Study Series within the Campaign:

Hydropower Projects in Protected Areas on the Balkans

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for

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Foto credit

The construction of a hydropower plant in the midst of the Albanian Fir of Hotova National Park. © Roland Tasho (Title Page)

Impressum

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Contents

1. Summary

This study aims to quantify the number of hydropower projects that are planned within protected areas on the Balkan Peninsula. A total of 1,640 projected hydropower plants (HPPs) have been examined based on a detailed and categorised network of protected areas. 32% of the projects are planned in strictly protected areas while another 17% are intended to be constructed in other protected areas. Thus, a total of 49% of all projected HPPs are located in protected areas, which points to the fact that this practice is the rule rather than an exception. This indicates a very high pressure of hydropower on protected sites.

2. Introduction

This study 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 and an initial overview of protected areas required to assess the conservation value of Balkan rivers. This new report explores the precise position of planned hydropower plants within protected areas.

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 protected sites was updated systematically and categorised based on various data from European sources (EEA 2012, 2015), international organisations (Ramsar 2015, and UNEP-WCMC (2014) as well as from regional programmes or national surveys (e.g. Republic of Serbia 2010).

After reviewing the contents and structure of several data sets, the different protected areas were categorized and divided into five GIS Layers listed below. This approach allows a quick and independent analysis despite extensive overlaps and fuzzy boundaries:

1. National Parks based on national and international data
2. Ramsar Sites, Biosphere Reserves and World Heritage Sites (Nature); in most cases, these international categories are protected as nature reserves or national parks under national law
3. Natura 2000 Network for EU countries (SI, HR, BG, GR)

4. Strictly protected areas in the non-EU countries; mainly comprised of smaller areas (nature reserves) but also of "nature parks" formerly designated by the Former Republic of Yugoslavia (FRY) in BA, RS, ME, KV and MK with strict protection (not to be confused with nature parks in western European countries where they don't have such a strict protection status). Furthermore, EMERALD[1] areas in non-EU countries were included in this category.
5. Other protected areas such as landscape protection, natural monuments, official enlargement proposals and other officially designated areas with less protection

Secondly, information from the original database for hydropower plants from 2010-2012 was updated for several areas: for river stretches with Hucho occurrences (Sava catchment), for key areas of the Blue Heart campaign (as in Macedonia and Albania), as well as for Albanian national parks in general. After the review of lists and maps provided by "Bankwatch.org" and further sources in SI, BA and RS, the project database was updated (in Serbia with a particular focus on small hydropower plants). Furthermore, the Vijosa/Aoos catchment on Greek territory was also included in the update.

There is a strong increase of projected and constructed small hydropower plants (< 1 MW) across the entire Balkan region, while many projects with a capacity of > 1 MW are also still in the pipeline or already under construction. Therefore, a high pressure of hydropower development on protected areas can be assumed.

The third and final step for the main analysis was to overlay the data of protected areas with that of projected hydropower plants in order to identify those projects located within protected areas. The results of this analysis are presented in tables and maps on the following pages. The focus was set on the first three – and where data was available – on the fourth category; for the fifth category not all information was collected. First, each of the five data layers were overlapped with the HPP data separately and in some cases the same HPP may thus be counted in two categories e.g. in a national park and Natura 2000 area. For overall results, duplicates were eliminated, so that projects that fall in two or more categories are only counted in the highest category.

[1] The Emerald network – where available and up to date - will serve as coherent basis for the preparation of Natura 2000 network in accession candidate countries. These areas are more or less officially protected; however, there are many ongoing alterations since the compliance with the network's guidelines is not obligatory for non-EU countries.

4. Results

4.1 Protected areas and hydropower plants

Protected areas

51 National Parks and 64 Ramsar Sites/Biosphere Reserves/World Heritage Nature Sites can be found in the entire study area. Combined with Natura 2000 areas in SI/HR/BG and GR and the strictly protected national reserves in non-EU countries, the region features a quite dense network of protected areas. However, in BA, RS, ME, KV, MK and AL many areas are weakly protected or Emerald sites are still not confined or clearly designated. The map on page 7 (Figure 1) shows the protected areas as prepared for this study.

Hydropower plants (HPPs)

Of the 1,970 hydropower plants in the current database, 1,640 are in planning and are subject to the analysis (298 already exist and 32 are under construction). The database actually contains only hydropower plants with a capacity of >1 MW, but for particular national parks and campaign areas (Mavrovo NP in Macedonia, Albanian NP's and Huchen stretches in the Sava catchment) smaller hydropower plants were also taken into account. Not included are numerous small hydropower stations (SHPPs) in the other countries. The number of SHPPs can be estimated at least with another 1,500 projects (according to the analysis of SHPP potential under http://www.smallhydroworld.org and assuming a capacity of 1 MW per SHEPP) for the entire area. So far, the map in this study contains comprehensive detailed positions for potential SHHPs for Serbia only, but similar lists or even inventories exist for other countries as well. The map on page 8 (Figure 2) shows the distribution of hydropower plants.

Mavrovo NP in Macedonia: 19 hydropower projects are here in the pipeline, one is under construction. The photo shows the Mala Reka, a river on which a peaking power plant is projected. © Gabriel Schwaderer

Balkan Lynx: the last successfully reproducing population of this species lives in the Mavrovo National Park – also threatened by the construction of hydropower plants and accompanying symptoms (roads, power lines, disturbances) © BLRP/Scopes

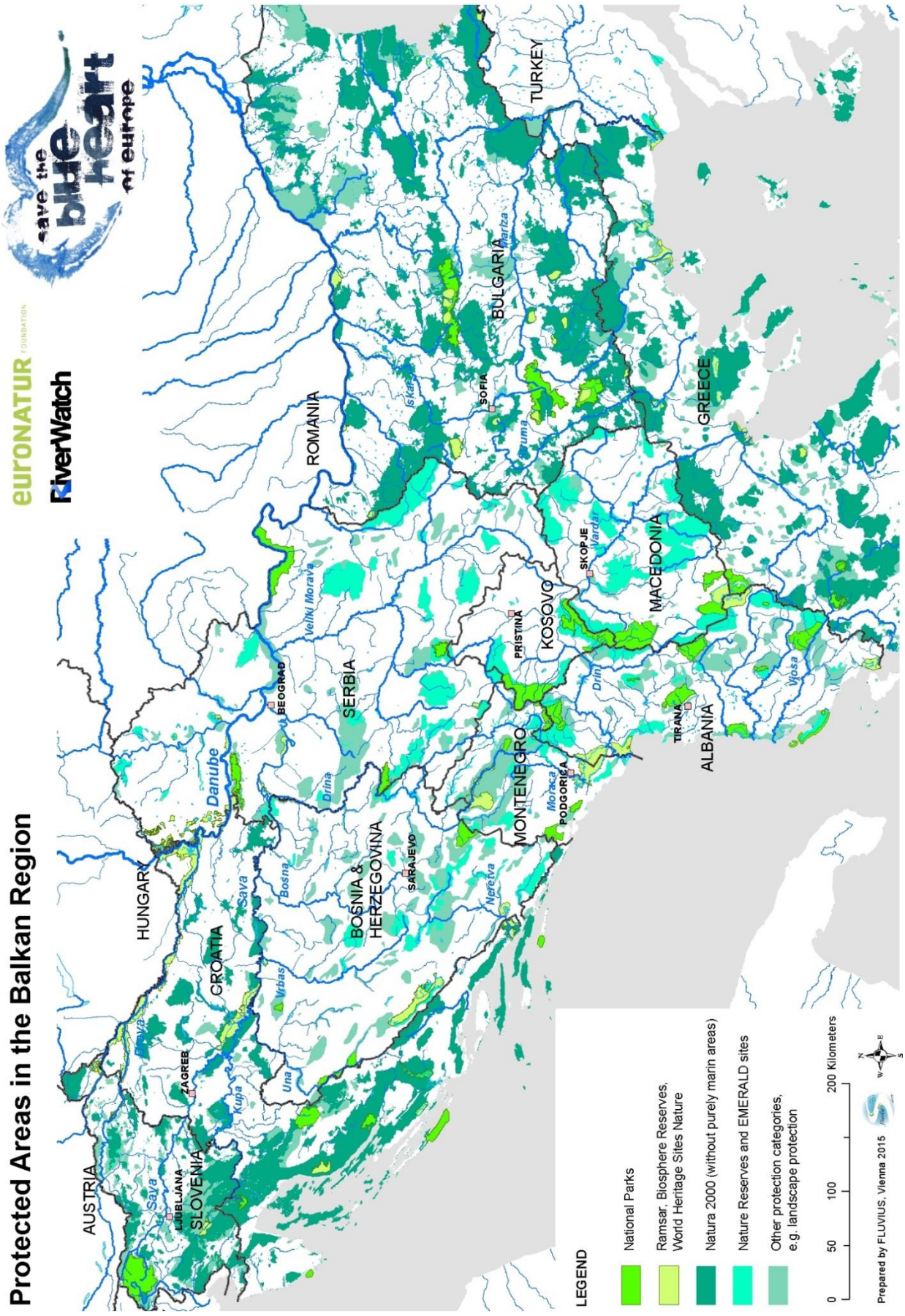

Figure 1: Overview of protected areas in the Balkan region.

