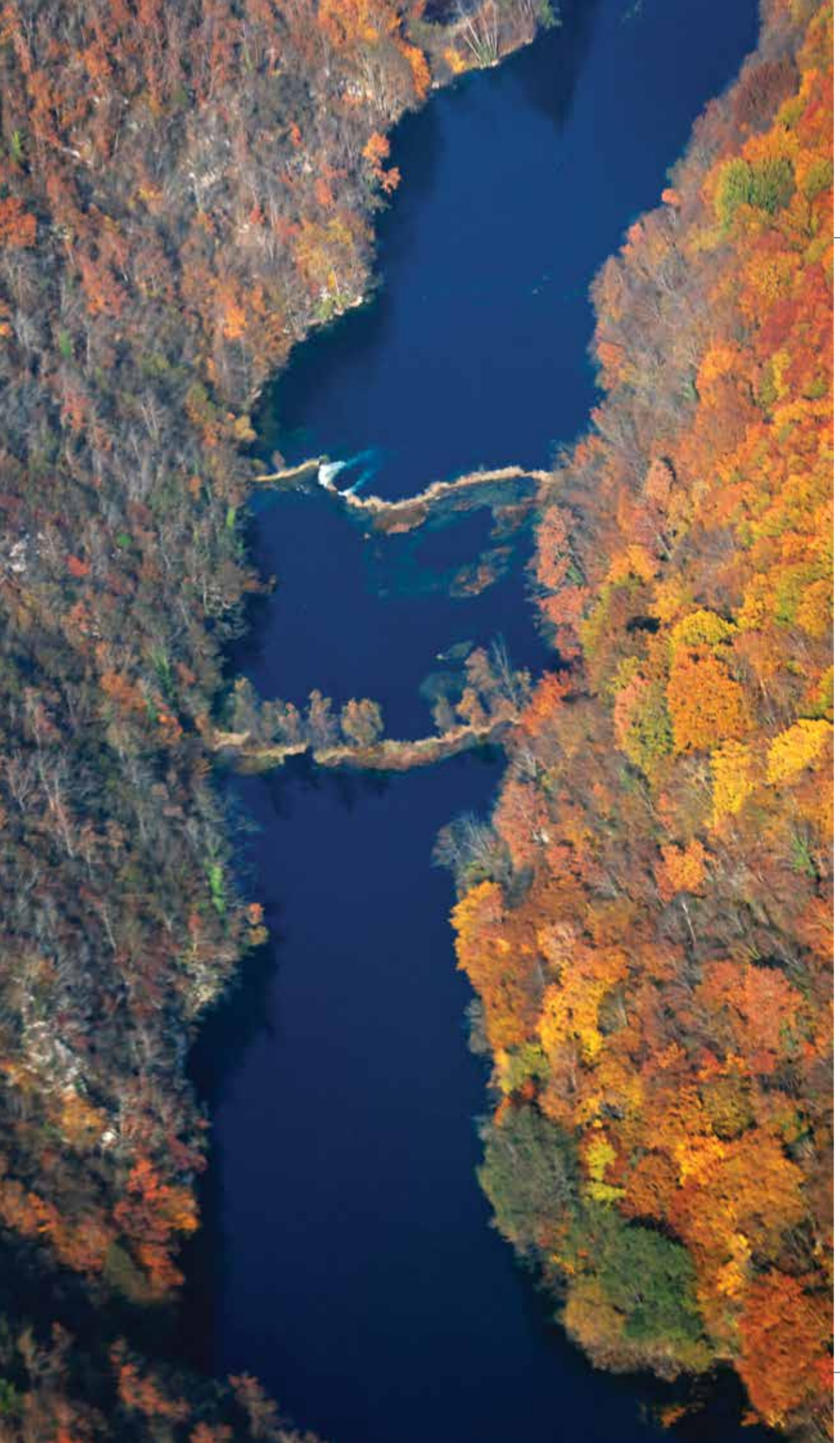
save the blue heart of europe

# ECO-MASTERPLAN FOR BALKAN RIVERS

## DRAWING A LINE IN THE SAND



Mrežnica River, Croatia. Photo: Goran Šafarek

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## Imprint

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# ECO-MASTERPLAN FOR BALKAN RIVERS

## DRAWING A LINE IN THE SAND

CONTENTS

# FOREWORD

## "WHERE NOT?" IS THE MOST IMPORTANT QUESTION

When we started the Save the Blue Heart of Europe campaign seven years ago, we faced a huge knowledge gap regarding the environmental values of the Balkan rivers. There existed almost no substantial collated information about biodiversity, nothing about hydromorphology and sediment transport and nothing about the dimension of the threat from hydropower projects. Since then, we have greatly improved the knowledge base, in particular through the dedication and expert work of the many scientists who have supported us in our work.

Today, we have evidence of about 3,000 planned hydropower projects between Slovenia and Greece. Almost every river and stream is threatened to be dammed or diverted. Incomprehensibly, more than 1,000 of these hydro projects are located in strictly protected areas, such as national parks, nature reserves and Natura 2000 sites. To date, investors have also ignored the effects of hydropower on endangered species. Scientists predict that about 10 percent of European freshwater fish species are at risk of extinction if these hydropower plants are constructed. Thousands of people are suffering from the impacts of existing dams, and many more would suffer if these proposals become a reality.

In our discussions with financiers and politicians from the EU and a number of different countries, we heard repetitively that it would be a good idea to define river stretches of high ecological importance – an Eco-Masterplan for the Balkans. A spatial plan for the rivers with "no-go" zones for hydropower development and other projects destructive to rivers. Most people – even hydropower backers – admit that this would be a good thing to have, since it minimises the risk of destroying valuable stretches, avoids social conflicts and it improves investment security. In fact, we never heard anybody argue against this idea.

And it makes sense, because the most important question for dam construction is "where not" to build a dam. This question is much more crucial than "how to build it", because every hydropower plant has unavoidable negative effects. It is the same for house building – the first question is where you are and aren't allowed to build, not how you pour the foundations. This is simply good spatial planning principles.

The idea of an Eco-Masterplan with no-go zones for dams is not new. Discussions have occurred for many years and plans have been suggested for many different parts of Europe, including by the European Commission. For example, the International Commission for the Protection of the Danube River (ICPDR) has created an Eco-Masterplan for the Danube Basin. However, never before has this been attempted over such a large area and to such an extent.

When we started working on this Eco-Masterplan, we did not know how big the challenge would be, nor what outcome to expect. But, after more than a year of intense work, the results are to a certain extent a surprise to us. Then again, it proves how incredibly valuable these rivers are on a European scale. Now we can clearly demonstrate, with more data than ever before, that the Balkan rivers are, without any doubt, the true Blue Heart of Europe.

The Eco-Masterplan is a great collaborative work and we thank all our partners and namely Ulrich Schwarz and Luke Chamberlain for their outstanding contributions.

So here it is, the Eco-Masterplan for the Balkan rivers – and we are proud of it.

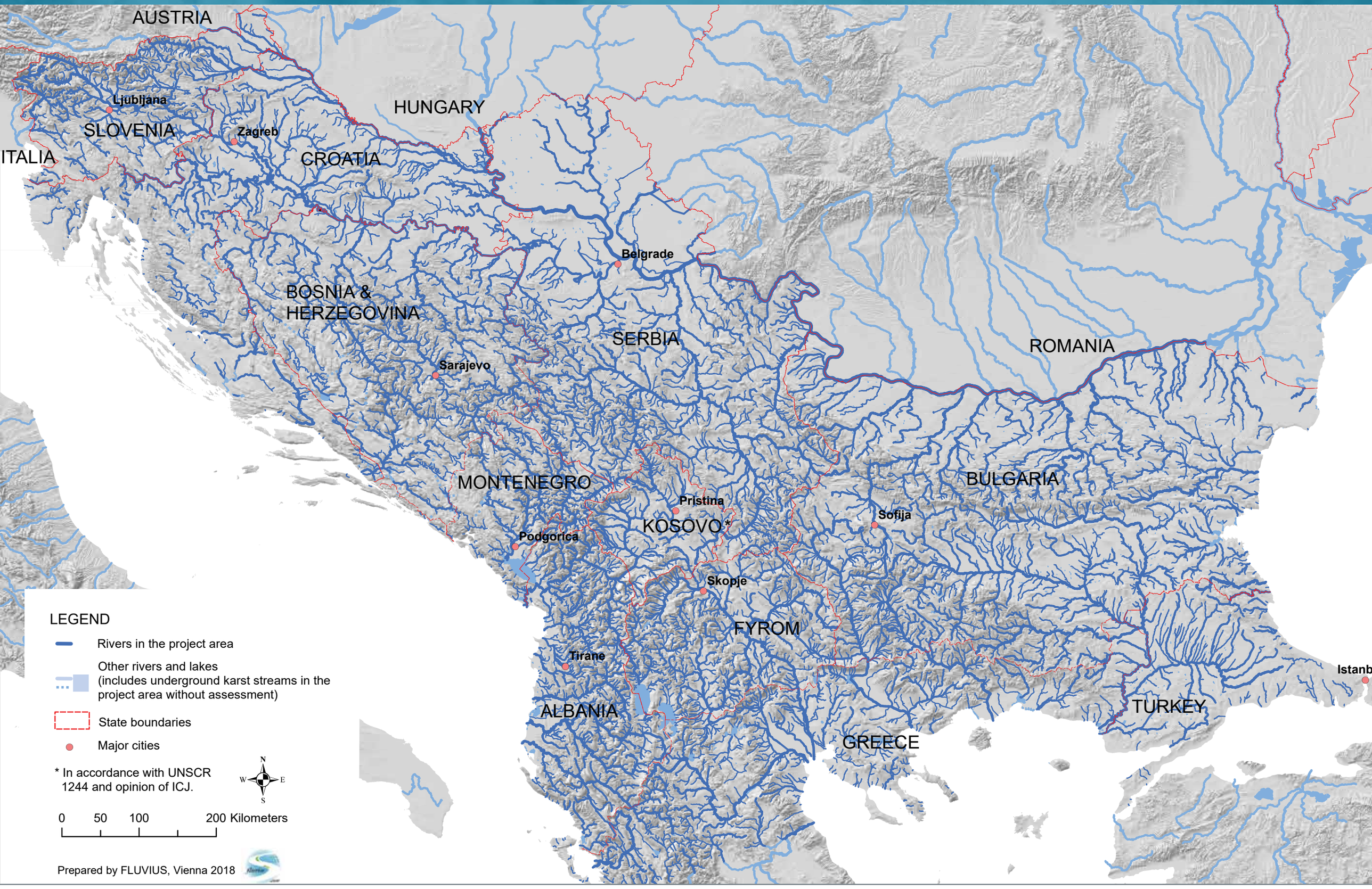
Ulrich Eichelmann, Riverwatch

Gabriel Schwaderer, EuroNatur

Confluence of the Krupa River (left) and Zrmanja River, Croatia. Photo: Goran Šafarek

Kravice waterfall, Bosnia and Herzegovina. Photo: Goran Šafarek

# Map 1: Extent of 80,523 kilometres of rivers assessed for this Eco-Masterplan.



# WHY WE NEED AN ECO-MASTERPLAN

Imagine a place where wild rivers still run free. A place where life thrives in and along pristine rivers that stretch their whole course from mountain tops to the sea. Where nature is alive and untamed and doing what it has done for millennia. Where rare and threatened species abound in a sanctuary of intact meandering river courses and their untouched headwaters.

To many Europeans, the idea of beautiful, wild river systems is contained in the imagination to far away parts of the planet. In the countries of the Balkan Peninsula, however, this idea is a startling reality.

Stretching from Slovenia in the north to Greece in the south, from the Black Sea in the east to the Adriatic and Ionian seas in the west, these countries are home to many of the most intact, the most precious and the most beautiful rivers in continental Europe. Spectacular landscapes – deep chasms, stunning waterfalls, untamed wildernesses, cascades cutting through ancient forests, extensive underground karst systems, wild alpine meadows, precious floodplains – have been carved out of towering mountain systems by mighty rivers, creating some of the most awe inspiring scenery in Europe.

The rivers here are the Blue Heart of Europe, providing sanctuary to a vast number of wild animals and plants. They are the most important hotspot for endangered fish and mollusc species which make up the two most threatened taxonomic groups in Europe (Freyhof 2012). Invertebrate species, including freshwater mussels and caddisflies, which are important indicators of the health of river systems, continue to be discovered here. The intactness and near naturalness of most rivers is high and stands in stark contrast to most other parts of Europe where rivers have been largely degraded over time.

## Preventing Biodiversity Loss

Although freshwater systems support some of the richest biodiversity on the planet, they are highly threatened all over the world. Only since the early 1970s, when the world's first microprocessor was produced, at least 81% of our planet's freshwater ecosystem populations have been lost (WWF Living Planet Index 2016) (Figure 1). This compares with 38% for terrestrial systems and 36% for marine systems. At a European level, 37% of freshwater fish and 44% of freshwater molluscs are threatened according to IUCN criteria (Freyhof and Brooks 2011). They face a much higher threat than other species assessed, including amphibians (23%), reptiles (19%) birds (13%) and butterflies (9%). The conservation status of freshwater species and habitats is poor with only 17% of species and 16% of habitats reporting a favourable conservation status (European Environment Agency 2015) (Figure 2). In its recent assessment report, the European Environmental Agency confirms that 60% of rivers within the European Union do not have a good ecological status. Furthermore, little progress has been made on improving this status since the previous assessment in 2009 (EEA 2018).

