



Dam removal step by step

Pao Fernández Garrido World Fish Migration Foundation www.worldfishmigrationfoundation.com







This webinar series was supported by the European Commission through LIFE NGO funding





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Dam removal step by step

World Fish Migration Foundation

- World Fish Migration Day (WFMD)
- Adaptive Management of European Rivers (AMBER)
- Dam Removal Europe (DRE)
- USA
- France
- Sweden
- Finland
- Spain
- UK





WORLD FISH MIGRATION DAY 21st April 2018 www.worldfishmigrationday.com



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Connecting Fish, Rivers and People

The World Fish Migration Day (WFMD) is a one day global-local event to create awareness on the importance of open rivers and migratory fish. The next World Fish Migration Day is on April 21, 2018.

Register your event



















Waterschap Amstel, Gooi en Vecht



Going global

Creating awareness on a global scale

In 2016, we reached 177 more events than in 2014. The majority of the events were in Europe (228) and the USA (103), but there were also events from other countries; Mongolia, Gambia, Iceland, Ecuador and Papua New Guinea to name a few. Our goals for 2018 are to increase the impact and double the number of events to involve at least 75 countries around the globe, particularly increasing the number of events in developing areas in Africa, South America and Asia, where a major expansion of hydropower and dam development is proposed. It is critical that citizens, companies, governments, financiers and other organizations in these areas are well informed about migratory fish and the impacts they face.

450 Events 63 countries 82.000 visitors to events 2,000 organizations involved 70.000.000 people reached worldwide +15.000.000 people reached on social media







First atlas of weirs and dams in European rivers





Funded by the Horizon 2020 Framework Programme of the European Union

Adaptive Management of Barriers in European Rivers www.amber.international





DAM DAM REMOVAL EUROPE

www.damremoval.eu







val Europe













Dam Removal Europe









Dam Removal Europe Movement

1. Create awareness to general public

- Importance of wild and free flowing rivers
- Dam Removal as best option for river restoration

2. Network & knowledge exchange

- Inspire each other
- Generate and share knowledge & experience

3. On agenda in Brussels

- Dam Removal as WFD policy option
- European funding for projects





Dam Removal Europe How?



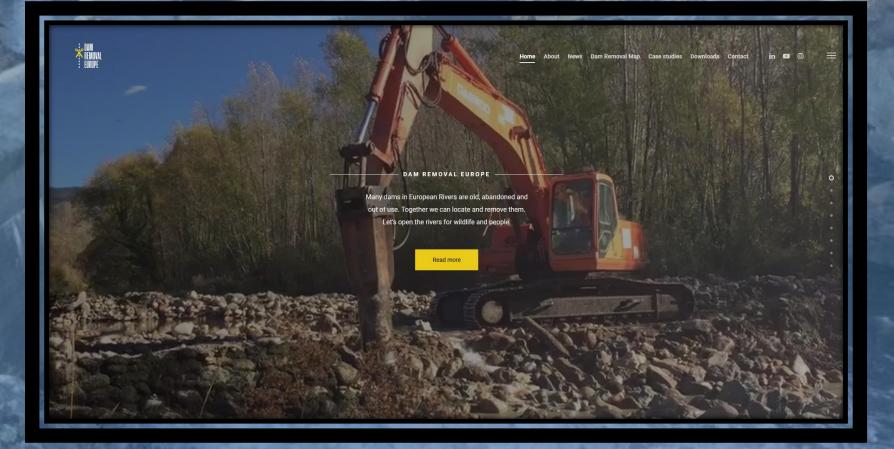
1. Setting up dam removal network

- Website: www.damremoval.eu
- Social networks
- News, info, case studies
- 2. Inventory and atlas of dams removed
- 3. Dam Removal Workshops
 - November 2016, León (Spain)
 - September 2017, Birmingham (UK)





Dam Removal Europe Website: <u>www.damremoval.eu</u>





X REMOVAL Europe Webinar series 'Restoring river continuity: methods and open challenges' Dam Removal Step by Step – 13th Dec 2017



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Dam Removal Europe News and newsletters

News



September 21, 2017

Dam Removal Projects in Sweden

Dam Removals in Sweden Swedish government is also making a great effort updating their obstacle database (over 10,000 obstacles along the whole country) and our findings show that Sweden has...



