



Study Series within the Campaign:

Hydropower Projects on the Balkan Rivers - Update



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for

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Kalivaç project on the Vjosa river in Albania © Olaf Unverzart (Title Page)

Impressum

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1. Summary

A total of 2,683 future hydropower projects have been recorded on the Balkan Peninsula. Additionally, 714 existing dams were found in this region. This vast number of new HPPs is distributed among 11 countries as follows:

Slovenia:	181 planned, five under construction
Croatia:	124 planned, three under construction
Bosnia & Herzegovina:	165 planned, five under construction
Serbia:	878 planned, three under construction
Kosovo:	87 planned, one under construction
Montenegro:	84 planned, one under construction
Macedonia:	199 planned, three under construction
Albania:	313 planned, 24 under construction
Northern Greece:	378 planned, eight under construction
Bulgaria:	247 planned, eight under construction
Turkey (European part only)	27 planned

Based on four size categories (for the first time also including a class of “Small HPP” (SHPP) from 0.1-<1 MW), the 2,683 planned HPPs are distributed as follows: 68 very large projects (> 50 MW), 178 large projects (10-50 MW), 867 medium projects (1-<10 MW) and 1,570 small projects (0.1-< 1 MW) were identified.

The construction speed varies across countries. In some countries – particularly in Albania – hydro development is fast while the overall trend on the Balkan Peninsula shows slow but steady increase of hydro development.

2. Introduction

The analysis is based on the integrative study “Balkan Rivers Assessment – The Blue Heart of Europe” from 2012 (Schwarz 2012), which included a detailed inventory of existing and projected hydropower plants. This initial inventory included only larger projects above 1 MW, however a recent analysis of planned HPPs in protected areas (Schwarz 2015) indicate the high importance of small HPP. Therefore, the category of SHPPs was added and the database was updated where possible.

3. Data preparation

The study area comprises the following countries: Slovenia (SI), Croatia (HR), Bosnia & Herzegovina (BA), Serbia (RS), Montenegro (ME), Kosovo (KV), Macedonia (MK), Albania (AL), Bulgaria (BG), the northern Balkan area of Greece (GR) and the European part of Turkey (TR).

Initially, the existing data on HPPs was updated systematically and categorised based on various data from countries and international organisations (including a special query for MK, AL and BA prepared by bankwatch.org for the project). For some countries, such as Serbia, the information on SHPPs has improved considerably since 2012.

Due to the high amount of small projects planned in protected areas (Schwarz 2015) as well as in river stretches supporting *Hucho* populations (Freyhof, Weiss, et al. 2015), it was decided to include small HPP in this update, leading to the following classification:

0.1-<1 MW (SHPP)*

1-<10 MW

10-50 MW

>50 MW

*This class include a lot of planned and licences HPPs without detailed information, therefore some projects may actually reach the 1-<10 MW class if cascades or complexes (water abstractions) were considered. In most cases, licences and planning consider only SHPPs with a capacity of over approximately 0.1 MW (many of these very small plants are private). Hence, the class is incomplete in regards to existing SHPPs.

The maps in the final analysis show an overview of the entire working area as well as maps and statistics for each individual country.

4. Results

4.1 Overall distribution of HPPs in the project area

In the entire project region, a total of 3,458 HPPs were recorded. The number of existing dams is 714, which now also include many SHPPs. In the categories > 1 MW a slight increase of existing dams since the first inventory in 2012 can be recorded due to the completion of several projects (61).

The number of planned projects (2,683 in total) increased only slightly for the larger categories but significantly for smaller HPPs. Progress in planning and construction cannot be assumed for all projects recorded in 2012, but there is no evidence that these projects have been abandoned, even though some of the huge projects along lower Drava or Sava are politically no longer under discussion. However, a new transboundary planning company was established officially by Bulgaria and Romania for two large Lower Danube projects (Svistov and Silistra) in mid-2014. Regarding the very small HPPs it is often very difficult to verify their status (even with satellite images) and most probably some more plants are currently already under implementation rather than in the planning phase.

Most projected HPPs fall in the categories $0.1-<1$ and $1-<10$ (a total of 2,437 projects). Though small or medium, they cause significant damage since they extend to almost every river in the region and are unfortunately often projected on rivers with high ecological value.

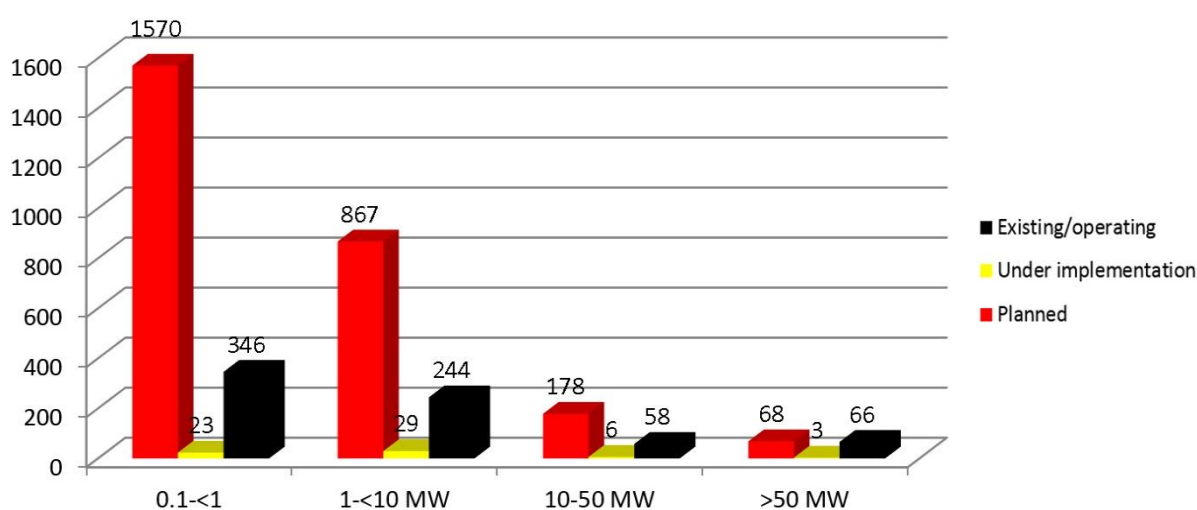


Figure 1: Total distribution of hydropower plants for entire project area.

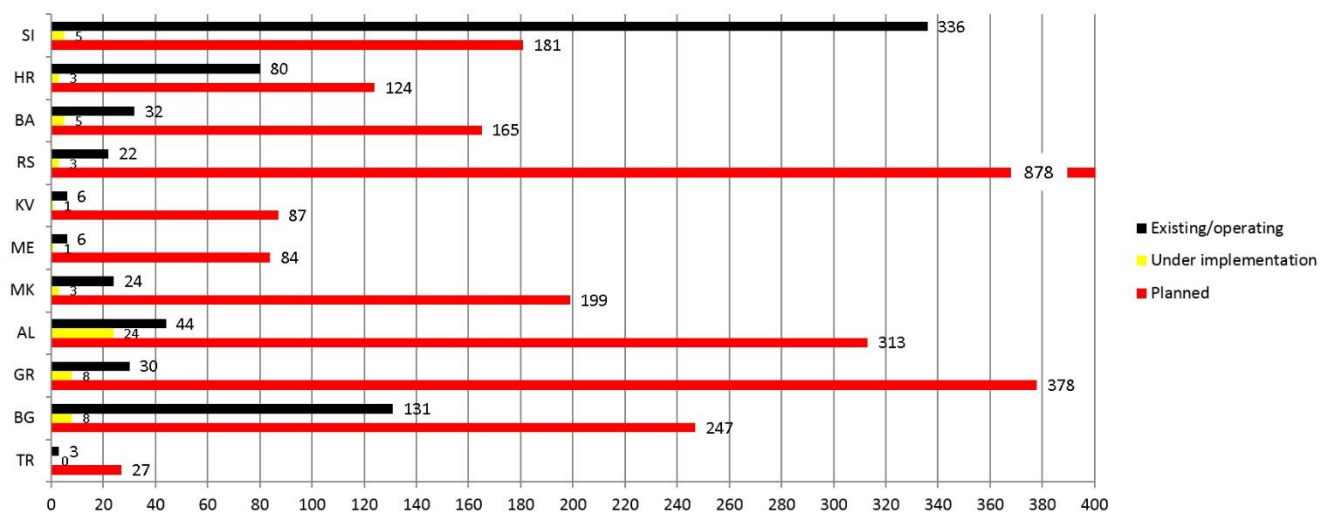


Figure 2: Country distribution of hydropower plants for entire project area.

In general, the focus of HPP development is set on mountain ridges and larger rivers. In the cases of the rivers Mura, Drava, Sava, Velika Morava, Danube and Maritza this includes their lower courses as well.

Hot spots in regards to new hydropower development are Western Balkan countries, particularly countries such as SI, HR, BA, RS, ME, KV and AL. Serbia and Greece have currently the largest numbers of sites for SHHP.

