

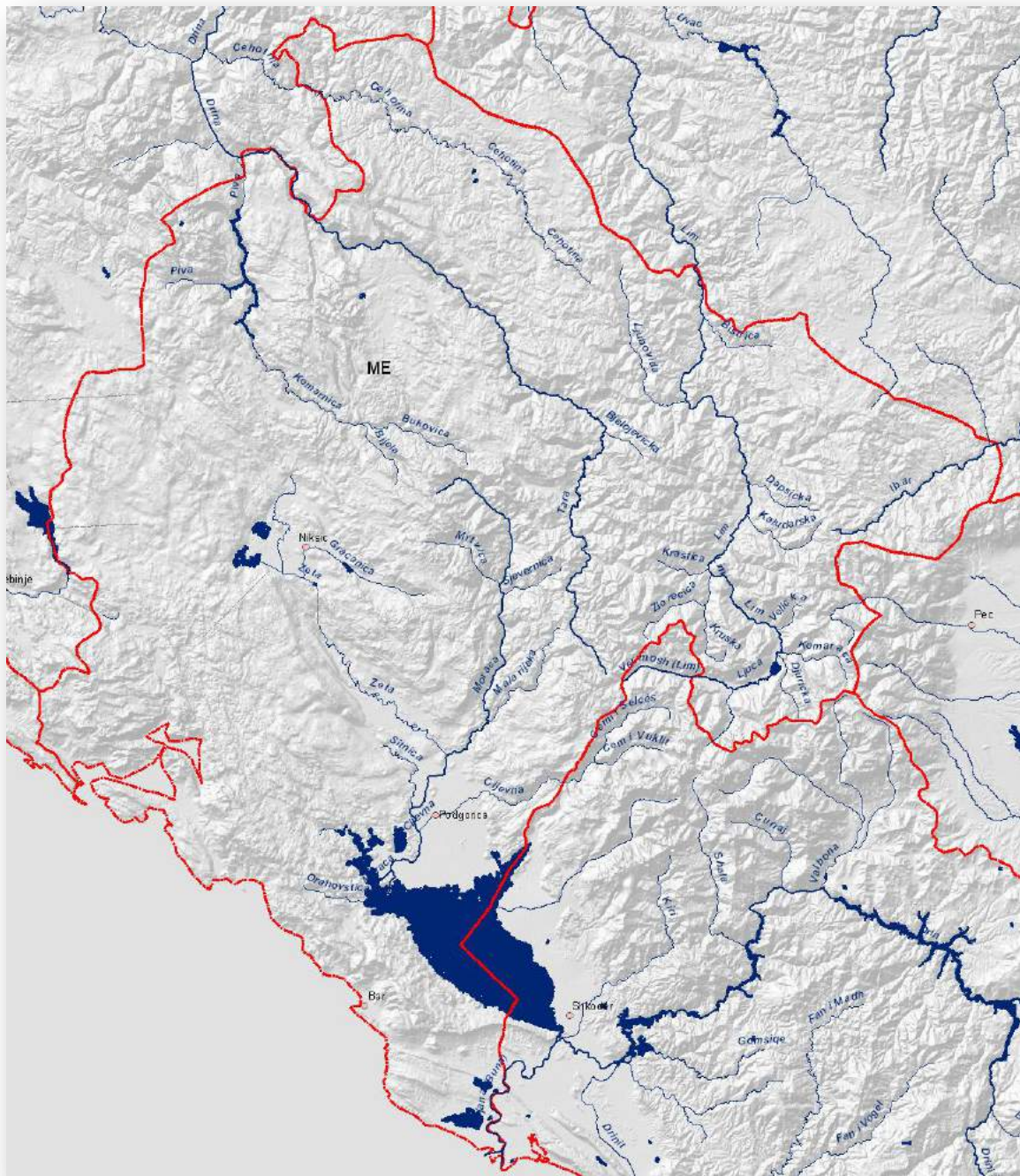


Outstanding Balkan River landscapes – a basis for wise development decisions

Montenegro

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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 severely modifications in particular impoundments. Lakes and rivers outside of the project areas are visualised in dark blue.

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Hydromorphological assessment