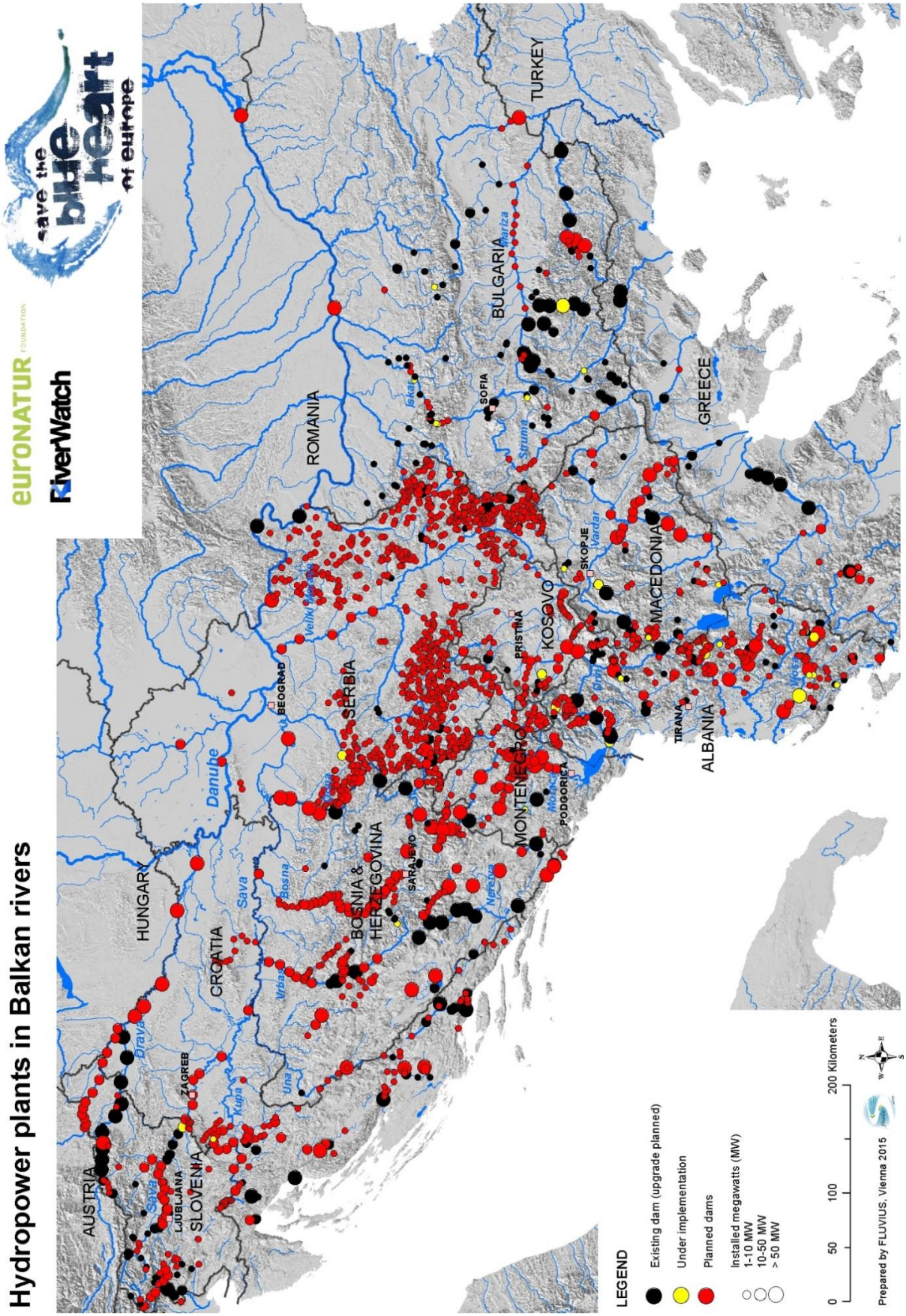

Figure 2: Overview of hydropower plants in the Balkan region, in red are those in the pipeline

4.2 Overall results of hydropower projects in protected areas

Of the total number of 1,640 projected HPPs, find below the numbers and percentages of projects that are planned in the respective categories:

1. National parks: 113 (7%), *further in*
2. Ramsar/BR/WH: 23 (1%), *further in*
3. Natura 2000: 131 (8%), *further in*
4. National PA's: 268 (16%), *further in*
5. Other PA's: 282 (17%).

For overall results, double counting was eliminated ("*further in*"), so that projects that fall in two or more categories are only counted in the highest category (e.g. if a project is located in a national park as well as in a Ramsar or Natura 2000 site, it is only counted in the category "National park").

A total of 535 planned projects or 32 % fall in strictly protected areas.
In addition, 282 HPPs (17 %) are projected inside other protected areas with a weaker protection status.

Altogether, 817 or 49% of all projected HPP's fall in protected areas.

Significant regions:

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 within protected areas are Western Balkan countries, particularly countries such as SI, HR, BA, RS, ME, KV (irrespective of the development of protected area networks, EU Natura 2000) and Albania.