Hydropower plants in Balkan rivers

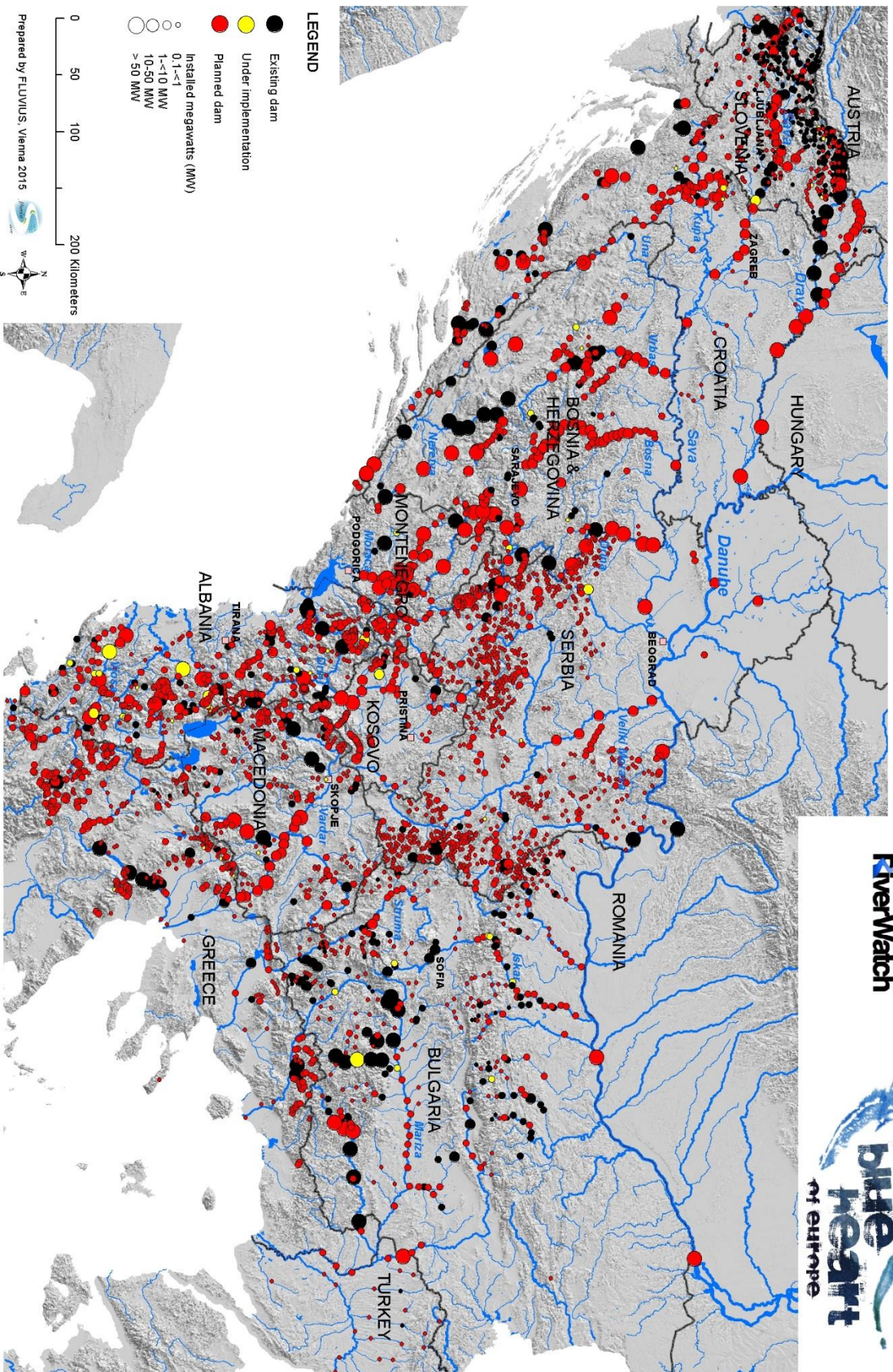


Figure 3: Overview of distribution of HPP in the Balkan region.

4.2 Distribution of HPPs in Slovenia

Initially, hydropower development in Slovenia started on the rivers Drava and Soča. However, in recent years some projects were implemented on the Sava and many more are planned to complete the chain.

According to the political agenda, the number of SHHP could increase by 130 new plants by 2020.

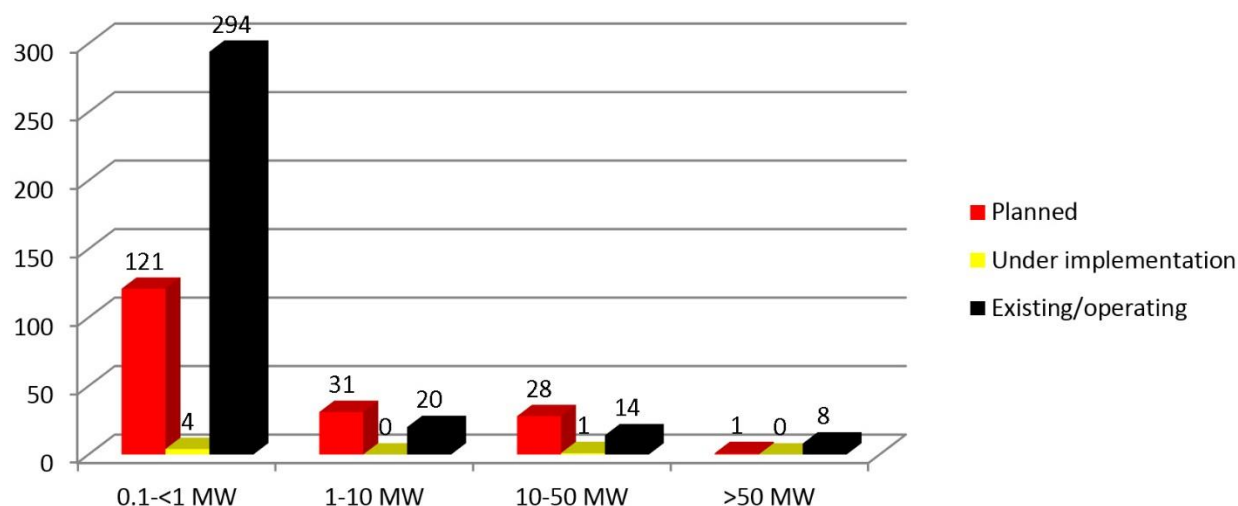
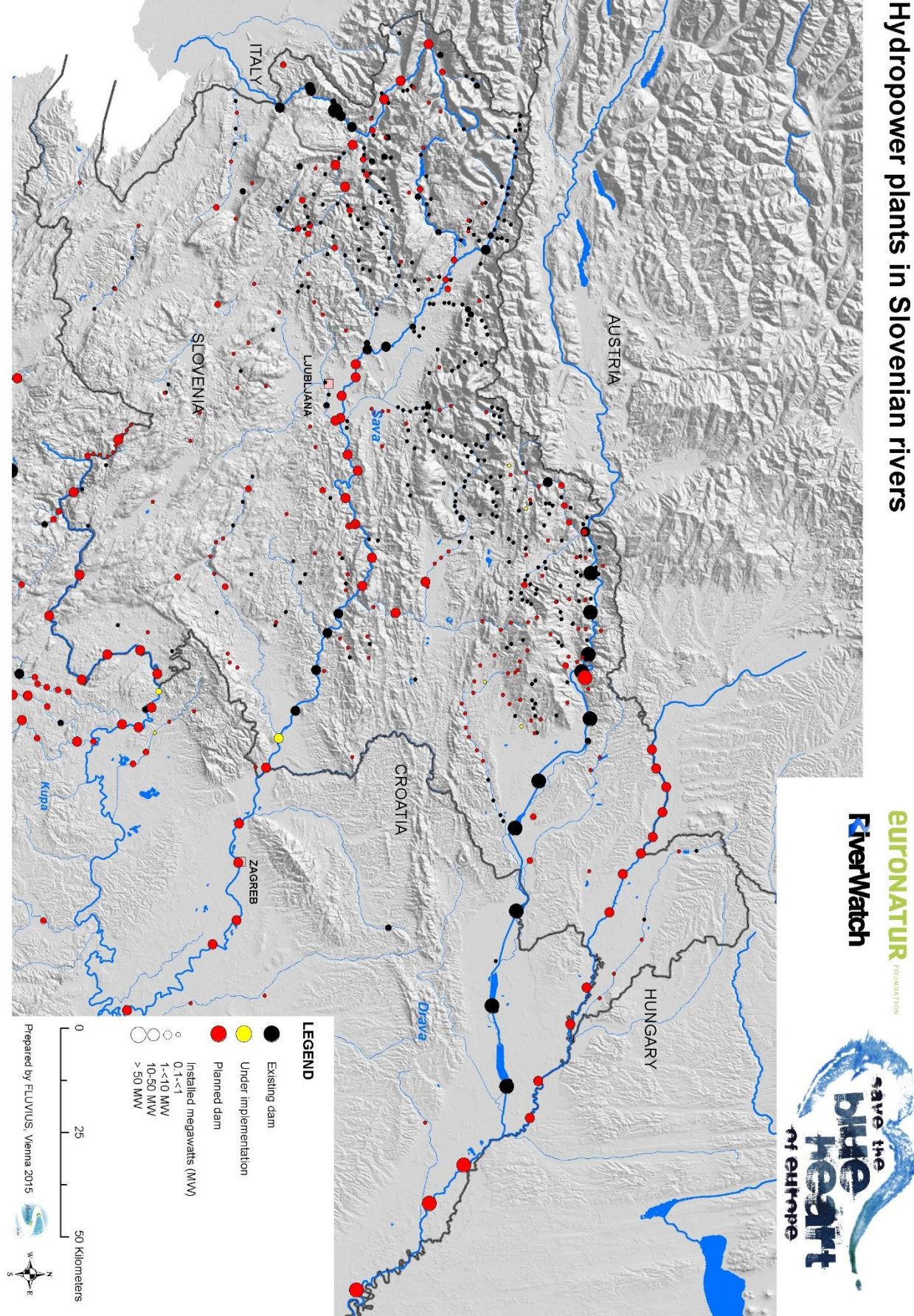


Figure 4: Distribution of hydropower plants for Slovenia.

Significant examples:

The Sava valley is subject to the ambitious plans to turn the entire Slovenian course into a cascade of HPPs, several plants were built in the last decade and a large one is under implementation. The construction of yet another is about to start at the border to Croatia (Mokrice). On Mura river, all planning pre-work is close to finish in regards to the HPP Mota despite the designation as Natura2000 and planned transboundary Biosphere Park “Mura-Drava-Danube”. Furthermore, HPPs are still being considered on the Soča – one of the famous alpine rivers.

Hydropower plants in Slovenian rivers



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Figure 5: Distribution Map of HPP in the Slovenia.

4.3 Distribution of HPPs in Croatia

The biggest HPPs in Croatia can be found on Drava (Dubrava) in the north of the country and on Cetina (Karst born rivers close to coast) in the southern part.

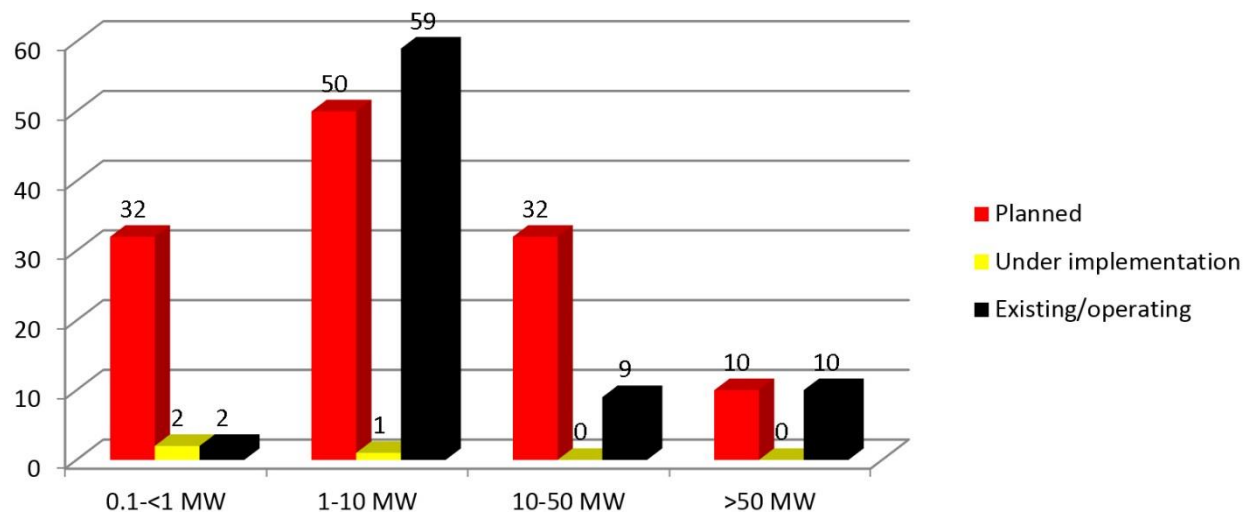


Figure 6: Distribution of hydropower plants for Croatia.

