

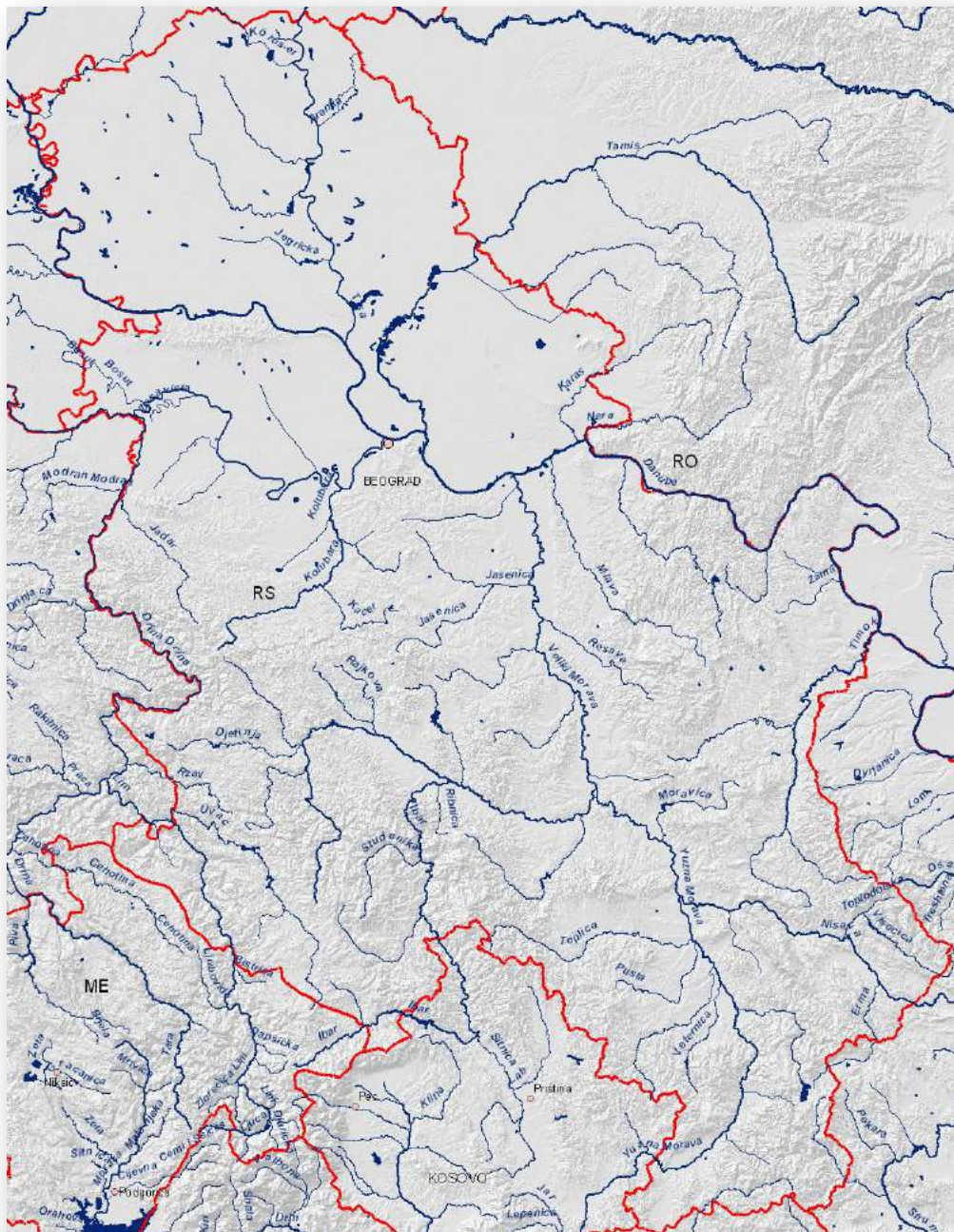


Outstanding Balkan River landscapes – a basis for wise development decisions

Serbia

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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

