

## **DAM REMOVAL EUROPE: TRASPASANDO BARRERAS Y LIBERANDO RIOS**

Pao Fernández Garrido(World Fish Migration Foundation), Herman Wanningen (World Fish Migration Foundation), Arjan Berkhuisen (World Fish Migration Foundation), Iwan Hoving, Roxanne Diaz (World Fish Migration Foundation), Rosa Olivo del Amo(World Fish Migration Foundation)

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### **Resumen**

El ser humano llevan construyendo azudes y presas desde hace cientos de años, como atestigua “La Gran Presa de Marib” del año 700 A.C. Sólo en Reino Unido, en 1086 el documento “Domesday Book” recoge alrededor 6.000 azudes de molinos. En 2018 el proyecto europeo AMBER estimó que hay aproximadamente una barrera por kilómetro de río. Esto ha influido de forma significativa en el estado ecológico de los ríos y contribuido a la extinción de especies piscícolas tanto a nivel regional como nacional.

Por ello, desde hace más de dos décadas algunos países en Europa empezaron a dismantelar azudes y presas obsoletas y en desuso, no sólo para mejorar el estado ecológico de sus ríos, si no también por motivos legales y de seguridad.

Este es uno de los objetivos de Dam Removal Europe (DRE), resaltar la necesidad de eliminar las barreras fluviales obsoletas y abandonadas de los ríos para la recuperación de los ecosistemas fluviales. Además, DRE facilita el desarrollo y el intercambio de conocimiento sobre eliminación de presas y azudes entre profesionales y organizaciones de diferentes países.

### **Abstract**

Humans have been building weirs and dams for hundreds of years, as the Great Dam of Marib, from 700 BC, proves. In the UK alone, in 1086, the Domesday Book recorded around 6,000 water-powered mills. In 2018, the AMBER project estimated that there is approximately one barrier for each river kilometre in Europe. This has significantly influenced the ecological state of the rivers and contributed to the extinction of fish species both at a regional and national level.

For this reason, for more than two decades some countries in Europe have begun to dismantle old and obsolete dams and dams, not only to improve the ecological status of their rivers, but also for legal and security reasons.

This is one of the objectives of Dam Removal Europe (DRE), highlight the need to remove obsolete and abandoned barriers of rivers to restore fluvial ecosystems. Furthermore, DRE facilitates the development and exchange of knowledge on dam removal between professionals and organizations from different countries.

## DAM REMOVAL EUROPE: Traspasando barreras y liberando ríos

Free-flowing rivers are the arteries of Europe's richest ecosystems. The larger part of the European biodiversity is connected to rivers, wetlands and deltas. Currently, however, there are hardly any free-flowing rivers left in Europe as we have been fragmenting rivers for centuries, in part, due to dam construction. Biodiversity is declining at an alarming rate and it has been estimated that 55 – 60% of the known causes that lead to freshwater fish decline in Europe is due to dams and weirs construction (Birnie-Gauvin, 2017). Populations sizes of freshwater species have declined by 81% in the period between 1970-2012 (Living Planet Report, WWF, 2016).

At this moment, there is scarce information about the number of barriers (type and size) blocking European rivers. We only have the European inventory of big dams (those higher than 10m), but studies show that this could be less than 3% of the existing barriers (Belletti et al, 2018). In the AMBER Project (Adaptive Management of Barriers in European Rivers) ([www.amber.international](http://www.amber.international)) the estimations done by inventory validations in the field show that there could be 1 barrier per kilometre of river. Actually, the countries with the most complete barrier inventories show this situation: France 95,000 barriers (out of which 70,000 are weirs and dams), Switzerland 80,000 barriers, England and Wales 22,000, Spain 22,000 (AMBER, 2018).

Dams impact every aspect of healthy rivers. They impede the migration patterns of fish and other aquatic fauna and this can cause a decline and even local extinction of many species (Gosset et al, 2006; Tejeiro et al, 2006; Roscoe & Hinch, 2010; Birnie-Gauvin et al, 2017). Dams can be responsible for a significant loss of natural riverine habitat and many times create ideal conditions exotic and/or invasive species to thrive (García de Leaniz, 2008). They alter the natural flow of rivers by reducing the downstream flow and decreasing the river's natural flood frequency. This reduces the channel connection with the floodplain, which decreases the soil fertility and aquifer recharge. Dams can block nutrients and sediments upstream of the dam, in greater or lesser degree depending on the dimensions of the dam and on the type of sediments on the valley. Invariably, this causes downstream incision problems in the river channel and bank erosion that diminishes delta formation due to the lack of sediment deposition, and sometimes causes coastal erosion due to sand decrement. Upstream the dam, the riverine dynamics is modified to a lentic (standing-water) system, deteriorating the water quality (Hart & Poff, 2002) and causing greenhouse gas emissions through the decomposition of stored vegetation and carbon inflows from the basin (WCD, 2000).

Dam Removal Europe (DRE) is a European wide dedicated cooperation of organizations with the ambition to bring back life to our rivers by removing old, obsolete dams - to open our European rivers again and have rivers full of fish. Dam Removal Europe was started by six organizations, World Fish Migration Foundation, World Wildlife Fund, Karlstad University, European Rivers Network, the Rivers Trust and Rewilding Europe. Currently it is a strong growing network of authorities, NGO's, companies and knowledge institutes from many different European countries working on dam removal.

