

The Same Coin: Hydropower Dams and the Biodiversity Crisis

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Dive below, look high above or walk along the banks – whichever way you look, our rivers, lakes and wetlands are teeming with wildlife. They’re home to over 140,000 species, including 55% of all fish species.¹ And let's not forget the rest of the gang – from amphibians and mammals to thriving birdlife, these ecosystems host it all - yet the reality is these habitats are under increasing pressure by the influx of hydropower dams, putting biodiversity at great risk.

In Europe, all freshwater ecosystems are protected under European Union law. But, despite this, these habitats are being degraded and destroyed to fuel unsustainable industries, such as industrial agriculture and hydropower. While hydropower is often regarded as “green”, the dams needed to operate the plants have an enormous impact on rivers and biodiversity – but the sector is booming in Europe, demonstrating a blatant disregard for these water and nature protection laws, which should limit hydropower plants.

WWF, together with other environmental groups, commissioned a study to find out how serious Europe’s addiction to hydropower is. The results, released last month, are sobering.² With 21,387 existing hydropower plants, Europe’s hydropower potential has been well and truly harnessed. And, yet, a staggering 8,785 additional plants are planned or under construction, more than 4,000 of which are in the Balkans and Eastern Mediterranean. This region holds some

of the healthiest, most pristine rivers in Europe and many vulnerable species. Over 90% of all the existing and planned hydropower plants in Europe are small, meaning that each plant generates a measly 10 MW of electricity tops.