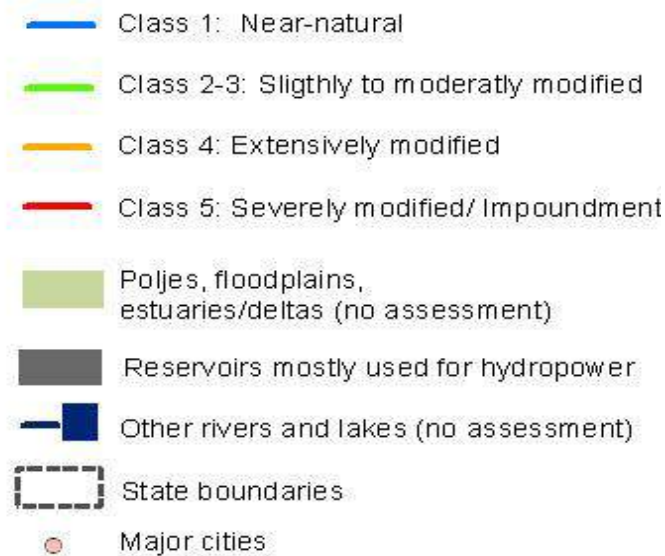


Fig. 1: Legend for the hydromorphological assessment map on next page

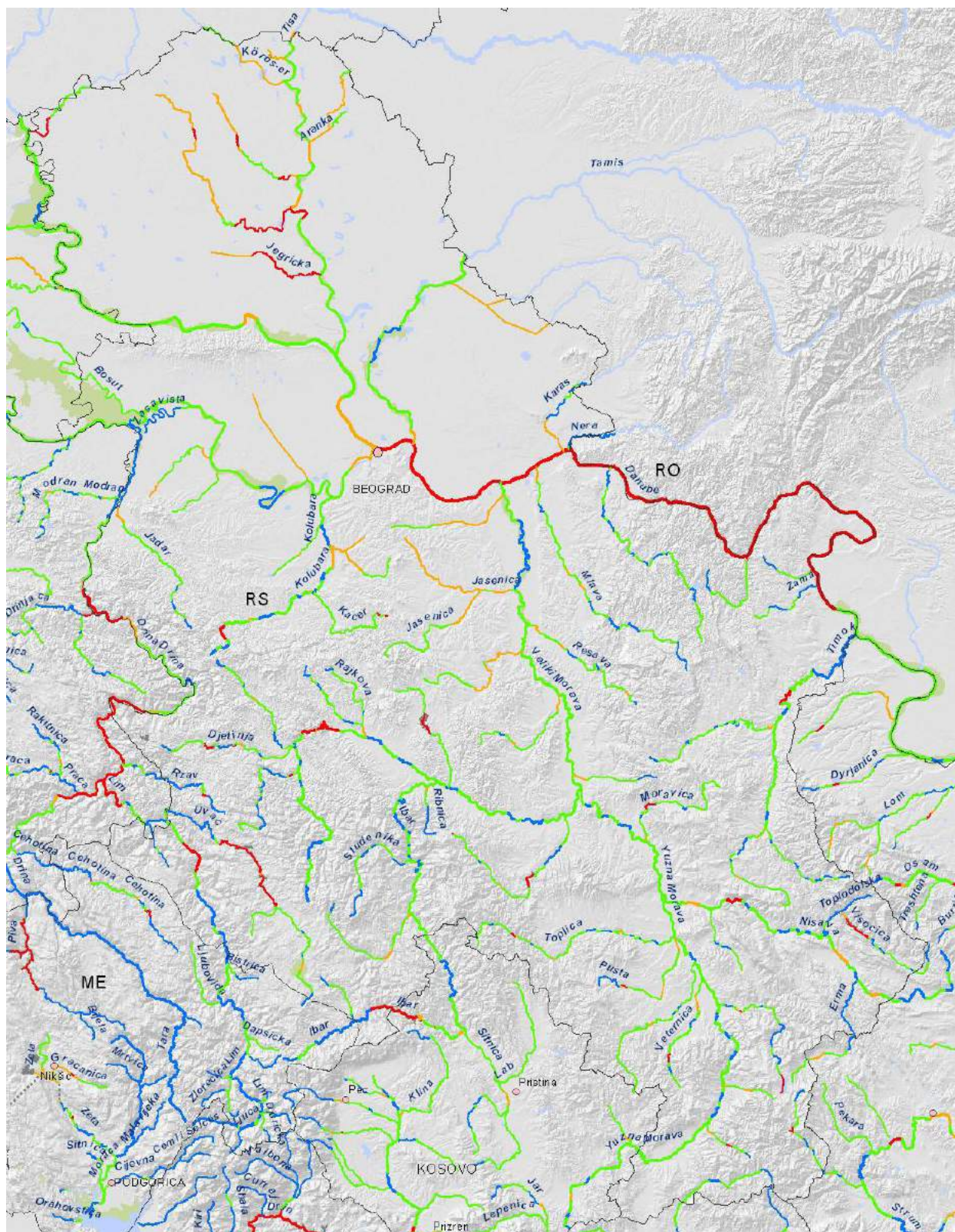


Fig. 2: Hydromorphological assessment for RS.

The northern part of the country (mainly Vojvodina) can be counted to the Pannonian plain adjacent to Hungary. In Serbia, major river systems of the Danube meet, changing the hydrological regime of the Danube from Alpine-influenced to Pannonian and Balkan-influenced.

river systems (Tisa and Sava influence). The construction of Iron gate 1 and 2 dams completely changed the breakthrough valley between Carpathian mountains in the north and the Balkan ridges in the southeast (class 5). The former gravel dominated cataract stretch turned into a huge hydropower lake. The impoundment reaches approximately the Tisa mouth but depending on discharge it spreads between Novi Sad (during very low water) and Beograd (very high water). Therefore lower Sava and Tisa are affected by backwater as well. Coming to the two main Balkan rivers the Drina and Veliki Morava systems large parts still provides good hydromorphological conditions (class 2-3), even on lower courses of both rivers stretches with very good conditions can be find (as well as on lower Timok). But the Drina continuum is interrupted by several major dams. On the other side the narrow Lim valley is similar as the well known Tara canyon in Montenegro a touristic attraction and partially untouched. Floodplains were widely spread in the northern part of the country, today only remaining sites can be find along the upper part of Serbian Danube, some places along Tisa and along the course of lower Tamiš.

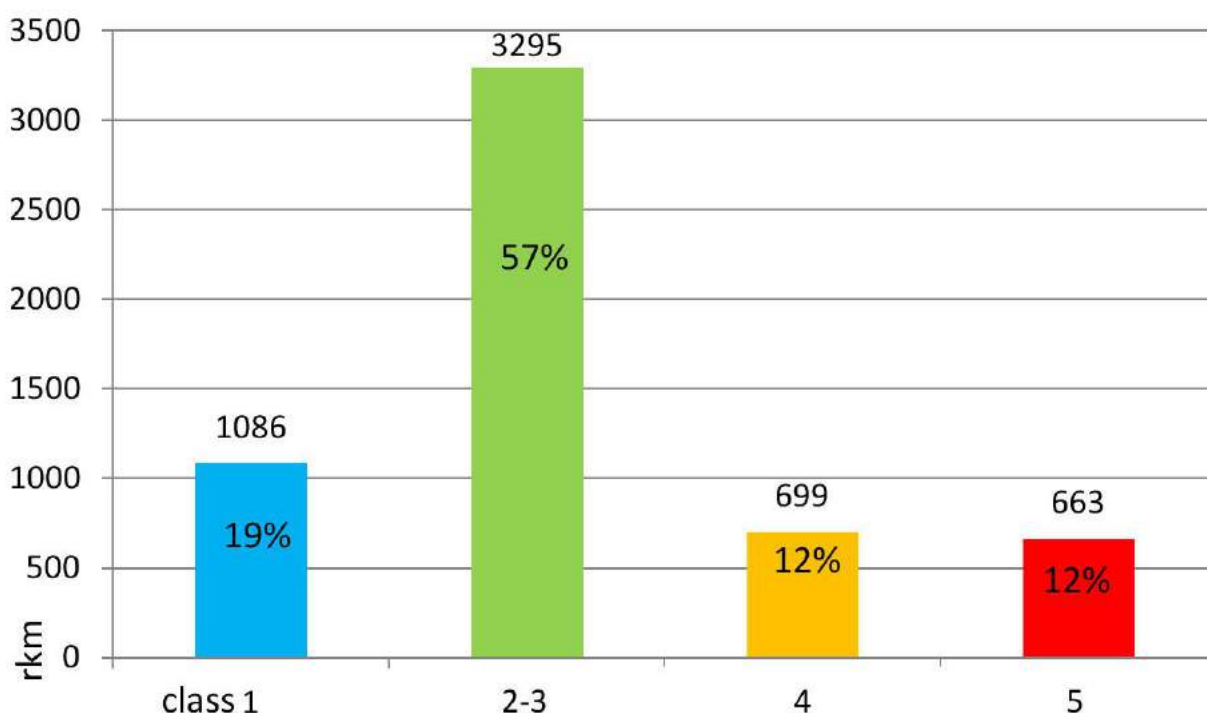


Fig. 3: Hydromorphological assessment in rkm and percentage for RS.

