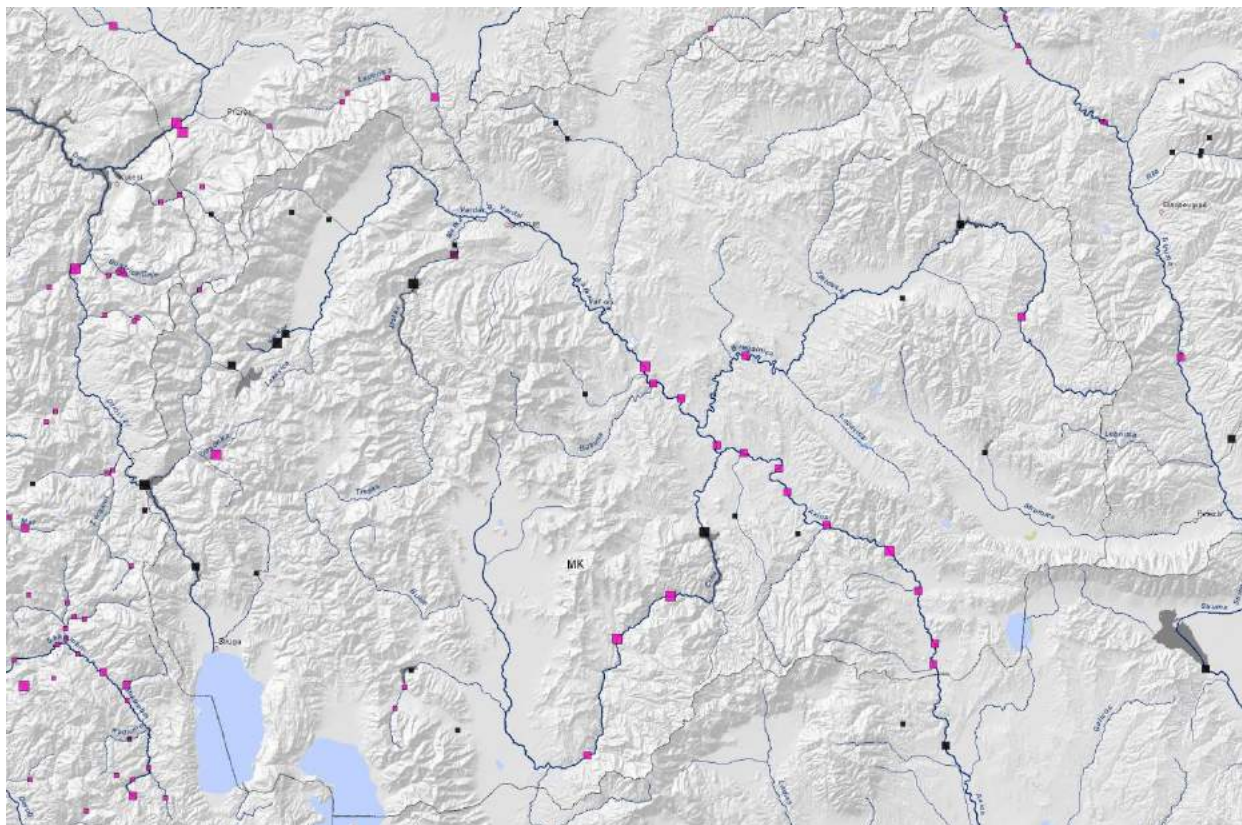


Fig. 10: Hydropower plants for MK.

Macedonia has so far only a few larger HPP's, but along Vardar, the largest river of the country many new dams are planned.