Significant examples:

Croatia plans a significant number of hydropower plants in all sizes along all rivers: sensitive karst rivers (such as the Kupa-tributary “Korana” coming from Plitvice water falls) will be affected as well as the large lowland rivers such as Drava, Sava and Kupa.

Hydropower plants in Croatian rivers

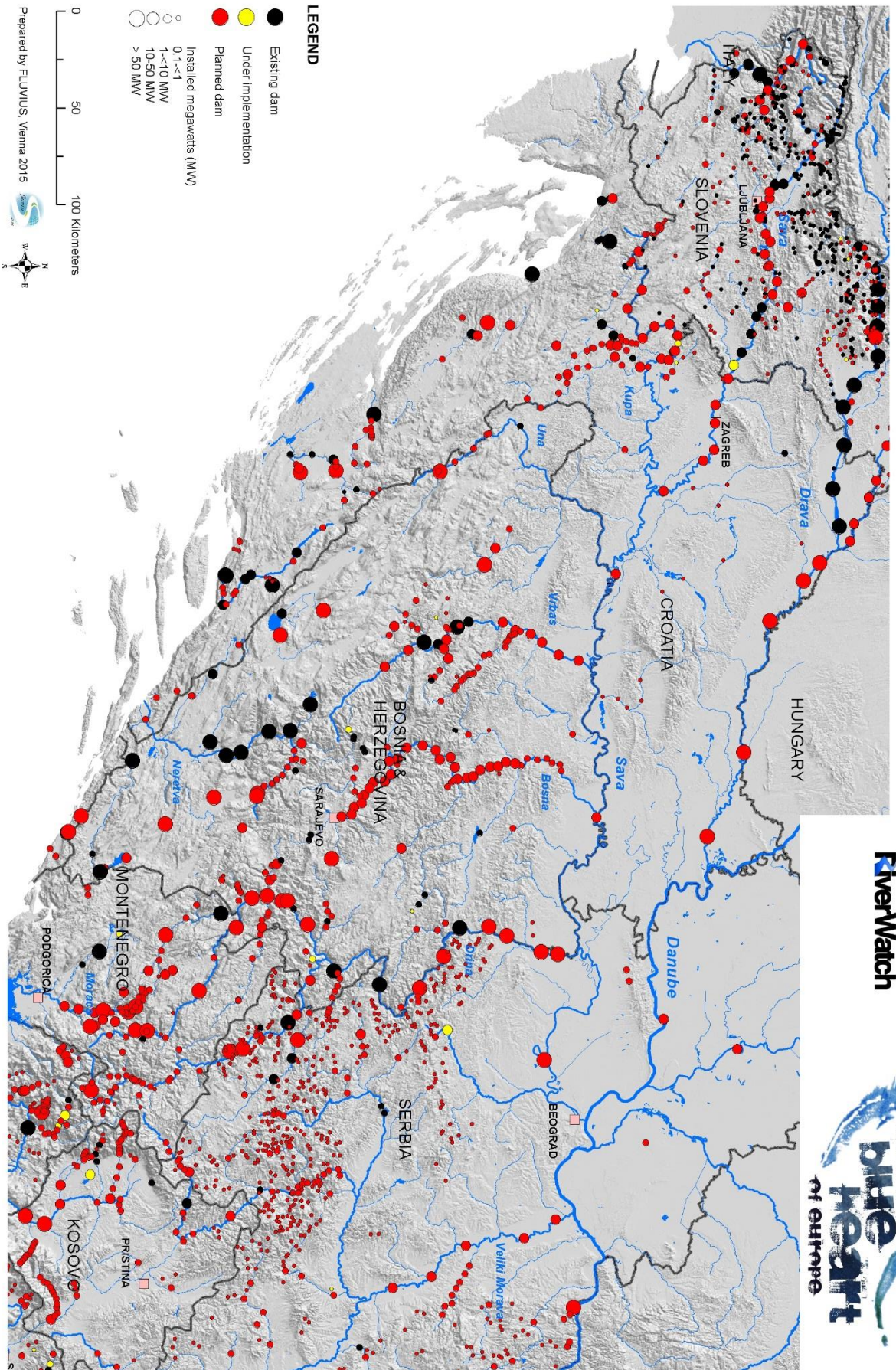


Figure 7: Distribution Map of HPP in Croatia.

4.4 Distribution of HPPs in Bosnia & Herzegovina

So far, some larger HPPs can be found only on Vrbas and Drina rivers. New plans focus on Vrbas, Bosna, Drina and Neretva but also on many smaller tributaries.

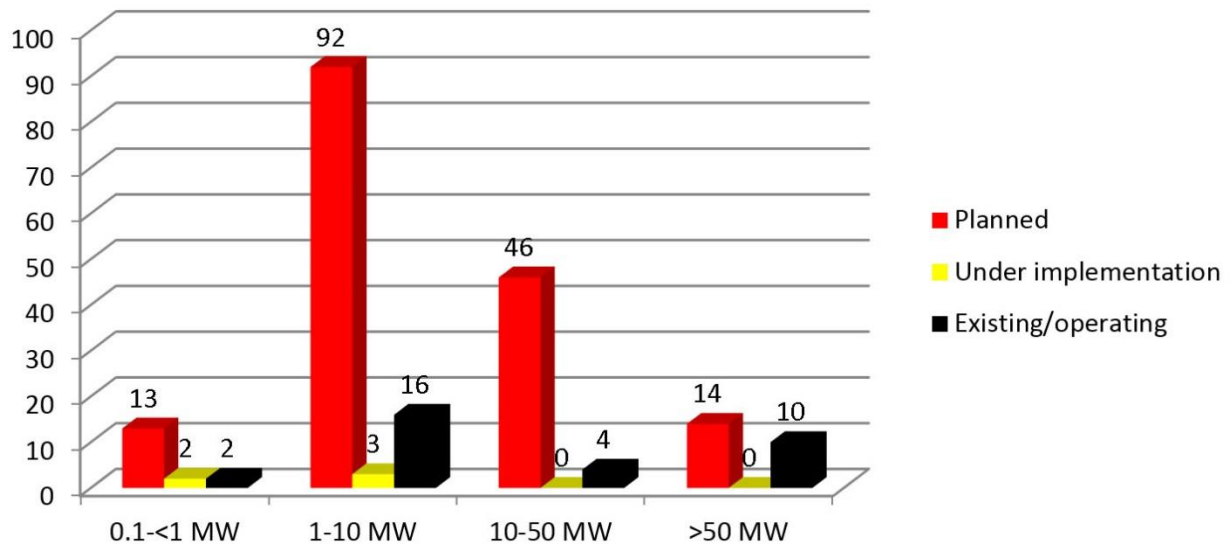


Figure 8: Distribution of hydropower plants for BA.

Significant examples:

Critical examples for new dams can be found in the headwaters of Neretva, the lower Drina and along rivers in the Sutjeska National Park. Also significant is the full hydropower development on the entire course of Bosna and Vrbas rivers.



Medna project (4.7 MW) on upper Sana river, a river that still hosts *Hucho* population © Za vodo Podgorice

Hydropower plants in Bosnian & Herzegovina rivers

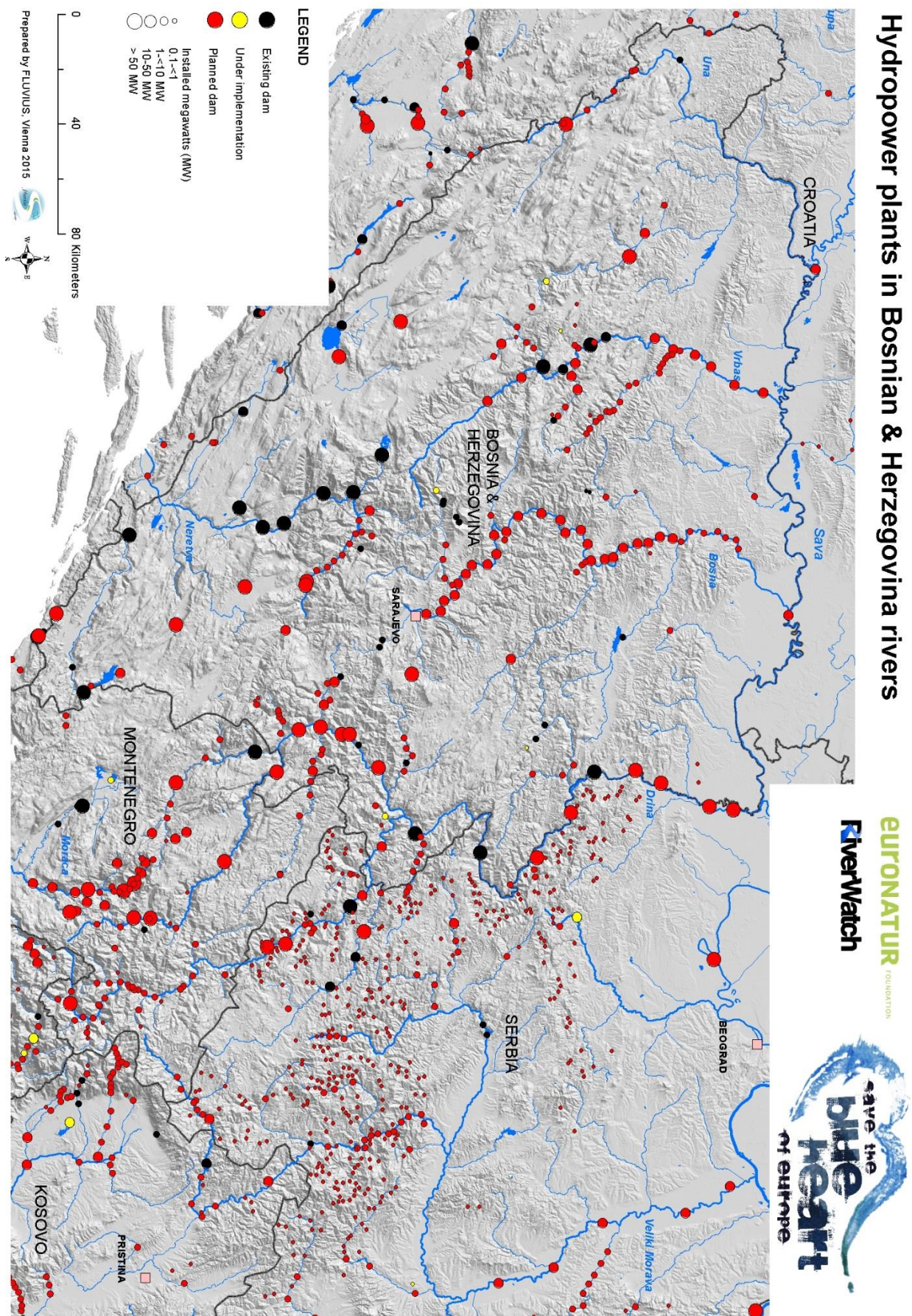


Figure 9: Distribution Map of HPP in Bosnia & Herzegovina.