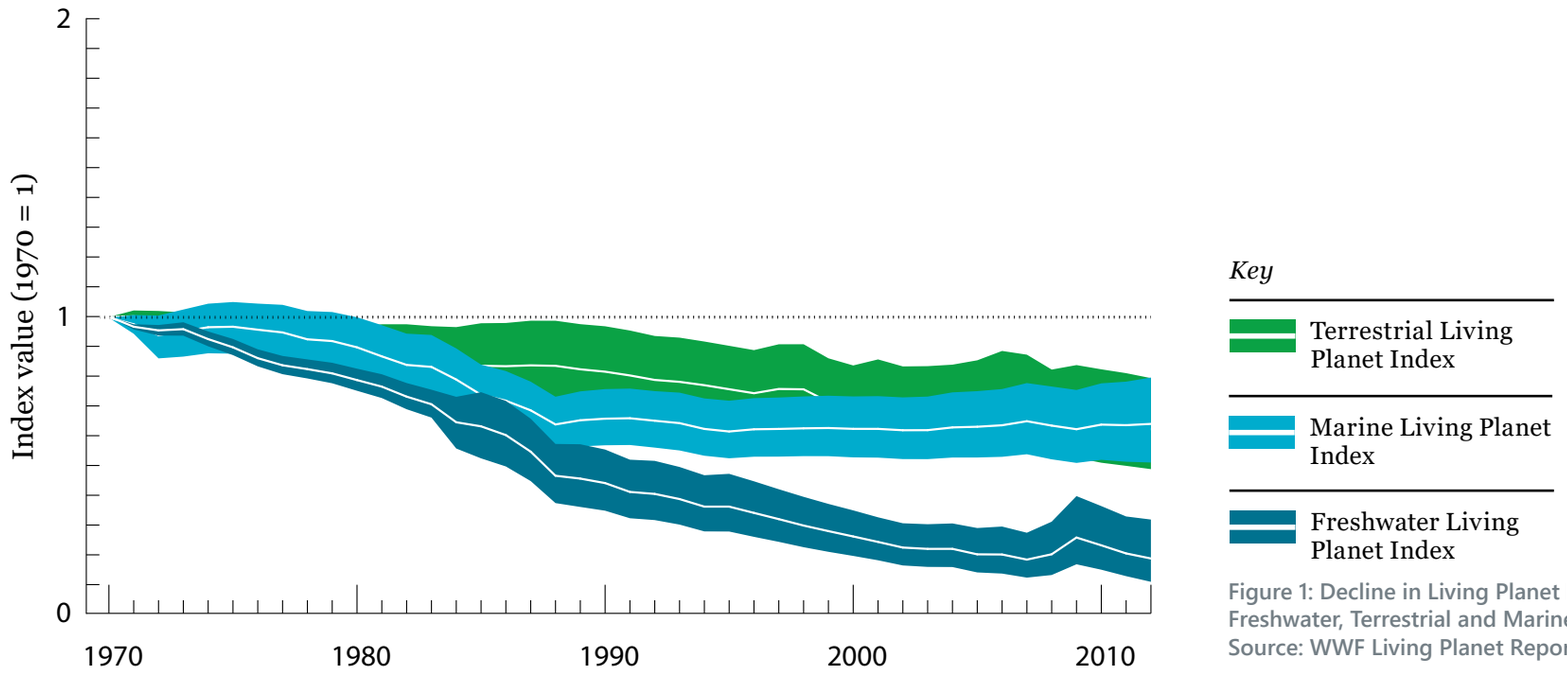
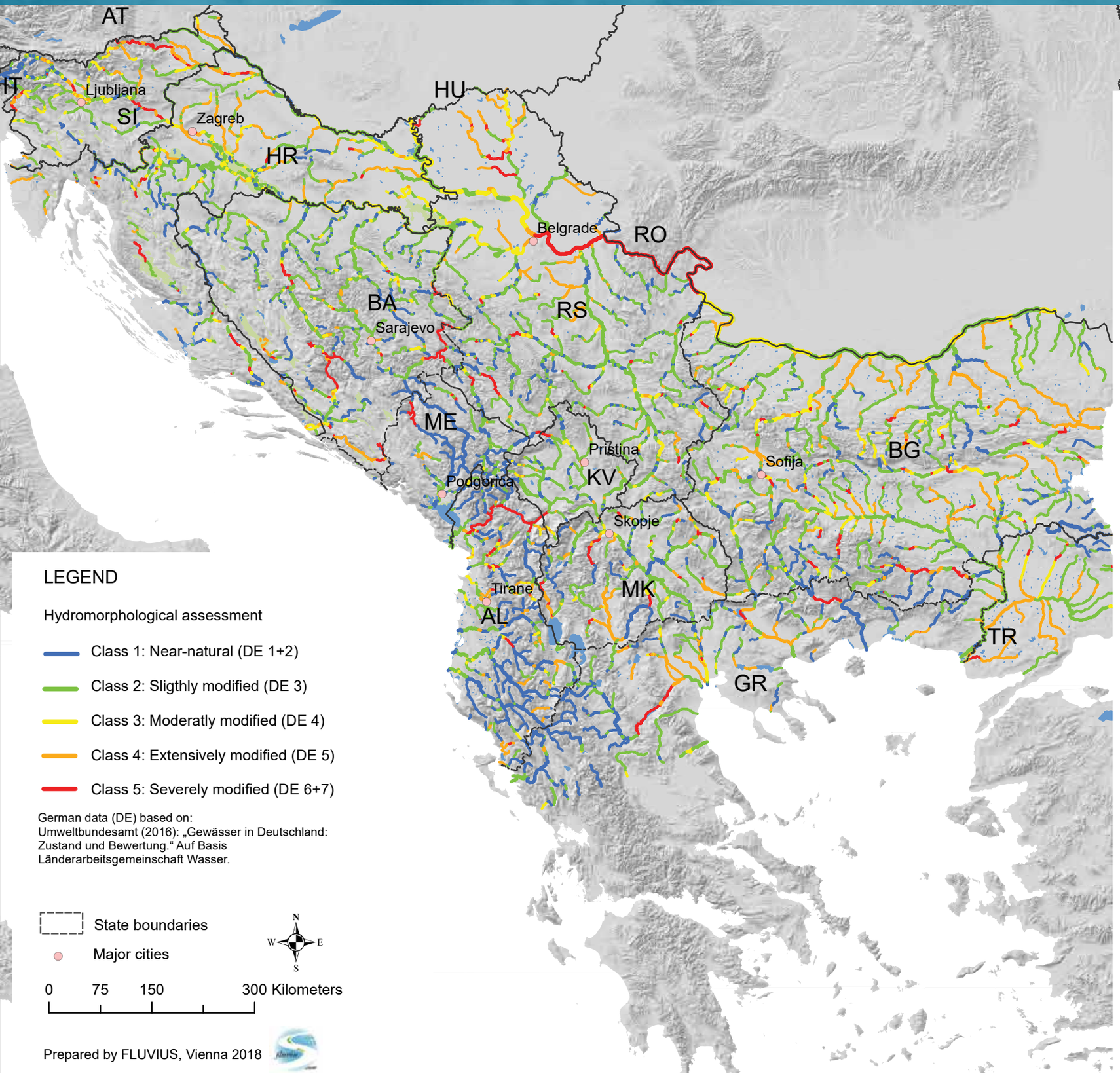
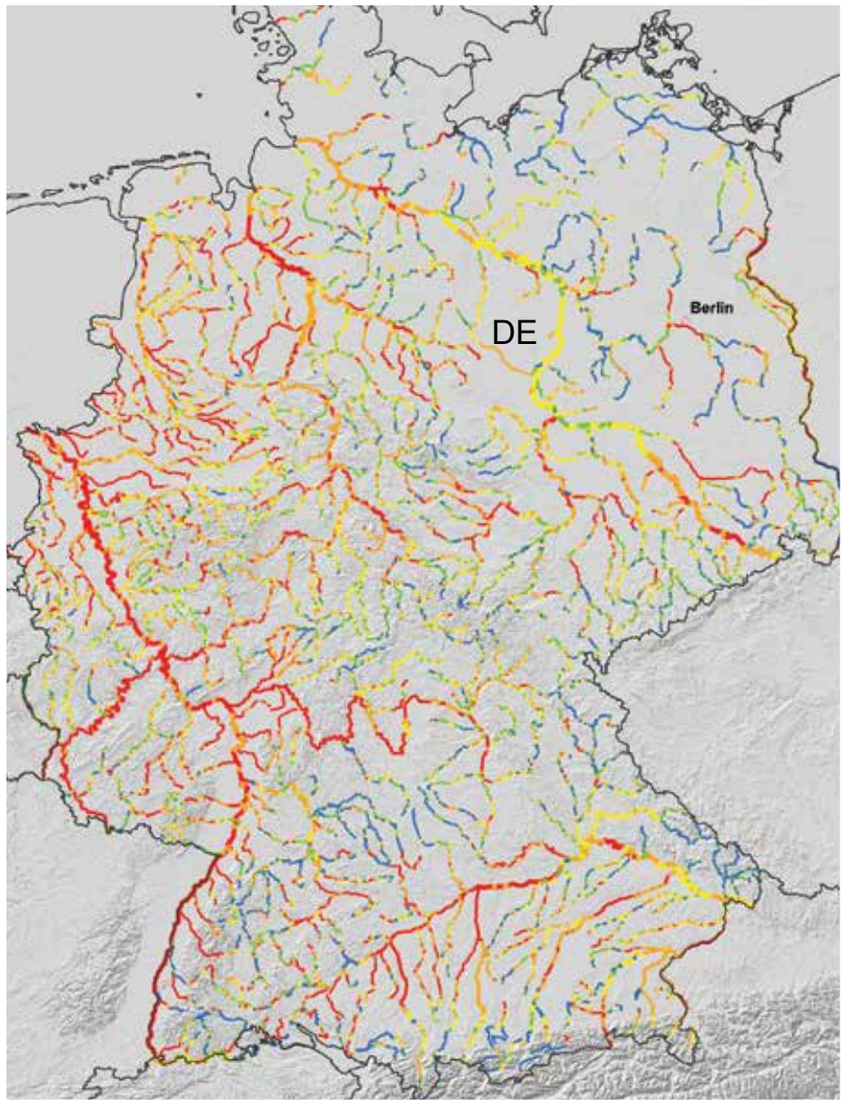



Figure 1: Decline in Living Planet Index of Freshwater, Terrestrial and Marine systems. Source: WWF Living Planet Report 2016

# Map 2: Hydromorphological status of Balkan rivers compared to rivers in Germany (rivers with catchment size > 500 km²).




Map 2.1: Hydromorphological situation for German rivers.
Source: German data from 2002 based on: Umweltbundesamt (2016): “Gewässer in Deutschland: Zustand und Bewertung.” Auf Basis Länderarbeitsgemeinschaft Wasser.

Note: The German assessment is originally based on 7, rather than 5, assessment classes. Based on the official recommended class boundaries for original survey data the transposition combines classes 1 and 2 into class 1 (blue) and classes 6 and 7 into class 5 (red), the other classes 3-5 being the same. This leads to a slight overestimate of blue and red river stretches, but does not change the overall share of rivers falling into the more intact (blue and green) and more degraded (orange and red) classes.

**"Pre-planning mechanisms allocating "no-go" areas for new hydro-power should be developed [...] it is our view that the WB6 countries should establish clear "no-go" areas for new hydro-power projects, based on the protection of nature conservation values."**

Source: Regional Strategy for Sustainable Hydropower in the Western Balkans (2018), pages A-92 and 45. Report commissioned by the European Commission.

It is clear that Europe's freshwater river systems are under huge strain and face ongoing threats. Protecting the best of what is left of them, including here in the Balkans, is critical to conserving freshwater biodiversity into the future.

To ensure the protection of the rare and outstanding values of the Balkan rivers, management regimes must prioritise the conservation of freshwater biodiversity by ensuring they are not negatively impacted by development, including for electricity generation.

Unfortunately, however, many Balkan rivers now face the same threat that has impacted freshwater values in other parts of the world. **We have evidence of almost 3,000 new hydropower projects on the rivers of the Balkans (Schwarz 2017) (Map 3).** If built, they will cut, dissect and degrade some of Europe's most pristine freshwater systems, with significant and irreversible impacts on freshwater biodiversity in the region (Freyhof 2012, Weiss et al. 2018) (Figure 3). The vast majority of these are small installations (Figure 4) with cumulative impacts similar to those for big dams. Incredibly, approximately 40% of proposals are planned or being implemented within protected areas, including in national parks and Natura 2000 sites (Figure 5).

## Fulfilling EU and International Environmental Objectives

The European Union, through its long term Biodiversity Strategy, has committed to targets to halt biodiversity loss and ecosystem degradation by 2020 (The EU Biodiversity Strategy to 2020, 2011). The plans to build around 3,000 hydropower plants are incompatible with these objectives, even for the Balkan countries that are aspiring to join the EU.

To bring energy planning in line with critical biodiversity objectives, the Balkan region needs a tool that integrates key environmental data into a spatial plan; a masterplan that shows us where we simply should not be building hydropower plants. Here we have comprehensively assessed important environmental information over the entire river system of the Balkan peninsula to create such a plan – an ecologically robust, scientifically informed *No-go* map of river stretches for hydropower in the Balkans.

**This Eco-Masterplan is consistent with targets of the European Union's Biodiversity Strategy and the enabling Birds, Habitats and Water Framework Directives. It provides essential components of a baseline freshwater dataset that is needed to measure the goals of the European Union's Water Framework Directive (WFD).** To date, most European rivers are on a trajectory to fail the WFD environmental objective of reaching a good ecological status. The Eco-Masterplan demonstrates that a very high percentage of the rivers of the Balkans are in a near-natural state – a key attribute of this ecological status – and that this state must be maintained to meet key legislated WFD objectives. Key objectives of the Birds and Habitats Directives can be met by protecting species and their habitats here that are threatened or not found in other parts of Europe. Building hydropower plants on the Balkan rivers will only move Europe further away from meeting these legally binding objectives.

It is also consistent with findings from the State of Nature in the EU report (European Environment Agency 2015) which conclude that 'modification of natural conditions' is the primary reported threat to freshwater river and lake ecosystems and that primary management responses to threats are to establish protected areas/sites, to restore and improve water quality and hydrological regimes and to legally protect habitats and species.

**The Convention on Biological Diversity (CBD) is a global convention that aims to protect biodiversity. The European Union and all Balkan countries except Kosovo* (* in accordance with UNSCR 1244 and opinion of ICJ) have signed this convention.** It affirms "that the conservation of biological diversity is a common concern of humankind" and has an overriding objective for the conservation of the planet's natural systems. Its targets urge for a halt of biodiversity loss, degradation and fragmentation. This should be achieved by 2020, through, amongst other things, the establishment and effective management of more protected areas. This Eco-Masterplan is a tool that is entirely consistent with these targets.

## Reducing Risk of Breaching the Law

This Eco-Masterplan can contribute to an improvement in energy project related planning activities in the Balkans and can help avoid a repetition of conflict where environmental and social values have been impacted by hydropower development.