September 21, 2017 Dam Removal Projects in France

Dam Removals in France The removal of dams and weirs has been happening for centuries. Since the 90's a few countries have increased this tendency. USA has already removed more...



News Dam Removal Map Case studies Downloads Contact

February 8, 2017

Workshop on dam and weir removal in the urban environment

DAM REMOVAL EUROPE Workshop Workshop on dam and weir removal in the urban environment - 25 & 26 September 2017 Birmingham, England, UK The 2nd Dam Removal





Dam Removal Europe DRE workshop 2016: León, Spain











Dam Removal Europe

DRE workshop 2017: Birmingham, UK

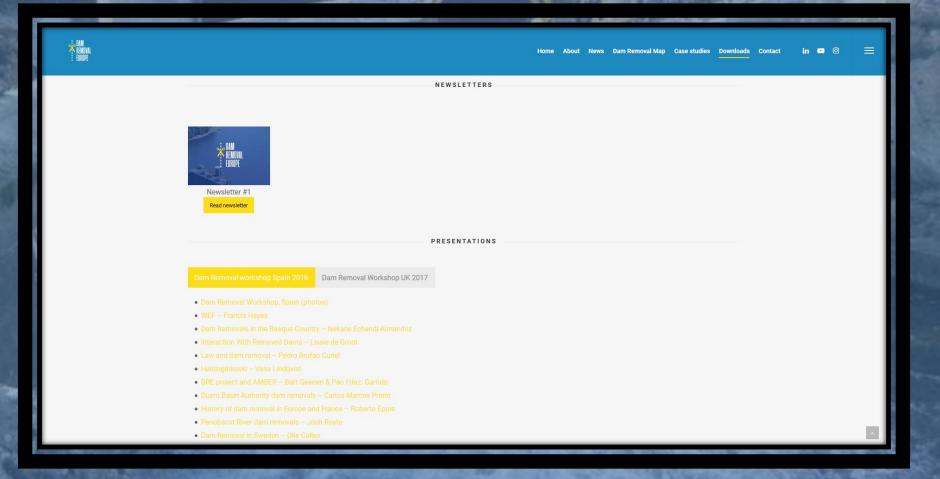








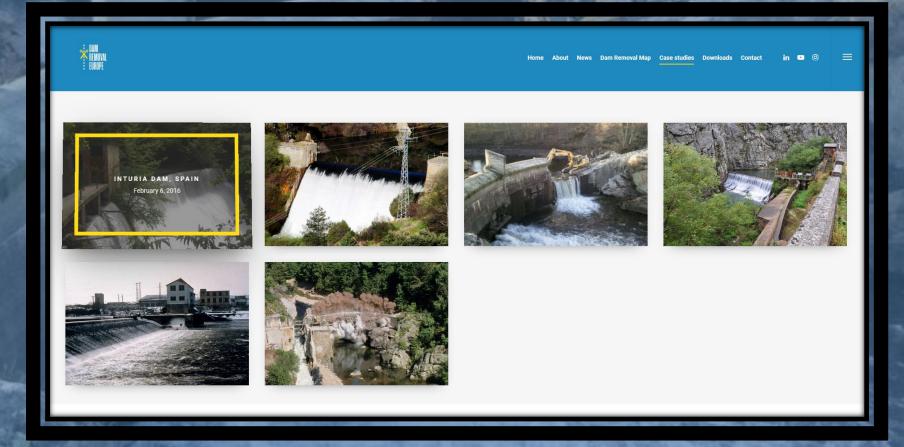
Dam Removal Europe Downloads







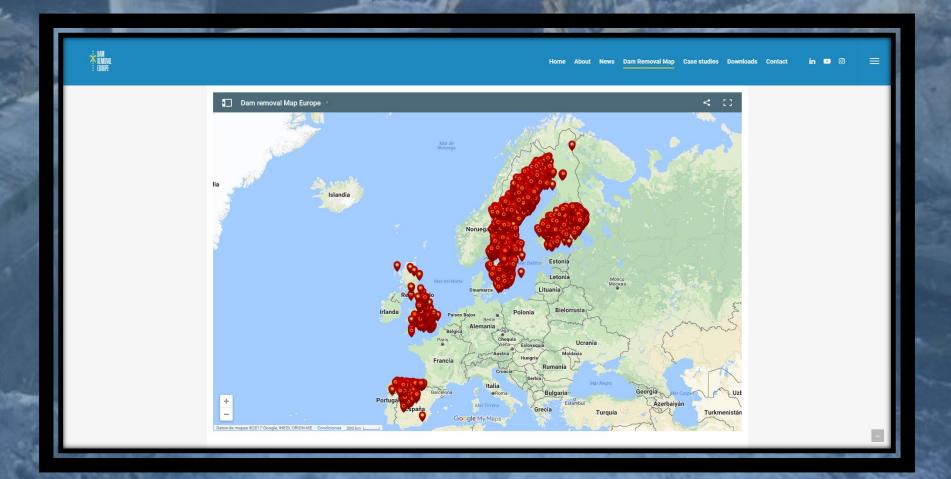
Dam Removal Europe Case studies







Dam Removal Europe DRE Map







Dam Removal Europe How?

2017-2020

- **1. Website**: facilitate information and contacts
- 2. Complete atlas of dams removed and to be removed
- 3. Continue with **workshops** all around Europe Next one: September 2018 Sweden
- 3. Develop and launch a Dam Removal Guide
- 4. Dam Removal Europe Film
- 5. Finance for DRE and for 9 dam removals





Dam Removal Europe Drivers

- Economically: More expensive to maintain than removing
- Safety and liability
- Legislation: Water Framework Directive
- Environmental:
 - Restore aquatic connectivity
 - Improve water quality
 - Restore natural water and sediment processes
 - Restore self-sustaining and ecologically river