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.

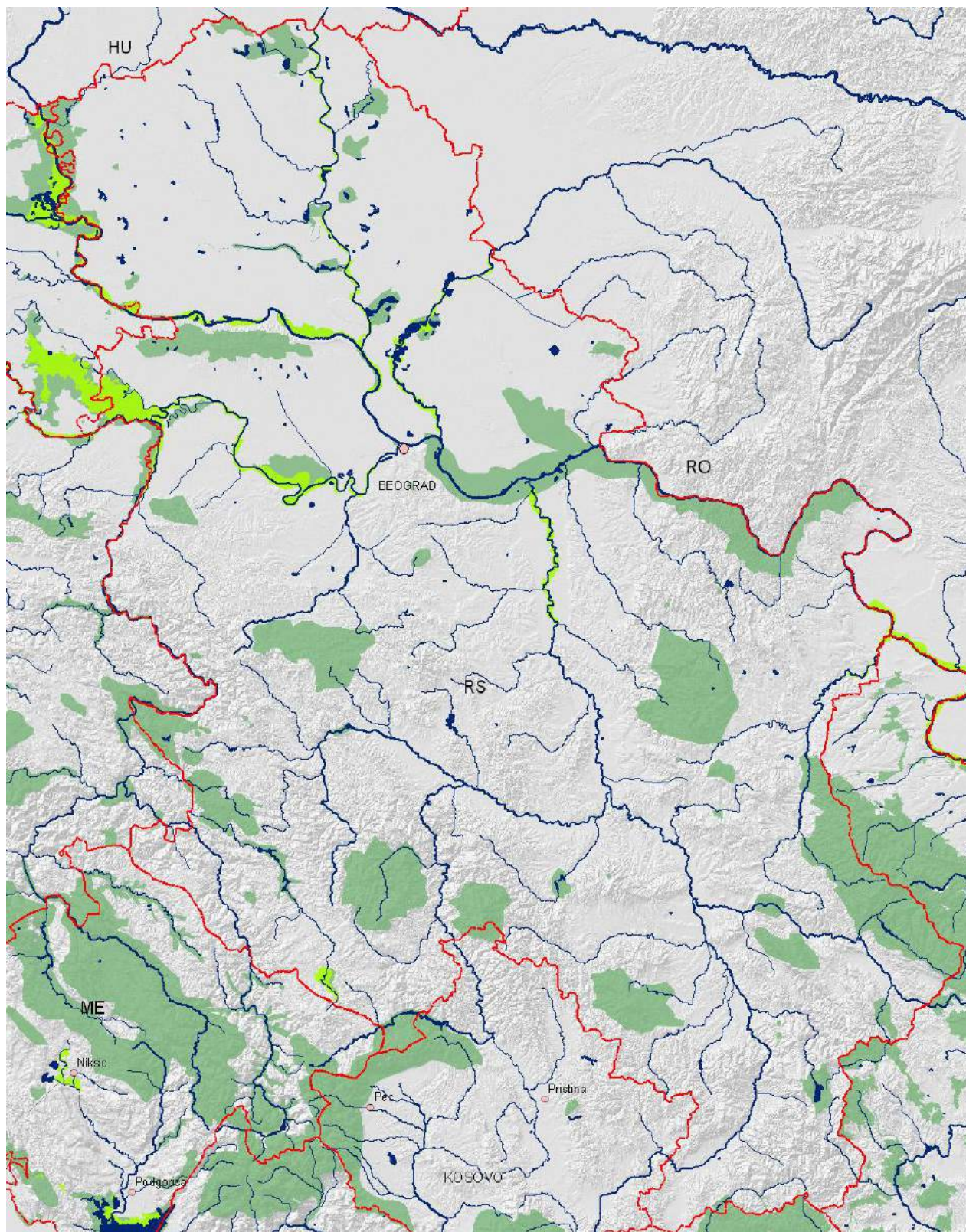


Fig. 4: Protected areas (incl. planned and proposed areas) in dark green (light green are poljes and large floodplain areas)

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)











-  Very high conservation value 
-  High conservation value 
-  Low conservation value 
-  Impounded stretches and hydropower reservoirs
-  Other rivers and lakes (no assessment)
-  State boundaries
-  Major cities