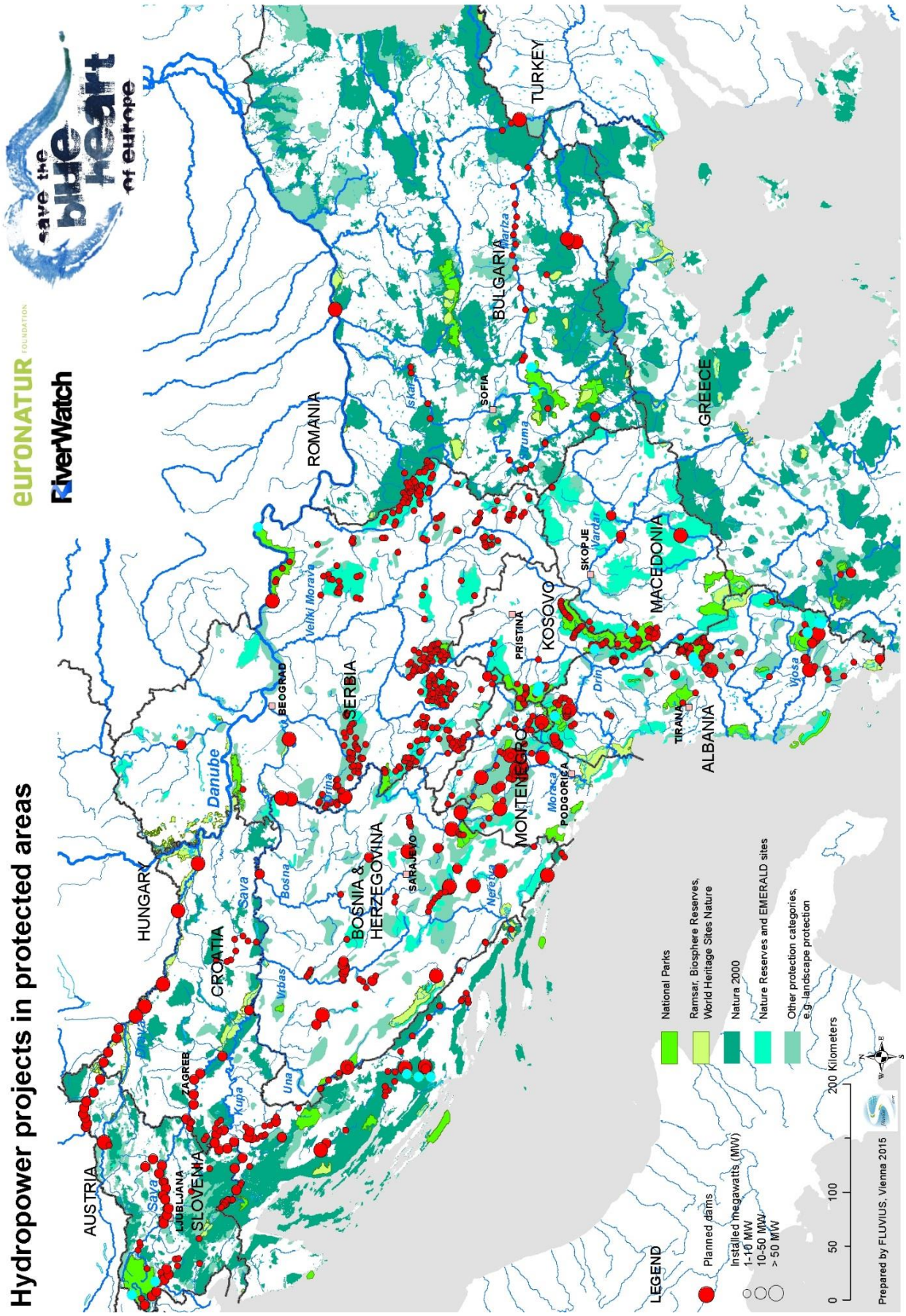

Figure 3: Overview of all hydropower projects planned in protected areas

4.3 National Parks and hydropower projects

Out of 141 registered HPPs within national parks, 28 already exist or are under construction, whereas 113 HPP are in the pipeline. In the case of SHHPs the precise number may vary as water abstractions, pipelines and powerhouses are not explicitly known for many projects. Furthermore, some projects located in close proximity to NPs may impact the protected area, particularly if the water for energy production is extracted directly from the park's boundary or if they impede on fish migration.

Table 1

Country	Name of NP	Existing HPP	Planned HPP
Slovenia	Triglav National Park	2: "Log" and "Zadlascica" (in Soca catchment)	
Croatia	Krka National Park	4: "Jaruga 1 and 2", "Roski Slap" and "Miljacka"	4: "Cikola 5", "Manojlavica slap", "Bilusica Buk"and "Miljacka 2"
Bosnia & Herzegovina	Una National Park		6: "Strbacki buk", "Unac", "Kulen Vakuf","Dvoslap", "Troslap" and "Martin Brod"
Bosnia & Herzegovina	Sutjeska National Park		4: "Sutjeska 2A" and "Hrcavka S-H-1-3", another close to park boundary is "Sutjeska 2B"
Serbia	Djerdap National Park	1: "Djerdap I"	4: SHHP's from national "SHHP Potential Study"
Serbia	Tara National Park		3: SHHP's from national "SHHP Potential Study"
Serbia	Kopaonik National Park		7: SHHP's from national "SHHP Potential Study"
Montenegro	Durmitor National Park (also World heritage Site)		2: "Tepca", "Ljutica"
Kosovo	Bjeshket e Nemuna National Park	2: "Belaje", "Radavci"	15: "Shtupeq", "Drelaj", "Kuqishta", "Koznjer", Jasq", "Erenik", "Mal", "Reka e Aliages cascade 1+2" and "Peja cascade 4-9"
Kosovo	Mali Sharr National Park	1: "Orcush"	6: "Restelica cascade 2-4", Prizreni cascade 3,4 and 8"
Albania	Lugina e Valbones National Park	3: "Valbone", "Dragobi" and "Ceremi" under construction	2: "Valbona cascade 2 and 3"
Albania	Mali I Dajtit National Park		2: "Tujan", "Skorana"
Albania	Shebenik-Jabllanice National Park	4: "Gizawesh", "Zgoshte", "Qaristha" and one NN in Bustrhica catchment	36: "Stebleve", "Bushtrica", rest NN
Albania	Bredhi I Hotoves-Dangelli	6: "Langarica I and II", "Radove" and "Carshove", further "Lengarica 3" and "Lengarica (Ura e Dashit)" under construction	3: "Gostivisht", "Ura e Dashit" and one NN
Macedonia	Mavrovo National Park	3: "Vrben" and two additional ones	19: "Lukovo polje, Crna Kamen" and "Boskov Most" and 17 additional ones
Bulgaria	Rila National Park	2: "Beli Iskar"and "Belmeken"	

Significant examples:

National parks are dedicated to protect wilderness and natural heritage. Thus, all HPP projects inside national parks are ecologically significant as they affect hydromorphological conditions.

Particularly in Albania, Macedonia, but also in Montenegro, national parks are impacted by numerous smaller or bigger projects.

Two other examples are the Una NP in BA and the upper Krka NP in HR, where new facilities are projected within the boundaries of national parks.

In regards to relevant riparian habitats, national parks play an important role: 911 km of larger rivers flow through the area of national parks (this includes only larger rivers as shown in the maps). However, many small hydropower stations extract water from rivers with much smaller catchments.

Often hydropower projects can be found in close vicinity of parks, such as in the Sutjeska NP in BA or the Lura NP, where water for the power generation is taken directly from the park's boundary, or even from lakes inside the park. The big power plant "Rapuni 1" strongly impedes the connectivity to Shebenik-Jabllanice National Park in Albania.

The Una river in the Una National Park near the village Martin Brod in Bosnia&Herzegovina. A diversion power plant is projected here. © Ulrich Eichelmann

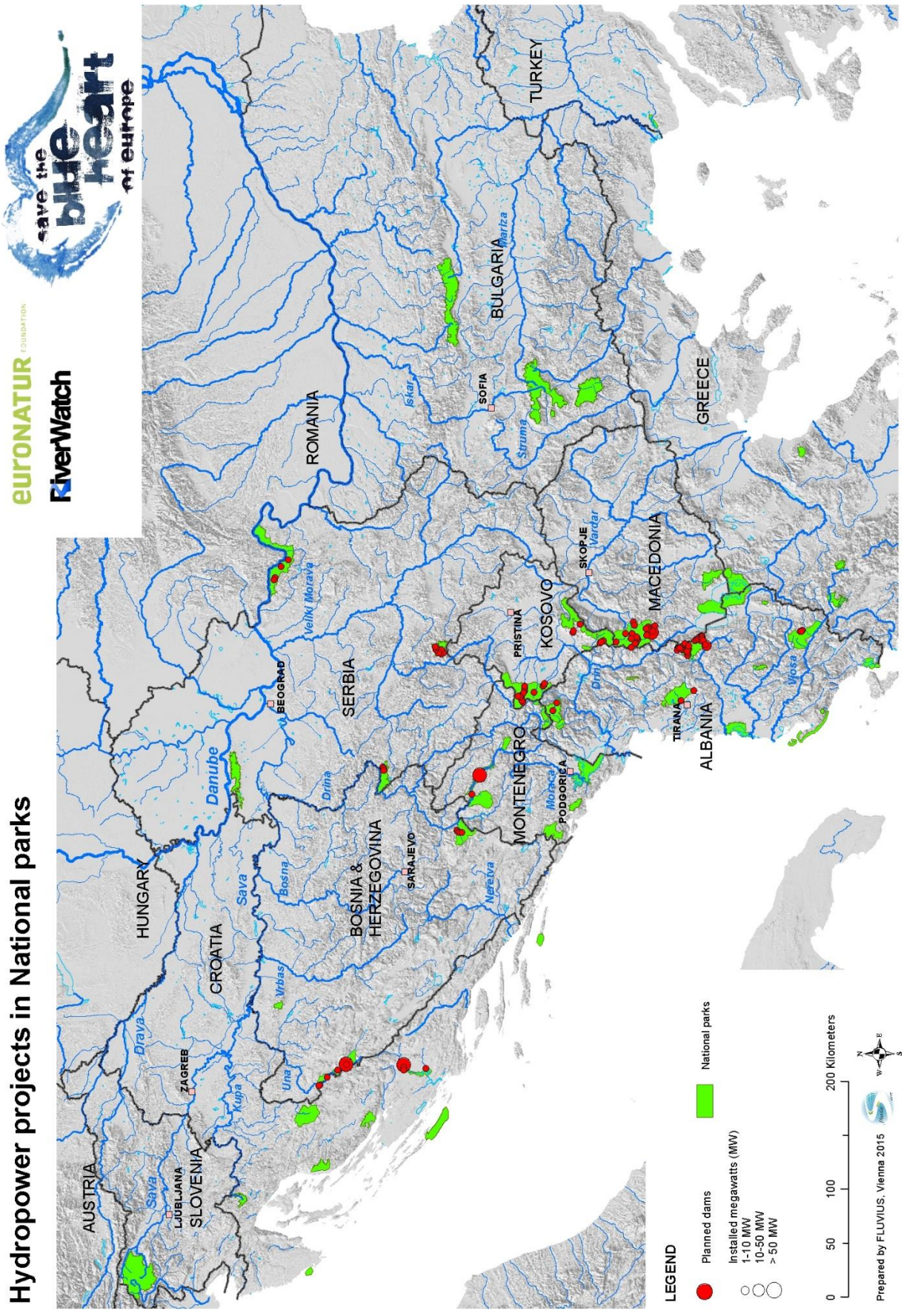

Figure 4: Hydropower projects in National Parks

4.4 Ramsar Sites, Biosphere Reserves and World Heritage Sites (Nature) and hydropower projects

A total of 30 HPPs can be found in Ramsar Sites, Biosphere Reserves and World Heritage Nature Sites. Five are operating or under implementation, whereas 25 new projects are projected (mainly along the Mura and Drava, but also in the Neretva Delta (Opuzen), Sava or Durmitor NP/WH on Tara). Only two planned hydropower plants in this category also fall within national parks.