4.5 Distribution of HPPs in Serbia

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

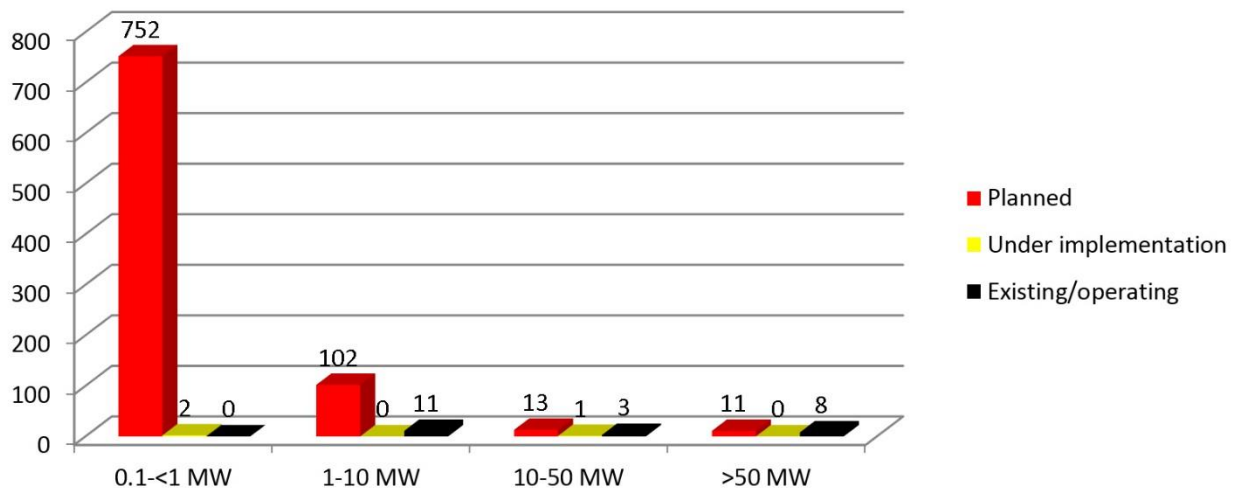


Figure 10: Distribution of hydropower plants for Serbia (the chart is rather distorted due to the extraordinary high number of SHHPs).

Significant examples:

Most significant is the hydropower development on lower courses of Drina (which is already impeded by developments on the BA side) as well as on the Velika Morava in the eastern part of the country. In addition to projects in several narrow river valleys such as the Ibar gorge, plenty of new plants are projected on many medium as well as small rivers based on plans developed in former Yugoslavian time.

Hydropower plants in Serbian rivers

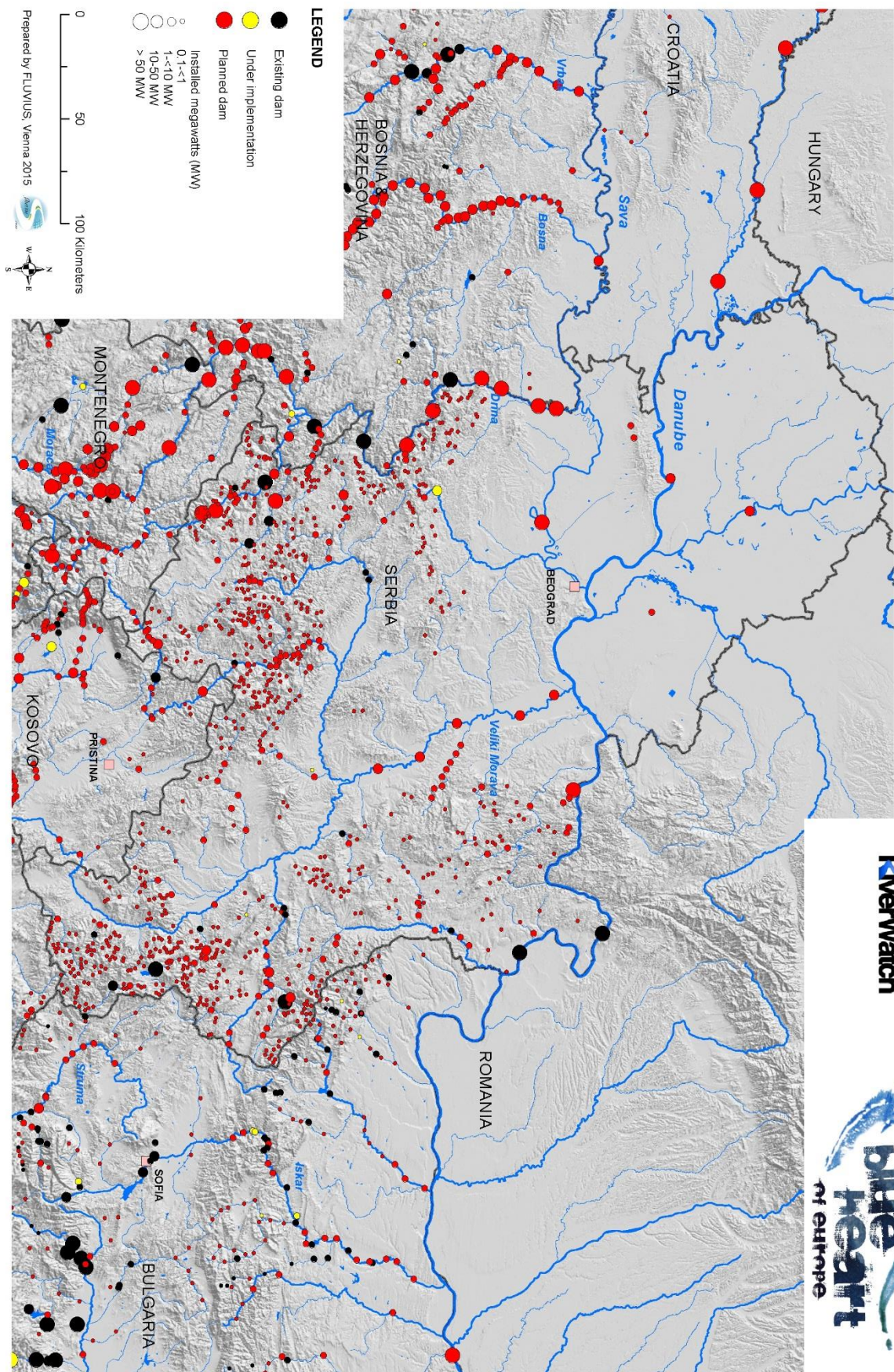


Figure 11: Distribution Map of HPP in Serbia.

4.6 Distribution of HPPs in Kosovo

Plans for hydropower development in Kosovo were developed in FYR times and only a couple of larger dams have been implemented so far.

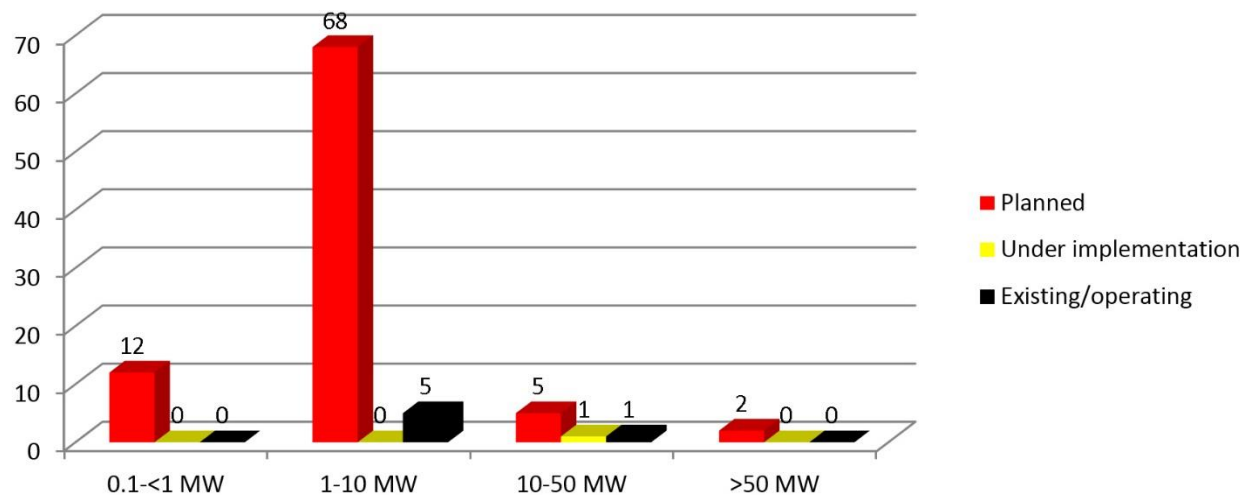


Figure 12: Distribution of hydropower plants for Kosovo.

Significant examples:

Along the two large rivers Ibar and Beli Drin many new medium sized HPPs are foreseen, interrupting the river continuum.