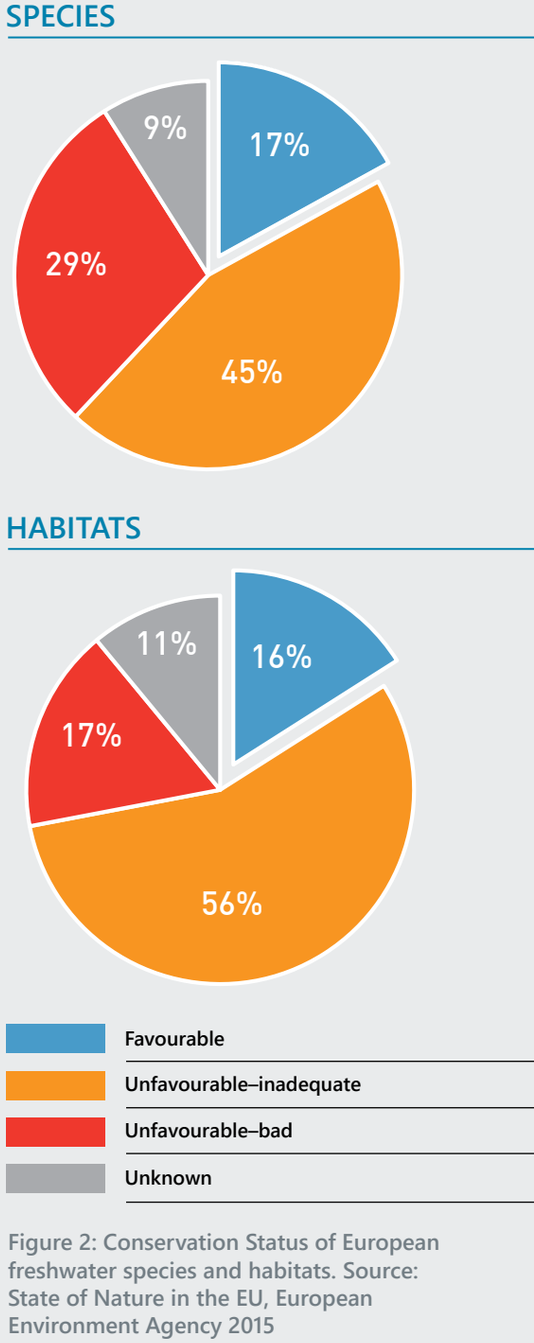
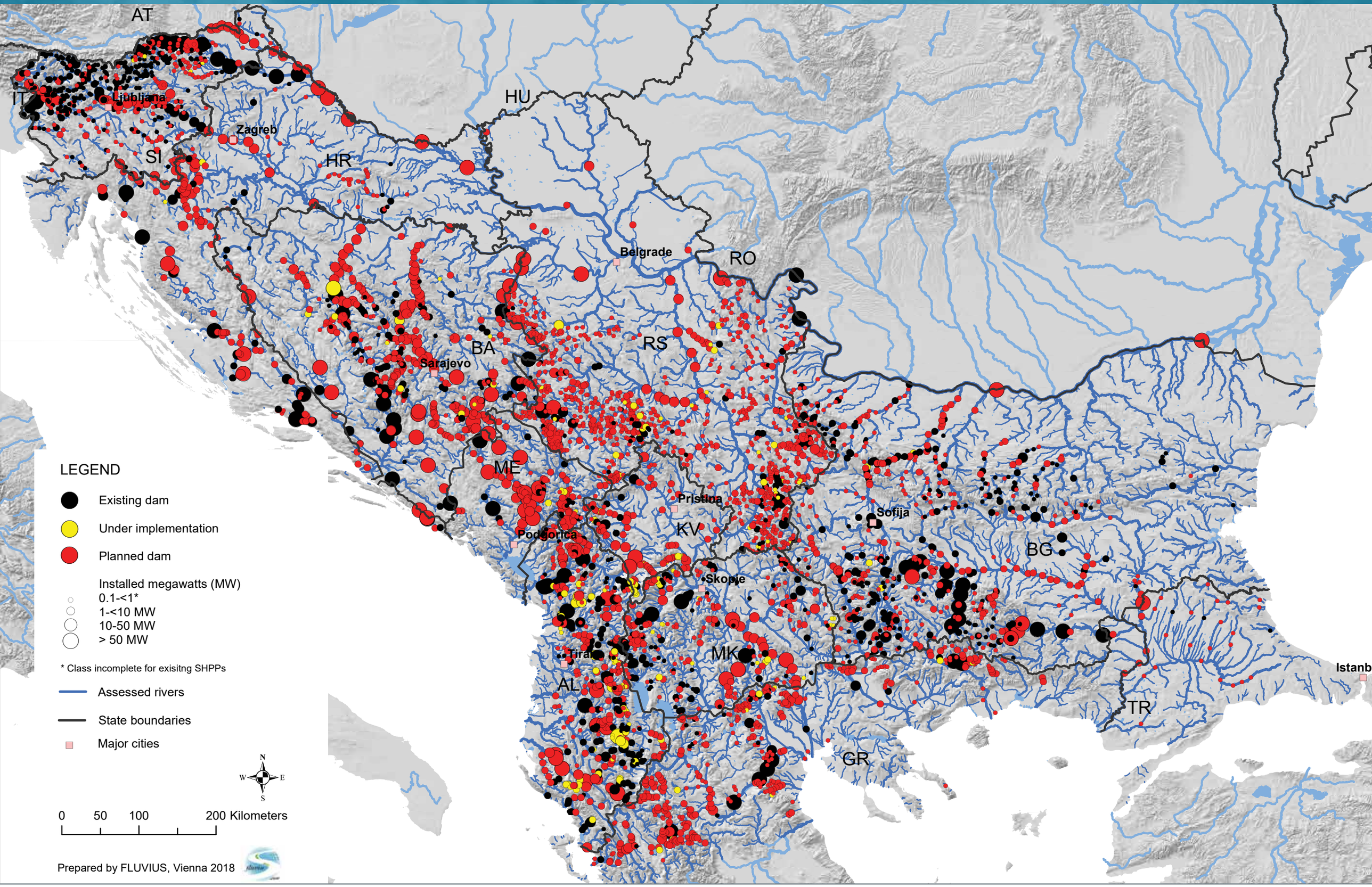



Figure 2: Conservation Status of European freshwater species and habitats. Source: State of Nature in the EU, European Environment Agency 2015

# Map 3: Overview of hydropower plants in the Balkans showing almost 3,000 projects either proposed or already under construction.



Example of impact of recent hydropower development in the Balkans: Devoll River, Albania. Photos show intact river in 2009 (left) and dammed river in 2017 (right). Images: 2009 data – copyright Google/DigitalGlobe. 2017 data – copyright Google, CNES / Airbus

Example of impact of recent hydropower development in the Balkans: Black Drin River, Albania. Photos show flowing river in 2013 (left) and diverted/dried out river in 2017 (right).
Images: 2013 data – copyright Google/DigitalGlobe. 2017 data – copyright Google, CNES / Airbus

# Balkan Freshwater Fish and Molluscs in Numbers

**113**
**FISH SPECIES**
listed in one of the three IUCN threat categories and/or listed in one or more of the annexes of the European Habitats Directive or Bern Convention.

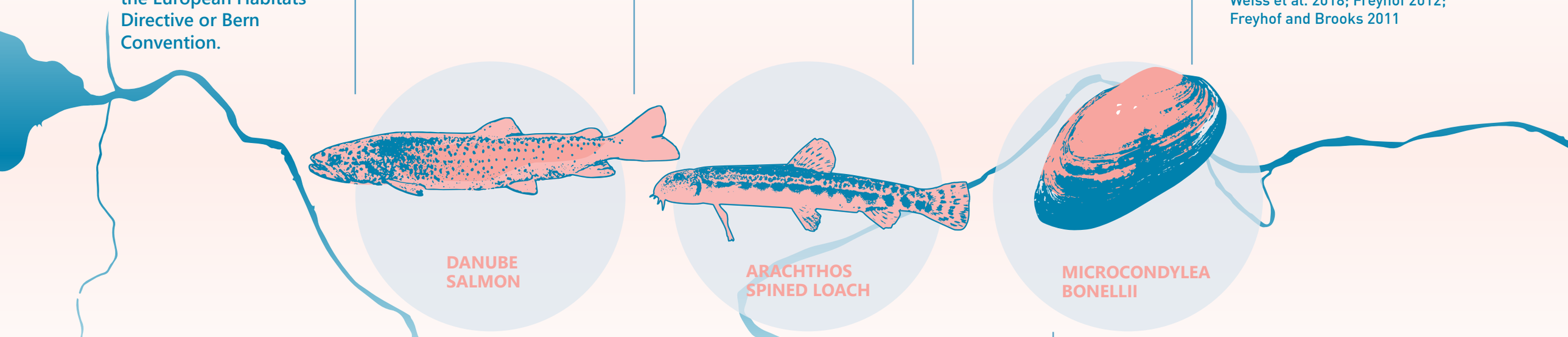
**69**
**ENDEMIC FISH SPECIES ARE FOUND HERE**
and nowhere else on the planet, making it one of the highest concentrations of endemic fish species in Europe.

**28%**
**OF EUROPE'S ENDANGERED FISH SPECIES ARE FOUND HERE**

**40%**
**OF EUROPE'S ENDANGERED MOLLUSC SPECIES ARE FOUND HERE**
making the Balkans a hotspot for threatened molluscs which are highly vulnerable to hydropower development.

**FRESHWATER FISH AND MOLLUSCS**
are the two most threatened taxonomic groups in Europe.

Figure 3: The importance of fish and molluscs in numbers. Source: Weiss et al. 2018; Freyhof 2012; Freyhof and Brooks 2011




# IF DAMS ARE BUILT:

**49**
**FISH SPECIES**
are faced with either the threat of extinction or loss of between 50 and 100% of their Balkan distribution, 11 of these are endemic so will be globally extinct.

**APPROXIMATELY 10%**
of all of Europe's freshwater fish species are threatened by Balkan dams. (There are around 500 freshwater fish species in Europe).

**108 OUT OF 113**
fish species would become either extinct or assigned to a threat category.

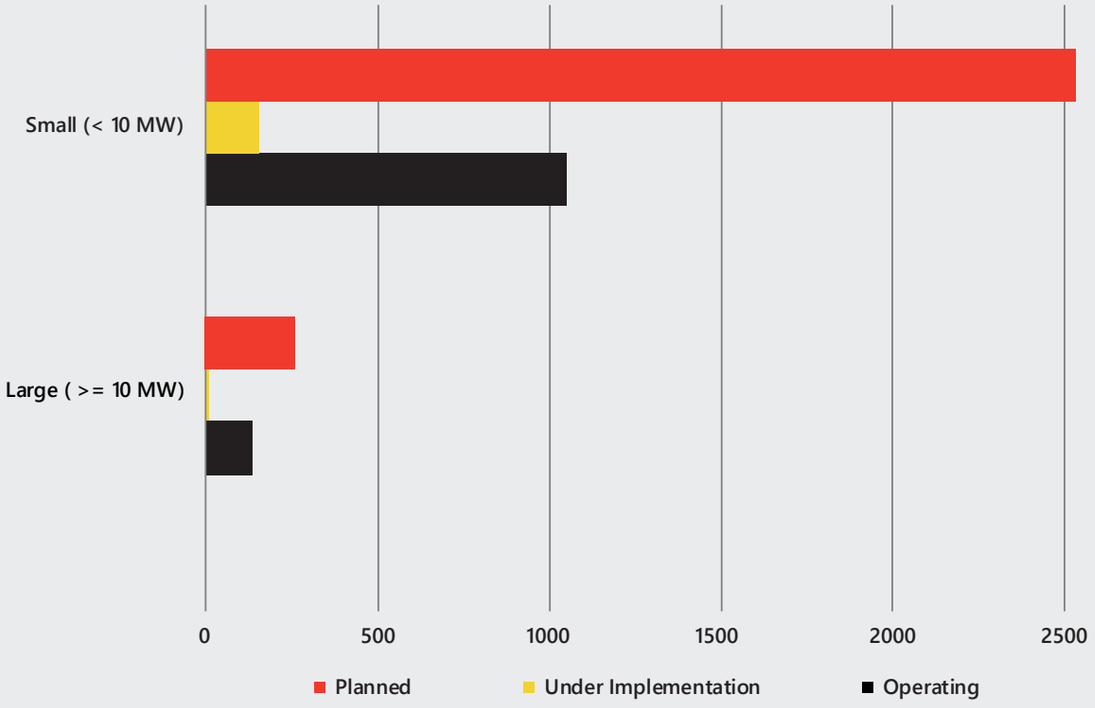



Figure 4: Hydropower plants by size and operational status. Source: FLUVIUS, 2017

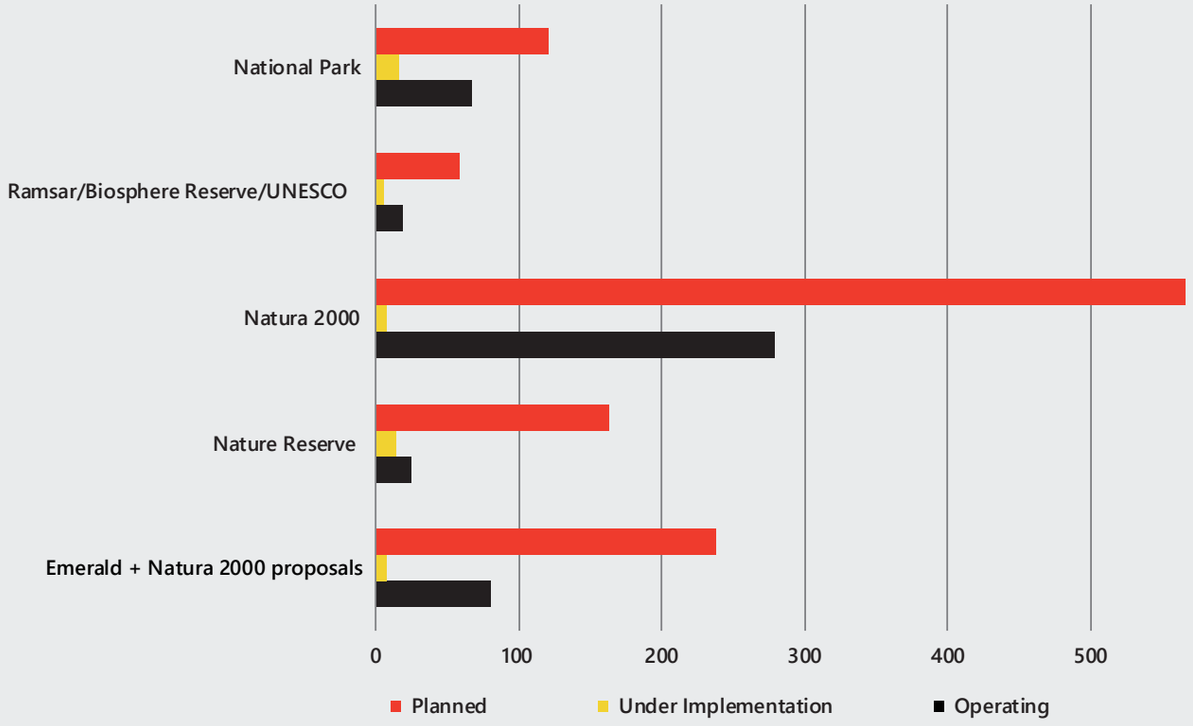



Figure 5: The number of hydropower plants by operational status within protected areas. Source: FLUVIUS, 2017

Environmental impact assessments have not been carried out competently or comprehensively in the Balkans (Nelson 2015), with natural values and biodiversity consequently not been properly assessed and considered. Data and text has even been copied and pasted from other areas, completely ignoring the natural values of the area in which the dam will actually be built. The outcome of the recent Albanian Poçem dam court case, where the Albanian Administrative Court intervened against the Albanian government's approval to build a hydropower plant on the Vjosa River, is a recent demonstration of clear legal problems with the environmental planning process for some current proposals. Public consultation is required by law, but is almost always ignored by the investors and the responsible administration and government bodies.