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

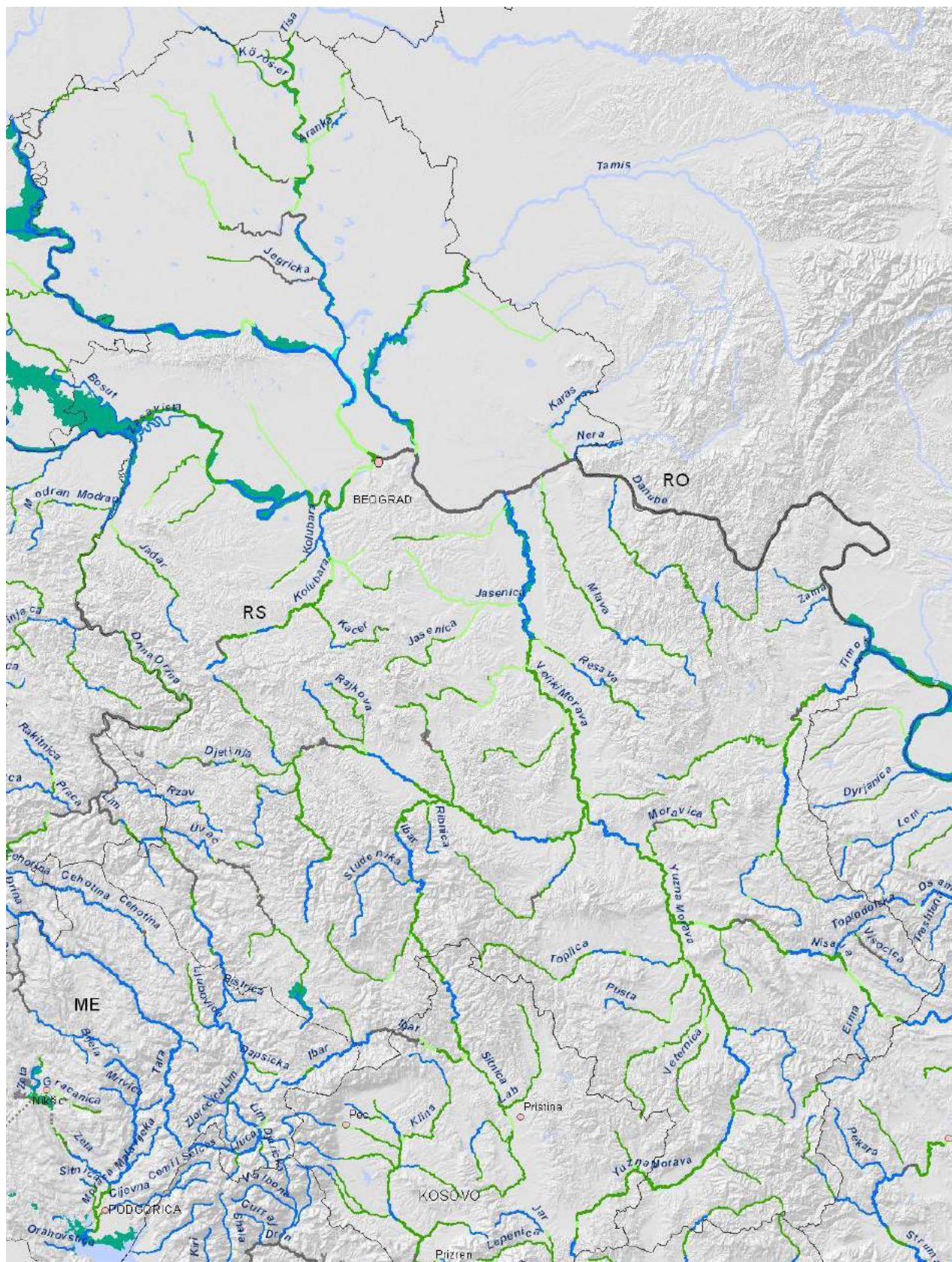


Fig. 7: Conservation value for RS.

In Serbia several large river stretches fall into the highest class due to protected areas or significant adjacent floodplains. However most of the rivers are so far classified in the second class, which could change due to enlarged protection areas (e.g. by EMERALD/

Natura 2000 planning) including river corridors. The Danube in the Iron Gate was not assessed due to large impoundment.

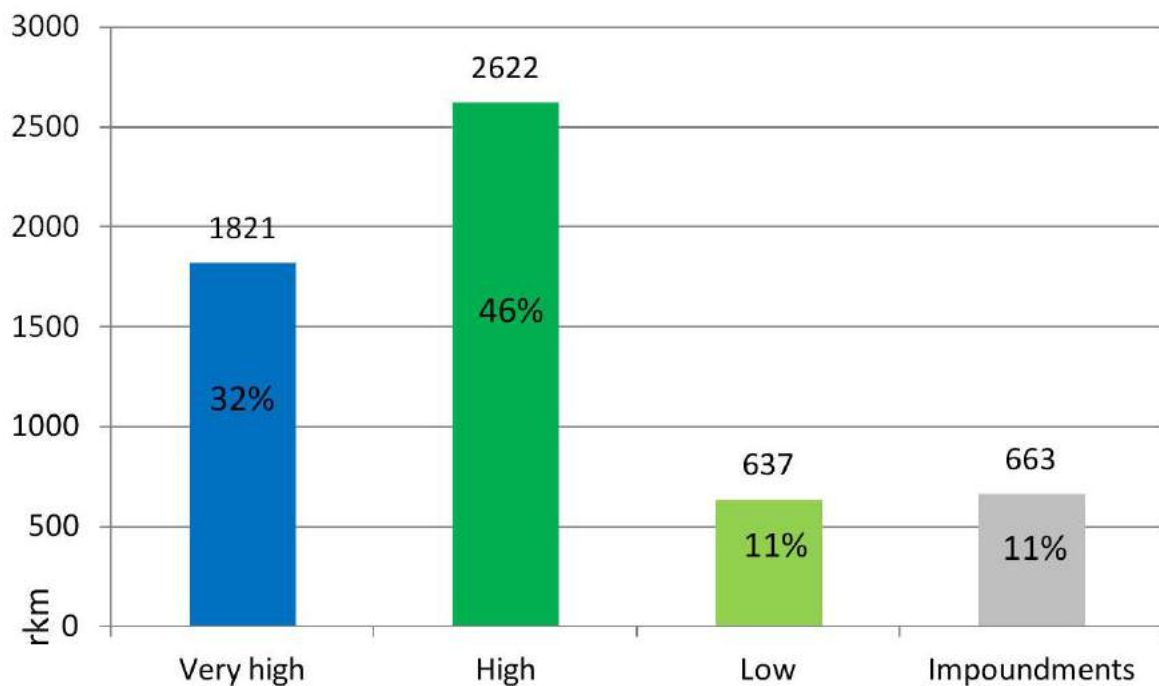


Fig. 8: Conservation value in rkm for RS.

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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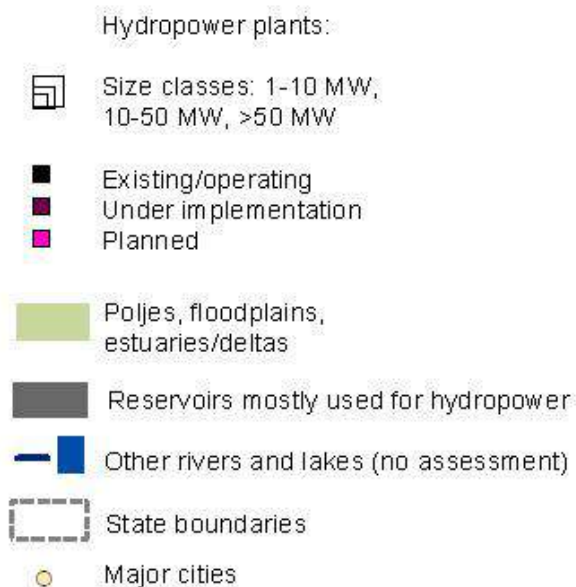