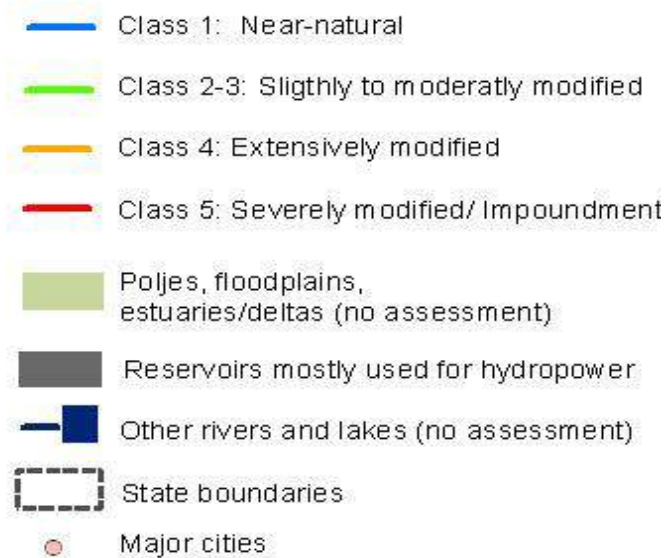


Fig. 1: Legend for the hydromorphological assessment map on next page

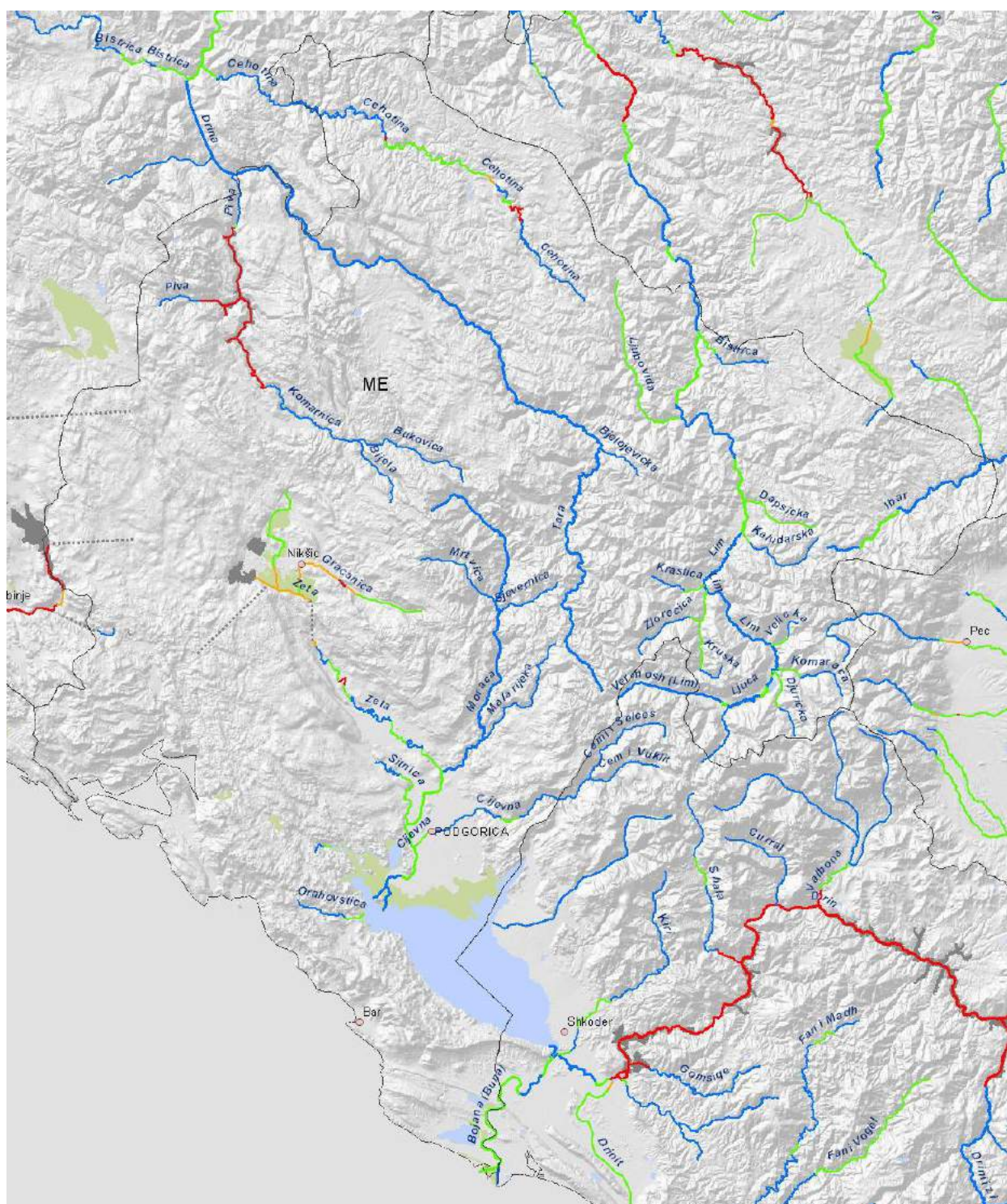


Fig. 2: Hydromorphological assessment for ME.

Montenegro and Albania still have the most intact river network across the entire Balkan region. Only the upper and middle Zeta catchment near Nikšić is used for hydropower usage. The Morača as the main tributary to Lake Scutari (Scutari-Shkoder) is entirely free-flowing. The upper course is a nearly untouched narrow valley with canyon parts, the lower part is under pressure of excessive gravel exploitation before entering the tremendous floodplain belt surrounding the northern lake shore. The Tara canyon is a national park and most famous, but also the Bojana-Buna delta provides good conditions.

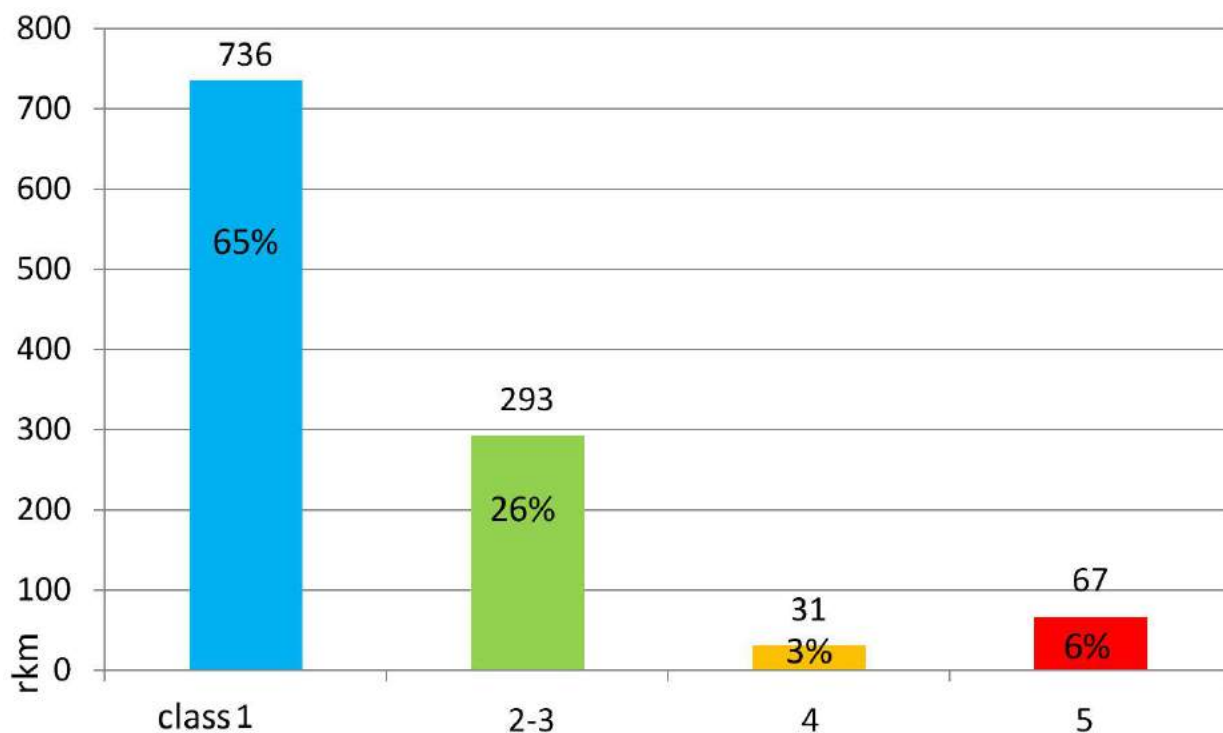


Fig. 3: Hydromorphological assessment in rkm and percentage for ME.