Hydropower plants in Kosovo rivers

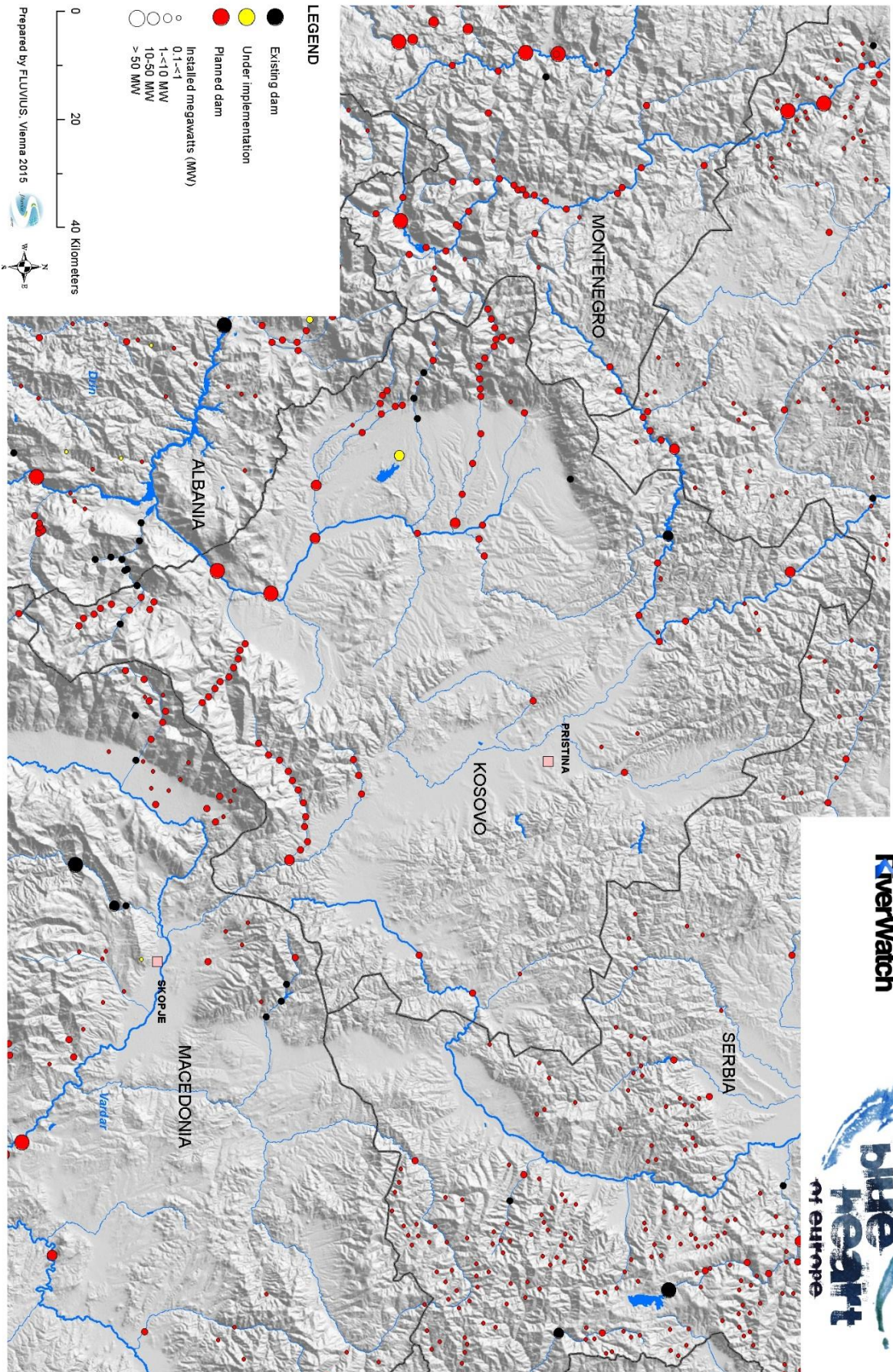


Figure 13: Distribution Map of HPP in the Kosovo.

4.7 Distribution of HPPs in Montenegro

There are two major HPPs: one fed by the Zeta from the Nikšićko Polje and another one at upper Piva. Many new hydropower plants are proposed along Morača and Tara.

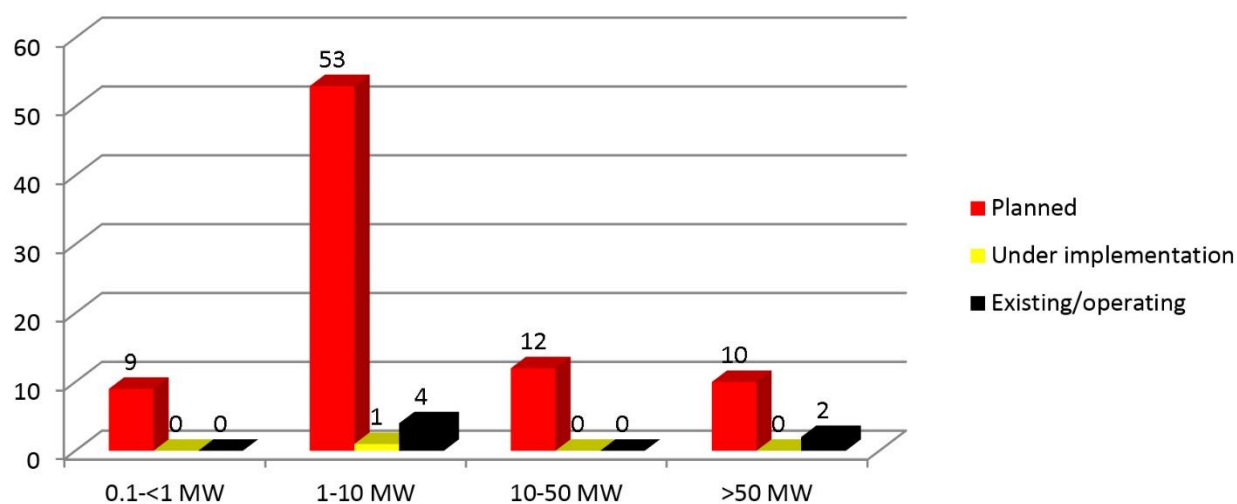


Figure 14: Distribution of hydropower plants for ME.

Significant examples:

In the case of Morača, the implementation of dams was postponed – not only because of financial and consortia issues, but also due to problems with the sealing of fissured karstic rocks in the underground of reservoirs. Many other projects on the Piva and mountainous catchments are on the way or await reactivation.

Hydropower plants in Montenegrinean rivers

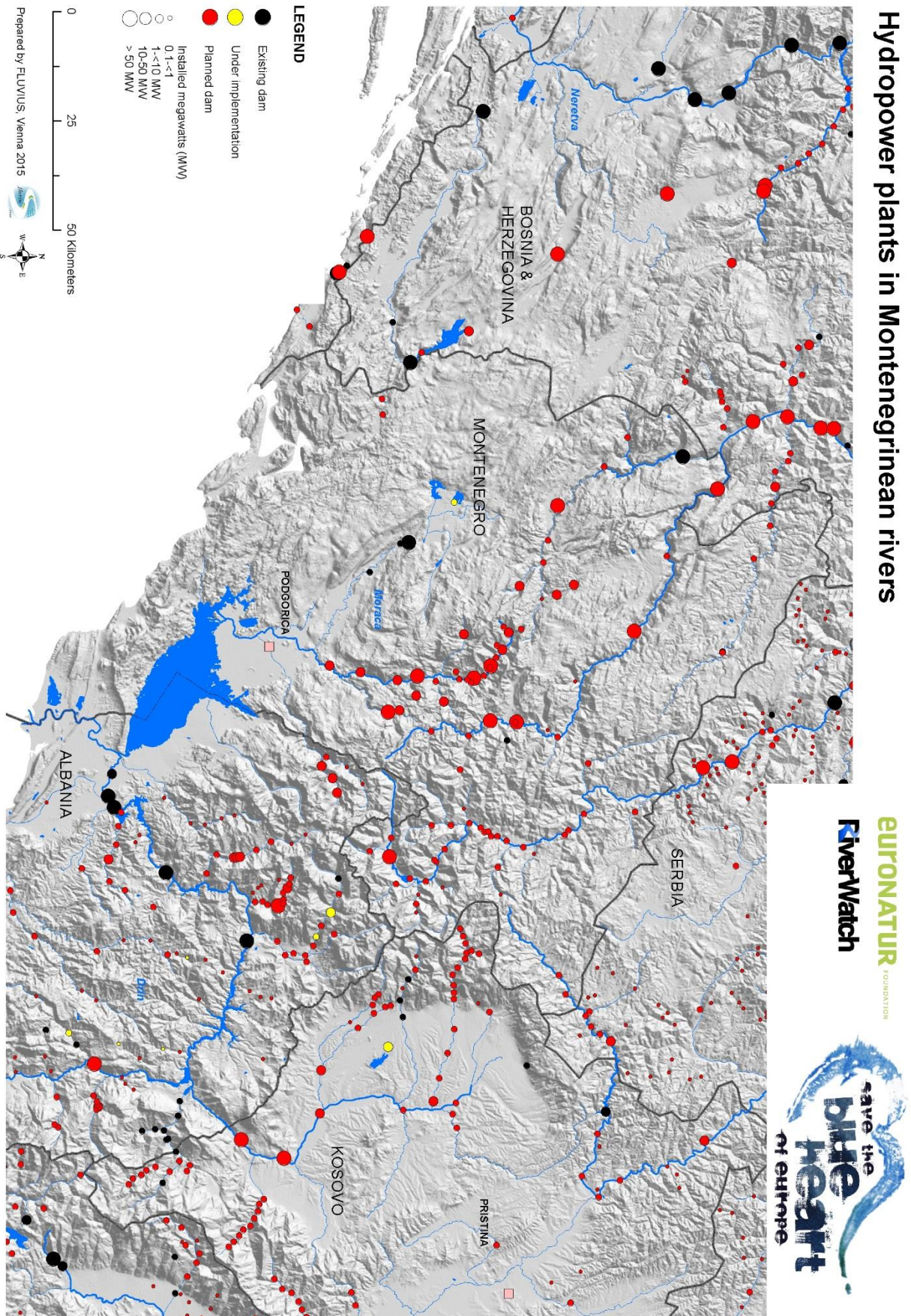


Figure 15: Distribution Map of HPP in Montenegro.

4.8 Distribution of HPPs in Macedonia

Macedonia has so far only a few larger HPPs, but along Vardar – the largest river of the country – many new dams are planned. Similar to Serbia, many SHHP are proposed.

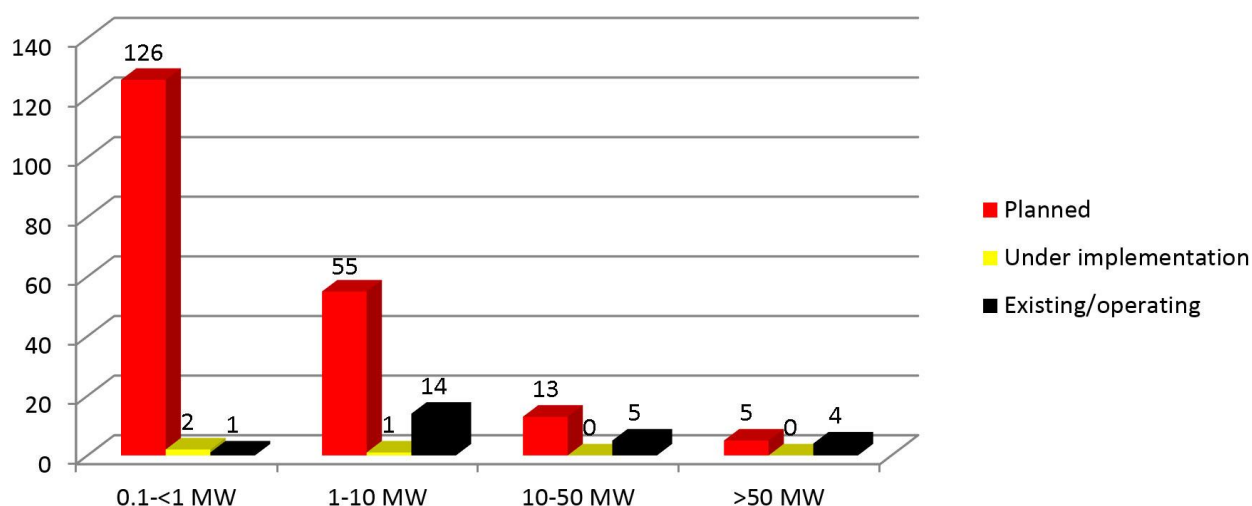


Figure 16: Distribution of hydropower plants for Macedonia.