Fig. 9: Legend for the dam map on next page

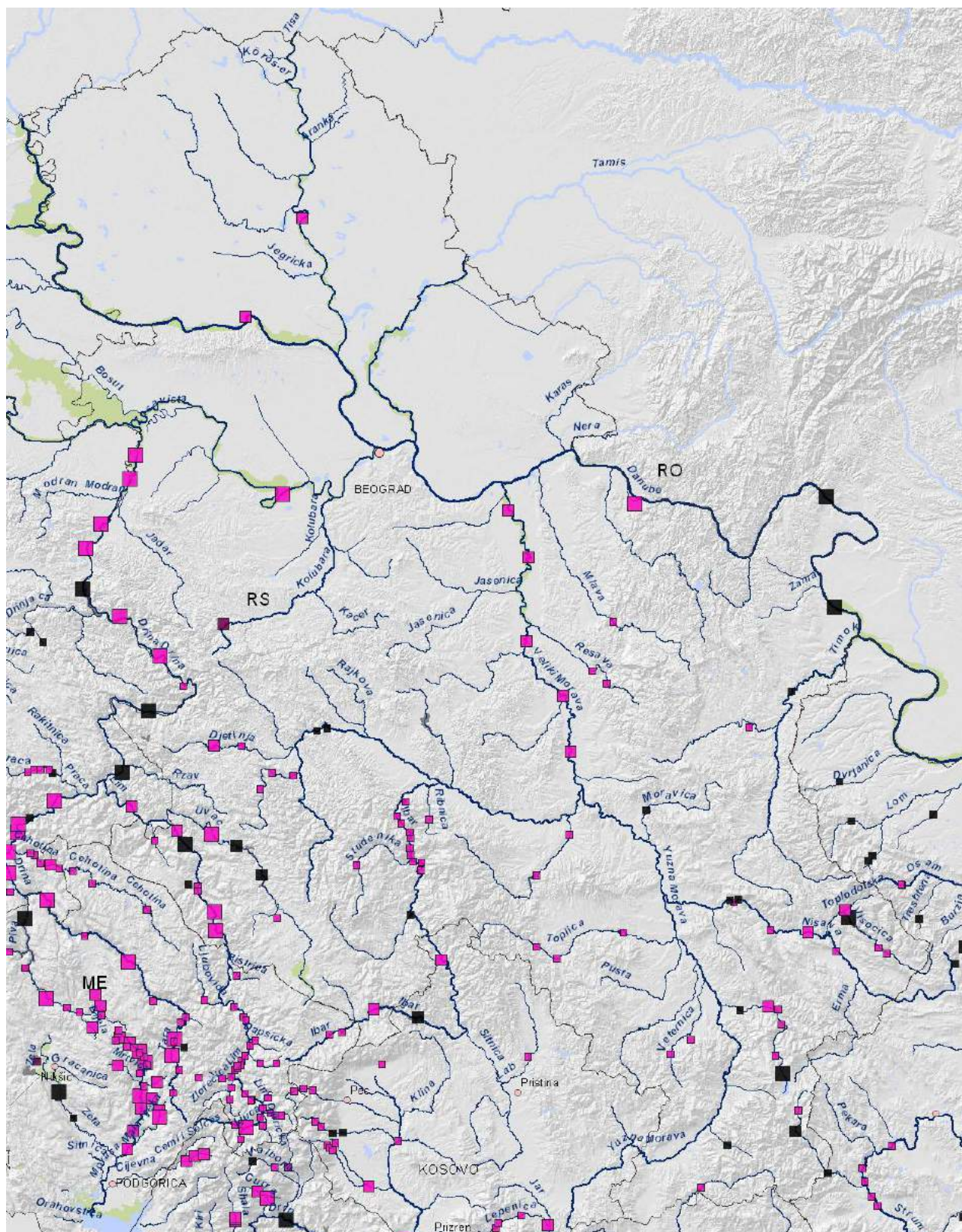


Fig. 10: Hydropower plants for RS.

The Iron Gate 1 HPP is the largest in the Danube basin (and western and central Europe) with about 1,000 MW installed power. It impounds the Danube for some 320 rkm. Other HPPs can be find in particular on Drina. Many new ones are planned on Veliki Morava and Ibar rivers. On Danube a huge pumping storage plant is projected (so called Iron Gate 3).

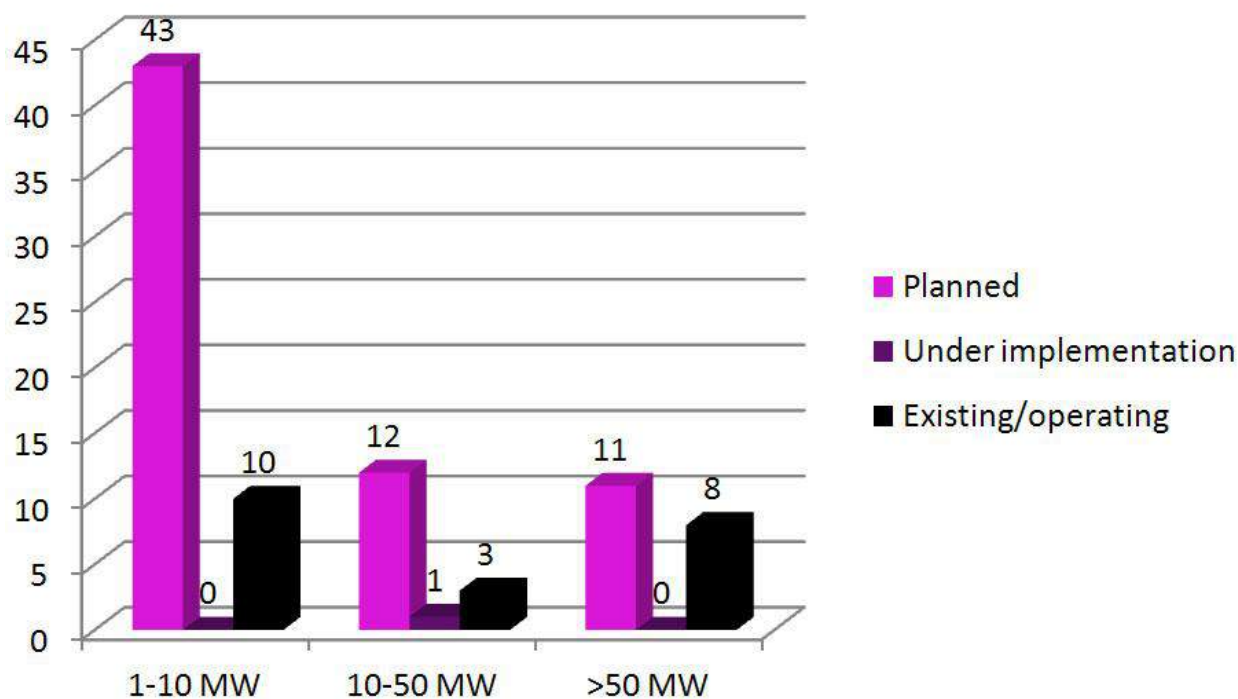


Fig. 11: Distribution of hydropower plants for RS.