Inadequate data used for assessment is clearly undermining proper planning processes. In the Former Yugoslav Republic of Macedonia, for example, where an agreement exists with the European Union to adhere to EU environmental standards, breaches of key EU directives (Habitats, Birds, Water Framework, Environmental Impact Assessment and Strategic Environmental Assessment) have been identified, all within a national park (ÖKOBÜRO 2015).

## Preventing Social Conflict

Proper community consultation has been inadequate, meaning that obtaining a critical social licence for development projects is often not achieved. For example, local residents have physically blocked hydropower construction activities, a petition against hydropower plants in the region has gathered over 120,000 signatures and peaceful protests continue to be held in various Balkan countries.

Approvals for hydropower concessions can be tied to political, rather than social needs. In Albania, for example, concessions have skyrocketed during election years (Qendro 2017) (Figure 6).

This can all lead to crude political decision making, corrupted policy development, missed strategic sustainable energy policy, degraded environmental outcomes and ongoing conflict within the community. In turn, this engenders mistrust in the political process and provokes further opposition to energy projects.

Community outrage is the result of bad planning and corruption: in Serbia thousands of people have joined continuous protests over the plans to build 60 hydropower plants in the Stara Planina Nature Park; in Albania, protests continue to fight against the construction of dams within Valbona National Park and in Bosnia and Herzegovina, a more than year-long blockade continues to prevent construction in Kruščica.

This opposition will only grow if the attempts to promote, fund and implement the current wave of planned hydropower projects continue.

## Increasing Investor Security

Investment in infrastructure projects always carries a certain level of risk, but the opposition to hydropower investment in the Balkans is growing rapidly, increasing this risk further.

More and more hydropower projects are being legally challenged through national law suits and official complaints to the European Commission and to multilateral environmental agreements such as the Bern Convention. These legal challenges are often delaying and even stopping hydropower projects. This means that investor time, money and reputation are increasingly at risk in the Balkans.

Alternatively, national strategic energy and environmental policies and frameworks can be informed by the outcomes of this document, allowing for a more integrated approach to these key policy areas and instilling greater trust in the political process.

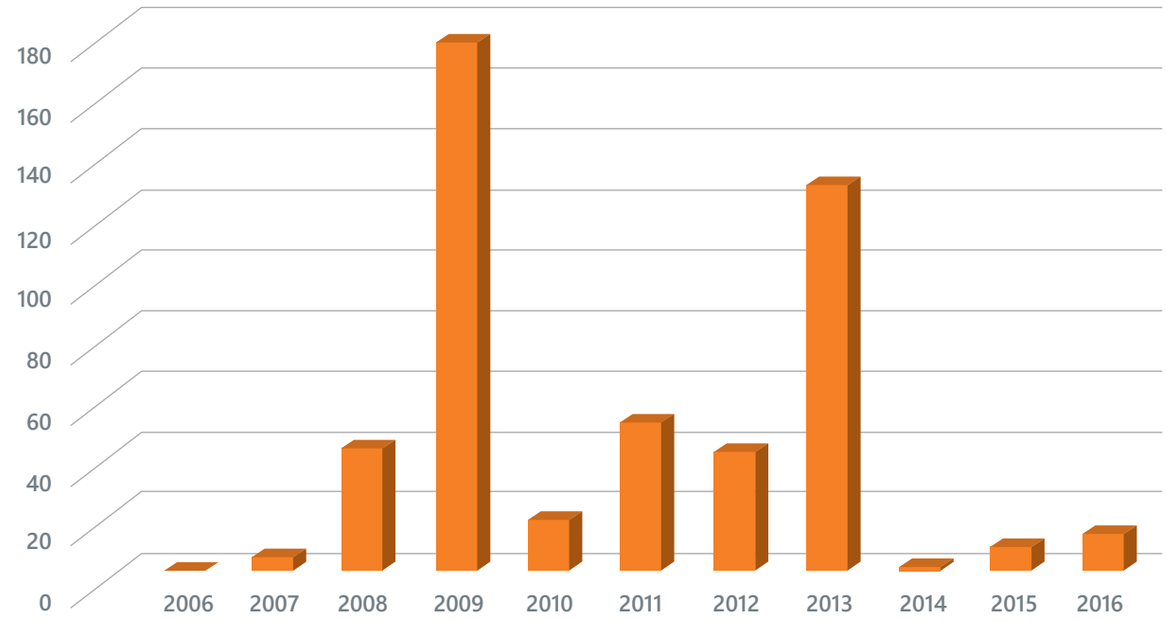



Figure 6: Number of hydropower plants approved between 2006 and 2016, with peaks during 2009 and 2013 federal election years. Source: EcoAlbania

In September 2018, thousands of Serbians gathered in Pirot to protest against plans to build 60 hydropower plants in Stara Planina Nature Park.  Photo: Miljan Andonov

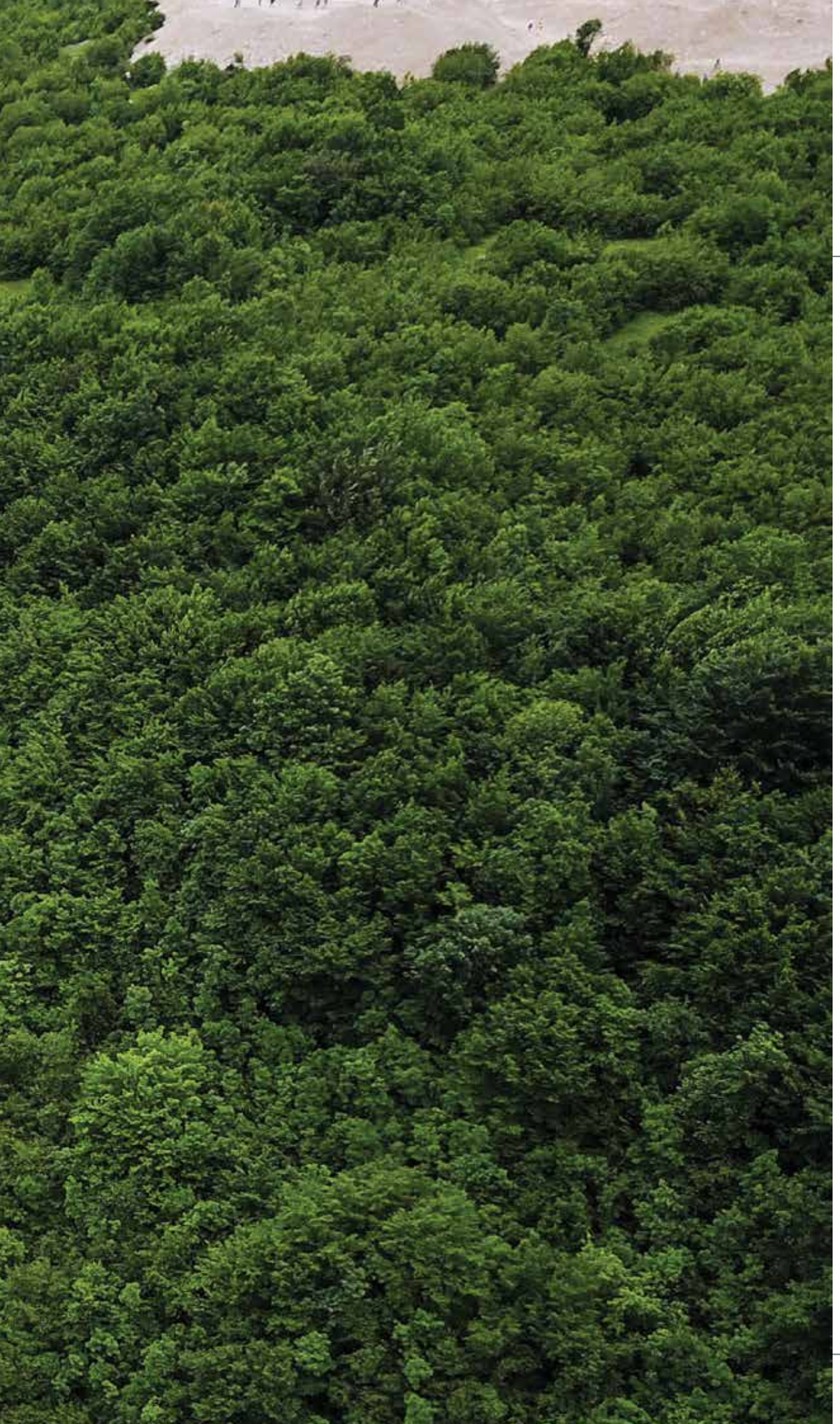
# THE BRAVE WOMEN OF KRUŠČICA

For more than a year, the Brave Women of Kruščica have stood immovable on a bridge, blocking the path of dam builders. They have built a hut to house and feed themselves, a makeshift home that protects them from the baking summer sun and bitter nights of a Balkan winter.

These women are all that stands between a free-flowing river and thousands of tonnes of concrete that would divert it. They are mothers, daughters, sisters and grandmothers who have been beaten and dragged away by riot police, only to return more determined than before.

They love this river and the families that live on it. They want to protect what nurtures them and defend it against the companies that want to dam the river and steal its flow. They are saying to the corrupt, the greedy and the powerful – this river belongs to everyone. They will not be silent, they will not be passive, they will not remove themselves from the bridge until their river, the beautiful Kruščica, is guaranteed its freedom.

Women of Kruščica. Photo: Andrew Burr



Sana River, Bosnia and Herzegovina. Construction site of Medna hydropower plant in 2017 and former huchen spawning habitat. Photo: Matic Oblak

# CRITERIA FOR *NO-GO* RIVER STRETCHES

To inform the development of *No-go* river stretches, a set of environmental criteria has been implemented across the Balkan region. These criteria capture key environmental values that are both important for biodiversity protection and can be impacted and degraded by hydropower development. The methodology of applying these criteria to define valuable river stretches is based on the European Union approach of assessing the ecological status of rivers according to the Water Framework Directive. The criteria have been mapped across the region and can exist exclusively or intersect with each other. Occurrence of any of the criteria forms a *No-go* stretch of river.

Criteria used to determine *No-go* river stretches for this Eco-Masterplan are:

- **Near-natural or only slightly modified hydromorphology**
- **Distribution of 33 key freshwater fish species**
- **Protected areas**
- **Significant wetlands such as floodplains, karst polje systems and estuaries**
- **Freshwater mussel and caddisfly species vulnerable to hydropower.**

## Hydromorphology

Hydromorphology is a scientific discipline concerned with the physical characteristics and assessment of riverine systems for channels, banks and floodplains (Schwarz 2012). For the first time, an analysis of the intactness of rivers in the Balkans has applied a consistent hydromorphology assessment to the entire network of rivers, including catchments below 500 square kilometres. The analysis, conducted by *FLUVIUS, Floodplain Ecology and River Basin Management*, has reconfirmed the outstanding values of the network of larger rivers (minimum catchment size of 500 square kilometres) following an earlier assessment in 2012 (Schwarz 2012) and has complemented this with a further analysis across a network of smaller rivers (catchment size between approximately 100 and 500 square kilometres). The total river length assessed for hydromorphology is 80,523 kilometres, including 34,850 kilometres for the larger rivers and 45,673 kilometres for smaller rivers and streams.

Using contemporary remote sensing data, ground images and expert judgement based on supplementary technical and local information for the rivers, the assessment categorises river stretches into five classes in accordance with Guidance CEN standards (CEN 2004 and 2010), effectively measuring the quality of intactness of the rivers from a status of pristine or near-natural (class 1) to a status of severely modified (class 5, which includes impoundments).

Our *No-go* criteria include all rivers with a hydromorphology class 1 (pristine/near-natural) and all rivers with a class 2 (slightly modified) where the river stretch adjoins a class 1 river stretch. The class 2 river stretches are limited to approximately 20 kilometres for the large river network and approximately 10 kilometres for the small river network, building functioning buffer stretches upstream and downstream of near pristine rivers, migration corridors along the larger rivers and around near pristine tributaries.

## Protected Areas

Protected areas, along with scientifically informed management regimes and targeted resourcing, are paramount for nature conservation. Their promotion and protection is crucial for maintaining the planet's shared natural heritage.

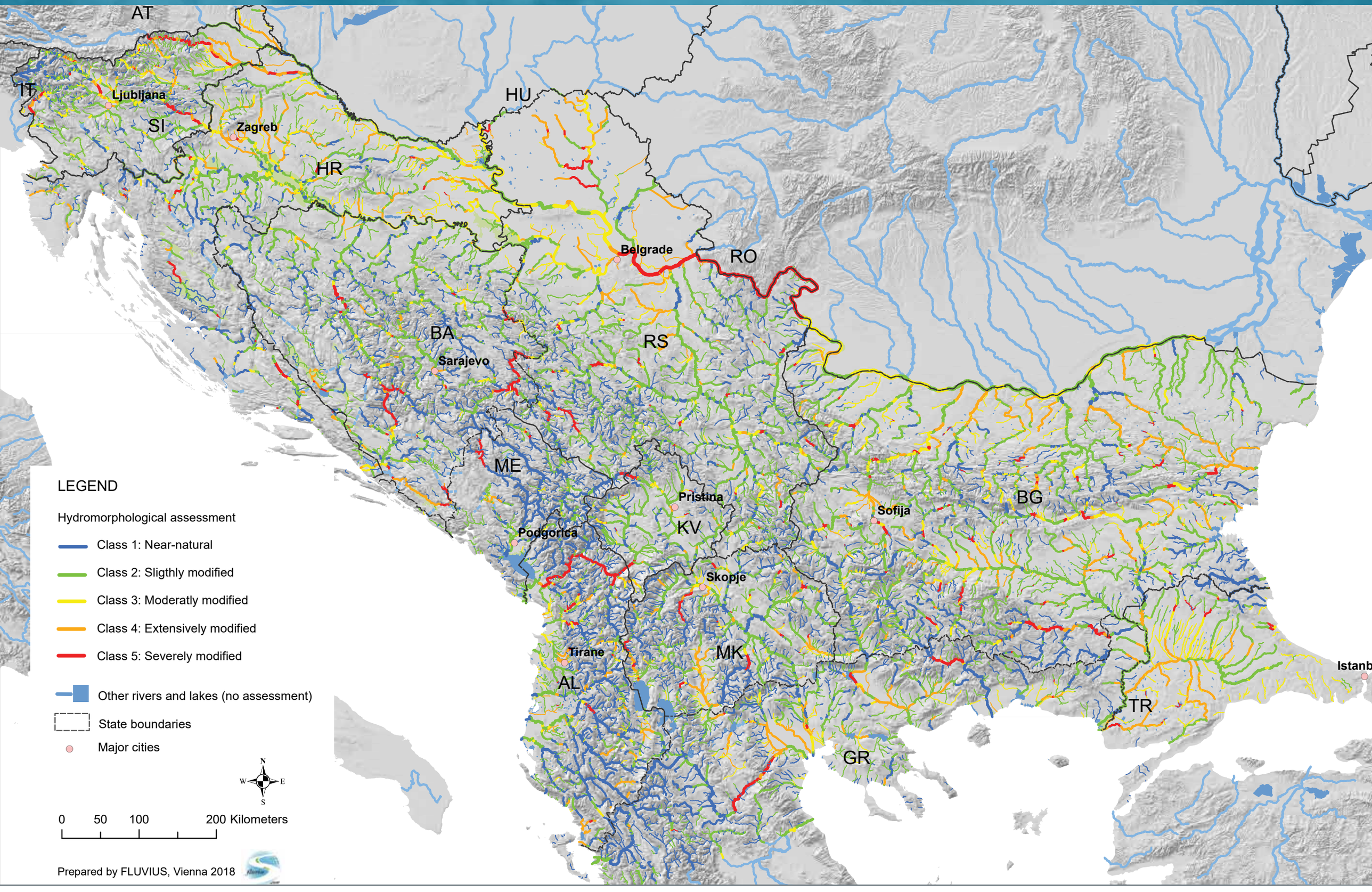
In Europe, a continent where nature has, in most places, been almost unrecognisably altered and fragmented by human hands, it is imperative that existing natural areas are protected and degraded lands restored.