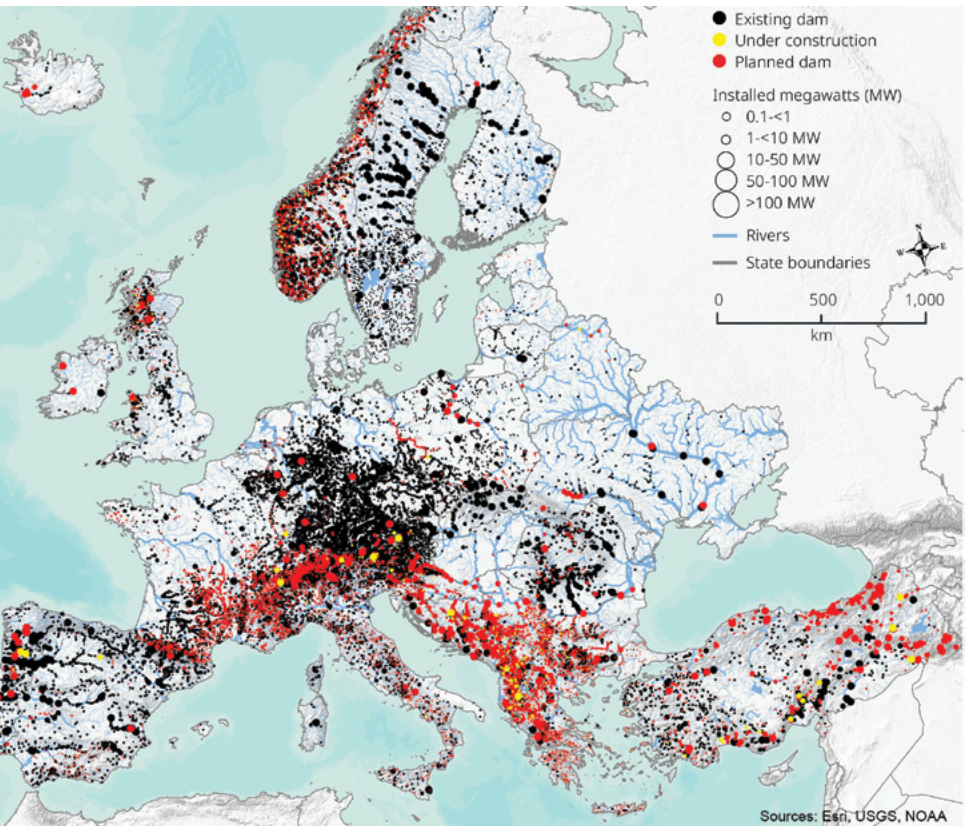


Freshwater species are the most threatened on the planet

An 83% decline in the freshwater species population has been recorded in the past 50 years alone.³ This bleak pattern is reflected all across Europe, where we are experiencing the most significant deterioration of rivers and biodiversity decline to date, with freshwater fish and mollusks being the most threatened. This is happening in spite of existing legislation – the EU Water Framework Directive – under which Member States must ensure all rivers are healthy by 2027.

1. IUCN
2. WWF, EuroNatur, GEOTA, RiverWatch, 2019, [Hydropower pressure on European rivers: the story in numbers](#)
2. Jumping trout, Finland. Photo: Petteri Hautamaa / WWF Finland
3. WWF, 2018. [Living Planet Report 2018](#)
4. Hydroelectric power station in Arribes del Duero called Mirador de Iberdrola in Salamanca. Photo: Jose Luis Vega





While centuries of abuse have sparked this decline – including pollution and excessive use of water – it is physical change to the shape and flow of rivers which creates the biggest pressure. And for that, hydropower has a lot to answer for. If ever built, it is estimated that the new generation of hydropower dams evidenced by the study could be the kiss of death for up to 30 freshwater fish species.⁵

Big risk, small gain

Hydropower may be a renewable energy source, but it isn't green. The dams needed to harness this natural power destroy both rivers and their surrounding environment, changing a river's natural flow, blocking fish migration routes and trapping sediments that protect riverbanks and deltas against floods and sea level rises. Moreover, they release methane and CO₂ from their reservoirs (and are therefore not climate neutral). Hydropower dams also rely on a healthy supply of water. With droughts and water scarcity on the rise, it is not a climate resilient source of energy.

To add insult to injury, more than 90% of all the existing and planned hydropower plants in Europe are small, meaning that each plant produces less than 10 MW of energy. If all the planned small hydropower projects outlined in our study were carried out, their contribution to the total net electricity generation in the EU would only be between 0.2 and 2%. Compared to wind and solar, this is hardly worth getting out of bed for, let alone the destruction of Europe's

last remaining free-flowing rivers. In addition to supporting our freshwater biodiversity, we need these rivers to recharge vast networks of underground water, maintain floodplains that are essential to agriculture and flood protection, and protect pristine sceneries that have an immense value for recreational and business activities.

Protected on paper, not in practice

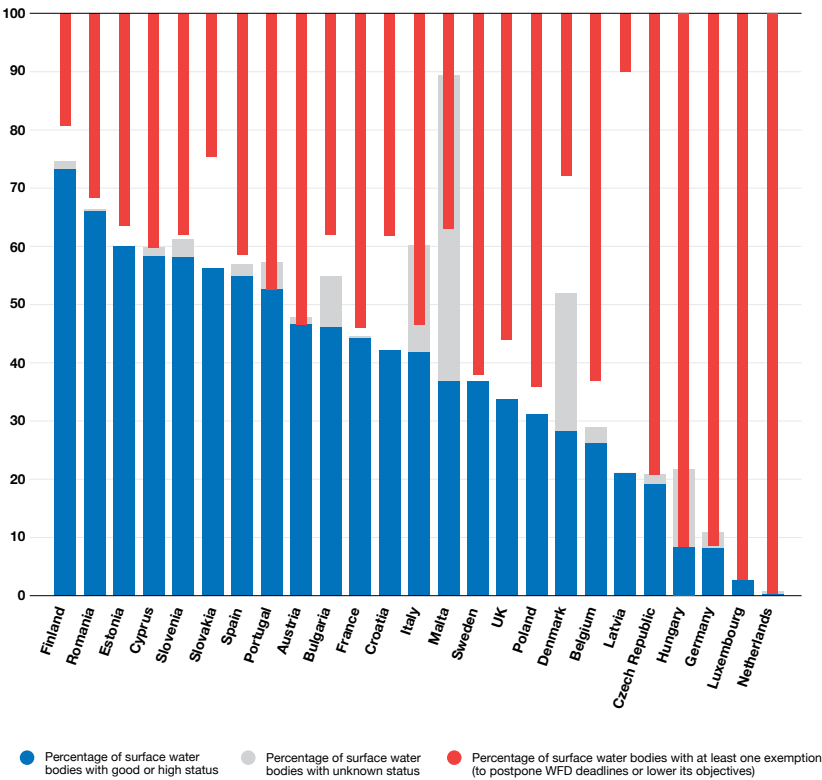
Protected areas – such as national parks, Natura 2000 sites and natural reserves – are protected for a reason. They offer a safe haven to Europe's most threatened biodiversity, as well as the continent's last handful of pristine, free-flowing rivers. In the EU, these areas are also protected under EU legislation – the EU Birds and Habitats Directives (BHD) and EU Water Framework Directive (WFD).