Hazard Classifications

- Red: High
- Yellow: Significant
- Black: Low

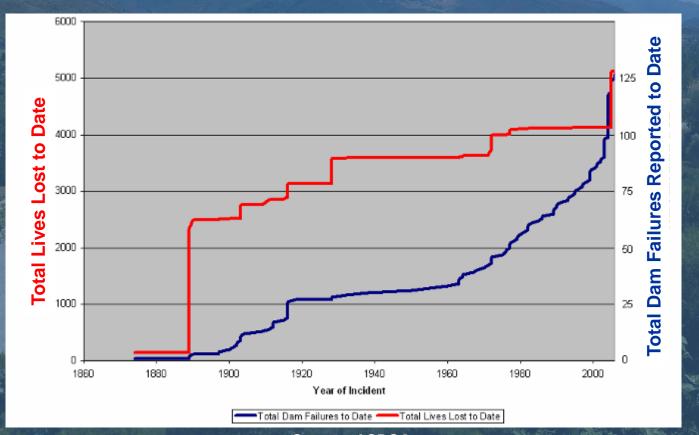
National Inventory of Dams >87,000 Dams (>25 ft w/ 15ac-ft capacity or >6ft w/ 50ac-ft capacity)
 Several Million Dams Status Report on the Nation's Floodplain Management Activity, 1989







ASDSO REPORTED DAM FAILURES & FATALITIES 1874-2006



Source: ASDSO









<u> 1972 - Buffalo Creek Valley, WV</u>

Coal-waste impoundment failure; **<u>125 lives</u>**; over **<u>\$400 million</u>** in damage; destruction of over 500 homes

<u>1972 – Rapid City, SD</u> Canyon Lake Dam failure; <u>33 to 237 lives</u>; over <u>\$60 million</u> in damages; destruction of 1,335 homes

<u>1976 – Teton, ID</u> Teton Dam failure; <u>11 lives;</u> over <u>\$1 billion</u> in property damage

<u>1977 – Laurel Run, PA</u> Laurel Run Dam failure, over <u>40 lives;</u> over <u>\$5.3 million</u> in damages

<u>1977 – Toccoa Falls, GA</u> Kelly Barnes Dam failure; <u>39 students and college staff killed</u>; approx. <u>\$2.5 million</u> in damages









Dam Safety in the United States

A Progress Report on the National Dam Safety Program Fiscal Years 2012 and 2013 August 2014



Federal Emergency Management Agency

Creation of National Dam Safety Program (NDSP) in 1979, which is administered by Federal Emergency Management Agency (FEMA).

NDSP mission: Reduce risks to life, property and the environment from dam failure by guiding public policy and leveraging industry best practices across the dam safety community.