International categories are based on national protection categories such as Nature Reserves or Natura 2000 Sites (e.g. Ramsar Sites have commonly been designated within strict nature reserves or Natura 2000 areas; core zones of Biosphere Reserves are usually built upon strict nature reserves). Therefore, the corresponding national protection categories are recorded wherever applicable.

Table 2

Country	Name of Ramsar sites, BR, WH	Existing HPP	Planned HPP
Slovenia	Mura-Drava-Danube Transboundary Biosphere Reserve (MDD TBR)	2: "Slatolice" and "Formin" (on Drava)	8: "Mura 1-8"
Croatia	Mura-Drava-Danube Transboundary Biosphere Reserve (MDD TBR)	3: "Varazdin", "Cakovec" and "Dubrava"	9: On Mura: "Mursko Sredisce", "Podturen", "Gorican" and "Kotoriba"; on Drava: "Molve I and II", "Barcs", "Donji Miholjac" and "Osijek"
Croatia	Lonjsko Polje Nature Park and Ramsar site		1 on Sava: "Jasenovac"
Croatia	Neretva delta Ramsar site		1: "Opuzen"
Bosnia & Herzegovina	Livanjsko polje Ramsar site		1: "Vrilo" (Busko blato)
Serbia	Srebarna Ramsar site		1 on Sava: "Kupinovo"
Montenegro	Durmitor National Park (World Heritage Site)		2:"Tepca" and "Ljutica" (count for National parks)
Albania	Butrint Ramsar site		1: just on upper border of the site at the main tributary "Pavla Cascade"
Bulgaria	Ramsar site Belene islands complex		1 on Danube: "Nikopol-Turnu Margurele"

About 1,423 km of large rivers can be found within this category; more than half of them in the Mura-Drava-Danube Transboundary Biosphere Reserve (MDD TBR).

Significant examples:

One critical example is the Durmitor National Park in Montenegro, a World Heritage Nature Site (WH), where new HPPs are planned in the Tara valley.
Intentions to build a chain of hydropower plants within the Mura-Drava Danube Transboundary Biosphere Reserve in SI and HR still exist, but are not very realistic after the area has been designated as Natura 2000 and Biosphere Reserve.

Tara River in the Durmitor National park, Montenegro. © Riverwatch

Protected areas are often the last sanctuaries for rare species. Hydropower projects are putting these species at risk, like the Huchen in the Durmitor National Park. © Andreas Hartl

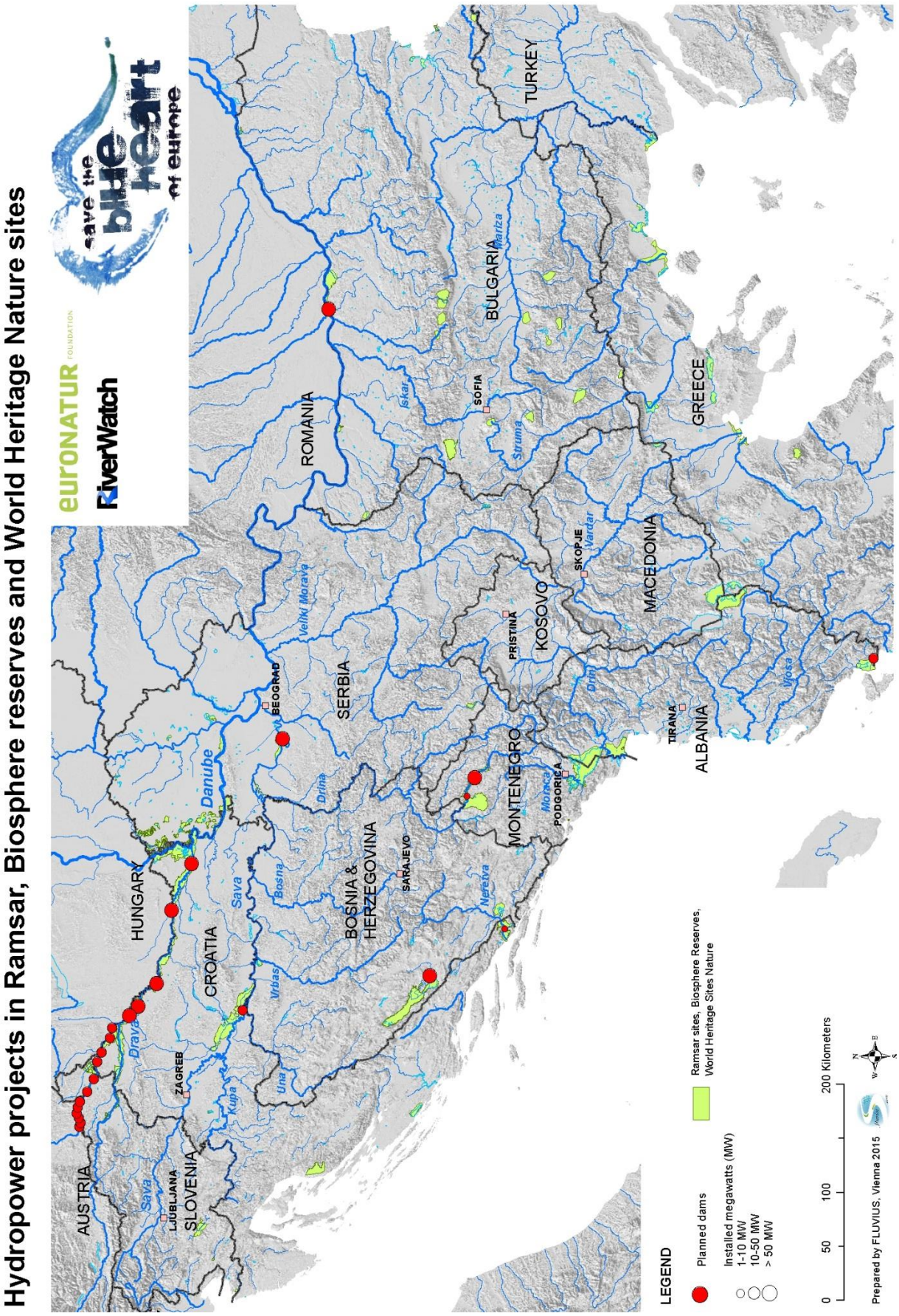

Figure 5: Hydropower projects in Ramsar Site, Biosphere Reserves and World Heritage Sites (Nature) (may include upper categories)

4.5 Natura 2000 network for EU countries and hydropower projects

The Natura 2000 network, which is based on special protection areas under the Flora Fauna Habitat Directive as well as on bird protection areas under the Bird Directive, exists in SI, HR, BG and GR. In total, 232 HPPs can be found in Natura 2000 areas, 77 of which are already in operation or being constructed. Of the 155 planned projects, 4 fall under category 1 (National Parks) and 20 under category 2 (Biosphere Reserve).

With at least 8,991 rkm, the Natura 2000 network comprises the largest amount of river stretches of all categories. This is not only due to the high density of the network, but also due to the high priority on riparian habitats across all countries. Considering the fact that many narrow protection corridors (often only some 100 m in width) do not exactly overlap with the overall river network geometry (which is based on European GIS CCM2 database), this analysis would include nearly another 1,000 river kilometres within Natura 2000 areas.