But, all over Europe, these laws are being broken to allow more hydropower. More than a quarter of all planned hydropower in Europe is in protected areas, the overwhelming majority of these in Natura 2000 sites.

Under the WFD, any project that could lead to the deterioration of a river in the EU is against the law. The principle can only be challenged through so-called "exemptions", which were set-up when the law first came into effect in 2000, to be used in exceptional cases only. But these exemptions are being handed out to Member States like a "get out of jail free" card: 53% of EU rivers are covered by at least one exemption, many of which are to allow more hydropower plants to be built.

And that's where the process is even used – new hydropower plants are often built without even asking for an exemption in the first place.

Ambition to make the EU water law work is low amongst member states



The use of exemptions to the EU Water Framework Directive is rampant among Member States. The graph shows that countries where the state of water is especially dire are those employing the most exemptions - either to postpone the law's final 2027 deadline for bringing freshwater ecosystems to "good status", or to lower the law's objective. © WWF European Policy Office. Data source: EEA WISE (2018), (WFD reporting EC dashboards)

The EU water law is critical for the European Green Deal

The European Commission cannot continue "business as usual" and allow its own laws to be breached and misused. In December 2019, the European Commission's final evaluation of the WFD concluded the law to be "fit for purpose", acknowledging that its objectives "are as relevant now as they were at the time of the adoption". The decision concluded a two-year evaluation of the law (known as a "fitness



check") and sets the EU back on course to bring life back to its rivers through full implementation and enforcement of the WFD.

WWF is a staunch advocate of the WFD and strongly supports these conclusions. But the proof will be in the pudding - the Commission must now do everything in its power to ensure that the law's impact is no longer gutted by shoddy implementation, lackluster enforcement, and abuse of exemptions - especially when these are to allow additional hydropower plants to slip under the net.

The WFD is the best barrier to hydropower development. By taking a holistic approach to preserving rivers and their ecosystems, the law mirrors the ambition of the European Green Deal. The European Commission must keep this

Spotlight on: Austria

With more than 4,000 existing plants, Austria is one of the countries with the most hydropower. Despite this, it continues to invest in it – over 100 additional plants are on the cards. A recent study from WWF Austria and ÖKOBÜRO found that less than a third of the permits authorizing new hydropower plants were not in line with requirements of the EU Water Framework Directive, which oblige Member States to go through an exemption to the law to justify building infrastructure that causes deterioration to a river. A large number of them just bypassing the established exemption process.

legal barrier strong, and ensure it works not just on paper but in practice. Any weakening of its standards will put a serious question mark over the credibility of its European Green Deal.