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.

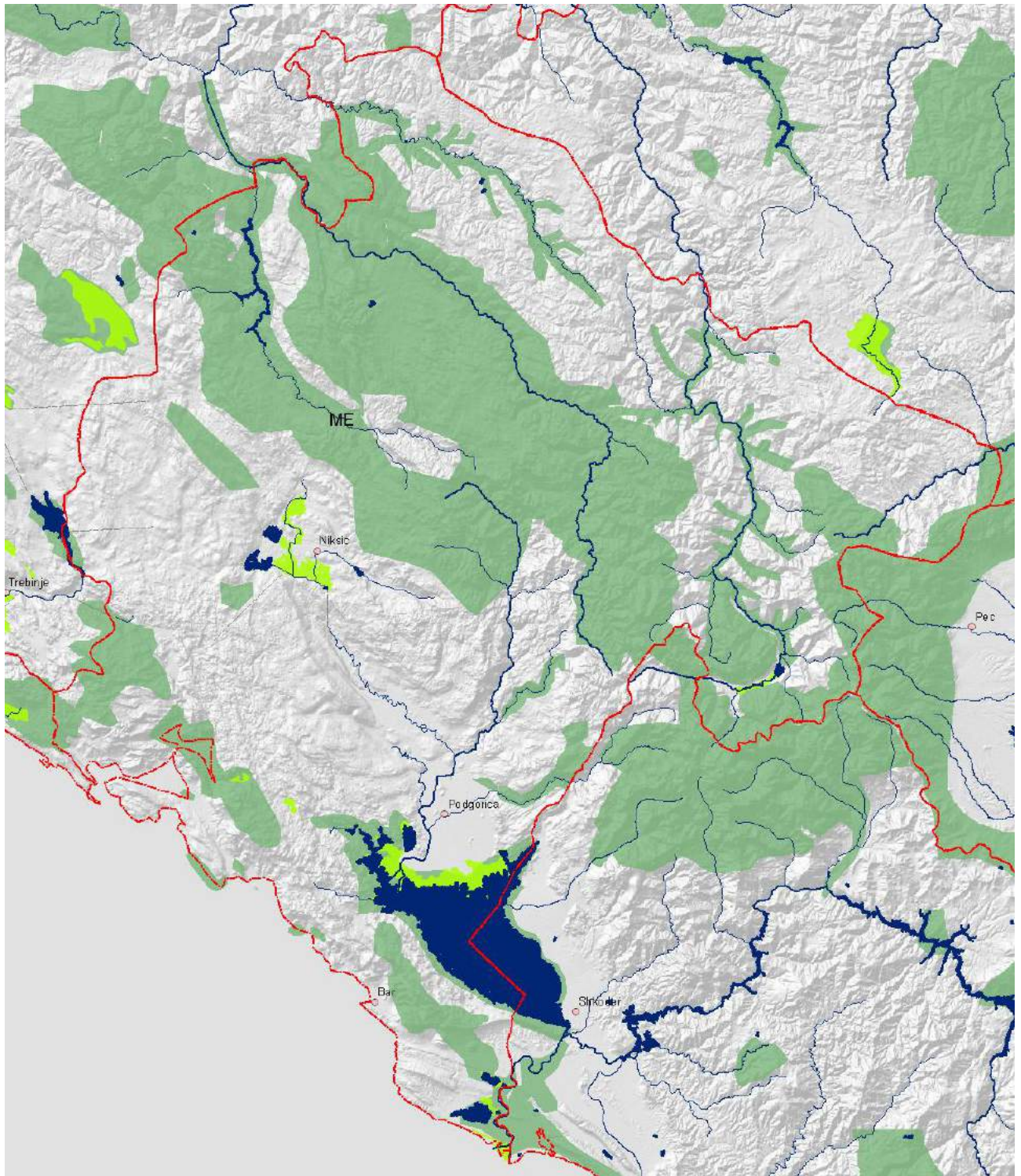


Fig. 4: Protected areas (incl. planned and proposed areas) in dark green (light green are poljes and large floodplain areas)

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.