Dam Safety Offices, one per State (except Alabama, which has no dam sagety legislation neither formal dam safety program).

Association of State Dam Safety Officials (ASDSO), which is a national non-profit organization serving state dam safety programs and the broader dam safety community (federal dam safety professionals, dam owners and operators, engineering consultants, emergency managers, manufacturers, suppliers, academia, contractors, etc.)







NATIONAL DAM SAFETY PROGRAM (NDSP)

• Dam owners have liabilities where the law requires them to maintain their dams

• Dam Safety requires the dam owner an inspection (every year, every two years, every five years...)

• A dam inspection can cost between \$5,000 to \$15,000

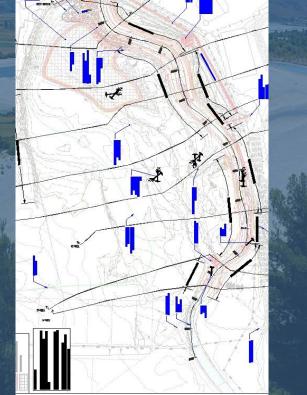
• Many times, after the inspections the owners find out they must repair their dams...













Feasibility

Design and permitting

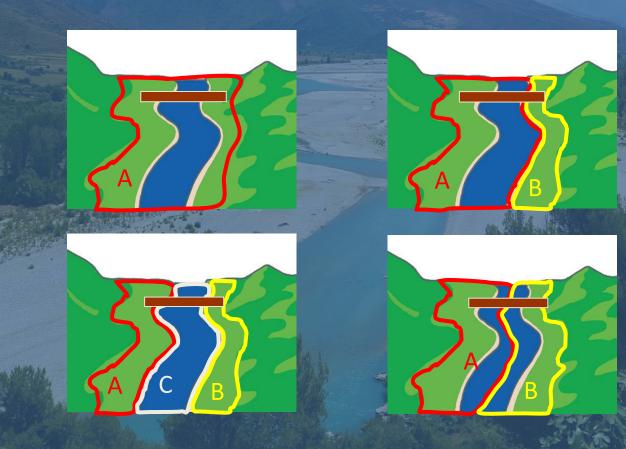
Construction







OWNERSHIP: Private









PERMITS

- Local permit
 State permit

 Dam Safety (DEEP)
 ... up to 11 or more permits

 Federal permit

 Army Corps of Engineers
- 4. Check the Nature Diversity Data Base (DEEP)
- 5. FEMA (flooding map revision within 6 months after removal)







Check the Nature Diversity Data Base (DEEP)

Natural Diversity Data Base Areas WATERTOWN, CT December 2012 State and Federal Listed Species & Significant Natural Communities Town Boundary NOTE: This map shows general locations of State and Federal Listed Species and Significant Natural Communities. Information on listed species is collected and compiled by the Natural Diversity Data Base (NDDB)

by the Natural Diversity Data Base (NDDB) from a number of data sources. Exact locations of species have been buffered to produce the general locations. Exact locations of species and communities occur somewhere in the shaded areas, not necessarily in the center. A new mapping format is being employe that more accurately models important riparian and aquatic areas and eliminates the need for the upstreamidownstream searches required in previous versions.

This map is intended for use as a preliminary screening tool for conducting a Natural Diversity Data Base Review Request. To use the map, locate the project boundaries and any additional affected areas. If the project is within a shaded area there may be a potential conflict with a listed species. For more information, complete a Request for Natural Diversity Data Base State Listed Species Review form (DEP-APP-007), and submit it to the NDDB along with the required maps and information. More detailed instructions are provided with the request from on our website.

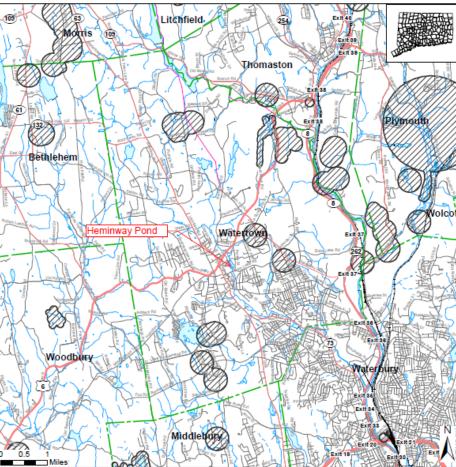
www.ct.gov/deep/nddbrequest

This file has PDF Layers. Look for the Layers tab on the left. Expand the layers and use the "eye" icons to change visibility.