The objective of Dam Removal Europe is to highlight and emphasize removal of old, obsolete dams as the most eco-efficient and cost-effective measure. It is proven that after the removal of dams, the river-ecosystem quickly recuperates. In this sense, DRE has written a report to facilitate the understanding of the benefits of removing dams and why it is the best option to restore the river ecosystem: "Dam Removal: A Viable Solution for the Future of our European Rivers" Report aims to stimulate dam removals in Europe and put dam removal on the agenda of policy makers

Furthermore, DRE facilitates the development and exchange of knowledge on dam removal between partners in different countries. It does so by inspiring and connecting people so together we can re-create and protect our great European rivers. Since 2016 there has been 3 International Seminars hosted in different European countries and all presentations can be found in the DRE website:

- I DRE International Seminar, Leon, Spain, 2016
- II DRE International Seminar, Birmingham, England, 2017
- III DRE International Seminar, Hudiksvall, Sweden, 2018

During these international seminars over a hundred professionals, practitioners and students dealing with dam removal projects from all over the world come to share their experiences and lessons learned. Next International Seminar (June 2019) will take place in Rennes (France,) an hour trip from the biggest dam removal that is taking place in Europe, the Vezins Dam in the Selune River (which will be the fieldtrip visit).

In addition, DRE has built the first European database with removed weirs and dams, and it is open access from DRE website ([www.damremoval.eu](http://www.damremoval.eu)). It was once believed that the USA was leading on dam removal with more than 1,300 documented dams demolished (American Rivers, 2018). However, Europe has managed to demolish over 4,000 barriers. According to DRE collected records, France has removed more than 2,300 barriers, naturally or artificially, Finland has torn down more than 450 and Spain over 250 dams (DRE, 2018).

DRE also shares real dam removal cases done in the past, planned in the future or currently taking place. There is much more happening than what is thought. For example, in Estonia, the biggest European river opening is being executed as we speak. It is in the Parnu River basin which covers 20% of Estonia. The river is 144 km long but together with the tributaries (270 rivers and streams) it makes up to 3,300km length of channels. This river is the biggest historical salmon river in the country. However, the Sindi Dam (151m wide and 4,5m high) is the first migration barrier within the river (14 km from the sea), so due to this and that the dam is also in violation of an Estonian state policy that aims to protect and conserve natural habitats, the government decided to demolish the dam (DRE, 2018).

There are several reasons why dams are being demolished in Europe and the USA, and it is not only because of environmental reasons.

In the USA, for example, the primary reason is mostly economical. This is because US law dictates that if you own a dam then you are obliged to maintain it. This invariably means that the dam is subject to periodical inspections, which will cost the owner money. If, after those inspections, the state engineer considers that repair must be carried out, then this will cost a lot more than if one were to remove the dam.

Another reason is public safety. All dams have a shelf life, which is why it is important to inspect dams that no longer serve a purpose to avoid potential accidents which may arise due to dam failures. Additionally, small dams (weirs) can also pose major safety hazards. They are known in USA as “drowning machines” because they generate a very strong suction force (hydraulic notch) below the dam, sucking any object down to the base of the dam. This phenomenon is responsible for taking lives every year.

To our surprise, Europe is actually leading when it comes to the demolition of dams. It was once believed that the USA held this leading position with more than 1,300 documented dams removed (American Rivers, 2018). However, Europe has managed to demolish over 4,000 barriers. According to collected records, France has removed more than 2,300 barriers, naturally or artificially, Finland has torn down more than 450 and Spain over 250 dams (DRE, 2018).

Although less known, there are also legal cases for removing dams in Europe. Under the terms of the European Union Water Framework Directive, Member States agree to achieve “good ecological status” in all water bodies by the year 2015 (in some cases this has been extended to 2027). Under the Habitats Directive, the European Commission has required Member States to restore and maintain the natural habitats of the European Union Natura 2000 network by 2015. The restoration of the freshwater environments of Europe is therefore underpinned by important EU legislative requirements, and the restoration of the continuum of rivers is a fundamental part of that. Current assessments show that 40% of surface water bodies have an ecological status of ‘good’ or ‘high’, with lakes and coastal water bodies having a better status (approx. 50%) than rivers and transitional water bodies (approx. 40%) (Gough et al, 2018). Therefore, dam removal is an interesting measure for water authorities to meet the Water Framework Directive goals.

Additionally, some European countries have specific national laws which support dam removal. For example, Spanish legislation dictates that once a dam has finished its objective, the dam owner must leave the river in the same conditions they found it in prior to the construction of the dam. However, very few people have actually paid any attention to this law, leaving thousands of dams abandoned in rivers and without any consequences to the offender.

Many times, initiatives to remove dams come from outside the region, like central governments or national angling- and nature organisations. Local citizens and communities are involved in later stages, which can cause negative reactions. As with any project that will impact local communities, it is imperative to communicate, plan and carry out proper consultation meetings with local residents from the start. This way, dam removal initiatives will be implemented with a vision that better suits nature and people.

In addition to this, there is the Renewable Energy Directive, which requires EU countries to fulfill at least 20% of their total energy needs with renewable energy by 2020, and amongst these renewable energy sources is hydropower. This makes dam removal projects tremendously difficult to those who are willing to start removing outdated and obsolete dams and makes dam removal an uncomfortable subject to mention to politicians. This situation is like a snake biting its own tail and it will not progress until we come to an understanding of the need for both restoration of efficient dams and removal of obsolete and abandoned dams. Therefore, we need to provide more awareness and funding to remove more obsolete dams.

This is why Dam Removal Europe (DRE) started in 2016 ([www.damremoval.eu](http://www.damremoval.eu)). DRE wants to improve citizens’ awareness about removing dams., facilitate communication within Europe and between USA and Europe, create a reference community of experts and starters who generate and share knowledge about dam removal and put dam removal on the agenda of policy makers. Together we can locate and remove obsolete dams.

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