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

Fig. 5: Definition of conservation value

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

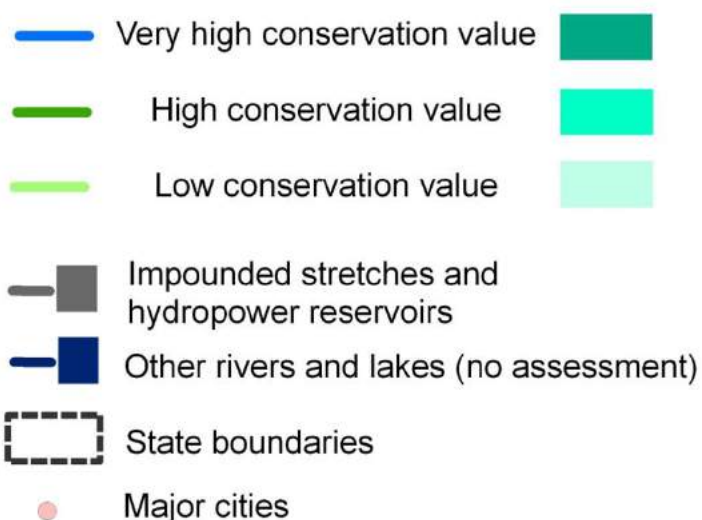


Fig. 6: Legend for the map on conservation value on next page

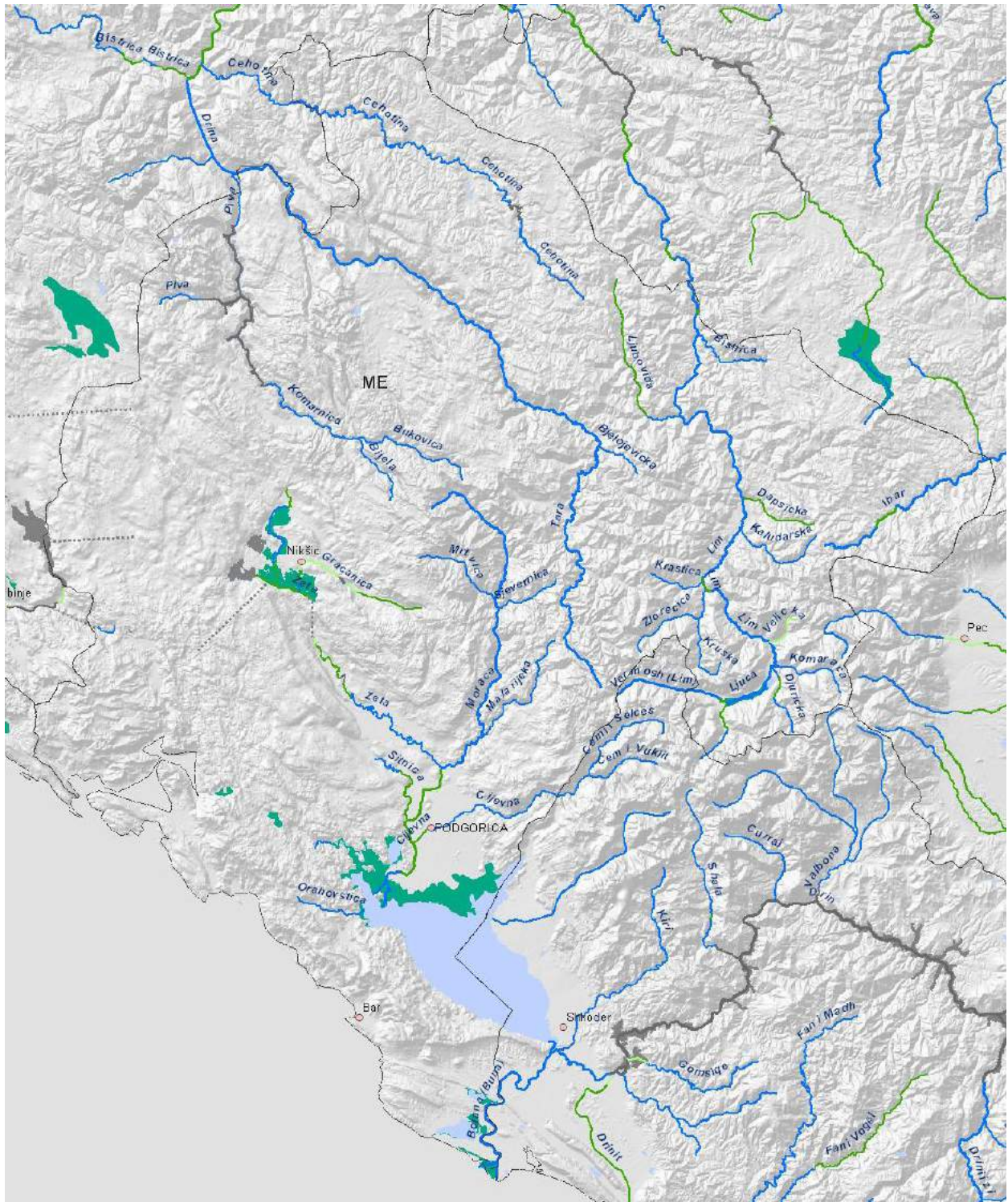


Fig. 7: Conservation value for ME.

In Montenegro nearly 80% of all rivers still provide a very high conservation value, which is outstanding across entire project area. Skadar Lake would have a special role in the freshwater ecosystem of the country and is the continuum between the Adriatic Sea (Bojana-Buna) and Morača having the characteristics of a huge “floodplain lake” an a dynamic of 5 m of lake water level annually building a broad floodplain belt on its northern shore. The rather good developed system of national parks supports the very high conservation value assessment.

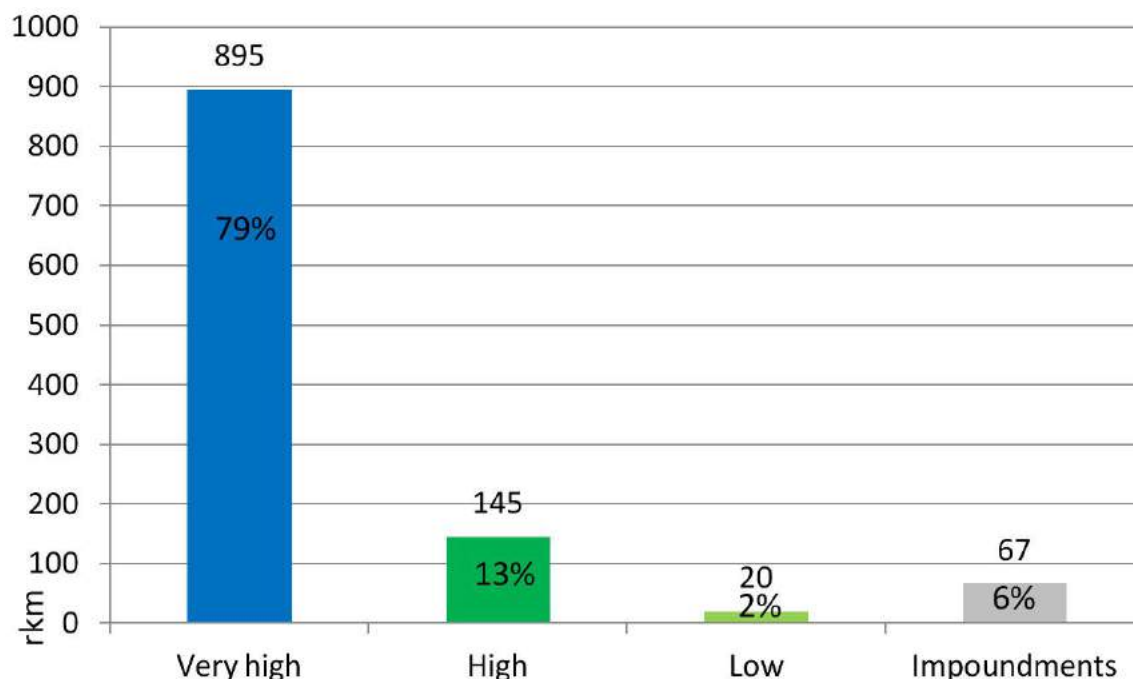


Fig. 8: Conservation value in rkm for ME.