The Eco-Masterplan gives equal priority to the following protected area categories and denotes all as *No-go* areas for hydropower development:

- National Parks
- Ramsar sites, Biosphere reserves and UNESCO World Heritage natural sites
- Natura 2000 areas (for EU member countries)
- Strictly Protected sites, including Nature Reserves and Nature Parks (mostly for non-EU countries)
- Emerald sites and proposed Natura 2000 sites (for non-EU countries).

Although each of these categories may have different conservation management priorities and approaches, the predominant goal of all of them is nature protection. The State of Nature in the EU review of nature protection in Europe (European Environment Agency 2015) found

# Map 4: Hydromorphological status of Balkan rivers in 2018 (rivers with catchment size > 100 km$^2$).

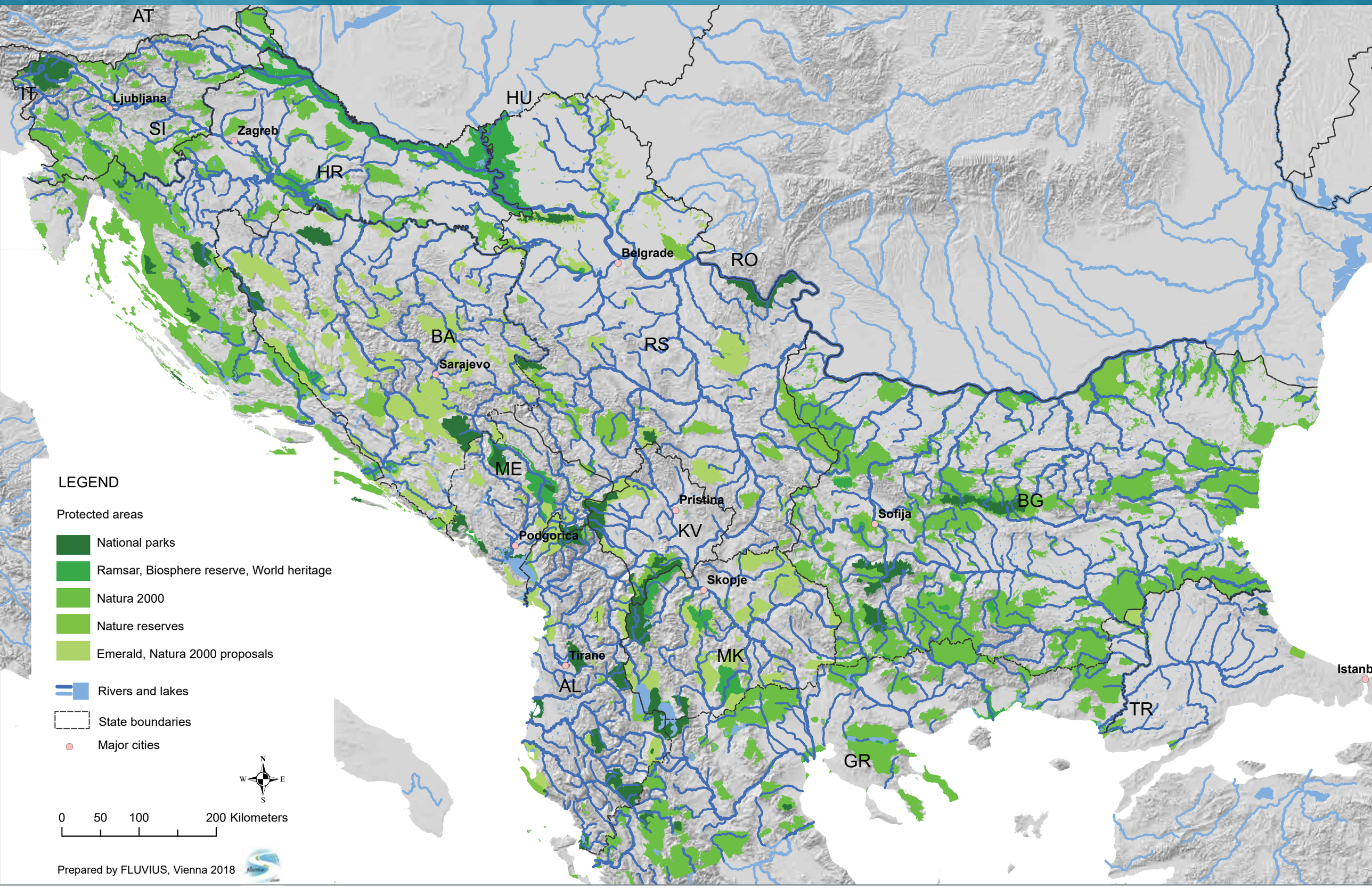


The Shushica River in Albania, a good example of pristine/near-natural hydromorphology (class 1). Photo: Lukas Thuile Bistarelli

Hydropower development in Valbona National Park, Albania. Photo: Mirjan Aliaj

that even though there is ongoing decline of natural values, habitats and species are faring better within Natura 2000 sites than outside sites. The report noted that Natura 2000 sites, which make up the largest portion of *No-go* river stretches of all protected area categories in the Balkans, are under continuous pressures that threaten biodiversity and suffer inadequate implementation of proper protection measures. Their inclusion here is a step to addressing this noted concern.

# Map 5: Protected areas of the Balkans.



The Dalmatian minnow, living only in the Cikola River, Croatia, is threatened with extinction from planned hydropower plants.
Photo: Perica Mustavic

## Key Fish Species

The huchen, or Danube Salmon, is a big fish. It is only found in the Danube Basin and survives in long lengths of cool, fast flowing oxygen rich rivers. In the Balkans, the huchen is at home, where around 1,800 kilometres of rivers provide for healthy self-sustaining populations of this important indicator species (Freyhof et al. 2015).

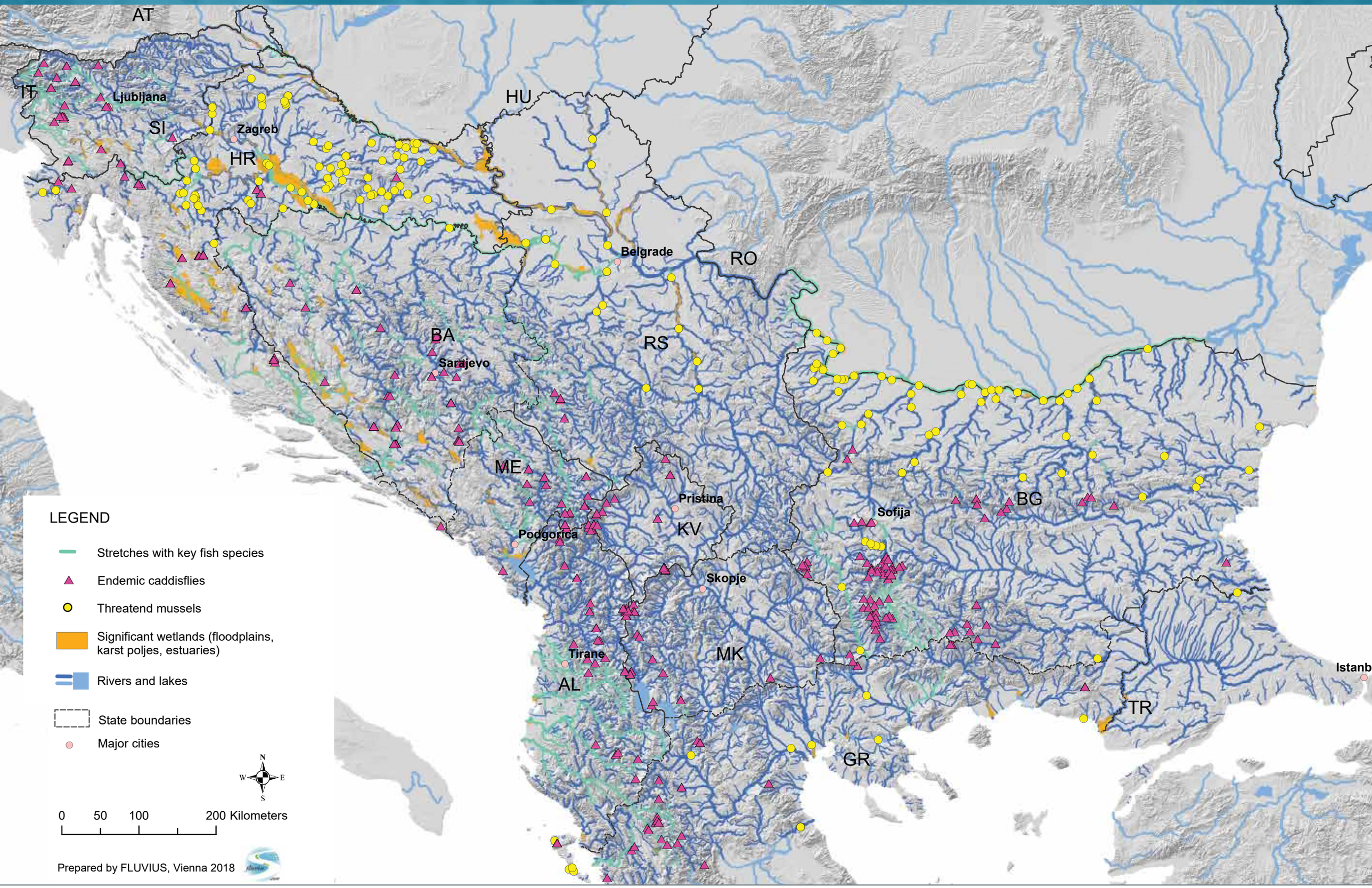
The dire situation of the huchen shines a blinding spotlight on what is wrong with plans for hydropower plants in the Balkans. Two-thirds of its former range in Europe have already been decimated, it is endangered, it is highly susceptible to the building of hydropower plants and yet, in the Balkans, around 90 hydropower plants are planned on identified stretches of river where huchen thrive. If these are all to be built, it is estimated that 70% of populations would be lost (Freyhof et al. 2015). The huchen is supposed to be protected by the EU's Habitats Directive and the Bern Convention, and yet these threatening hydropower plants are actively planned and promoted on rivers that are its last line of defence against a slide to extinction. The Dalmation minnow (*Phoxinellus dalmaticus*) and the Dalmatian spined loach (*Cobitis dalmatina*), both endemic to the Balkans, are at risk of extinction if current hydropower plans go ahead.

| Species | IUCN | Bern Convention Annexes | EUR-HAB-DIR | Hydropower Sensitivity | Balkan Dam Threat |
|---|---|---|---|---|---|
| *Acipenser gueldenstaedtii* | CR | II | V | Very High | High |
| *Acipenser stellatus* | CR | III | V | Very High | High |
| *Alburnus sava* | EN | III | II | Very High | Very High |
| *Aulopyge huegelii* | EN | | II | Moderate-to-High | Very High |
| *Chondrostoma knerii* | VU | III | II | Very High | High |
| *Chondrostoma phoxinus* | EN | III | II | Low-to-Moderate | Moderate |
| *Cobitis arachthosensis* | EN | III | II | Moderate | Moderate-to-High |
| *Cobitis dalmatina* | VU | III | II | Moderate | High-to-Very High |
| *Cobitis hellenica* | EN | III | II | Moderate | Very High |
| *Cobitis illyrica* | CR | III | II | Moderate | Moderate-to-High |
| *Cobitis jadovaensis* | CR | III | II | Moderate | High |
| *Cobitis illyrica* | CR | III | II | Moderate | Moderate-to-High |
| *Cottus haemusi* | NE | | | Very High | Very High |
| *Delminichthys jadovensis* | CR | III | II | Very High | Very High |
| *Delminichthys krbavensis* | CR | III | II | Very High | High |
| *Eudontomyzon hellenicus* | CR | III | II | Very High | High |
| *Hucho hucho* | EN | III | II,V | High | High |
| *Huso huso* | CR | II, III | V | Very High | High |
| *Oxynoemacheilus pindus* | VU | | | Very High | High |
| *Pelasgus epiroticus* | CR | | II | Low* | High |
| *Phoxinellus dalmaticus* | CR | | II | High | Very High |
| *Phoxinus strymonicus* | EN | | II | Very High | Very High |
| *Salmo marmoratus* | LC | | II | High | High |
| *Salmo obtusirostris* | EN | | II | High | Very High |
| *Salmo peristericus* | EN | | II | Very High | Very High |
| *Telestes dabar* | NE | | II | Very High | High |
| *Telestes fontinalis* | CR | | II | Very High | High |
| *Telestes karsticus* | CR | | II | Very High | Moderate-to-High |
| *Telestes polylepis* | CR | III | | Very High | High |
| *Telestes turskyi* | CR | III | | High | High |
| *Telestes ukliva* | EX* | | | High | Very High |
| *Umbra krameri* | VU | II | II | Very High | High |
| *Valencia letourneuxi* | CR | | II | High | Moderate-to-High |

Figure 7: List of 33 key freshwater fish species used for criteria for *No-go* river stretches.

* Although this species has not been impacted by hydropower to date, it is facing potential extinction from three new hydropower plants on Lake Pamvotis (Weiss et al. 2018).

# Map 6: Key fish species, caddisfly and freshwater mussel habitats and significant wetland systems used for *No-go* criteria.