Significant examples:

An important example is the Sava River: a chain of dams was planned along its course in SI and HR before – or even while – the Natura 2000 network was being established. In SI this led to the construction of several huge dams and the planning for many more.

Other significant examples are projects along the Neretva near Opuzen (HR) or on Kupa/Kolpa (HR and SI).

The construction of two more Danube dams along the BG-RO border is relatively improbable, since almost the entire valley is a designated Natura 2000 area.

In Bulgaria, the entire Maritza valley is subject to hydropower development plans.

The following table shows all projected HPPs within Natura 2000 areas (rivers are indicated for better orientation; table may include HPPs of higher categories; cascades with more than two HPPs have been aggregated):

Table 3

Country	Planned HPP	River
BG	Ardino	Arda
BG	Kitnitsa	Arda
BG	Energy-Chiprovtsi	Chiprovska
BG	Nikopol - Turnu Magurele	Danube
BG	Slivka	Davidkovska
BG	Karlukovo 1	Iskar
BG	Kunino	Iskar
BG	Opletnya	Iskar
BG	Cherepish	Iskar
BG	Pesnopoi	Malka Arda
BG	Galabovo	Malka Arda

BG	Dositeevo	Maritza
BG	Simeonovgrad	Maritza
BG	Dimitrovgrad	Maritza
BG	Krum	Maritza
BG	Zlatna Livada	Maritza
BG	Parvomay	Maritza
BG	Dobri Dol	Maritza
BG	Govedare and Stamboliyski	Maritza
BG	Nova Nadejda	Maritza
BG	Manole	Maritza
BG	Milevo	Maritza
BG	Sestrimo	Maritza
BG	Gabrovitza 1 and 2	Maritza
BG	Rila Monastery	Rila tributary
BG	Kresna-Cascade	Struma
BG	Struma 1-3	Struma
BG	Pchelina	Struma
BG	Skrino 4	Struma
BG	Skrino 5	Struma
BG	Radovets	Tundsa
BG	Ustrem and Srem	Tundsa
BG	Yugovska	Yugovska
BG/TR	Tundsha	Tundsa
GR	Pigai I HPP	Aos
GR	Pygai Aoos Hydro Plant	Arkoudorema
HR	Tisne Stine	Cetina
HR	Kostanje	Cetina
HR	Voloder	Cetina
HR	Bartulovic	Cetina
HR	Pleici	Cetina
HR	Mahe Vinalic	Cetina
HR	Nahe Rumin	Cetina tributary
HR	Cikola 5	Cikola
HR	Cikola 3&4	Cikola
HR	Cikola 1&2	Cikola
HR	Konavle	Croatian coastal catchment
HR	Zeleni Vir	Curak
HR	Dobrenici	Dobra
HR	Vrbovsko	Dobra
HR	Molve 2	Drava
HR	Molve 1	Drava
HR	Barc	Drava
HR	Donji Miholjac	Drava
HR	Osijek	Drava
HR	Mreznica	Dretulja
HR	Puskaric	Korana
HR	Krcic 1-6	Krcic

HR	Bilusica Buk	Krka
HR	Manojlavica slap	Krka
HR	Miljacka 2	Krka
HR	Krotusa	Krotusa
HR	Krupa B	Krupa
HR	Krupa A	Krupa
HR	Brodarci	Kupa
HR	Pokuplje	Kupa
HR/SI	Kocicin	Kupa
HR/SI	Dol	Kupa
HR/SI	Severin	Kupa
HR/SI	Prilisce	Kupa
HR/SI	Stankovci	Kupa
HR/SI	Otok	Kupa
HR/SI	Bozakovo	Kupa
HR	Kupcina 1,2 and 7	Kupcina
HR	Zeleni Vir	Kupica
HR	Miskulin 2	Lika
HR	Kosinj	Lika
HR	Senj 2	Lika
HR	Caprazlije	Livanjsko Polje
HR	Ljuta 1	Ljuta
HR	Bakici	Mreznica
HR	Sastavci	Mreznica
HR	Juzbasic	Mreznica
HR	Erdelj	Mreznica
HR	Gorican	Mura
HR	Kotoriba	Mura
HR/SI	Mursko Sredisce	Mura
HR/SI	Podturen	Mura
HR	Opuzen	Neretva
HR	Ombla	Ombla
HR	Pozega	Orljava
HR	Orljava 1-5 and 7-8	Orljava
HR	Ricica	Ricica
HR	Drenje	Sava
HR	Precko	Sava
HR	Strelecko	Sava
HR	Jasenovac	Sava
HR/BA	Samac	Sava
HR	Dizdari	Tounjicia
HR	Mocro Polje	Zrmanja
HR	Zegar	Zrmanja
HR	Berberov	Zrmanja
HR	Ervenik	Zrmanja
HR	Zrmanja	Zrmanja
HR/SI	Bregana 2 and 5-7	Bregana

HR/SI	Kupari	Cabranka
HR/SI	Cabranka 1-9	Cabranka
SI	Kneza	Baca
SI	Mesto	Idrijca
SI	Marof	Idrijca
SI	Idrijca1-3	Idrijca
SI	Zagradec	Krka
SI	Mura 1-8	Mura
SI	Precna	Precna
SI	Tacen	Sava
SI	Gameljne	Sava
SI	Brod	Sava Bohijnska
SI	Savinja 2	Savinja
SI	Pohorje	Small tributaries to Drava
SI	Kobarid	Soca
SI	Kamno	Soca
SI	Susek	Sopota
SI	Ucja	Ucja
SI	Gradisce	Vipava

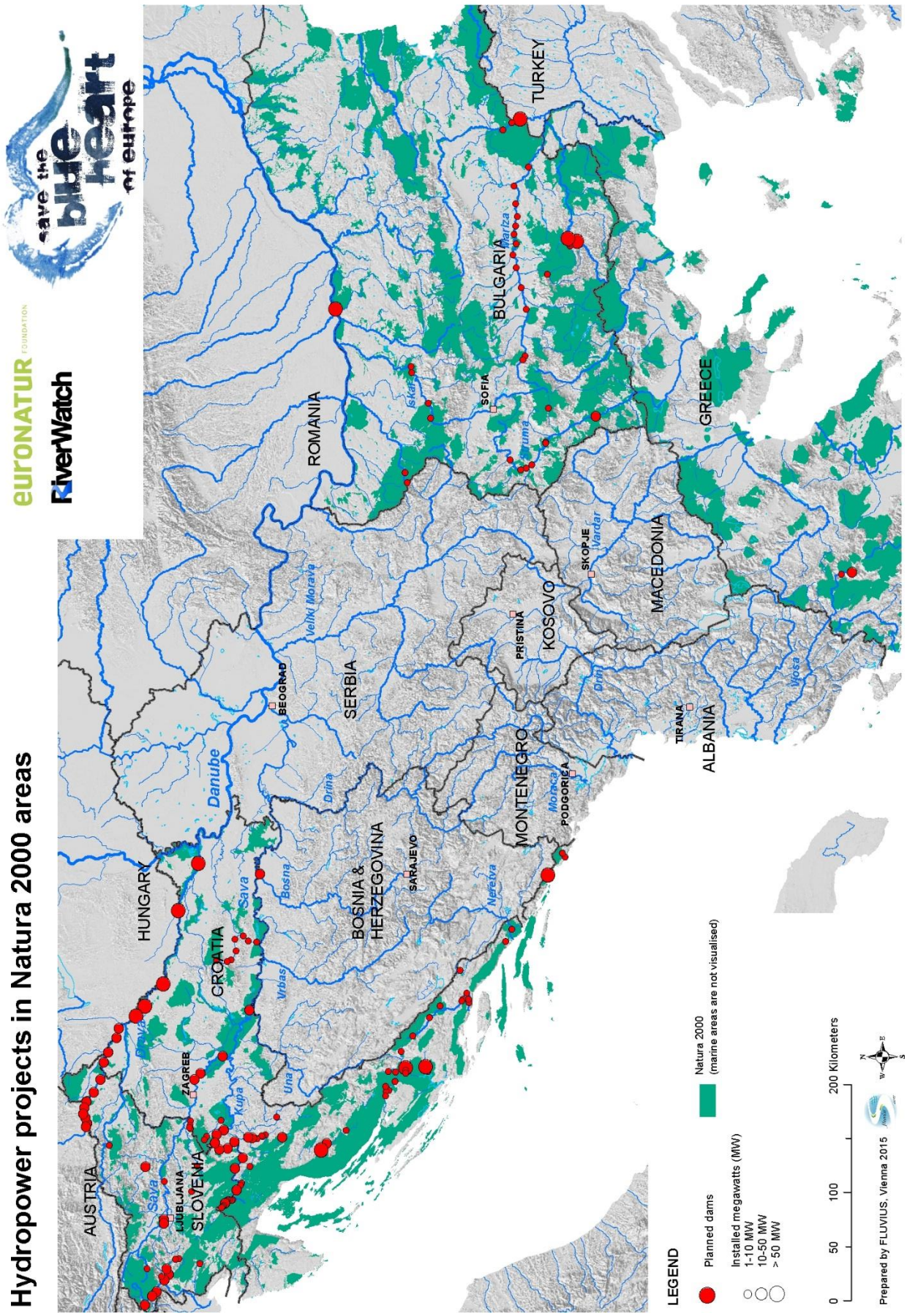

Figure 6: Total hydropower projects in Natura 2000 areas (may include upper categories)