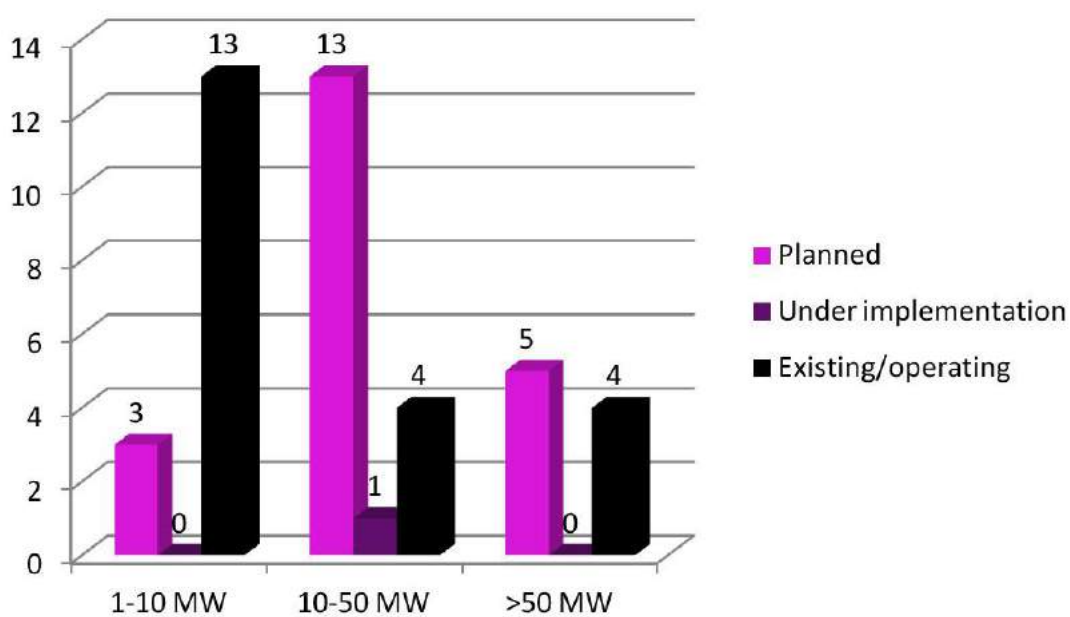



Fig. 11: Distribution of hydropower plants for MK.

## 5. Affected river stretches with conservation value by hydropower

This chapter combines the information of the “Conservation Value” with the planned hydropower plants.



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Hydropower plants:

 Size classes: 1-10 MW,  
10-50 MW, >50 MW

 Planned

Conservation value for rivers (left) and poljes,  
estuaries/deltas and floodplains (right):

 Very high conservation value 

 High conservation value 



 Low conservation value 

Fig. 12: Legend for the “conflict map” on next page

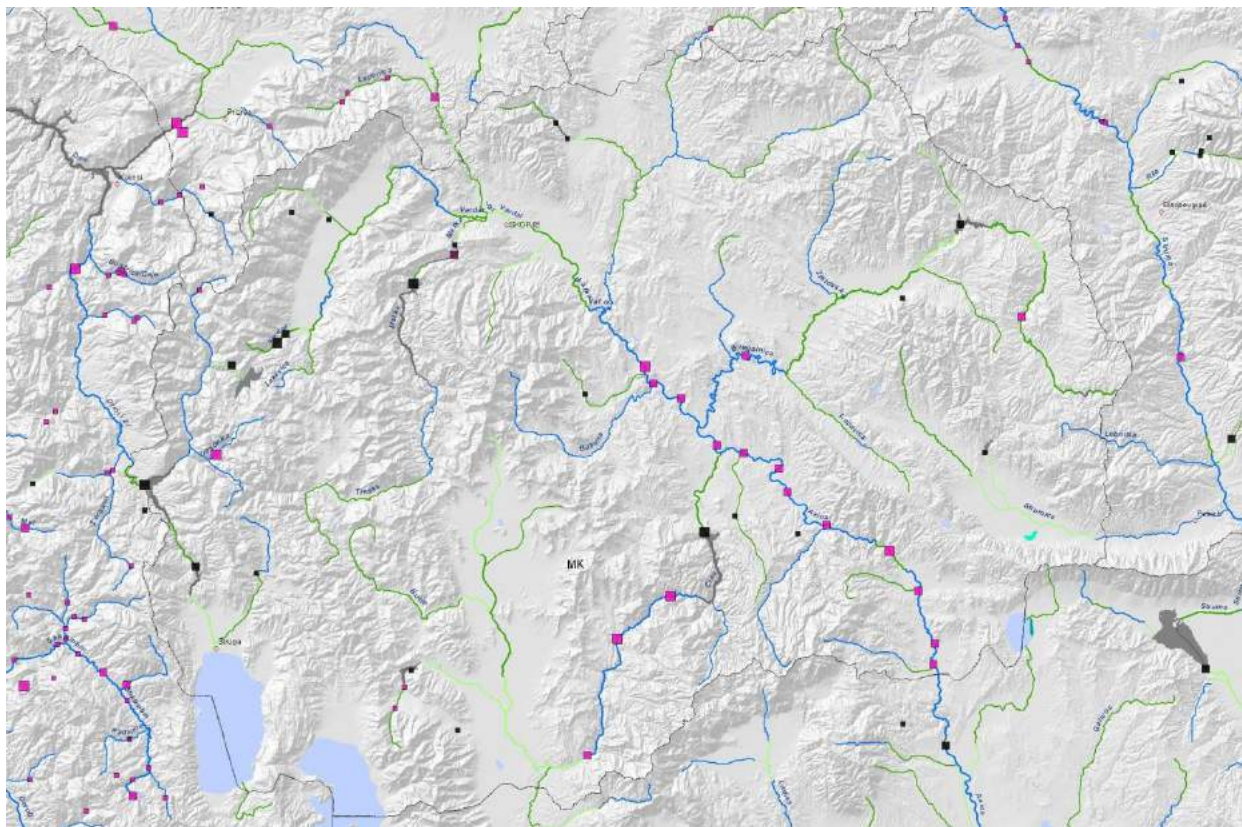


Fig. 13: Affected very high and high conservation stretches by planned hydropower plants for MK.