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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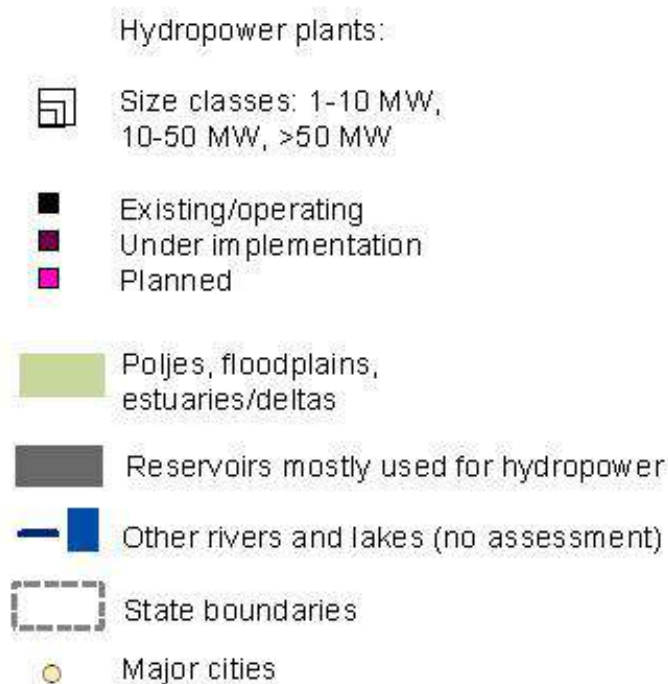


Fig. 9: Legend for the dam map on next page

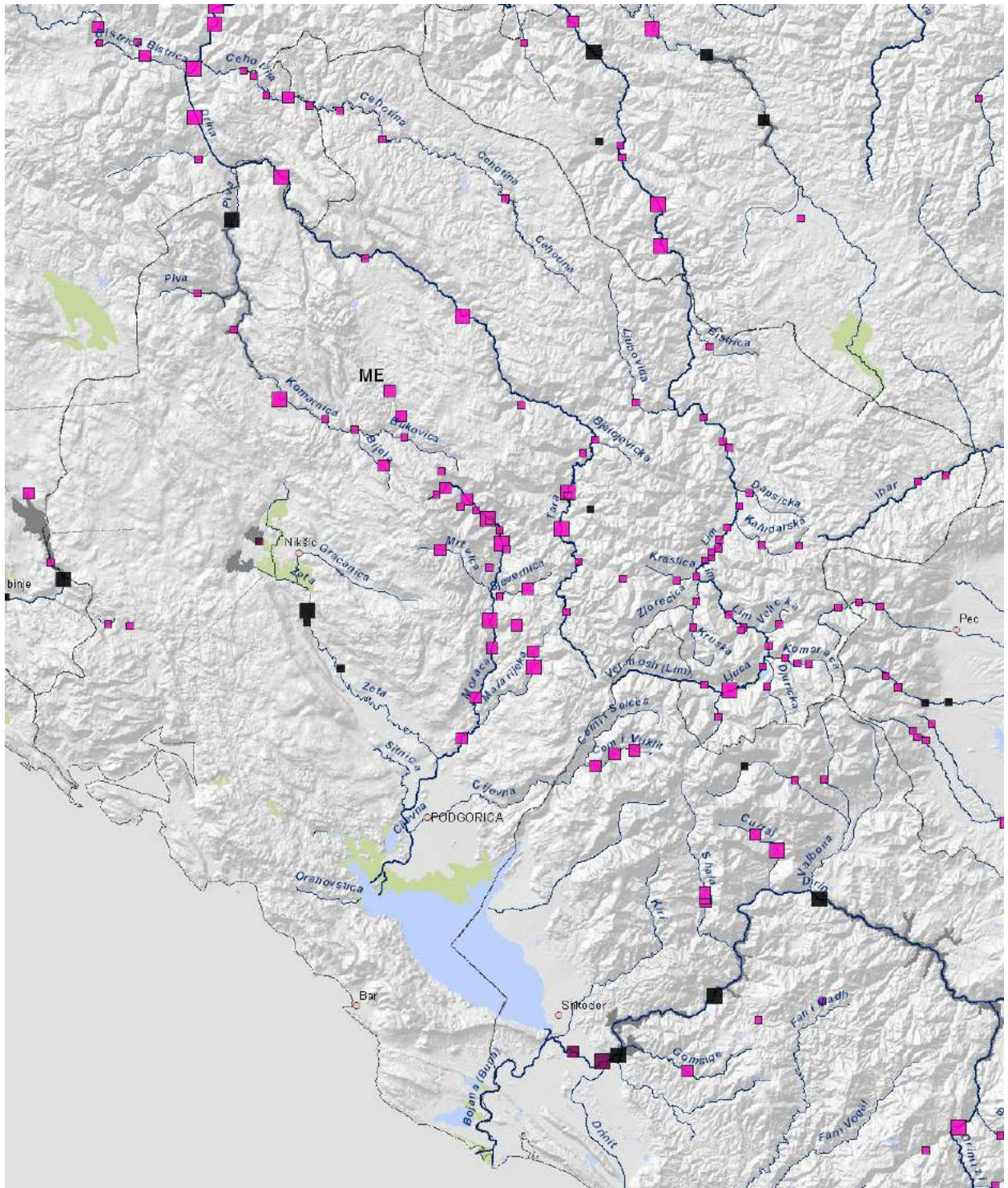


Fig. 10: Hydropower plants for ME.

There are two major HPP's, one feed by the Zeta from the Nikšićko Polje and another one at upper Piva. Many new hydropower plants are foreseen along Morača and Tara.