4.6 Strictly protected areas as well as EMERALD areas, mainly in non-EU countries, and hydropower projects

National protected areas have strong protection and are particularly relevant in non-EU countries. Out of the 331 HPPs in those protected areas, 26 are operating or under implementation and 305 are projected (268 out of which do not overlap with higher categories). Emerald areas serve mainly as official „planning areas" for future Natura2000 areas in potential EU candidate countries. The Emerald network partly consists of already protected areas but mostly proposed and planned areas.

2,667 km of large rivers are located in this category.

Significant examples:

Many new projects are planned in the Kosovo (e.g. on the Lepenica border river to MK) and in Serbia along the Visocica River, which originates from Stara Planina (border region to BG), but also within Emerald areas in ME, MK and BA. Sometimes entire river valleys, such as the Lim River valley, are affected by new plans.

Hydropower plants within strictly protected areas and Emerald sites (rivers are indicated for better orientation; table may include HPPs of higher categories; cascades with more than two HPPs have been aggregated):

Table 4

Country	Planned HPP	River
AL	Bradoshnica	Bradoshnica
AL	Caja	Caje/ Bustrica
AL	Caje 2	Caje/ Bustrica
AL	Dardhe	Dardha
AL	Gafer	Gafer
AL	Kaludhi	Vjosa
AL	Lapaj	Caje/ Bustrica
AL	Lusna	Caje/ Bustrica
AL	Shkinak	Caje/ Bustrica
AL	Radomir 1	Drini i zi tributary
AL	Radomir 2	Drini i zi tributary
AL	Rapuni 2	Rapuni
AL	Vertopit	Osum tributary
AL	Vukel 1-3	Cem i Vuklit
BA	Bjelimici	Neretva
BA	Crna Rijeka	Crna
BA	Dabar	Trebisnjica
BA	Divic	Vrbanja
BA	Glavaticevo	Neretva

BA	Ulog	Neretva
BA	Gornje Neretva cascade 3-6	Neretva
BA	Hrcavka S-H-2	Hrcavkva
BA	Hrcavka S-H-3	Hrcavkva
BA	Jablanica	Jablanica
BA	Medna-Sklop	Medijanci
BA	Nevesinje	Nevesinje
BA	Staro Selo	Crna
BA	Ugar 1	Ugar
BA	Ugar 2	Ugar
BA	Ivik	Ugar
BA	Vrletna kosa	Ugar
BA	Ugar-Usce	Ugar
BA	Vrilo	Suica
KV	Bitinja	Lepenca
KV	Brezovica	Lepenca
KV	Shterpce	Lepenca
KV	Lepenci cascade 1-5 and 9	Lepenca
KV	Brodi cascade 2	Brod
KV	Brodi cascade 3	Brod
KV	Dragash	Radesha
KV	Drelaj	Lumebardhi i Peja
KV	Kuqishta	Lumebardhi i Peja
KV	Shtupeq	Lumebardhi i Peja
KV	Erenik	Erenik
KV	Ibar cascade 1	Ibar
KV	Ibar cascade 2	Ibar
KV	Jasiq	Erenik
KV	Koznjer	Lumebardhi i Decani
KV	Mal	Erenik
KV	Mirusha	Drini i bardhe
KV	Peja cascade 4-10	Peja
KV	Prizreni cascade 1-8	Lumebardhi i Prizreni
KV	Recan	Lumebardhi i Prizreni
KV	Radac	Drini i Bardhe
KV	Radesha	Radesha
KV	Reka e Aliages cascade 1	Reka e Aliages
KV	Reka e Aliages cascade 2	Reka e Aliages
KV	Restelica cascade 1-5	Restelica
ME	Berane	Lim
ME	Lim (825 AMSL - 645 AMSL)	Lim
ME	Lim (907 AMSL - 825 AMSL)	Lim
ME	Mostine	Lim
ME	Murino	Lim
ME	Navotina	Lim

ME	Krusevo	Lim
ME	Bioce/Ljesnica	Ljesnica
ME	Bistrica	Bistrica
ME	Brskut	Mala rijeka
ME	Grncar	Grncar
ME	Kaludra	Kaludarska
ME	Kruska	Kruska
ME	Ljutica	Tara
ME	Tepca	Tara
ME	Mekote	Cehotina
ME	Otilovici	Cehotina
ME	Gradac	Cehotina
ME	Velje Duboko	Mrtvica
ME	Zlorecica	Zlorecica
MK	Babuna	Vardar
MK	Cebren	Crna
MK	Jagmurlar	Bregalnica
MK	Klecovce	Kriva Reka
MK	Kostur	Kriva Reka
MK	Pena cascade 2	Pena
MK	Pena cascade 3	Pena
MK	Topolka 2	Topolka
RS	Banjica	Nisava
RS	Celije	Rasina
RS	Kupinovo	Sava
RS	Rsovici	Visocica
RS	Visocka rzana	Visocica
RS	Tosin Kamik complex	Visocica tributaries
RS	Usce	Studenica