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 (righth):

Very high conservation value

High conservation value

Low conservation value

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

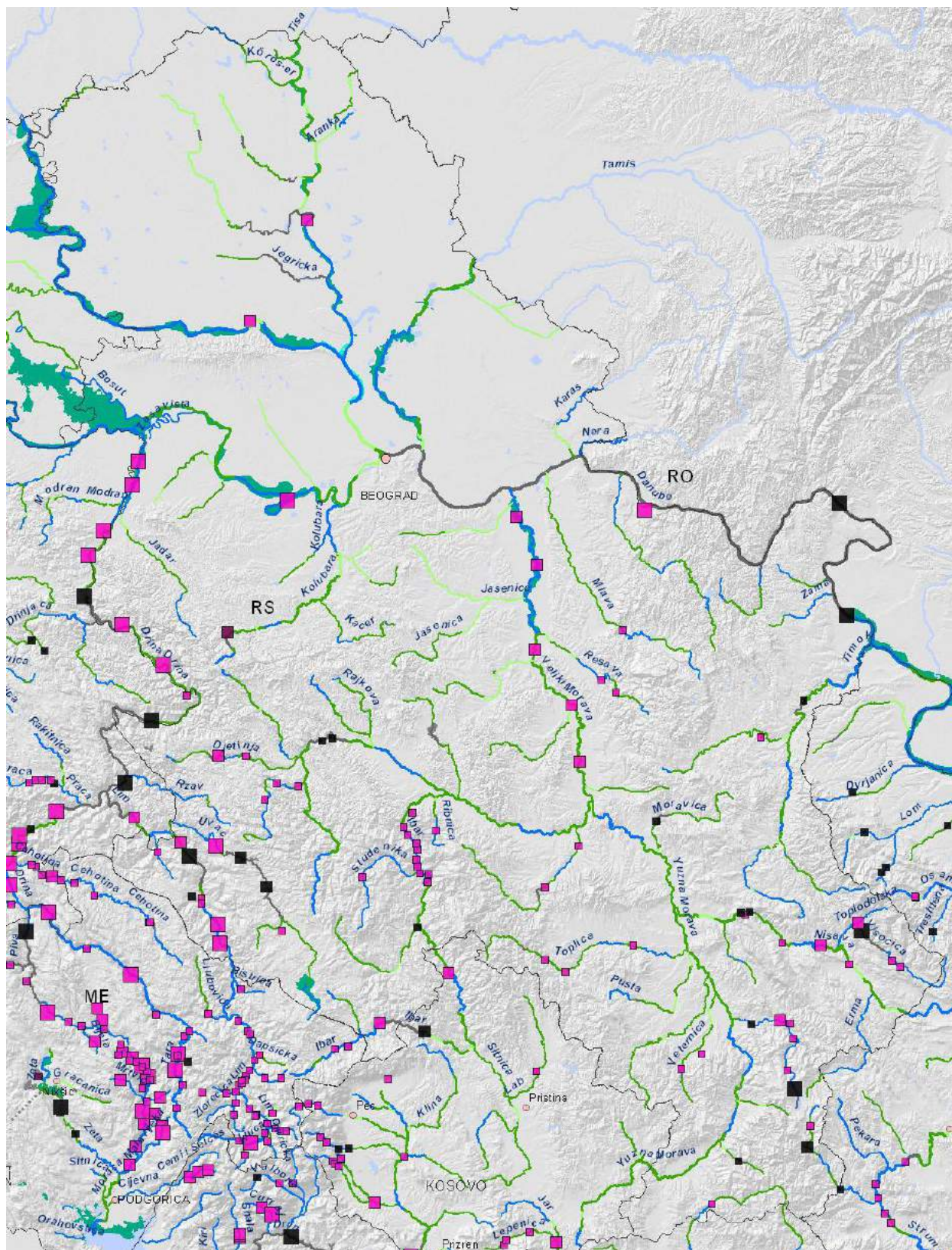


Fig. 13: Affected very high and high conservation stretches by planned hydropower plants for RS.

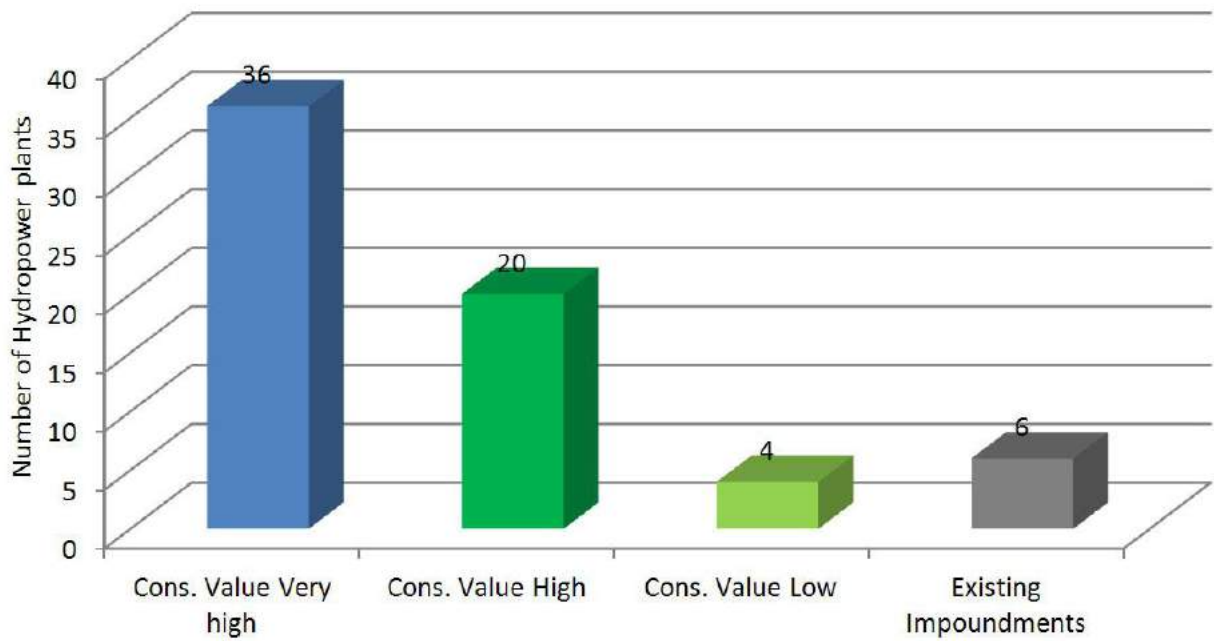


Fig. 14: Number of planned hydropower plants that would affect very high, high and low conservation stretches for RS.