QUESTIONS: Department of Energy and Environmental Protection (DEEP) 79 Eim St., Hartford CT 06106 Phone (860) 424-3011



Connecticut Department of Energy & Environmental Protection Bureau of Natural Resources Wildlife Division









PERMITS

Local permit
 State permit

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 ... up to 11 or more permits

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WHO PAYS FOR ALL THIS?

- 1. Owner
- 2. Dam Relicensing
- 3. Dam Safety (grants & loans)
- 4. Fines for Environmental Violations(Federal or State holding banks)
- 5. Federal Funding Sources (NOAA, National Marine Fisheries, Army Corps of Engineers...)
- State Funding Sources (SEPs, mitigation, car license plates...)
 Matching Grant Funds (volunteer, NGO, universities/schools, scouts, etc.)





GEORGIA°

Trout Unlimited







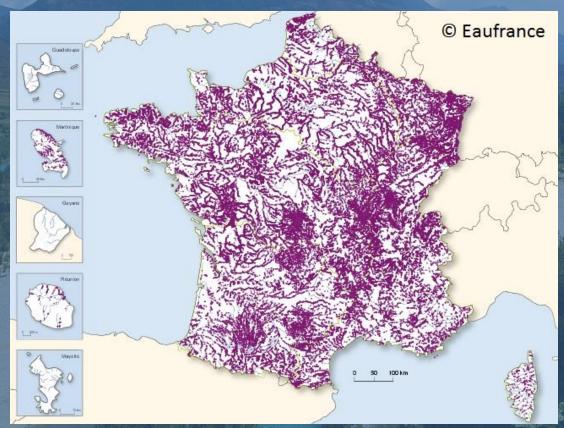
Over 1,384 weirs and dams removed in USA since 1912 (American Rivers, 2016)





France

Over 95,000 man-made obstacles in French rivers, more than 70,000 are weirs and dams (French Agency of Biodiversity, AFB)



http://www.sandre.eaufrance.fr/atlas/srv/fre/catalog.search;jsessionid=sup 3y7zydffj6vp449fhe7ex#/metadata/070df464-73d3-4c00-be2f-93f2a97ef8f5