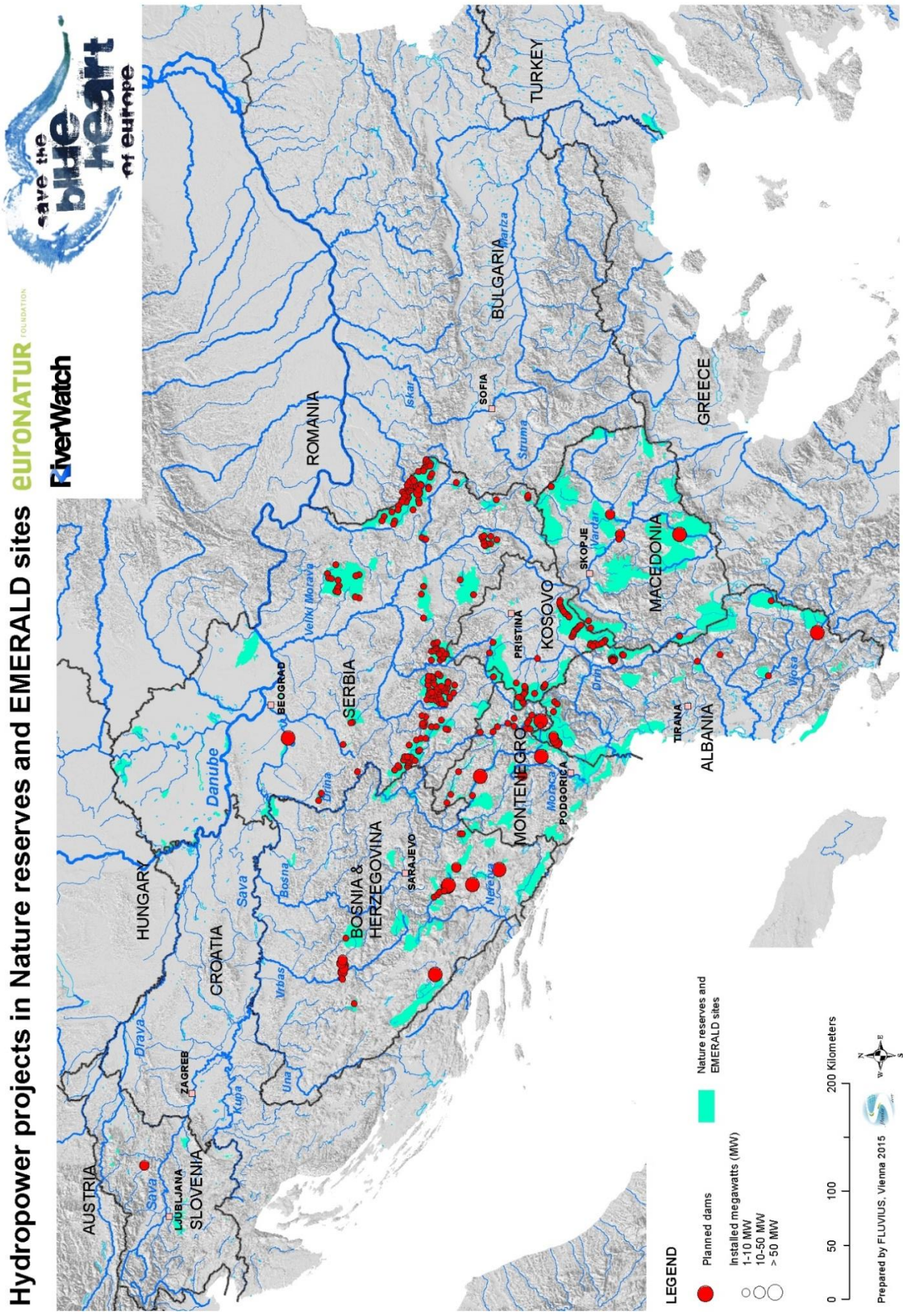

Figure 7: Total hydropower projects planned in strictly national protected areas (may include higher categories)

4.7 Other protected areas such as protected landscapes or nature monuments and other officially delineated areas and hydropower projects

Of the 712 hydropower plants in other protected areas, 616 are not yet being constructed. Only 282 out of these 616 projects do not also fall in one of the higher categories. These are mainly landscape protection areas but also natural monuments or nature parks with a weaker protection status.

In total, 3,711 river km are located within other protected areas, which is quite significant (the overlap with rivers in Natura2000 and NP areas has already been considered).

Significant examples:

Nine new projects are planned along Ibar River in RS. Furthermore, two huge dams projected in the free-flowing lower Drina fall under this category – a river stretch that would most definitely be covered by the Natura 2000 network in an EU country.

Hydropower plants in other protected areas (rivers are indicated for better orientation; table may include HPPs of higher categories; cascades with more than two HPPs have been aggregated):

Table 5

Country	Planned HPP	River
AL	Bistrica 3	Bistrica
AL	Bushtrica	Bushtrica
AL	Caja	Caje/ Bustrica
AL	Caje 2	Caje/ Bustrica
AL	Curraj-Eperm I	Curraj
AL	Curraj-Eperm II	Curraj
AL	Curray cascade 1-2 and 4-6	Curraj
AL	Dragostunja	She Dragostunja
AL	Gafer	Gafer
AL	Gomsiqe 3	Gomsiqe
AL	Gomsiqe 5	Gomsiqe
AL	Gostima	Gostima
AL	Gostime cascade 1	Gostima
AL	Gostime cascade 2	Gostima
AL	Gur Shpat 1	Gur Shpat
AL	Gur Shpat 2	Gur Shpat
AL	Hormova	Hormova
AL	Kacni	Peshkut
AL	Kalasa	Kalasa
AL	Kapariel	Kapariel
AL	Kelcyra	Vjosa
AL	Badelonje	Vjosa
AL	Dragoti	Vjosa

AL	Kaludhi	Vjosa
AL	Permet	Vjosa
AL	Kolonje 2	Drino tributary
AL	Kukur 1	Gramsh
AL	Kukur 2	Gramsh
AL	Lapaj	Caje/ Bustrica
AL	Librazhd	She Librazhd
AL	Lusna	Caje/ Bustrica
AL	Peshku	Mat
AL	Picar 1	Gurra
AL	Qukes	Shkumbin
AL	Spathar	Shkumbin
AL	Quku-Vulcan	Quku-Vulcan
AL	Radomir 1	Drini i zi tributary
AL	Radomir 2	Drini i zi tributary
AL	Rajan	Lengarica
AL	Barmash	Lengarica
AL	Rapuni 2	Rapuni
AL	Rapuni 3	Rapuni
AL	Selishte	Perroi i Madh, Murra
AL	Shala 1	Shala
AL	Shala 2	Shala
AL	Holte	Holte
AL	Shkinak	Caje/ Bustrica
AL	Ura e Dashit	Ura e Dashit
AL	Gostivisht	Ura e Dashit
BA	Bistrica B2-a	Bistrica
BA	Bistrica B3	Bistrica
BA	Caplje	Sana
BA	Vrhpolje	Sana
BA	Dabar	Trebisnjica
BA	Duljci	Pliva
BA	Glavica 1	Pliva
BA	Fojnica 1	Fojnica
BA	Fojnica 2	Fojnica
BA	Glavaticevo	Neretva
BA	Bjelimici	Neretva
BA	Konjic Mini	Neretva
BA	Gornje Neretva cascade 1-6	Neretva
BA	Gostovic 1	Gostovic
BA	Gradina	Vrbanja
BA	Celinac 1	Vrbanja
BA	Rudine	Vrbanja
BA	Hrcavka S-H-1-3	Hrcavkva
BA	Jablanica	Jablanica
BA	Basici	Janj
BA	Janjske Otoke	Janj

BA	Klokun	Tihaljina
BA	Kocusa	Tihaljina
BA	Krusevo & Zeleni Vir	Biostica
BA	Kulen Vakuf	Una
BA	Martin Brod	Una
BA	Dvoslap	Una
BA	Unac	Una
BA	Nevesinje	Nevesinje
BA	Pale	Pale
BA	Praca 1-4	Praca
BA	Sokocnica	Sokocnica
BA	Staro Selo	Crna
BA	Sutjeska 2A	Sutjeska
BA	Troslap	Una
BA	Ugar 1	Ugar
BA	Ugar 2	Ugar
BA	Ugar-Usce	Ugar
BA	Vrletna kosa	Ugar
BA	Ivik	Ugar
BA	Vrbanja 1	Vrbanja
BA	Vrbanja 2	Vrbanja
BA	Vrilo	Suica
BA/ME	Bijeli Brijeg	Tara
BA	Buk Bijela	Drina
BA/RS	Drina 2	Drina
BA/RS	Drina 3	Drina
BA/RS	Dubravica	Drina
GR	Alatopetra	Venetikos
GR	Shtika 4	Vijosa tributary
HR	Bakici	Mreznica
HR	Barilovic	Korana
HR	Bukovje	Korana
HR	Hrvatski Blagaj	Korana
HR	Lucica	Korana
HR	Primisje	Korana
HR	Smoljanak	Korana
HR	Bregana 2-4	Bregana
HR	Brodaci	Kupa Tributary
HR	Cabranka 1,4, 6-7, 9	Cabranka
HR	Kupcina 5-6	Kupcina
HR	Podsused	Sava
HR	Zagreb	Sava
HR	Sastavci	Mreznica
HR	Strbacki buk	Una
KV	Bitinja	Lepenca
KV	Brezovica	Lepenca
KV	Brodi cascade 2	Brod

KV	Brodi cascade 3	Brod
KV	Drelaj	Lumebardhi i Peja
KV	Erenik	Erenik
KV	Jasiq	Erenik
KV	Koznjer	Lumebardhi i Decani
KV	Kuqishta	Lumebardhi i Peja
KV	Shtupeq	Lumebardhi i Peja
KV	Lepenci cascade 3-5 and 9	Lepenca
KV	Llocan	Lumebardhi i Llocani
KV	Lumebardh-Hulaj	Decan
KV	Mal	Erenik
KV	Peja cascade 5-9 and 10	Peja
KV	Prizreni cascade 3-8	Lumebardhi i Prizreni
KV	Recan	Lumebardhi i Prizreni
KV	Radac	Drini i Bardhe
KV	Reka e Aliages cascade 1	Reka e Aliages
KV	Reka e Aliages cascade 2	Reka e Aliages
KV	Restelica cascade 3-5	Restelica
KV	Shterpce	Lepenca
ME	Bjelojevicka	Bjelojevicka
ME	Crnja	Crnja
ME	Ibrija	Ibristica
ME	Javor	Javorski potok
ME	Komarnica	Komarnica
ME	Poscenje	Komarnica
ME	Kostanica	Moraca
ME	Krusev Lug	Moraca
ME	Ljevista	Moraca
ME	Ljuta	Moraca
ME	Moraca above 1,040 AMSL	Moraca
ME	Dubravica	Moraca
ME	Ljuta cascade 1	Ljuta
ME	Ljuta cascade 2	Ljuta
ME	Ljutica	Tara
ME	Bakovica Klisura	Tara
ME	Matesevo	Tara
ME	Opasanica	Tara
ME	Tepca	Tara
ME	Zuti Krs	Tara
ME	Trebaljevo	Tara
ME	Luge	Kostanica
ME	Osljak	Osljak/Piva
ME	Pozanjska	Pozanjska
ME	Ratnja	Ratnja
ME	Ravnjak	Ravnjak
ME	Stitaricka	Stitaricka
ME	Timar	Bukovica