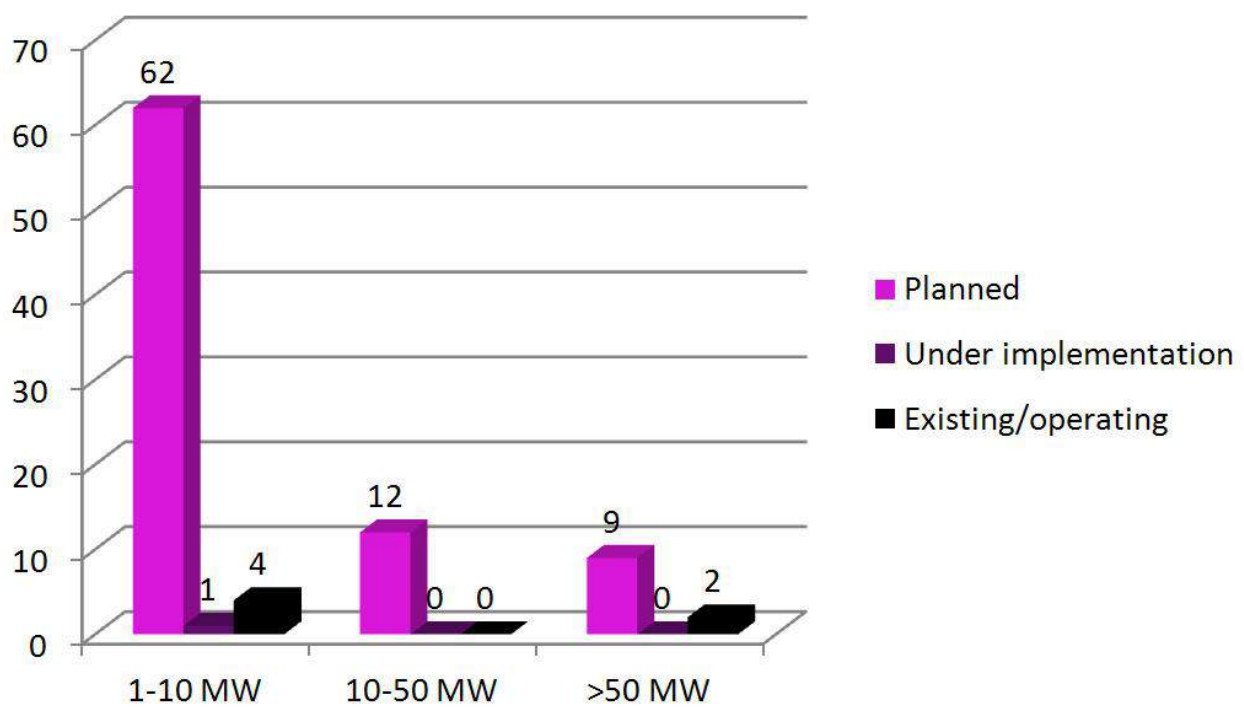


Fig. 11: Distribution of hydropower plants for ME.

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

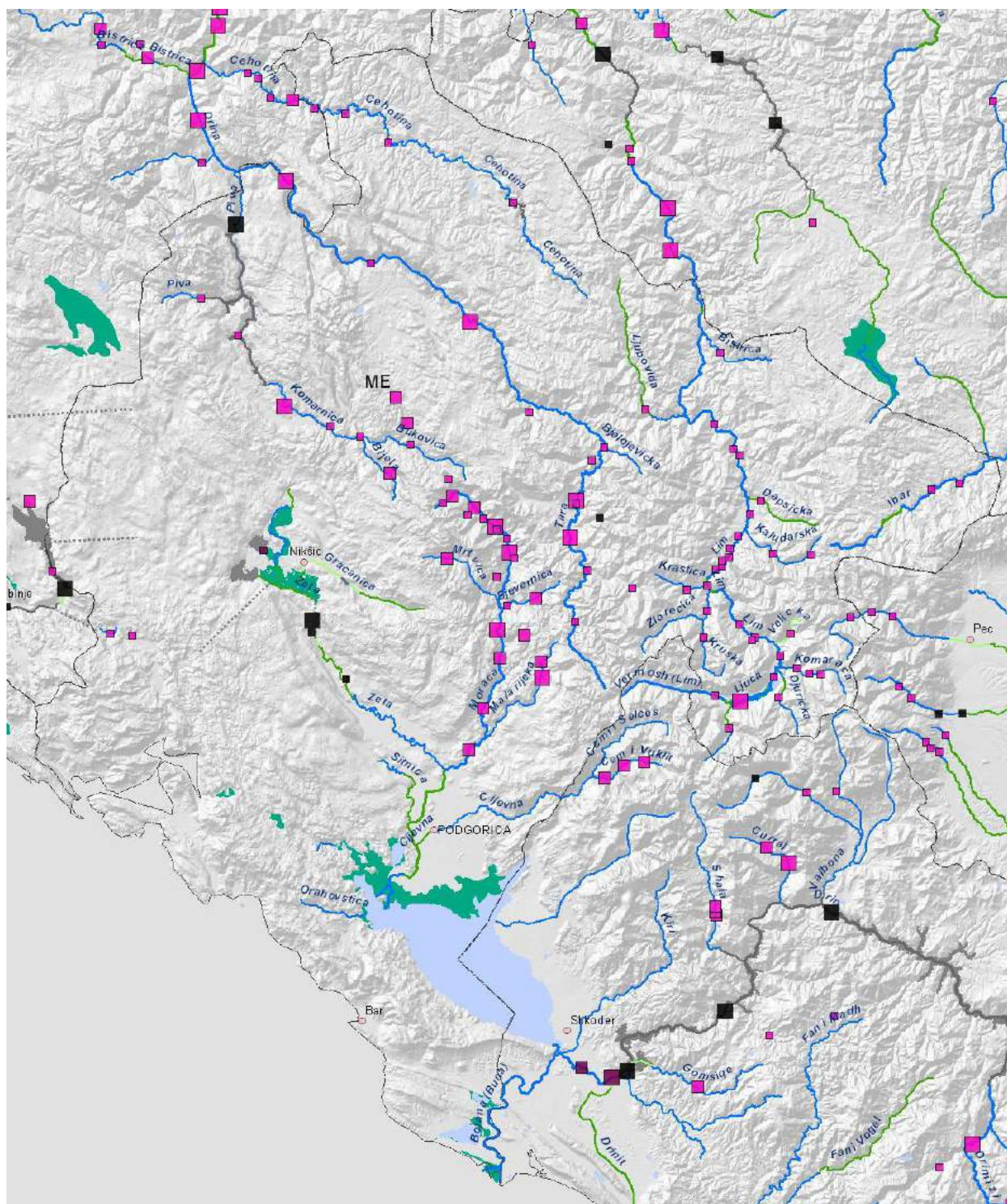


Fig. 13: Affected very high and high conservation stretches by planned hydropower plants for ME.