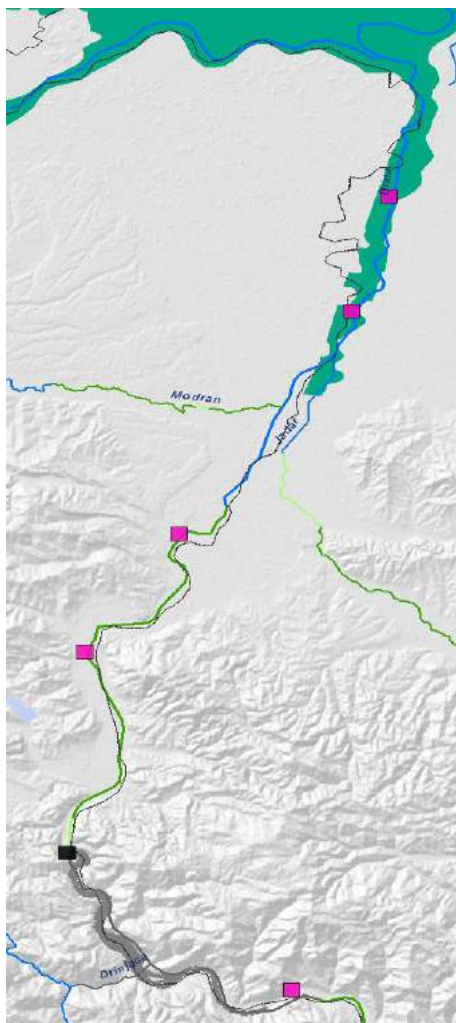


Fig. 15 (left): Map zoom lower Drina: The remaining free-flowing and meandering 80 rkm would be interrupted by new dams.



Fig. 16: Lower Drina: Braided toward meandering channels with many pioneer areas on gravel and floodplain forests.

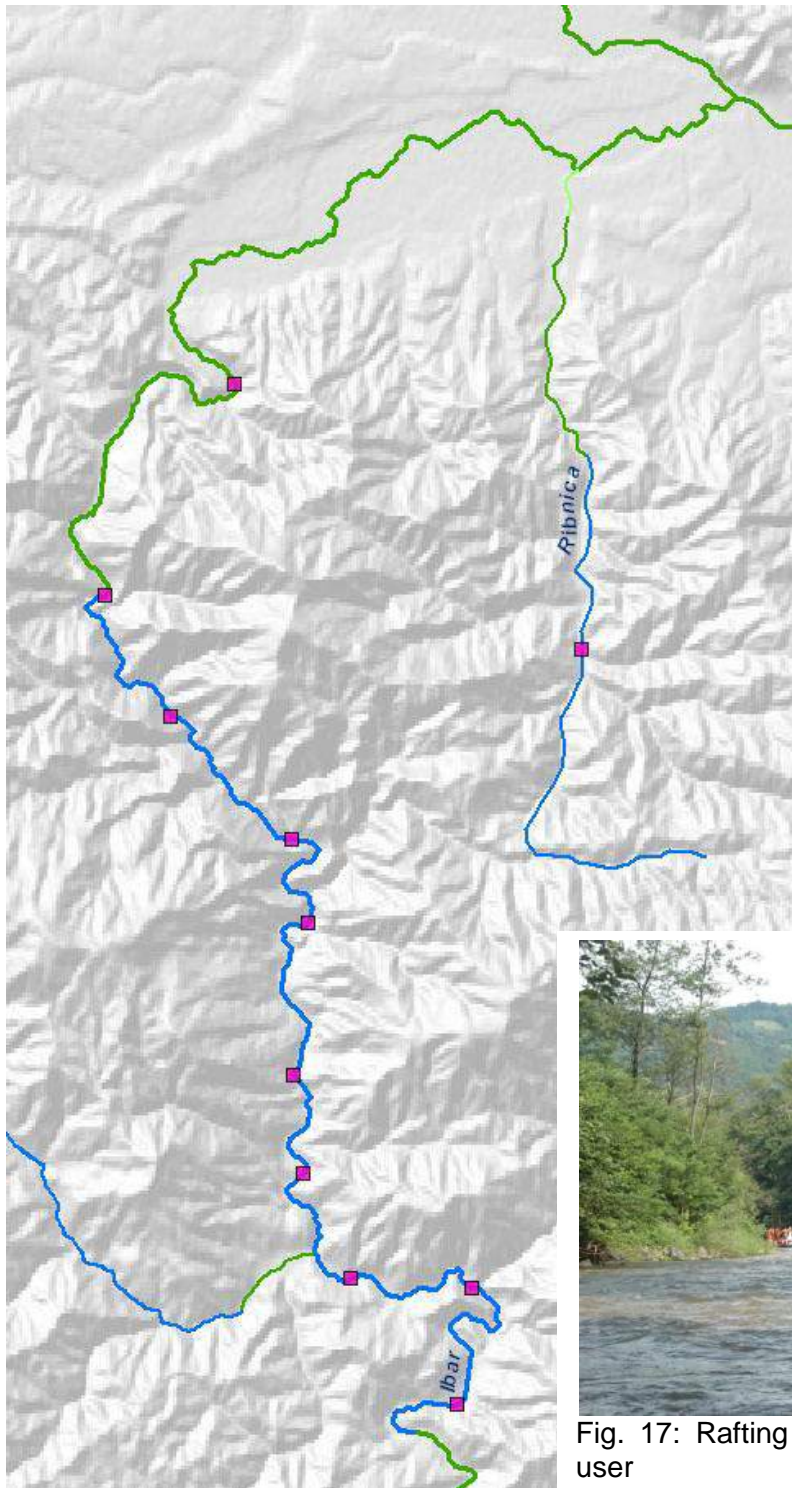


Fig. 17: Rafting tour on Ibar, by Google Panoramio user

Fig. 18: Map zoom Ibar: The gorge of Ibar would be systematically impacted by hydropower.