ME	Donja Bukovica	Bukovica
ME	Trebisnjica	Lake Bilecko
ME	Velje Duboko	Mrtvica
ME	Vrbnica	Vrbnica
ME	Vrela	Vrela
MK	Boskov Most	Mala
MK	Cebren	Crna
MK	Gari	Garska
MK	Jagmurlar	Bregalnica
MK	Klecovce	Kriva Reka
MK	Kostur	Kriva Reka
MK	Lukovo Polje, Crna Camen	Radika
MK	Radika	Radika
MK	Pena cascade 2	Pena
MK	Pena cascade 3	Pena
MK	Ribnica	Ribnica
MK	Tresonecka reka	Tresonecka reka
RS	Banjica	Nisava
RS	Bela glava	Ibar
RS	Brodarevo 2	Lim
RS	Kolovrat	Lim
RS	Celije	Rasina
RS	Cerje	Ibar
RS	Dobre Strane	Ibar
RS	Glavica 1	Ibar
RS	Gokcanica	Ibar
RS	Gradina	Ibar
RS	Maglic	Ibar
RS	Ribarice	Ibar
RS	Usce	Ibar
RS	Djerdap 3	Danube
RS	Dobra 1	Dobranska-desna reka i leva reka
RS	Dobra 2	Dobranska-desna reka i leva reka
RS	Dosici	Ribnica
RS	Gamzigrad	Crni Timok
RS	Globoko	Sava
RS	Kupinovo	Sava
RS	Novi Becej	Tisa
RS	Rsovici	Visocica
RS	Visocka rzana	Visocica
RS	Tosin Kamik complex	Visocica tributaries
RS	Stepanovici	Orovicka
RS	Usce	Studenica
SI	Klavzarica	Klavzarica
SI	Kozjak	Drava
SI	Ljubljanica	Ljubljanica
SI	Malin	Trziska Bistrica

SI	Mohorcev	Baca
SI	Moznica	Koritnica
SI	Planina	Unec
SI	Ponovice	Sava
SI	Renke	Sava
SI	Jevnica	Sava
SI	Kresnice	Sava
SI	Mokrice	Sava
SI	Sentjakob	Sava
SI	Suhadol	Sava
SI	Trbovlje	Sava
SI	Zalog	Sava
SI	Sava Bohinjka	Sava Bohinjka
SI	Savinja 1	Savinja
SI	Stare zage	Stare zage
SI	Tolmin	Tolminka

Many natural river stretches are still not protected, as in the middle Neretva basin. © Anonymous

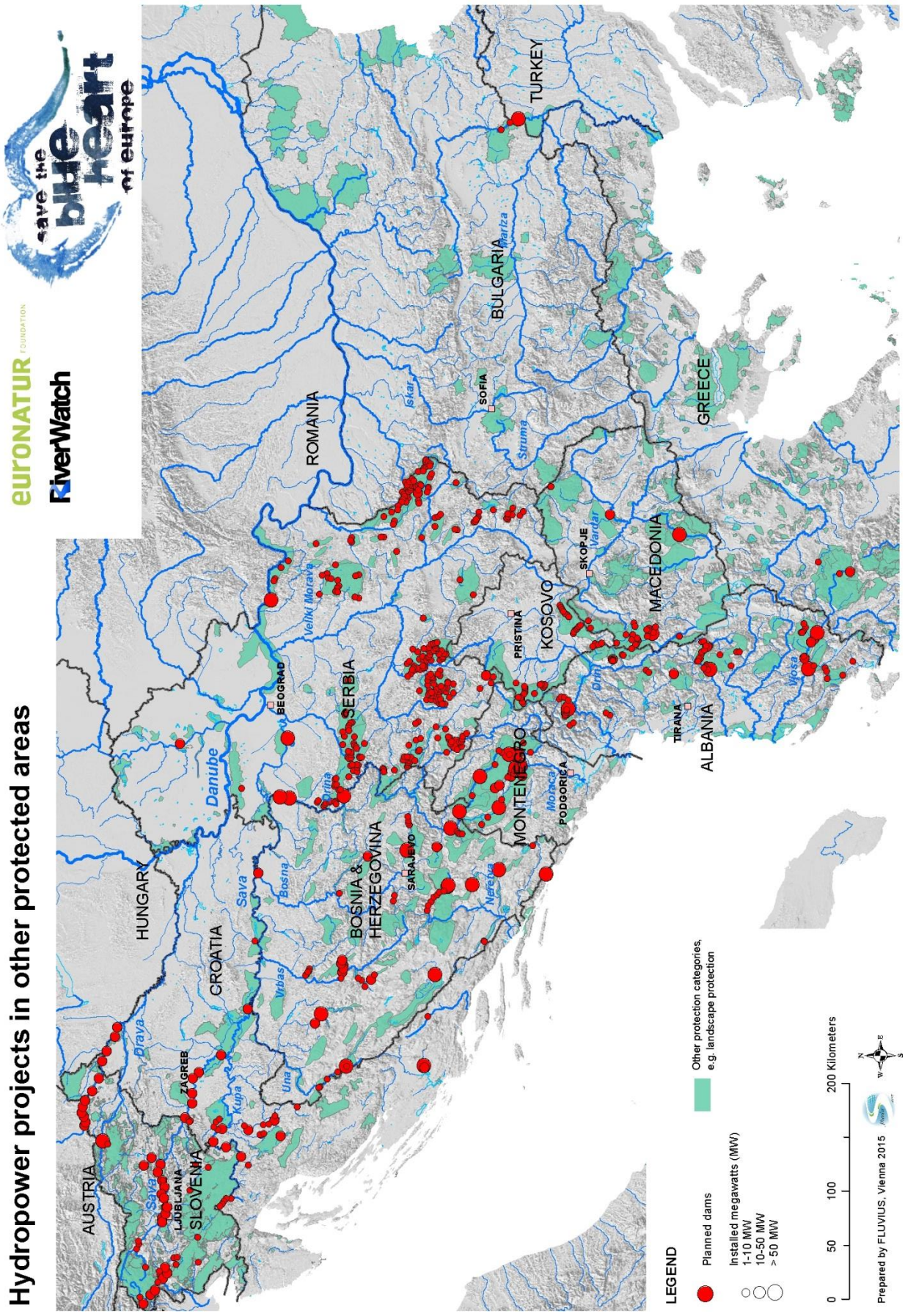

Figure 8: Total hydropower projects in other protected areas (may include higher categories)

5. Conclusions

On the Balkan Peninsula, strict protected areas cover about 10-15% of the total working area. They include wilderness areas in all forms of mountain terrains as well as coastal area and selected areas, wetlands and river corridors in the low lands.

The protected area network is still rather inhomogeneous among SI/HR on the western side and BG/GR on the eastern side due to different implementation of European directives (Natura 2000 network). Many rivers, narrow valleys and gorges are still not protected in the central Balkans, and protected area planning is often inconsistent with other planning. There are all in focus for hydropower development.

The fact that 32% of all new hydropower projects are planned in strictly protected areas and up to 17% additionally in less protected categories shows that this practice is in contradiction to guidelines and master plans for hydropower, highlighting protected sites as “no-go areas”. Considering that river valleys are often still not included in protected areas, hydropower seems to be **focusing on river stretches with high ecological values (mountain ridges, larger rivers from gorges to lowland).** In fact, a significant number of hydropower plants can already be found in protected areas today, deteriorating habitats and having strong impacts on whole river catchment as well as downstream sections of rivers, including related protected areas (see high number of existing plants in Natura2000 areas).

The results prove that even in national parks the harmful development of hydropower is an ongoing threat, not only for the park areas itself, but also for downstream areas in the long run. The construction of hydropower plants within even strictly protected areas is not the exception but rather the rule. In areas with the highest protection status even small hydropower are not acceptable as a sustainable solution.

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