The caddisfly, *Rhyacophila diakoftensis*, is one of the key species found in the Vjosa River, Albania. Photo: Wolfram Graf

The known distribution of the huchen, the Dalmatian minnow and the Dalmatian spined loach, along with 30 other key threatened freshwater fish species has been chosen as a critical criterion for the development of *No-go* river stretches where hydropower development should not take place. These 33 species of fish (Figure 7) have been chosen due to their endemic status in the region, their high level of extinction risk or their susceptibility to the threat of planned hydropower development. Detailed habitat distributions across the entire Balkan region (Weiss et al. 2018) have been used to delineate *No-go* river stretches because of the potential for catastrophic impacts on endangered fish species, some of which are micro-endemic and therefore threatened with extinction by a single hydropower plant.

## Caddisflies

Caddisflies are a quite species-rich insect order with about 1,700 described species in Europe (Neu et al. 2018). With few exceptions the larvae live in various types of water bodies while the adults are terrestrial. Ecologically caddisflies are highly diverse in habitat utilisation mostly due to their ability to spin silk like their sister group, the butterflies. These species-specific habitat preferences make this order of aquatic insects a powerful tool within the framework of water quality assessment. Because of their narrow niches and high sensitivity caddisflies react ideally to different kinds of habitat degradation like pollution or hydromorphological changes and they are therefore effective bioindicators applied on an international scale.

As far as is known today, 213 species are endemic to the Balkans, many restricted to a single mountain range or even to a unique stream. Among these micro-endemics, most are characteristic elements of springs and upper streams at higher elevations. These areas are especially susceptive to anthropogenic disturbances like hydropower plant developments and operation acts among others. As the ecological needs of these organisms are not entirely explored, it is assumed that any physical changes of their environment can lead to strong population losses or – in the case of micro-endemic species – even their world-wide extinction.

Caddisfly data was gathered within the BioFresh research project, funded by the EU from 2010 to 2014.

## Freshwater Mussels

Freshwater mussels belong to the most threatened animal group in the world with extinction of mollusc numbers the highest of all documented taxonomic groups (Johnson et al. 2013, Cummings et al. 2016). Among their main threats are habitat loss, fragmentation and degradation, introduction of invasive species and loss of fish hosts (Lopes-Lima et al. 2017), all of which are exacerbated by hydropower development which can cause major changes to river hydrology, channel hydromorphology and water. The Balkan rivers, where 40% of Europe's

Softmouth trout release after tagging. Photo: Arne Hodalič

endangered freshwater mollusc species are found, are a hotspot for the species (Freyhof 2012). 70% of these endangered mollusc species are highly susceptible to hydropower development due to habitat alteration and alien species invasion (Freyhof 2012). Scientific analysis and understanding of mollusc distribution and taxonomy is incomplete in Europe, with new species still being discovered, including in Balkan rivers.

Often described as ecosystem engineers, freshwater mussels (unionoida) are a critical component of freshwater systems and their presence and status is a key indicator of river health (Cummings et al. 2016). An individual mussel can filter up to 40 litres of water in a single day (Tankersley and Dimock 1993), making them an incredibly important species for water purification and other direct ecosystem services. As both distribution and taxonomic understanding of mussels are incomplete in the

The endangered freshwater mussel, *Unio crassus*. Photo: Shutterstock/Jiri Prochazka

Balkans and research continues, a small subset of freshwater mussel species has been chosen for this criterion. All three are considered to have low resistance to hydropower development and are globally endangered (Freyhof 2012; Lopes-Lima 2018 personal communications):

- *Microcondylea bonellii*
- *Potomida acornanica*
- *Unio crassus*

## Significant Wetland Systems

Wetlands are highly productive ecosystems that have a range of critical functions, including biodiversity protection, water storage, purification and supply, flood and erosion control, nutrient provision and recycling, carbon storage, food production and a myriad of recreational activities. In Europe, two-thirds of wetlands that existed 100 years ago are now gone (European Commission 1995). Remaining, intact wetlands are a natural asset that is highly susceptible to hydropower development.

Two hundred and eight wetland areas, including floodplains and karst polje systems, covering an area of 9,976 square kilometres have been included as a key supporting criterion. All are important flood retention areas and would be significantly impacted by the building of hydropower plants, hence reducing natural flood protection systems.

Sava River floodplain at Odransko Polje, Croatia. Photo: Goran Šafarek

# RESULTS – *NO-GO* RIVER STRETCHES

Applying the criteria to the assessed Balkan rivers network gives a clear picture that a significant percentage of the rivers contains high conservation values. Of the total river length of 80,523 kilometres, 61,033 kilometres of river are considered *No-go* river stretches, representing 76% of the total river network length (Map 7).

Figure 8 breaks this down, showing the length of *No-go* river stretches included within a certain criterion, sorted in decreasing order of impact of a particular criterion. It is important to note that these figures overlap and interact with each other, so the individual figures for each criterion are not exclusive of others. The figures make clear, however, that the criterion with the largest impact on extent of *No-go* river stretches is hydromorphology and that with the smallest impact is caddisflies.

The observation that hydromorphology criterion represents the largest contribution to overall *No-go* river stretches is not surprising given the results of the latest FLUVIUS hydromorphology assessment of Balkan rivers. The assessment demonstrates that in the Balkans, a very high portion (78%) of rivers fall in class 1 (pristine/near-natural) or class 2 (slightly modified) (Figure 9). This stands in stark contrast with other parts of Europe and highlights the high conversation value of Balkan rivers.

However, this contemporary analysis also shows a degradation of hydromorphology quality since the earlier study. Approximately 1,600 km or 16% of class 1 rivers have been lost since the 2012 study (based on 2008 data), representing a significant degradation in the highest quality

| Criterion | *No-go* River Stretches (km) |
|---|---|
| Hydromorphology | 46,585 |
| Protected Areas | 30,724 |
| Key Fish Species | 8,315 |
| Significant Wetland Systems | 5,452 |
| Freshwater Mussels | 1,330 |
| Caddisflies | 697 |

Figure 8: Impact of each criterion on *No-go* river stretch lengths (km). Note: these figures are not mutually exclusive of each other. For example, within the 46,585 km of hydromorphology there are also river lengths covered by other criteria.

rivers. This figure equates to 5% of the entire large river network (the small river network was not assessed in the 2012 report). Although difficult to absolutely quantify, the construction of hydropower plants in the Balkans has substantially contributed to this decline.

The impact on current planned hydropower plants is obviously significant. Figure 10 shows that of the 2,790 projected hydropower plants, 2,497 are planned within *No-go* stretches and thus should not be built. This does not mean that support for the remaining 293 plants is unconditional. Our criteria have used the most contemporary datasets, but these are dynamic and other important values are still being discovered. No hydropower plant should be built without full consideration of the impacts on nature and a comprehensive analysis of alternative renewable energy solutions.

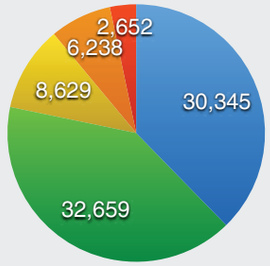
A large number of existing operational hydropower plants operate within the *No-go* river stretches. This is because plants have been built without proper planning and consideration for environmental values, and have been built within protected areas, including in national parks.

The *No-go* stretches should now prevent this from occurring in the future. They represent an opportunity to recalibrate and revolutionise future energy and electricity planning in the Balkans. A large percentage of river protection in the Balkans is not without justification – the values still exist and have been largely lost from so many other regions in Europe and around the world.

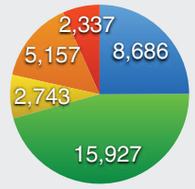
| | River Stretches (km) | HPPs | Number of projected HPPs by installed capacity (MW) | | | |
|---|---|---|---|---|---|---|
| | | | 0.1 - < 1 | 1 - < 10 | 10 - < 50 | > 50 |
| Total assessed | 80,523 | 2,790 | 1648 | 881 | 192 | 69 |
| - *No-go* | 61,033 | 2,497 | 1421 | 827 | 184 | 65 |
| - Non *No-go* | 19,491 | 293 | 227 | 54 | 8 | 4 |

Figure 10. Impact of *No-go* stretches on projected hydropower plants (HPPs).

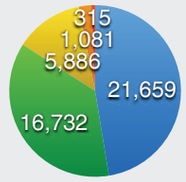
NETWORKS OF LARGE AND SMALL RIVERS COMBINED (KM)




NETWORK OF LARGE RIVERS (KM)




NETWORK OF SMALL RIVERS (KM)




Class 1 – pristine/near-natural

Class 2 – slightly modified

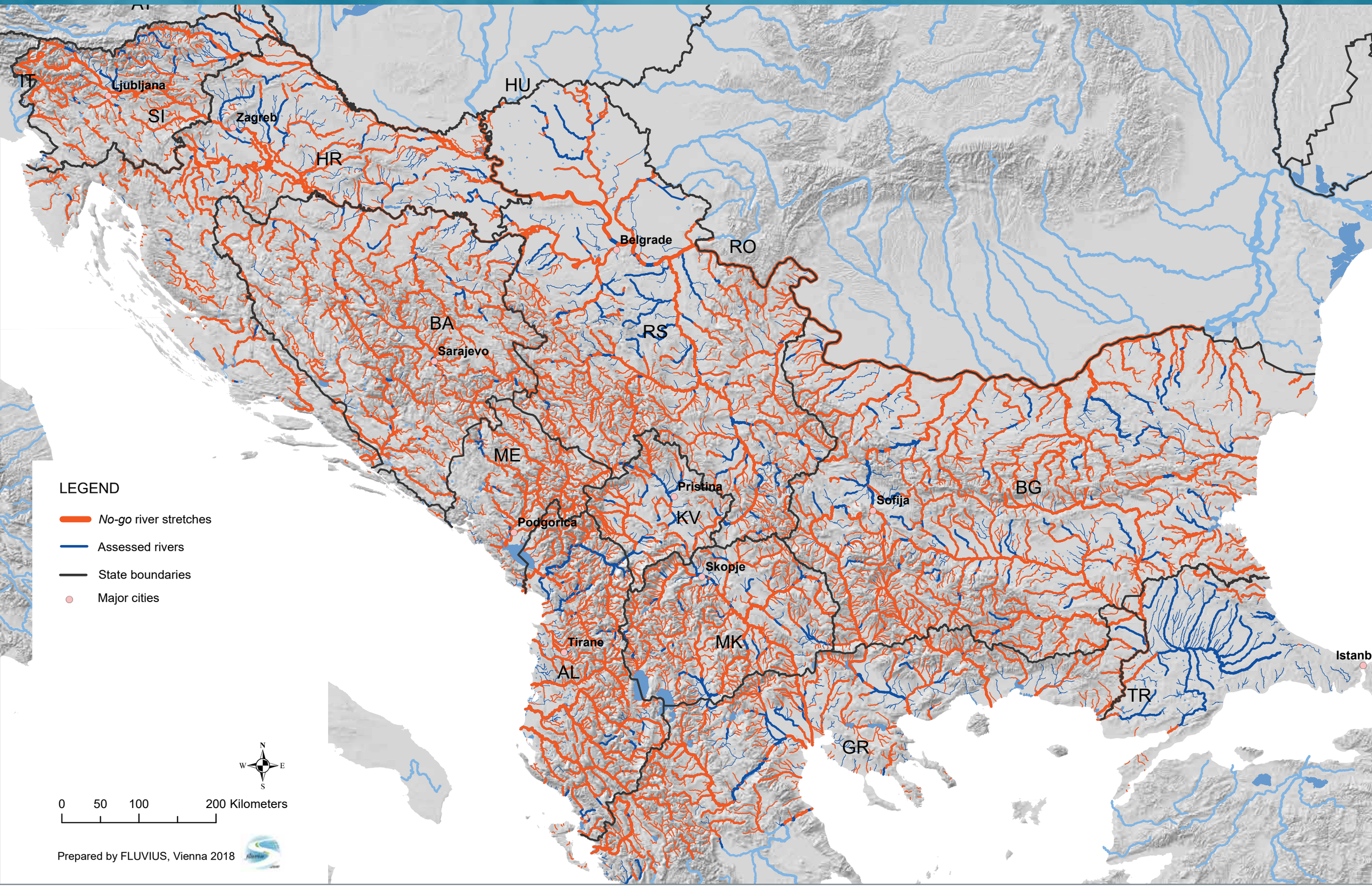
Class 3 – moderately modified

Class 4 – extensively modified

Class 5 – severely modified/impounded

Figure 9: Large chart at top: Hydromorphology class assessment of both the network or large and small rivers of the Balkans, covering a length of 80,523 km. This data is geographically represented in Map 4. Smaller charts below: Hydromorphology results broken into the networks of large rivers (catchment size > 500 km$^2$) totalling 34,850 km and small rivers (catchment size between 100 and 500 km$^2$) totalling 45,673 km. Besides the extraordinary value of the overall river network (78% in class 1 or 2), one of the most significant results of the assessment is that even for the larger rivers, the hydromorphological value is outstanding with 71% of rivers having pristine/near-natural or only slightly modified classes.

# Map 7: *No-go* river stretches based on criteria.



# SMALL SCALE, LARGE IMPACT

To the casual observer, small hydropower plants – usually defined as having an installed capacity of 10 MW or less – may seem more benign than larger plants. Unfortunately, small hydropower punches above its weight in terms of its impact on river systems. Although research is relatively immature, existing studies demonstrate that the total impacts of small plants on fragile natural river systems can be equivalent to, or even greater than, large dams (Kibler and Tullos 2013). While larger river basins have been subjected to degradation from hydropower development for over a century, more sensitive, intact upper reaches of water catchments have been relatively less impacted. They remain sanctuaries for freshwater river biodiversity, but here in the Balkans they are targeted by small hydropower dams and diversions.

## Cumulative Impacts Add Up

Small hydropower plants produce small amounts of electricity, so often many of them are built in series, or cascades, along river stretches. The impacts on river ecology, particularly on species that move up and down rivers are cumulative, meaning that a true understanding of the impacts on natural systems must be considered in the broader context of the total impact of all associated projects, not just in isolation of a single dam or diversion. With many small hydropower projects not being subjected to environmental assessment processes, this cumulative impact is often not even measured in the first place (Nelson 2015). Mitigation efforts are therefore either absent or grossly inadequate, leading to clear and direct degradation of natural river values.