6. List of planned Hydropower dams

| ID_HP | Rivers Poljes | Name Location HPP | Installed MW | Affected River Jewels |
|------------|----------------------|---------------------|--------------|-----------------------|
| RS_HP_1000 | Ibar | Ibar 1 | 1-10 | |
| RS_HP_1001 | Ibar | Ibar 2 | 1-10 | |
| RS_HP_1002 | Ibar | Ibar 3 | 1-10 | |
| RS_HP_1003 | Ibar | Ibar 4 | 1-10 | RS_RJ_598 |
| RS_HP_1004 | Ibar | Ibar 5 | 1-10 | RS_RJ_598 |
| RS_HP_1005 | Ibar | Ibar 6 | 1-10 | RS_RJ_598 |
| RS_HP_1006 | Ibar | Ibar 7 | 1-10 | RS_RJ_598 |
| RS_HP_1007 | Ibar | Ibar 8 | 1-10 | |
| RS_HP_1008 | Ibar | Ibar 9 | 1-10 | |
| RS_HP_1009 | Ibar | Ibar 10 | 1-10 | |
| RS_HP_405 | Ibar | Ribarice | 10-50 | RS_RJ_597 |
| RS_HP_370 | Djetinja | Djetinja | 1-10 | RS_HP_370 |
| RS_HP_408 | Djetinja | Vrutci | 10-50 | |
| RS_HP_1649 | Ribnica | Dosici | 1-10 | |
| RS_HP_407 | Vlasina | Svodje | 10-50 | RS_RJ_595 |
| RS_HP_410 | Rasina | Celije | 1-10 | |
| RS_HP_1638 | Visocica | Rsovici | 1-10 | |
| RS_HP_1640 | Visocica | Visocka rzana | 1-10 | |
| RS_HP_1630 | Visocica tributaries | Tosin Kamik complex | 10-50 | |
| RS_HP_1642 | Toplica | Selova | 1-10 | |
| RS_HP_1643 | Toplica | Magovo | 1-10 | |
| RS_HP_1644 | Toplica | Selova | 1-10 | |
| RS_HP_1641 | Pcinja | Pcinja | 1-10 | |
| RS_HP_1645 | Ljutina | Sljivovica | 1-10 | |
| RS_HP_1646 | Vlasina | Rejosnica | 1-10 | |
| RS_HP_1647 | Drakovacka | Petkovi | 1-10 | |
| RS_HP_1648 | Vlasina | Bare | 1-10 | |
| RS_HP_1653 | Krepoljin | Mlava | 1-10 | |
| RS_HP_1654 | Celije | Rasina | 1-10 | |
| RS_HP_1655 | Usce | Studenica | 1-10 | |
| RS_HP_1656 | Manasija | Resava | 1-10 | |
| RS_HP_1658 | Dutovo | Resava | 1-10 | |
| RS_HP_665 | Veternica | Barje | 1-10 | |
| RS_HP_666 | Vučjanka | Vučje | 1-10 | |
| RS_HP_667 | Crni Timok | Gamzigrad | 1-10 | |
| RS_HP_1650 | Gokcanica | Jelici | 1-10 | |
| RS_HP_729 | Veliki Rzav | Arilje | 1-10 | |
| RS_HP_754 | Nisava | Banjica | 1-10 | |
| RS_HP_1631 | Nisava | Crnokliste | 10-50 | |
| RS_HP_1639 | Nisava | Tigar | 1-10 | |
| RS_HP_1657 | Nisava | Vrgudinac | 1-10 | |
| RS_HP_759 | Lim | Brodarevo 2 | > 50 | RS_RJ_900 |

| ID_HP | Rivers Poljes | Name Location HPP | Installed MW | Affected River Jewels |
|--------------|---------------|-------------------|--------------|----------------------------------|
| RS_HP_1637 | Lim | Priboj | 10-50 | RS_RJ_900 |
| RS_HP_411 | Lim | Bistrica | > 50 | RS_RJ_605 |
| RS_HP_1651 | Lim | Kolovrat | 1-10 | RS_RJ_900 |
| RS_HP_927 | Lim | Prijepolje 1 | 10-50 | RS_RJ_900 |
| RS_HP_1652 | Lim | Pranike | 1-10 | RS_RJ_900 |
| RS_HP_926 | Velika Morava | Velika Morava 1 | 10-50 | RS_RJ_470; RS_RJ_592 |
| RS_HP_1632 | Velika Morava | Velika Morava 2 | 10-50 | RS_RJ_470; RS_RJ_592 |
| RS_HP_1633 | Velika Morava | Velika Morava 3 | 10-50 | RS_RJ_470; RS_RJ_592 |
| RS_HP_1634 | Velika Morava | Velika Morava 4 | 10-50 | RS_RJ_470; RS_RJ_592 |
| RS_HP_1635 | Velika Morava | Velika Morava 5 | 10-50 | RS_RJ_470; RS_RJ_592 |
| RS_HP_928 | Veliki Rzav | Roge | 1-10 | |
| RS_HP_929 | Veliki Rzav | Orlovaca | 1-10 | RS_RJ_603 |
| RS_HP_931 | Uvac | Sjenica | 1-10 | |
| RS_HP_726 | Danube | Djerdap 3 | > 50 | RS_RJ_619 |
| RS_HP_934 | Danube | Novi Sad | 10-50 | |
| RS_HP_936 | Lim | Prijepolje 2 | 10-50 | |
| RS_HP_938 | Sava | Kupinovo | > 50 | RS_RJ_612; T_SI-HR- RS_RJ_422 |
| RS_HP_1636 | Tisa | Novi Becej | 10-50 | |
| BA/RS_HP_451 | Drina | Tegare | > 50 | |
| BA/RS_HP_452 | Drina | Dubravica | > 50 | |
| BA/RS_HP_453 | Drina | Kozluk | > 50 | |
| BA/RS_HP_454 | Drina | Drina 1 | > 50 | |
| BA/RS_HP_455 | Drina | Drina 2 | > 50 | T_BA-RS_RJ_609; BA_RJ_361 |
| BA/RS_HP_456 | Drina | Drina 3 | > 50 | T_BA-RS_RJ_609; BA_RJ_361 |
| BA/RS_HP_762 | Drina | Rogacica | 1-10 | |

Picture cover: Slavo Glusčević on Google Panoramio (Upper Lim canyon)

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