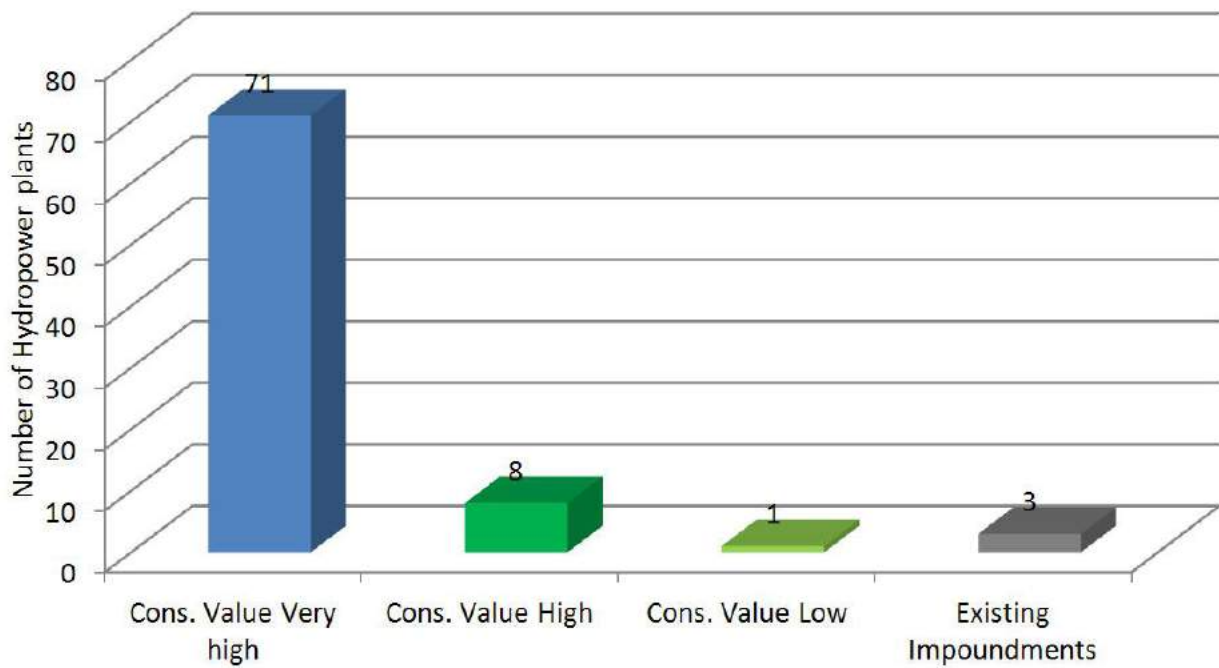


Fig. 14: Number of planned hydropower plants that would affect very high, high and low conservation stretches for ME.

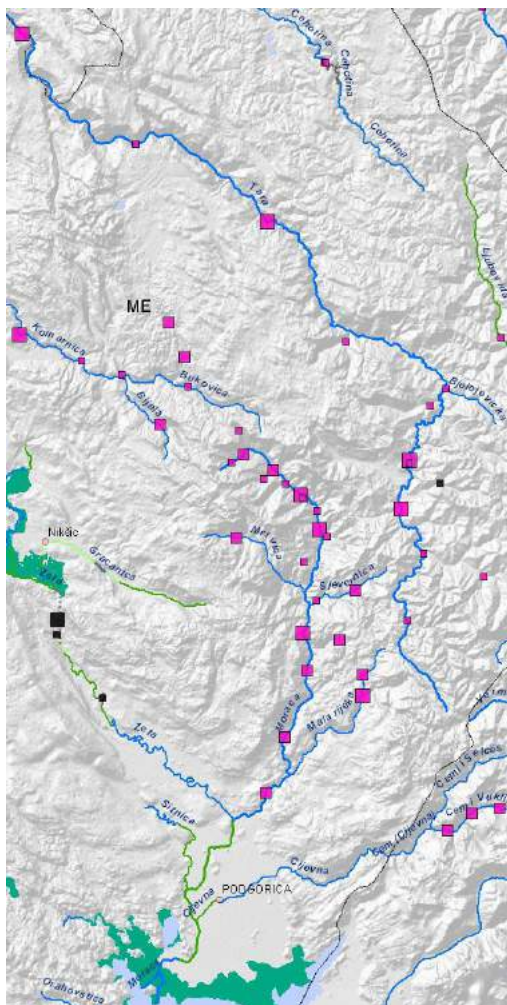


Figure 15: Map zoom on upper Morava and Tara rivers: Nearly pristine upper courses and even entire river systems of typical karst gorge rivers would be interrupted.



Upper Morača Canyon (Mathias Dieckmann).

The river Morača is the most important tributary of Lake Scutari. Together with Bojana-Buna, they form an entirely free flowing connection from the Adriatic sea to the high mountains of Zagradac ridges at 2000 m. A hydropower development foresees a cascade of four huge dams (Andrijevo, Raslovići, Milunović, and Zlatica) with crest heights between 60 and 150 m and installed power between 37 and 127 MW. The length of impoundments sums up to 40 rkm. In addition, on the upper Morača the hydropower plant Kostanica with 550 MW is planned. In sum this makes the largest project in the entire Balkan, impounding also upper Tara (with two dams) and tunnels to feed the water into the Morača catchment.

Lake Scutari Ramsar site would be heavily impacted and the maximum size shrink about 100 km². The total investment sum was estimated with almost 700 Million €.



A part of the delta of the Morača river into Lake Scutari with its unique flood pulse (5 m annual water level dynamics with some 20,000 ha of intact river-lake floodplains) will be threatened by the hydropower plans (Ulrich Schwarz, FLUVIUS).