Significant examples:

Whole systems of bigger and smaller dam and pipelines are planned within the Mavrovo National Park. All larger rivers in the country are subject to new dam developments.

Hydropower plants in Macedonian rivers

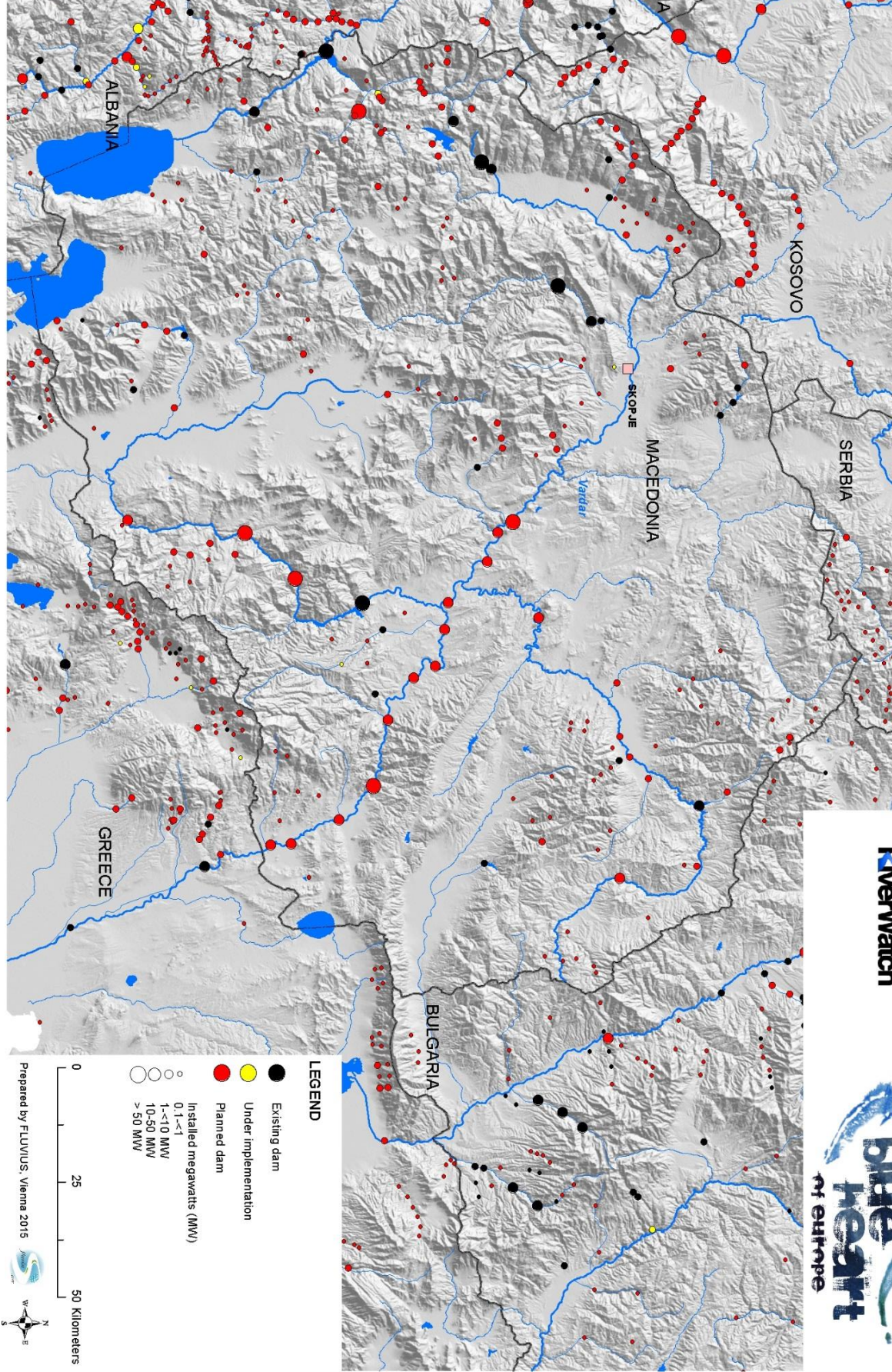


Figure 17: Distribution Map of HPP in Macedonia.

4.9 Distribution of HPPs in Albania

The Drin river is the largest river in Albania used for hydropower and with some 170 rkm, the chain of major dams combined equals to more than half of the Iron gate 1 impoundment. Other major dams can be found only in the northern part of the country so far. All rivers in mountainous reaches are subject of hydropower development.

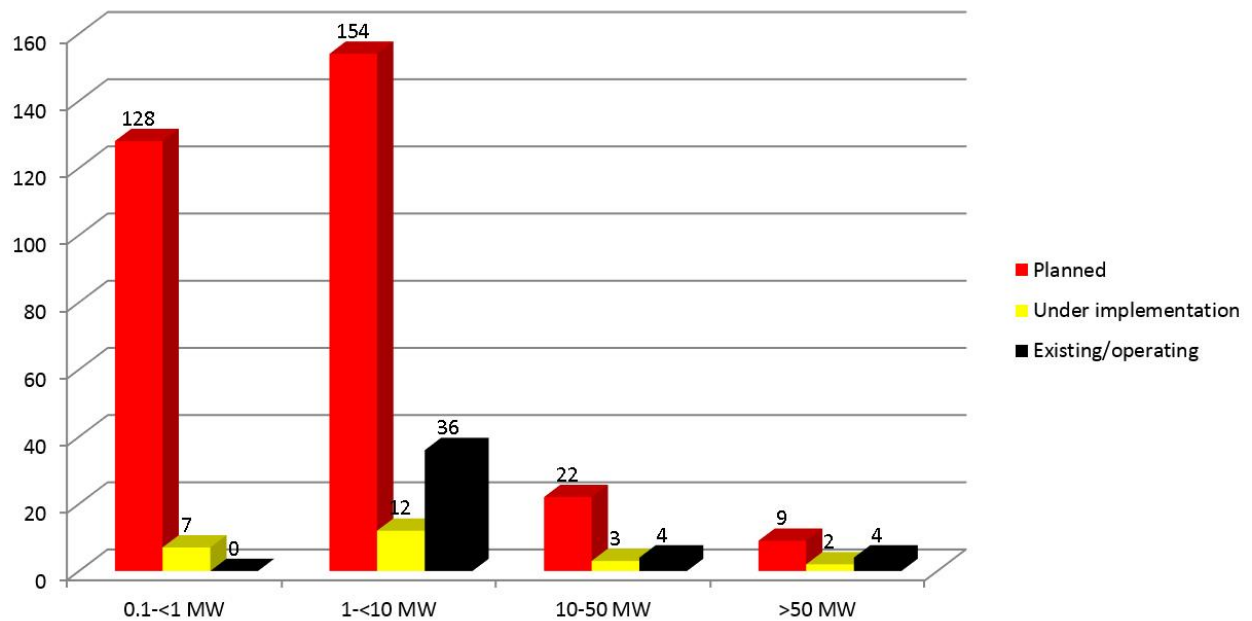


Figure 18: Distribution of hydropower plants for AL.

Significant examples:

The progress of medium sized derivation plants (see figure 18 and 19) is booming and does not even stop at national parks. The last free flowing braided Adriatic rivers such as Vjosa and Devoll are subject to huge dam projects, which are already under construction.

In Albania, hydropower development with long pipe take outs is booming in particular: at least two dozen projects with many kilometres of pipes have already been completed or are under construction. In most cases the residual water in the long old river stretches is utterly insufficient.



Water abstraction from Bishnica and completely dried-out former river bed. These pipes and canals divert water for some 20 km © Google earth



Dozens of km long pipes and canals are being installed in the mountains with huge efforts (often neglecting erosion control) © Google earth, Panoramio

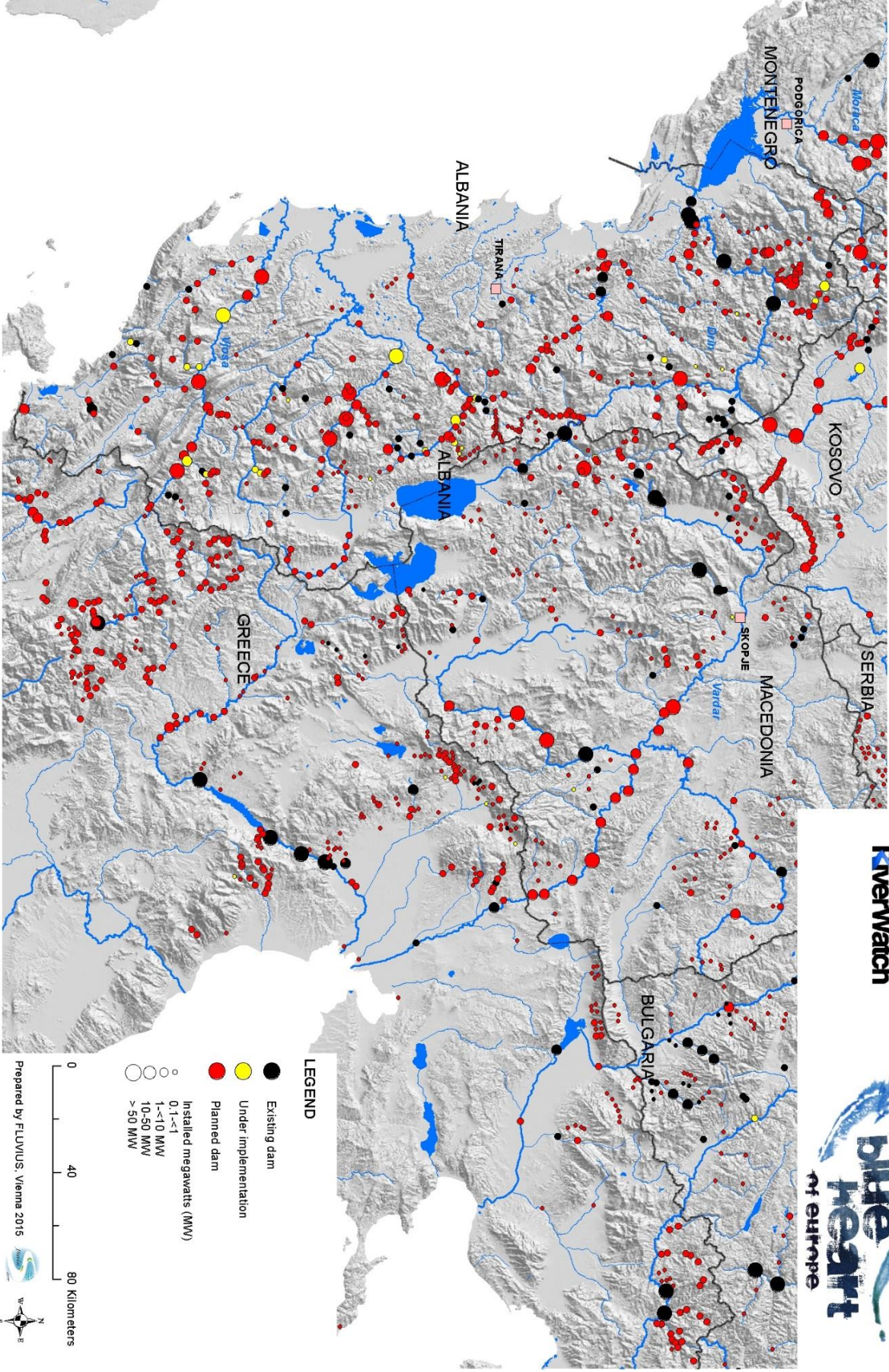


Construction site at Langerica, a Vjosa tributary © Roland Tasho



Canyon in the Bredhi i Hotoves-Dangelli National Park just downstream of the dam project – this stretch will fall mostly dry © Rok Rozman

Hydropower plants in Albanian rivers



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Figure 19: Distribution Map of HPP in Albania.