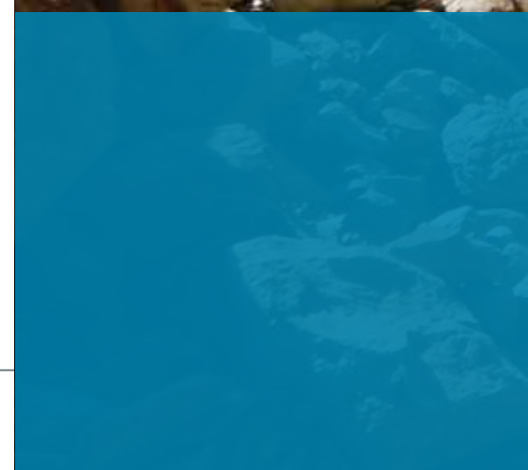
## Small Hydropower Plants are Inefficient

The contribution of small scale hydropower plants to overall electricity generation can be very small and unjustified based on their respective environmental costs. In the Danube basin, for example, hydropower plants with a capacity of less than 1 MW make up 90% of all hydropower plants by number, but contribute less than 4% of electricity generated (ICPDR 2013). Similarly, in the European Alps, small hydropower plants represent 75% of all hydropower plants by number, but contribute less than 5% of overall electricity production (European Environment Agency 2012). In Germany, hydropower contributed only 0.5% of the total energy mix in 2017 (Federal Ministry for Economics and Affaires 2018). Approximately 7,300 small hydropower plants (< 10MW) make up 90% of all German hydropower plants by number but contribute only 12% of hydropower electricity generation (Kampa 2011). Therefore, within the total energy mix, this equates to only around 0.06% of Germany's energy demand. With the associated damage of these 7,300 plants being almost immeasurable, it is simply nonsensical to attempt to repeat this scenario in the Balkans, where a vastly higher percentage of natural river values are still intact.

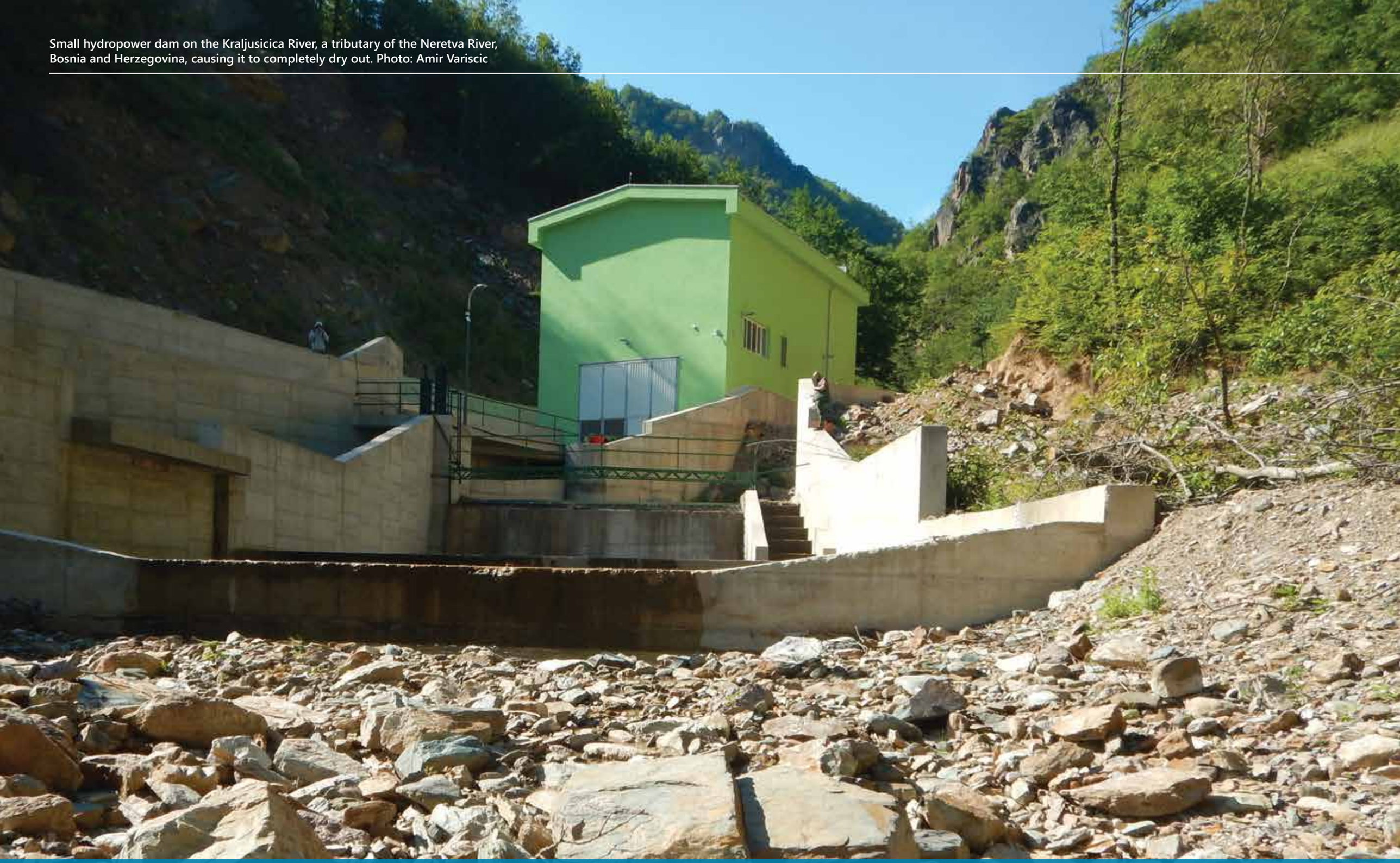
## Impacts Beyond the River

Hydropower, whether large or small, only works if it is plugged in. Particularly in remote areas, the impact of hydropower is felt well beyond the river system. Forests are lost as roads, pipelines and electricity pylons are built, often degrading swathes of wild and natural areas, fragmenting once intact ecosystems and intruding into nature. The importance of roadless areas to both humans and nature is well documented (Selva et al. 2011). They are critical in the face of climate change as they are more resilient to pest disease, drought and fire than roaded areas. They provide a suite of ecosystem services and their protection is key to biodiversity conservation in an increasingly fragmented world. Small hydropower cuts incisions into these important areas with impacts that are irreversible.

Small scale hydropower makes neither environmental nor economic sense. It causes immense damage to nature and inflames social conflict whilst providing a disproportionately tiny amount of electricity of a country's overall energy needs.



Small hydropower dam on the Kraljusicica River, a tributary of the Neretva River, Bosnia and Herzegovina, causing it to completely dry out. Photo: Amir Variscic



**""[...]the contribution of small hydropower plants (of a capacity below 10 MW) to the global energy production is extremely limited while their impacts on the environment are disproportionately severe. The 390 small hydropower plants currently in operation in the Western Balkans 6 region represent almost 90% of all hydropower plants in number while only producing 3% of the total hydropower generation."**

Source: EU Directorate-General for Neighbourhood and Enlargement Negotiations (DG NEAR) in draft document on Western Balkan 6 non-EU countries, 2018.commissioned by the European Commission.

# BULGARIAN RESISTANCE TO HYDROPOWER

BY DIMITER KOUMANOV, BALKANKA ASSOCIATION

The detrimental impacts of both large and small scale hydropower development are extremely severe in Bulgaria. Four large and about a dozen small old cascades with derivation channels from former socialist times are operating with an impact on at least 500 water catchments of small rivers and streams, located mainly within the boundaries of Natura 2000 sites and even in the national parks. About 70 old and 170 newer individual small HPPs are currently in operation – with most of the newer projects approved and built during the last 15 years.

Small hydropower plants with less than 10 MW installed capacity contribute only about 1% of Bulgaria's overall electricity production per year if the legal requirements on environmental flows are complied with. The best spots for hydropower, regardless of whether they are large or small plants, have been occupied already. It is not justified to kill the rest of the rivers that still remain intact for producing no more than the additional 0.5% of the overall electricity supply.

In letters of formal notice to the state environmental authorities a group of the most reputable Bulgarian scientific institutions have officially shared their concerns, stating that hydropower causes devastating impacts as it currently functions in Bulgaria. The same concerns are confirmed by the National Chamber of Engineers and by different scientists in the Appropriate Assessment of the 2010-2015 River Basement Management Plans as well. Even the European Commission has opened an infringement procedure against Bulgaria over the lack of proper assessments and many other infringements of the EU law concerning environmental protection in the Natura 2000 network, including a breach of the EU Strategic Environmental Assessment Directive and the Habitats Directive. The infringements inter alia include as well most of the hydropower activities in the country over the last 15 years.

In the past three years, Balkanka Association has lodged nine complaints with the European Commission Directorate-General for Environment (DG ENVI). These complaints allege that the EU legal framework concerning river protection has been constantly breached and that Bulgaria will not meet the EU Water Framework Directive objectives by 2027. Based on this evidence, the DG ENVI has started another pilot application which will most likely lead to an infringement procedure against Bulgaria for breach of the EU Water Framework Directive not later than the end of 2018.

Therefore, before any further hydropower development takes place in Bulgaria, nationwide strategical impact assessments must be carried out to study all the benefits and damages associated with small hydropower development in recent years in order to draw the necessary conclusions and to not repeat the same mistakes in the future.

Until then, the entire territory of the country should be considered a Hydropower *No-Go* Zone.

Full reasoned opinion on the above recommendation, including evidence and letters of formal notice to the state authorities by different organisations underpinning the recommendation, can be found at https://dams.reki.bg/uploads/Docs/Files/HYDROPOWER_BG_NO_GO.pdf

**The Banite dam on the Malka Arda River, one of several hundred small-scale hydropower plants in Bulgaria that are fuelling opposition to further hydro development in the country. Photo: Dimiter Koumanov**

# A RENEWABLE FUTURE BEYOND HYDROPOWER

To understand the implications of the *No-go* river stretches on future energy supply in the Balkan countries, a study was commissioned to determine the impact on currently planned hydropower plant capacity and current renewable energy targets, and to assess whether it was possible that forgone hydropower could be produced by other renewable energy technologies, including solar and wind power sources. The assessment, conducted by *e3 consult*, an energy consulting firm with specialist expertise in strategic energy related issues and energy industry trends, examined seven countries in the Balkans – Albania, Bosnia and Herzegovina, Bulgaria, the Former Yugoslav Republic of Macedonia, Greece, Montenegro and Serbia.

Although assessments were only made for seven countries, the results can be sensibly extrapolated to the other countries covered by this Eco-Masterplan, as they all occur in the same geographical and political region of South East Europe (SEE).

The following findings (direct excerpts in italics) are taken from the report *The role of hydropower in selected South-Eastern European countries* (Neubarth 2018). Note that the Neubarth report uses the term "exclusion zones" whereas this Eco-Masterplan uses the term "*No-go* river stretches":

- *92% of the projects and 96% of the total project capacity, are located in exclusion zones as defined by EuroNatur/ Riverwatch [....] This means that the further development of hydropower in the SEE countries would de facto be limited to the refurbishment and upgrade of existing hydropower power plants but hardly and new hydropower station would be built.*
- *About 92% of the projects are small hydropower plants below 10 MW and two third are even below 1 MW. From an economic perspective the strong focus of most countries on very small hydropower is not immediately apparent because very small hydropower projects are typically less economically attractive [....] beside possible economic issues small hydropower plants may also have disadvantages in terms of grid connection compared to large hydropower.*
- Most countries would still fail to reach their National Renewable Energy Action Plan (NREAP) targets even if all economically feasible hydropower plants were built, including in protected areas like national parks.
- *Other renewable energy sources, namely wind, solar PV and biomass, provide a huge technical potential of almost 300 TWh/a, i.e. almost twice as high as the current electricity demand of the seven countries.* The majority of this is from solar PV and wind and it equates to approximately 5 times the technical potential of hydropower in the region.
- *[...] wind, solar PV and biomass could deliver enough opportunities to accomplish the country's NREAP targets and to transform the country's electricity sectors into a post-carbon world in the long-term.*
- *Wind, solar PV and biomass could [...] also substitute projects that are located in EuroNatur/RiverWatch exclusion zones.*
- *Additionally, a stronger focus on alternative renewable technologies would make the country's generation portfolios less vulnerable to seasonal and yearly fluctuations of water runoffs, which may significantly increase in the future due to the impact of climate change on the precipitation in the region.* This relates to Montenegro but vulnerabilities relate to other countries as well.
- *[...] non-hydro technologies have seen a tremendous and partly even unexpected cost reduction in the past few years and have already achieved or will probably achieve soon cost competitiveness with hydropower and fossil fuels, respectively [...] Today average LCOEs of wind onshore*

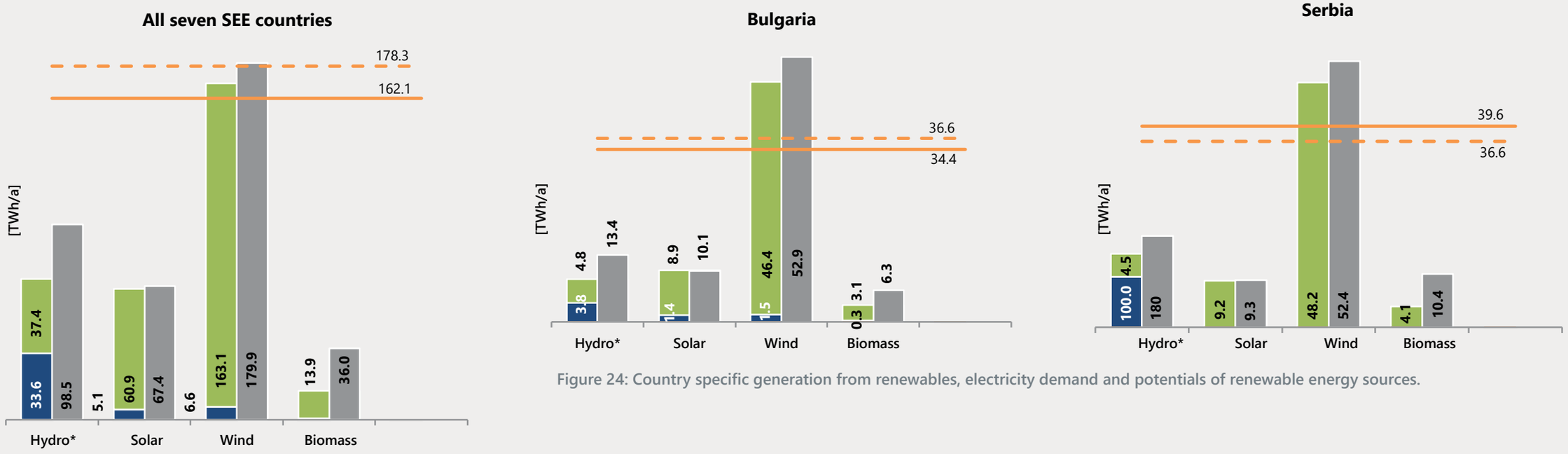



Figure 23: Generation from renewables, electricity demand and potentials of renewable energy sources for all seven SEE countries.

Source: IRENA, ENTSO-E, Dii, NREAPs of countries

Figure 24: Country specific generation from renewables, electricity demand and potentials of renewable energy sources.