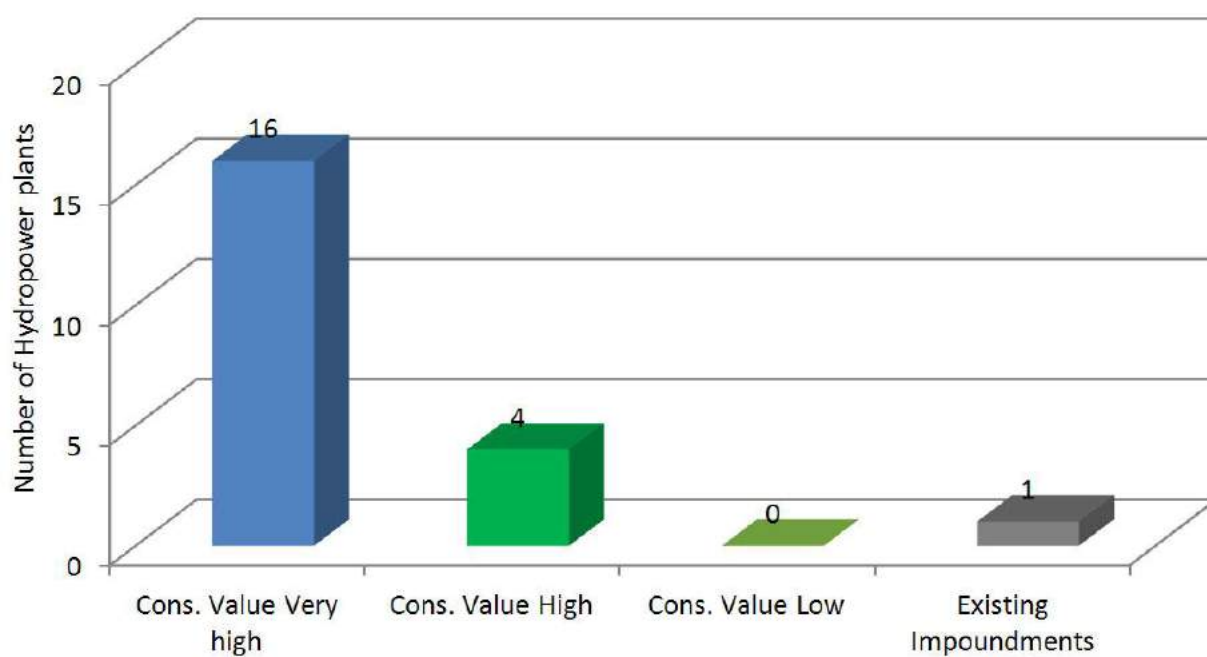


Fig. 14: Number of planned hydropower plants that would affect very high, high and low conservation stretches for MK.