4.10 Distribution of HPPs in Bulgaria

In Bulgaria some huge hydropower reservoirs already exist in the southern part of the country. Aside from a few larger projects, many SHHPs are planned across the country.

In 2014, Bulgaria revived several old communist HPP projects with some 1000 MW in total on the Danube. For the transboundary area near Svistov and Silistra, a joint transboundary development company was established in 2014.

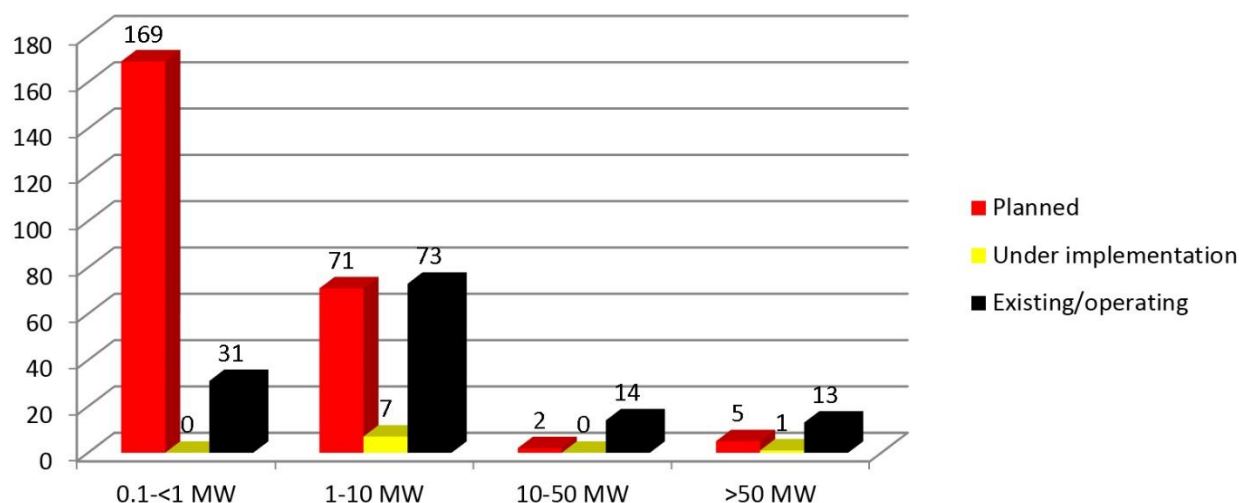


Figure 20: Distribution of hydropower plants for Bulgaria.

Significant examples:

The Iskar and Maritza rivers are subject to many new projects. Furthermore, Struma river and upper catchments will be impacted by many new dams.

Hydropower plants in Bulgarian rivers

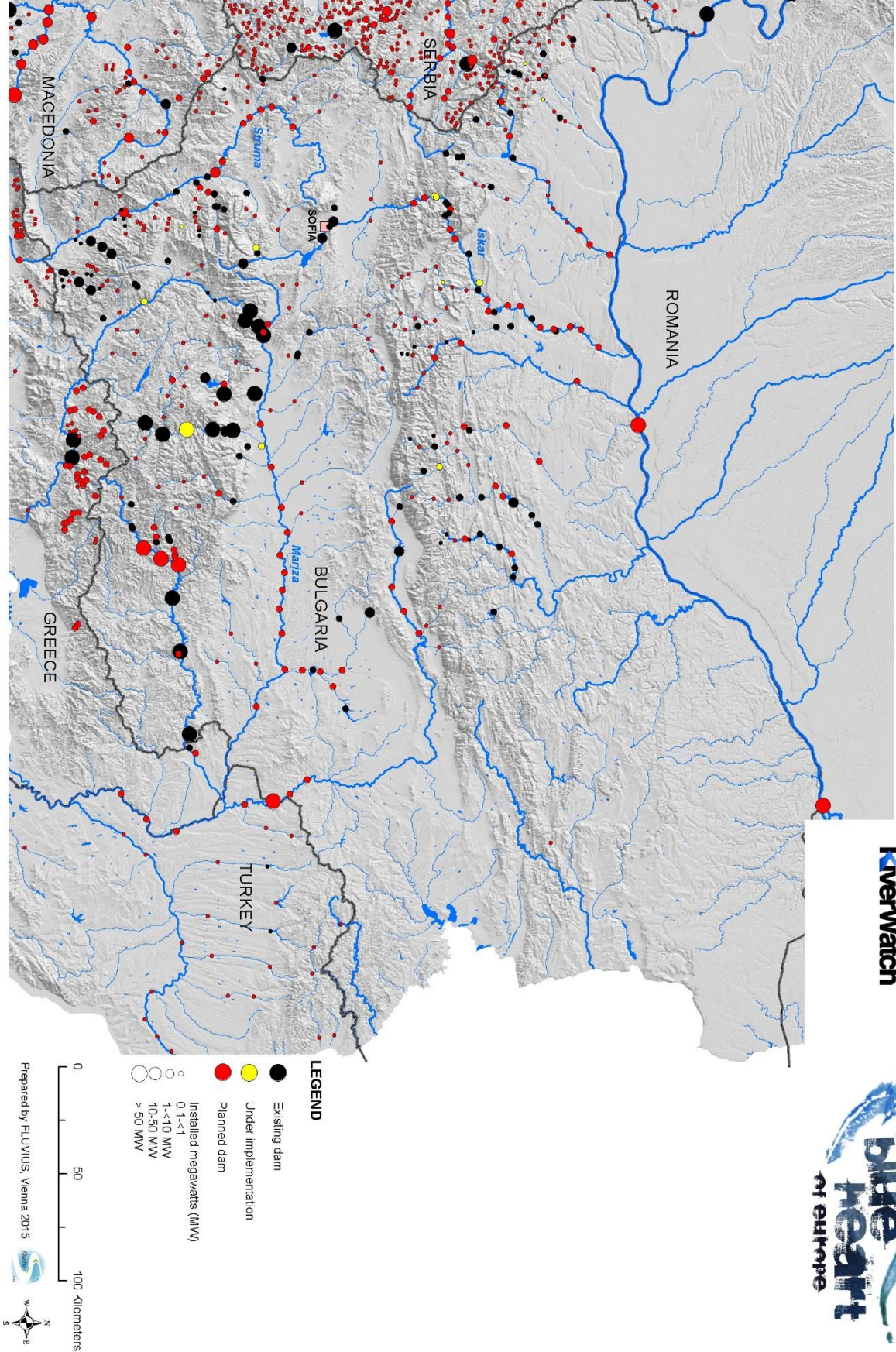


Figure 21: Distribution Map of HPP in Bulgaria.

4.11 Distribution of HPPs in Greece

The dams along lower Aliatmon and Nestos are the biggest in the country.

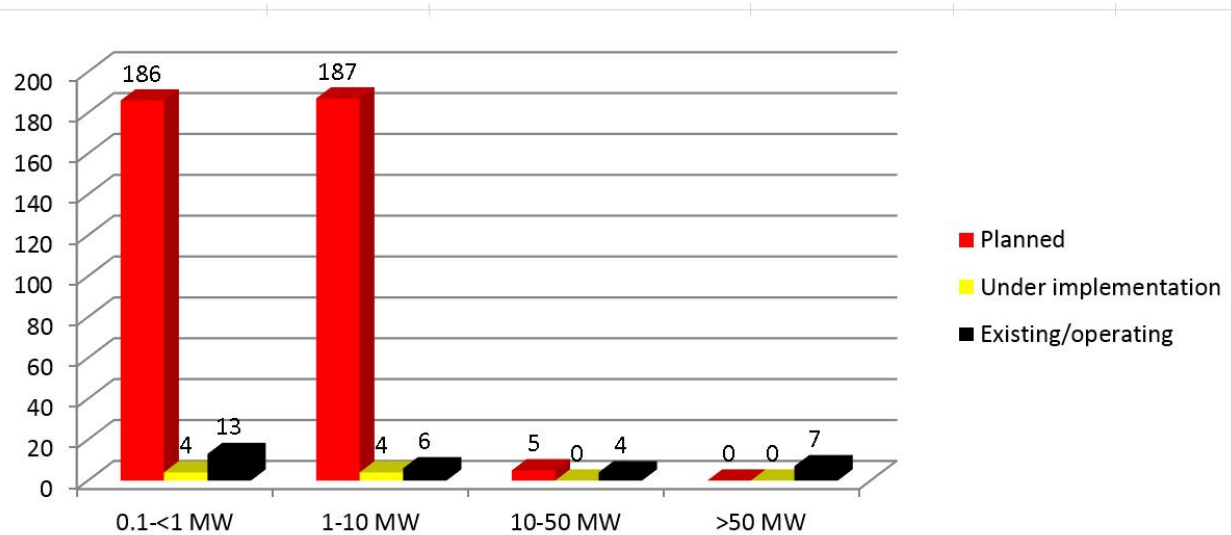


Figure 22: Distribution of hydropower plants for GR.

Significant examples:

Many small and medium sized HPPs are licensed, but so far there is no political push to further develop them. Many of these plants, particularly in the upper Aoos (Vjosa) catchment, could have adverse effects.