The time to act is now: Biodiversity is sky-high on the new European Commission's agenda and the 2020 Conference of the Parties to the UN Convention on Biological Diversity offers a tremendous opportunity to create a "Paris climate agreement" moment for biodiversity – while the Convention has existed since 1992, in 2020, this meeting will be pivotal for biodiversity conservation, as a post-2020 Biodiversity Strategy will be agreed upon for the following decade. The EU will operate as a single block at the table and the European Commission's new president has promised to "lead the world" and "work with its global partners to



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curtail biodiversity loss within the next five years".

If the Commission is indeed serious about positioning itself as a champion for biodiversity, it needs to tackle the issue at the source. Hydropower is incompatible with the EU's objective of halting biodiversity loss, its objective of having clean, healthy rivers, incompatible with the new European Commission's mandate.

Spotlight on: Portugal

Portugal's Tâmega Hydropower Scheme is financed in large part by the European Investment Bank (EIB). According to campaigners, this is in direct contradiction with the EIB's own guidelines on hydropower investment not undermining EU nature protection rules and being subject to a proper environmental impact assessment. The ongoing construction of the Gouvães hydropower dam on the Torno River, a tributary of the Tâmega, is expected to flood part of the Alvao-Marão area – a Natura 2000 site and crucial habitat for threatened species such as the European otter, the Iberian wolf or the Pyrenean desman. According to our recent study, Portugal is one of the few Western European countries continuing to build large dams rather than focusing on pumped storage or refurbishment of existing turbines.



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9. Dead fish near hydropower dam.
Photo: Amel Emric / Blue Heart Campaign

10. Drawing of Pyrenean desman.
Illustration: WWF / Helmut Diller

In conversation with Dr. Steven Weiss

FRESHWATER BIODIVERSITY EXPERT & ASSOCIATE PROFESSOR AT THE UNIVERSITY OF GRAZ, AUSTRIA

How do hydropower dams affect freshwater biodiversity?

Depending on the type and size of the plant, hydropower affects biodiversity in many different ways. The number one impact is habitat destruction. Additionally, with many plants being built, the whole river network becomes fragmented and fish aren't able to move up or/downstream to fulfil their lifecycle needs.



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Additionally, certain plants function with what is known as “hydro peaking”, which is highly destructive. Water is released at certain times of the day to meet peak demands for energy. In a matter of minutes, spawning and rearing grounds can go from being several centimeters or a meter or more deep to being completely dry. The fish don't have time to respond and are left stranded. Although your

so-called run-of-the-river plants don't have hydro peaking, they all accumulate fine sediments, which must be periodically flushed from the reservoir.

Which species are at risk should the planned hydropower plants go ahead?

All of Europe's large iconic species, such as the Atlantic salmon, European eel, the last surviving populations of sturgeon, would be impacted by these plants. In southern Europe, the Balkans in particular, there are many hotspots, as this is where the highest concentration of endemic biodiversity is found – virtually all of the endemic fish species in the Balkans would be threatened with massive reductions should the planned plants go ahead.

Is it just fish that are impacted?

Many species are impacted by hydropower, including lots of insect life, which are a basic building block in the food chain of the whole riverine ecosystem. Hydropower dams do indeed affect fish directly but also riverine life more broadly – such as semi-aquatic wildlife (like fish otters) and a wide array of birdlife, particularly fish-eating birds like kingfishers or pelicans. The projects also affect the terrestrial landscape, including species like the lynx, wolf

and local deer species, as they can't carry out their normal migratory pathways due to the fragmentation caused by the construction of the plants and reservoirs.



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So, what needs to happen?

First and foremost, we need to recognize and uphold existing legislation. Wildlife refuges, Natura 2000 areas and other nature reserves – all these areas need to be protected in the way they were meant to be protected. We also need to recognize that we don't have an energy crisis but an environmental crisis, and climate change is only one dimension of that. We can't tackle the climate crisis without taking nature protection seriously – the two are inseparable. ●

11. Fish-eating birds, like the red-tailed tern, are affected by the impact of hydropower on the whole riverine ecosystem. Photo: Goran Safarek

12. Beaver, Austria. Photo: Leopold Kanzler

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