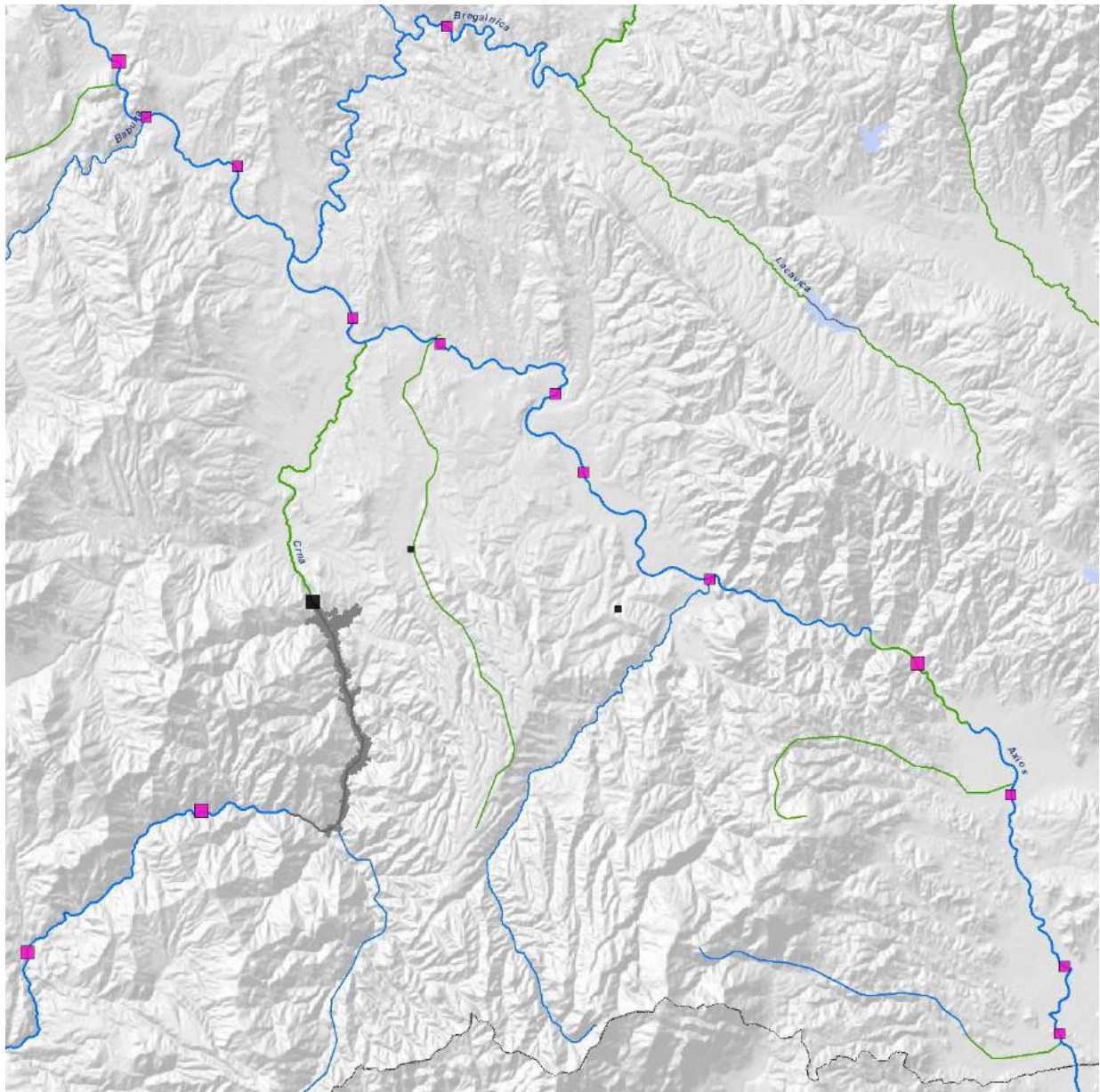


Fig. 15: Map zoom Vardar: Entire lower river in MK is subject of systematic hydropower planning.

## 6. List of planned Hydropower dams

ID_HP	Rivers Poljes	Name Location HPP	Installed MW	Affected River Jewels
MK_HP_394	Mala	Boskov Most	> 50	
MK_HP_397	Treska	Sveta Petka	10-50	
MK_HP_1627	Bregalnica	Razlovci	10-50	
MK_HP_1628	Bregalnica	Jagmurlar	10-50	MK_RWJ_118
MK_HP_1629	Radika	Lukovo Pole, Crna Camen	1-10	
MK_HP_398	Crna	Cebren	> 50	MK_RJ_141
MK_HP_399	Crna	Skočivir	10-50	MK_RJ_141
MK_HP_401	Crna	Galište	> 50	MK_RJ_141
MK_HP_606	Crna tributary	Lera	1-10	
MK_HP_607	Crna tributary	Kazani	1-10	
MK_HP_594	Vardar	Babuna	10-50	MK_RJ_156
MK_HP_913	Vardar	Zgropolci	10-50	MK_RJ_156
MK_HP_400	Vardar	Veles	> 50	MK_RJ_156
MK_HP_396	Vardar	Gradec	> 50	
MK_HP_914	Vardar	Gradsko	10-50	MK_RJ_156
MK_HP_915	Vardar	Kukuricani	10-50	MK_RJ_156
MK_HP_916	Vardar	Krivolak	10-50	MK_RJ_156
MK_HP_917	Vardar	Dubrovo	10-50	MK_RJ_156
MK_HP_918	Vardar	Demir Kapija	10-50	MK_RJ_156
MK_HP_919	Vardar	Miletkovo	10-50	MK_RJ_158
MK_HP_920	Vardar	Gjavato	10-50	MK_RJ_158
MK_HP_921	Vardar	Gevgelija	10-50	MK_RJ_158

Pictures cover: Ulrich Eichelmann (Lukovo Pole, Crna Camen)

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