Hydropower plants in Greece rivers

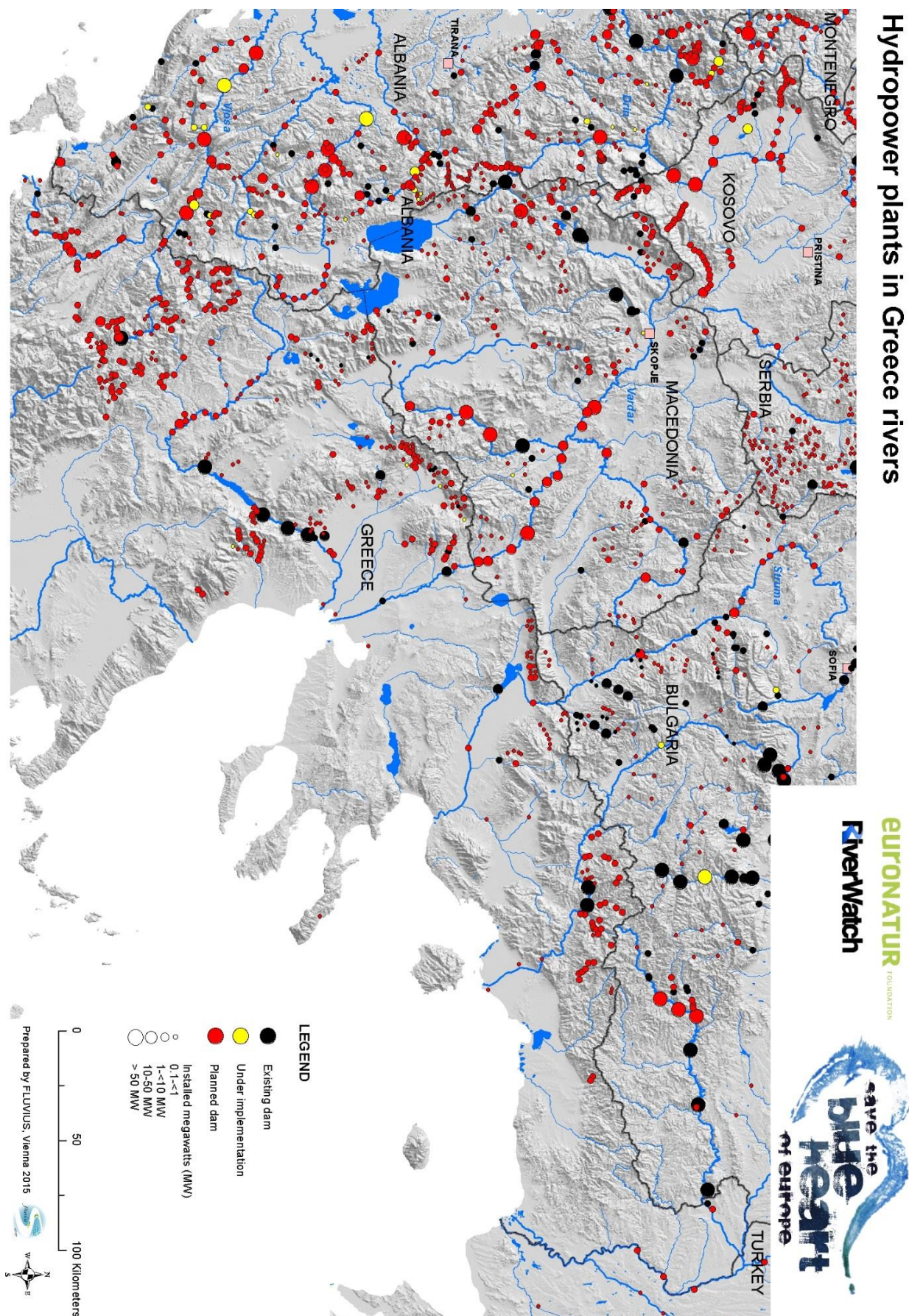


Figure 23: Distribution Map of HPP in Greece.

4.12 Distribution of HPPs in Turkey

Only the European part of Turkey is covered in this study. Many of the existing dams only serve for water storage purposes so far. But the very ambitious Turkish programme to develop hundreds of hydropower plants across the entire country also includes several projects on the European side.

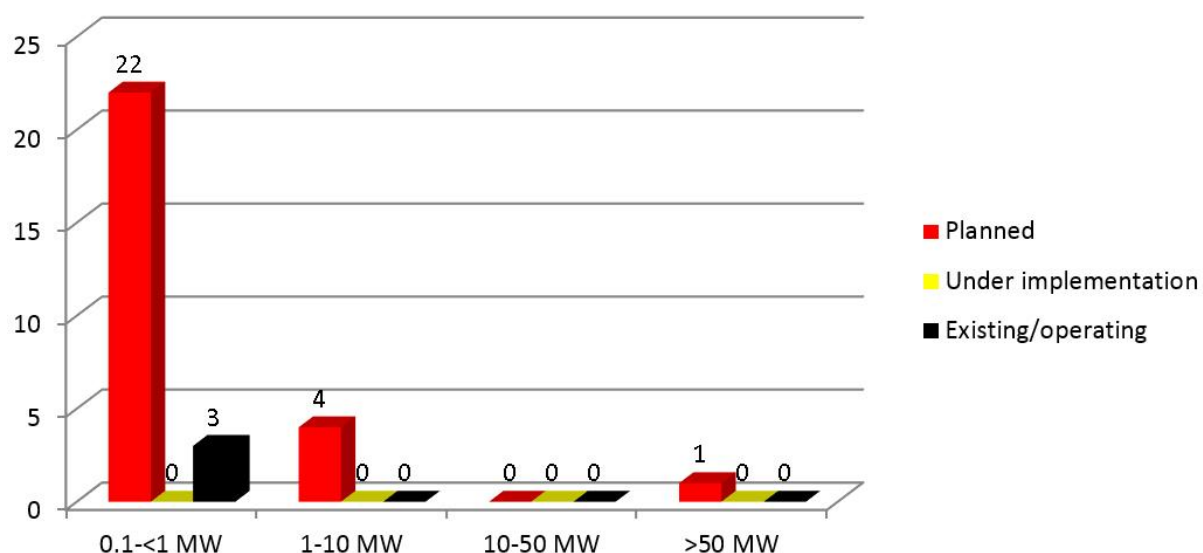


Figure 24: Distribution of hydropower plants for TR.

Significant examples:

The Meric/Meritza - a border river with Greece - is particularly threatened by hydropower projects. One large transboundary multipurpose dam at the Tundzha is planned to provide flood protection for Edirne, hydropower production and irrigation, water/low water control, as well as serving agriculture in Greece. The planned project falls in the category ">50 MW". Other reservoirs mainly serve water supply purposes.

Hydropower plants in Turkish rivers

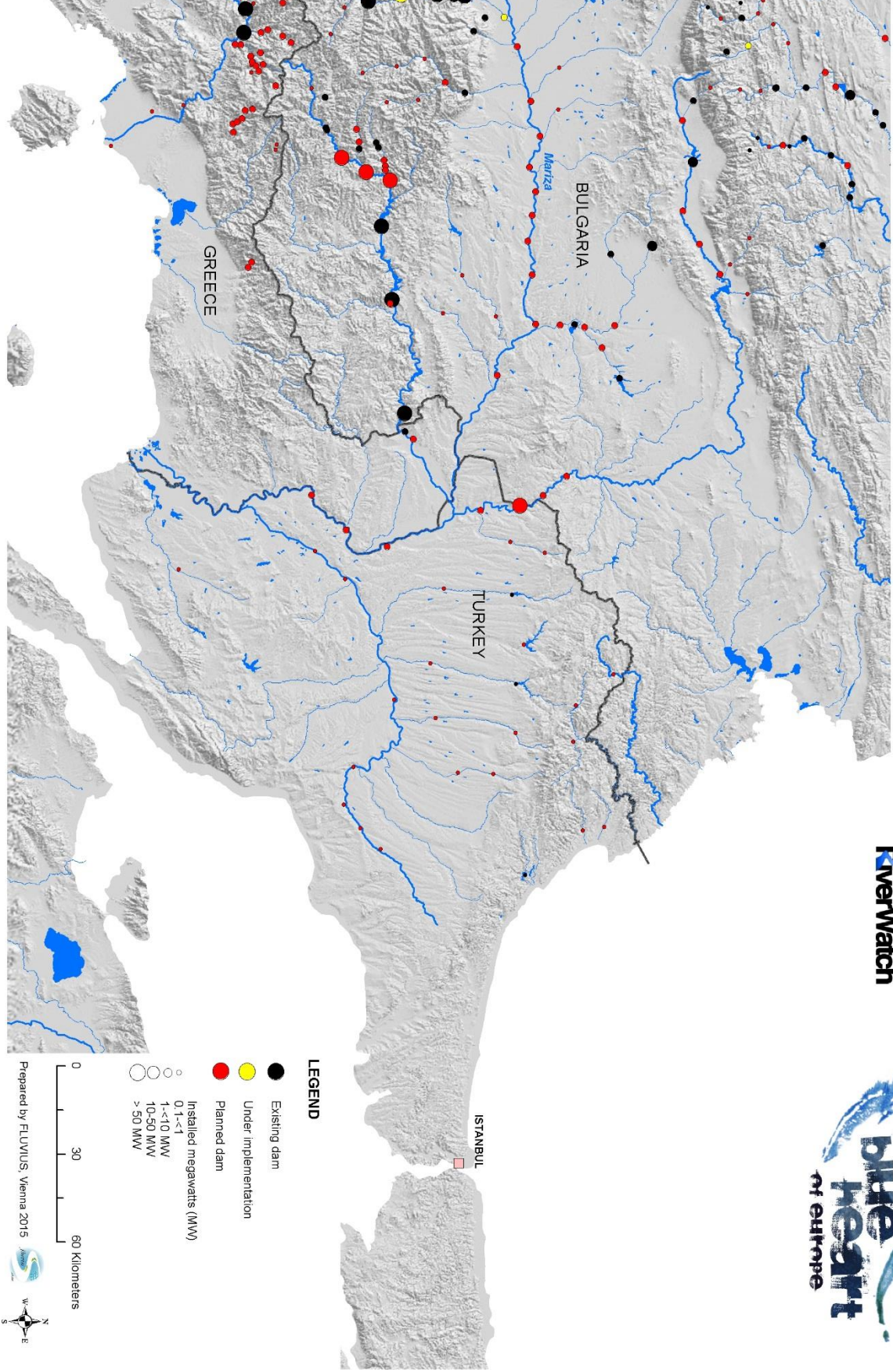


Figure 25: Distribution Map of HPP in Turkey.

5. Conclusions

Many new hydropower projects in the Balkan Peninsula threaten various ecologically valuable rivers of European importance. Not only large projects impounding dozens of kilometers of rivers must be taken into account, but in particular medium-sizes HPPs (some 5-10 MW) disconnecting entire catchments and floodplains from river systems. Even in national parks and many protected areas, SHPPs are projected, which is the reason why they were included in this study.

Even though progress of construction is slow in many countries, the number of dams increases from year to year. Hotspot countries are currently Albania, Macedonia, Bosnia & Herzegovina and - considering Sava – Slovenia. However, with regard to the potential and licensed sites for SHHP all countries show efforts to further develop hydropower.

The recently “revitalized” intention to build two new huge hydropower plants on the Danube at the Bulgarian-Romanian border indicates the high pressure even on large rivers.

The implementation of projects varies from country to country, but even projects which have been on hold for some time may be reactivated a couple of years later, which is understandable as millions of Euros were already spent on feasibility and planning documents as well as lobbying.

Official guideline documents (on hydropower, WFD) and formerly prepared planning documents (master plans) could be relevant if applied, but there is no strong indication that these are being considered for the approval of particular projects. Many projects only require administrative approval.

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