6. List of planned Hydropower dams

ID_HP	Rivers Poljes	Name Location HPP	Installed MW	Affected River Jewels
ME_HP_003	Tara	Tepca	1-10	ME_RJ_020
ME_HP_004	Tara	Ljutica	> 50	ME_RJ_020
ME_HP_005	Tara	Matesevo	1-10	ME_RJ_020
ME_HP_030	Tara	Trebaljevo	1-10	ME_RJ_020
ME_HP_006	Tara	Opasanica	1-10	ME_RJ_020
ME_HP_007	Tara	Žuti Krš	> 50	ME_RJ_229
BA/ME_HP_749	Tara	Bijeli Brijeg	> 50	ME_RJ_020
ME_HP_007	Tara	Bakovica Klisura	> 50	ME_RJ_229
ME_HP_008	Morača	Andrijevo	> 50	ME_RJ_229
ME_HP_009	Morača	Raslovici	10-50	ME_RJ_229
ME_HP_007	Morača	Kostanica	> 50	ME_RJ_229
ME_HP_010	Morača	Milunovici	10-50	ME_RJ_229
ME_HP_082	Morača	Ljevista	10-50	ME_RJ_229
ME_HP_011	Morača	Zlatica	10-50	ME_RJ_229
ME_HP_073	Morača	Morača above 1,040 AMSL	1-10	ME_RJ_229
ME_HP_091	Morača	Krusev Lug	10-50	ME_RJ_229
ME_HP_082	Morača	Ljevista	10-50	ME_RJ_229
ME_HP_092	Morača	Ljuta	> 50	ME_RJ_229
ME_HP_031	Morača	Dubravica	1-10	ME_RJ_229
ME_HP_028	Komarnica	Poscenje	1-10	ME_RJ_008
ME_HP_012	Komarnica	Komarnica	> 50	ME_RJ_008
ME_HP_023	Cehotina	Gradac	1-10	ME_RJ_219
ME_HP_024	Cehotina	Milovci	1-10	ME_RJ_219
ME_HP_025	Lim	Lukin Vir	1-10	ME_RJ_245
ME_HP_022	Lim	Krusevo	> 50	ME_RJ_097; ME_RJ_243
ME_HP_065	Lim	Lim (825 AMSL - 645 AMSL)	1-10	ME_RJ_244
ME_HP_096	Lim	Rzanice (Donja Rzenica)	1-10	ME_RJ_245
ME_HP_097	Lim	Murino	1-10	ME_RJ_244
ME_HP_098	Lim	Mostine	1-10	ME_RJ_245
ME_HP_086	Lim	Berane	1-10	ME_RJ_245
ME_HP_087	Lim	Poda	1-10	ME_RJ_245
ME_HP_101	Lim	Tresnjevo	1-10	ME_RJ_245
ME_HP_102	Lim	Navotina	1-10	ME_RJ_245
ME_HP_059	Lim	Lim (907 AMSL - 825 AMSL)	1-10	ME_RJ_244
ME_HP_108	Lim	Andrijevića	1-10	
ME_HP_026	Lim	Plavsko jezero	1-10	ME_RJ_243
ME_HP_109	Cehotina	Otilovici	1-10	ME_RJ_219
ME_HP_027	Cehotina	Mekote	1-10	ME_RJ_219

ID_HP	Rivers Poljes	Name Location HPP	Installed MW	Affected River Jewels
ME_HP_029	Bukovica	Donja Bukovica	10-50	ME_RJ_220
ME_HP_037	Zlorečica	Zlorečica	1-10	ME_RJ_231
ME_HP_038	Kutska	Kruska	1-10	ME_RJ_232
ME_HP_039	Trebačka rijeka	Gornja Trepča	1-10	
ME_HP_040	Mala rijeka	Nozica	10-50	ME_RJ_029
ME_HP_041	Murinska	Dosava Rijeka	1-10	ME_RJ_244
ME_HP_042	Velicka	Velika	1-10	
ME_HP_044	Grlja	Vusanje	1-10	
ME_HP_045	Temnjačka-Treskavicka	Jara	1-10	
ME_HP_047	Vrbnica	Vrbnica	1-10	
ME_HP_048	Djurička	Djurička	1-10	
ME_HP_049	Sekularska	Rijeka Marsenica	1-10	
ME_HP_050	Kaludarska	Kaludra	1-10	ME_RJ_239
ME_HP_051	Ljesnica	Bioce/Ljesnica	1-10	ME_RJ_245
ME_HP_053	Tusina	Tusina	1-10	ME_RJ_220
ME_HP_054	Bijela	Bijela	10-50	ME_RJ_221
ME_HP_055	Krastica	Kralje	1-10	ME_RJ_233
ME_HP_056	Komaraca	Komaraca	1-10	ME_RJ_241
ME_HP_057	Osljak/Piva	Osljak	1-10	
ME_HP_058	Babinopoljska	Babinopoljska	1-10	
ME_HP_062	Planinski potok	Planinski potok	1-10	
ME_HP_063	Dapsića	Dapsića	1-10	
ME_HP_066	Bistrica	Bistrica	1-10	ME_RJ_237
ME_HP_068	Pozanjska	Pozanjska	1-10	ME_RJ_229
ME_HP_069	Vrela	Vrela	1-10	ME_RJ_229
ME_HP_070	Ratnja	Ratnja	1-10	ME_RJ_229
ME_HP_071	Ibrištica	Ibrija	1-10	ME_RJ_229
ME_HP_072	Sjevernica	Sjevernica	1-10	ME_RJ_046
ME_HP_105	Ibar	Bac	1-10	ME_RJ_247
ME_HP_074	Ibar	Ibar with its tributaries	1-10	ME_RJ_247
ME_HP_075	Stitaricka	Stitaricka	1-10	
ME_HP_076	Crnja	Crnja	1-10	ME_RJ_229
ME_HP_077	Bjelojevička	Bjelojevička	1-10	
ME_HP_079	Zaslapnica	Zaslapnica	1-10	
ME_HP_080	Grahovo reservoir	Grahovo reservoir	1-10	
ME_HP_090	Ljubovida	Ljubovida	1-10	
ME_HP_093	Mrtvica	Velje Duboko	10-50	ME_RJ_045
ME_HP_094	Ravnjak	Ravnjak	1-10	
ME_HP_103	Grncar	Grncar	1-10	T_AL-ME_RJ_242
ME_HP_104	Savnik	Savnik II	1-10	ME_RJ_220
ME_HP_1040	Bukovica	Timar	10-50	ME_RJ_220

ID_HP	Rivers Poljes	Name Location HPP	Installed MW	Affected River Jewels
ME_HP_107	Trebišnjica	Trebišnjica	1-10	
ME_HP_115	Sjevnica	Kos	10-50	ME_RJ_046
ME_HP_116	Mala rijeka	Brskut	> 50	ME_RJ_029
ME_HP_117	Krušev potok	Kruševica	10-50	ME_RJ_229
ME_HP_118	Kostanica	Luge	1-10	ME_RJ_229
ME_HP_119	Javorski potok	Javor	1-10	ME_RJ_229

Pictures cover: Ulrich Schwarz (Moraca River delta into Skadar lake)

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