All graphs taken directly from *The role of hydropower in selected South-Eastern European countries (Neubarth 2018).*

The wind and solar potential in the region is not only far bigger than hydro, it could also easily substitute the hydropower projected in *No-go* rivers. In addition, the energy analysis shows that hydro is not a solution to future energy production. Even if countries would build all dam projects that are economical feasible, their national renewable energy targets would not be met. A total switch in energy policy is needed.

Background image – Rooftop solar panels. Photo: Fotohunter/Shutterstock.com

*are already in the range of hydropower and also LCOEs of solar PV will soon catch up with hydropower if the trend continuous. In this context it should be mentioned that large-scale solar PV plants that have been brought to European markets in 2018 have already shown cost structures significantly below the average IRENA numbers for wind and solar PV.* (IRENA 2018). LCOE refers to the levelised cost of electricity and means, according to IRENA, the ratio of lifetime costs to lifetime electricity generation, discounted to a common year.

The report both raised and confirmed concerns about a singular 'renewable' focus on hydropower plants in the Balkan countries. Besides the ecological and social impacts, building the planned hydropower plants would further monopolise the energy portfolios of the seven countries. Hydropower is highly dependent on water flows and drought years have seen a significant drop in generation from actual capacity. Climate change is also expected to further impact on reliable water flows.

The report also found that in most of the countries, many planned hydropower plants were not economically viable.

The conclusion that the potential for solar and wind is enormous and underexploited is confirmed by other studies that have found the untapped potential of these alternatives. For example, it has been recognised that Albania has enormous solar and wind potential but, although the situation is dynamic, it has had no clear framework for developing them and its focus has been on hydropower only (IRENA 2017).

The *e3 consult* report makes it clear that the impact of *No-go* river stretches on planned hydropower plant capacity (whether economically sensible or not) is significant, but these impacts can be mitigated by other alternative energy sources, particularly wind and solar PV, if policies are put in place to develop them.

# RIVERS IN FOCUS

The following four critical river systems are all examples of *No-go* river stretches based on them meeting one or more of the Eco-Masterplan criteria.

## Vjosa/Aoos, Albania and Greece

A mighty river, which begins its journey as the Aoos in Greece and whose name changes in Albania, the Vjosa is a river to behold. One of the last intact river systems in all of Europe, the Vjosa flows freely for 260 kilometres from the Pindus mountains to the Adriatic sea. What makes it even more unique is that most of its tributaries are still intact. It is a sanctuary to many species that have been lost or are endangered in other parts of Europe, including the European eel, the Ohrid loach and the Pindus loach. In 2017, one insect species and one spider species new to science were discovered in just one week of scientific surveys. Many more species are yet to be discovered. Forty hydropower plants are projected on the Vjosa/Aoos River and its tributaries. The Vjosa/Aoos is a *No-go* river stretch because it meets the criteria for hydromorphology, key fish species, protected areas and significant wetland systems.

Vjosa River at Tepelene. Photo: Christian Baumgartner

## Neretva, Bosnia and Herzegovina

Neretva River above the town of Konjic. Photo: Anton Vorauer

The Neretva River, flowing from the Jabuka Mountains in Bosnia and Herzegovina to the Adriatic Sea in Croatia, is one of the most important hotspots for freshwater biodiversity in the Balkans. No less than 17 endangered fish species are found in the free-flowing stretches of the Neretva Basin, including the most significant population of the Softmouth trout. We have evidence of 12 hydropower plants projected for the the Neretva River itself and dozens more on its tributaries including the Neretvica. The free-flowing sections of the Neretva are *No-go* stretches because they contain the criteria for hydromorphology, key fish species, protected areas, significant wetland systems and caddisflies.

## Morača, Montenegro

The Morača River itself is a highlight in the Balkans, but what makes it even more unique is its connection to Lake Skadar, the largest natural lake on the Balkan peninsula. About 33 endangered fish species live in the river/lake system. Even the lake species are dependent on a functioning and free-flowing Morača. Additionally, the river provides critical nutrient flow to the lake and surrounding wetland systems which would be impacted by hydropower development. We have evidence of about 10 hydropower plants projected directly on the Morača and many more on its tributaries. The Morača is a *No-go* river because it meets the criteria for hydromorphology, key fish species, protected areas and significant wetland systems.

Morača River canyon, Montenegro.
Photo: Sergey Lyashenko

## Rivers and Streams in Stara Planina Nature Park, Serbia

The Stara Planina (Old Mountain) Nature Park, located in eastern Serbia, was established in 1997. It covers a mountainous region with a huge variety of springs, waterfalls and streams as well as rivers in deep valleys. The park is rich in biodiversity. Within this protected area, two hydropower plants have recently been built, while 58 more are planned, against the strong opposition of local communities. The rivers and streams in Stara Planina are a *No-go* because they meet the criteria for hydromorphology and protected areas.

Gornji Piljski waterfall, Stara Planina Nature Park, Serbia. Photo: Milan Simonovic

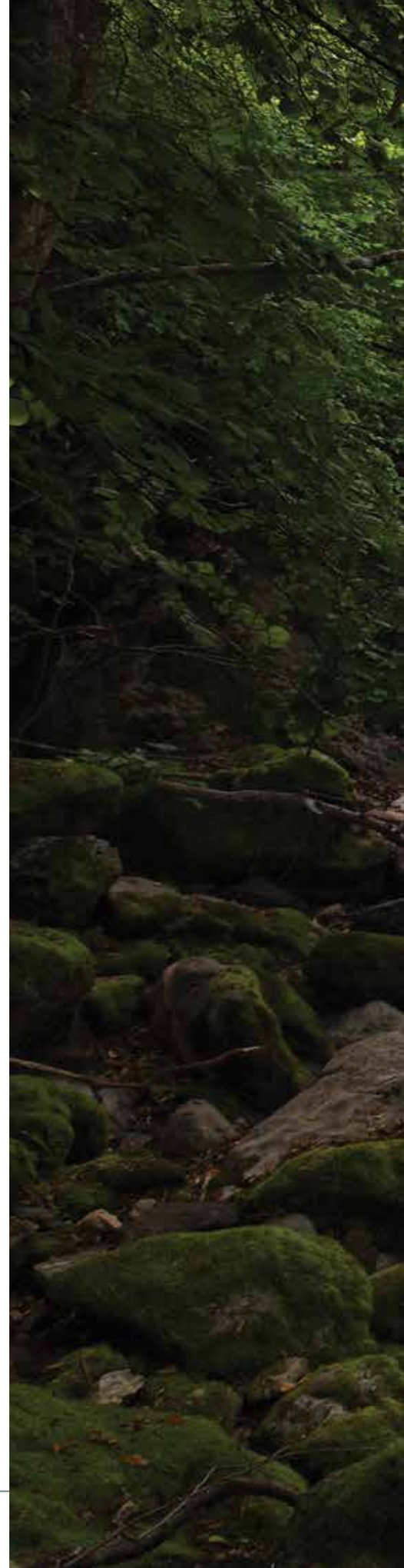
# CONCLUSION

It has become abundantly clear that the rivers of the Balkans are at a crossroads. The Eco-Masterplan has confirmed that the environmental and natural values of these rivers are extraordinary, particularly in the European context where so many freshwater ecosystems and species populations have been elsewhere lost. At the same time, however, they face a catastrophic threat from a wave of hydropower projects that, if built, would degrade and destroy these values.

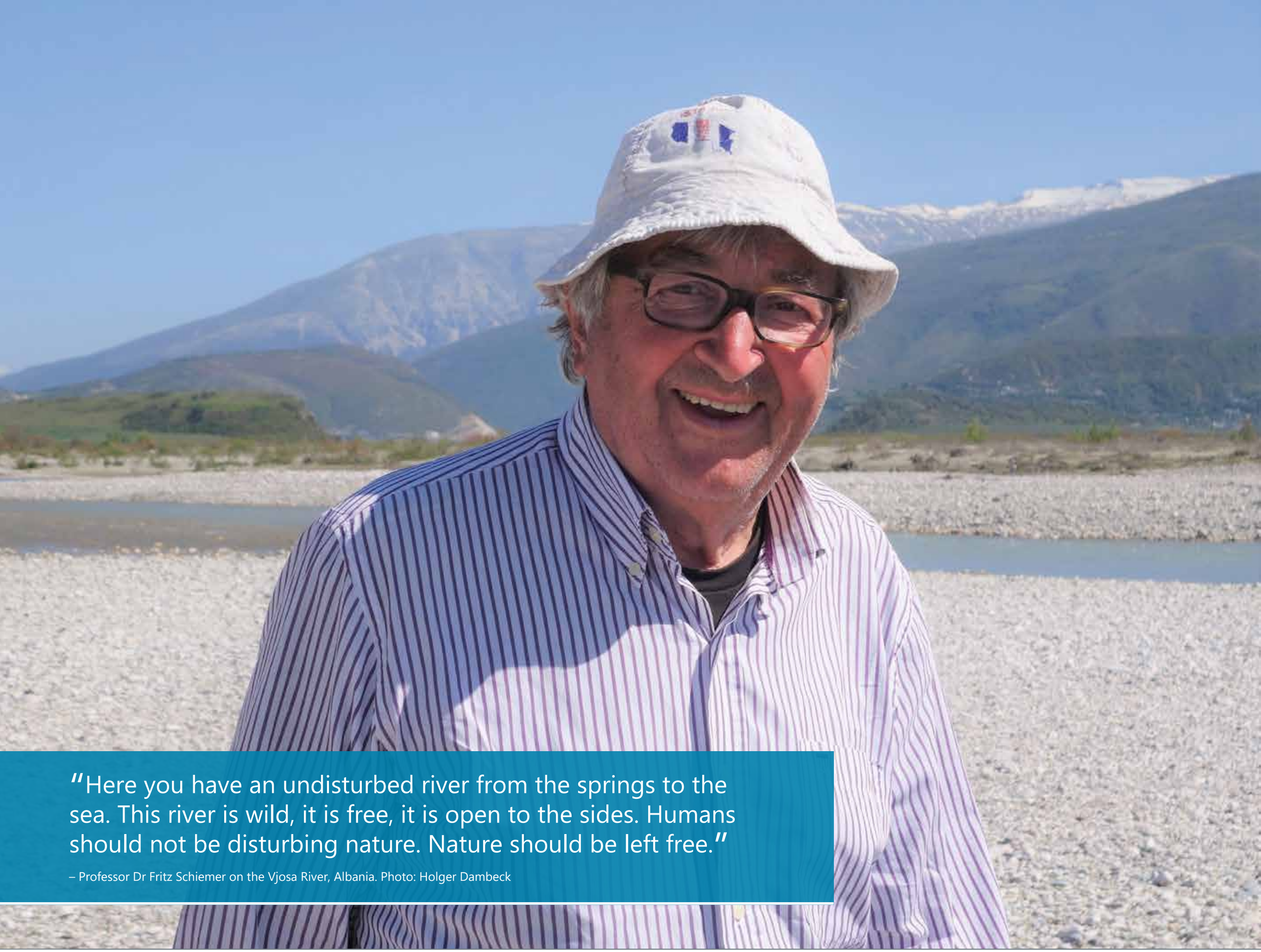
The Eco-Masterplan proves that these rivers are simply too valuable to lose, and that alternative energy systems can be found to secure a future where economic needs are met and environmental values are maintained and enhanced. To preserve these outstanding values, the plans to build almost 3,000 hydropower plants simply cannot proceed. This proposition is affirmed by the following key points:

- The Eco-Masterplan is underpinned by the most robust and comprehensive assessment of contemporary environmental and economic information to date. It has never before been attempted in this region to such an extent.
- Over a total river network of 80,523 km, 61,033 km (76%) of rivers meet our criteria for establishing *No-go* river stretches for hydropower. In Europe, this is an extraordinary outcome and highlights just how intact these rivers are and how critical they are to harbouring a rich array of biodiversity.
- 2,497 of a total of 2,790 (89%) hydropower plants are projected to be built within *No-go* river stretches. For seven countries assessed at a detailed level (Neubarth 2018), about 96% – the vast majority – of the hydropower capacity is projected inside these *No-go* stretches. In principle, this means that the whole Balkan region is a *No-go* zone for new dam projects.
- 91% of all projects are small hydropower plants with a capacity < 10MW and 59% are even below 1MW. The environmental impacts of small plants are often overlooked and can cumulatively be even bigger than for large projects. Their contribution to overall energy generation is tiny, rendering them both economically and environmentally nonsensical.
- The independent energy assessment has shown that projected hydropower expansion can be substituted by other renewable energy sources, most significantly by solar and wind technologies. Also, in most countries the hydro expansion is a senseless energy strategy as it does not lead to the fulfilment of EU renewable targets but to the degradation of nature and violation of EU legislation such as the Water Framework Directive and Natura 2000.
- What cannot be ignored is that the potential for solar and wind power in many countries is about twice as high as their current electricity demand and the costs of these technologies are falling rapidly. Renewable energy focus has been biased toward hydropower. This must now change.
- Coupled together, the Eco-Masterplan assessment and the complementary energy study demonstrate that the Balkans region is deserved of a complete switch in current energy generation policy. They categorically show that not only is this switch possible, but it is entirely necessary.
- The energy study highlights that in most Balkan countries significant grid losses can be observed. The reduction of these losses, and the increased uptake of energy efficiency technologies are necessary and sensible first steps that must be implemented to ensure energy production is environmentally and socially sustainable.
- The de facto ever increasing consumption of energy isn't a natural law. Decreasing total energy consumption and the reduction of waste would significantly increase the leverage of renewable energy in the Balkans.

The findings of the Eco-Masterplan prove that the Balkan Peninsula is truly the Blue Heart of Europe. As one of the world's biodiversity hotspots the Balkans can avoid a future that has been the lot of so many other parts of the world. The Eco-Masterplan is a line in the sand, a clear signal that future energy development in the Balkans does not have to come at the cost of its extraordinarily unique and precious river systems.



Mavrovo National Park, Former Yugoslav Republic of Macedonia. Photo: Goran Šafarek



"Here you have an undisturbed river from the springs to the sea. This river is wild, it is free, it is open to the sides. Humans should not be disturbing nature. Nature should be left free."

– Professor Dr Fritz Schiemer on the Vjosa River, Albania. Photo: Holger Dambeck

"In a connected European society, shouldn't there be something that we agree not to destroy?"

– Ulrich Eichelmann at the abandoned construction site of the Kalivaç dam project on the Vjosa River in Albania. Photo: Andrew Burr

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**Back cover photograph: Hydropower dam protest on the Lake Bohinj, Triglav National Park, Slovenia. Photo: Matic Oblak**

Huchen protest on the Drina River, the most important river for this globally threatened species. Photo: Aleksander Skoric


SAVE OUR RIVER
STOP THE DAM