France

OWNERSHIP: Private

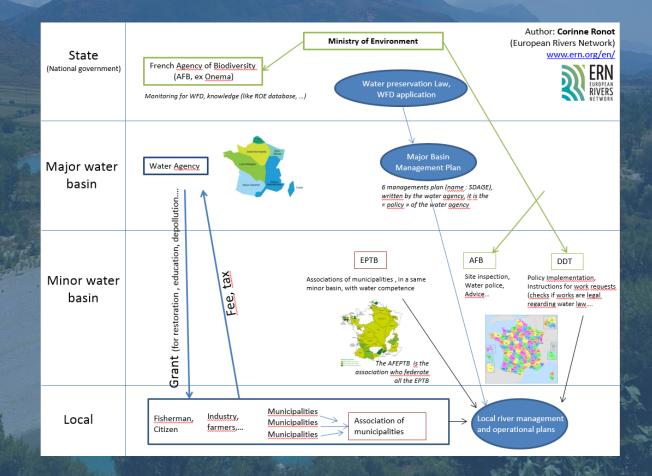


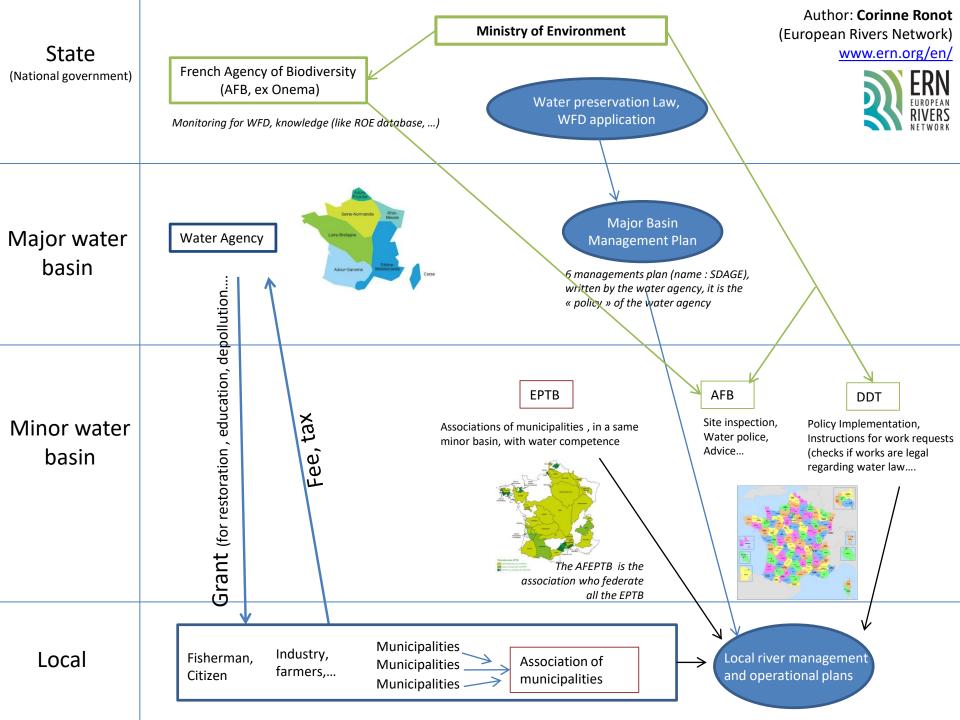




France

Who manages rivers?









France

Fully removed obstacles (naturally or artificially): 2,425 Partially removed obstacles: 5,728 Source: L'Atlas-Catalogue du Sandre

(http://www.sandre.eaufrance.fr/atlas/srv/fre/catalog.search#/metadata/070df464-73d3-4c00-be2f-93f2a97ef8f5)

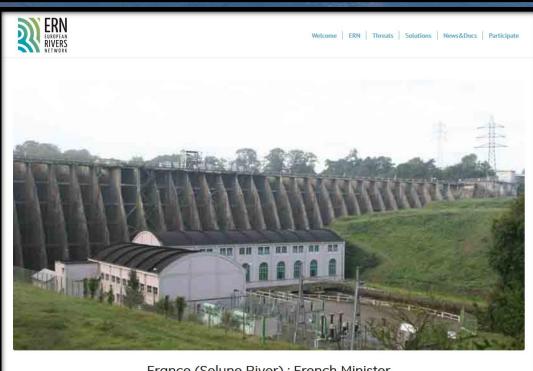
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France

Confirmation of the removal of the largest dams in Europe: Vezin (35) and Roche qui boit dam (15m)



France (Selune River) : French Minister Hulot confirme the removal of two large dams



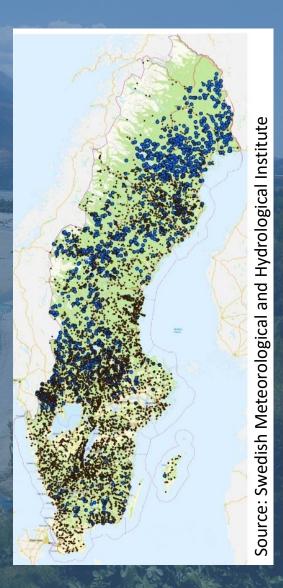


Sweden

Over 10,000man-made obstacles.

Different managers of obstacles inventories:

- Swedish Meteorological and Hydrological Institute (SMHI)
- The biotope Inventory Database (The Swedish County Administrative Board)
- The restoration measures in waters (Åtgärder I vatten) - (The Swedish County Administrative Board)







Sweden

- Ownership: Rivers are private
- Drivers: Environmental Restoration
- Legislation: Swedish Environmental Code and WFD
- Management: River owner (however, any activity in the river that might have impact on private or common interest must receive permission from the Environmental Court*)
- Authorization: The Swedish County Administrative Board (*) Applications forms, court process and environmental assessment: all of them have a cost
- Who pays for dam removal? Usually the owner
- <u>Funding</u>: There are some grants that can come from government, municipalities, NGO's, EU

Proposition of a grant funded by hydropower companies

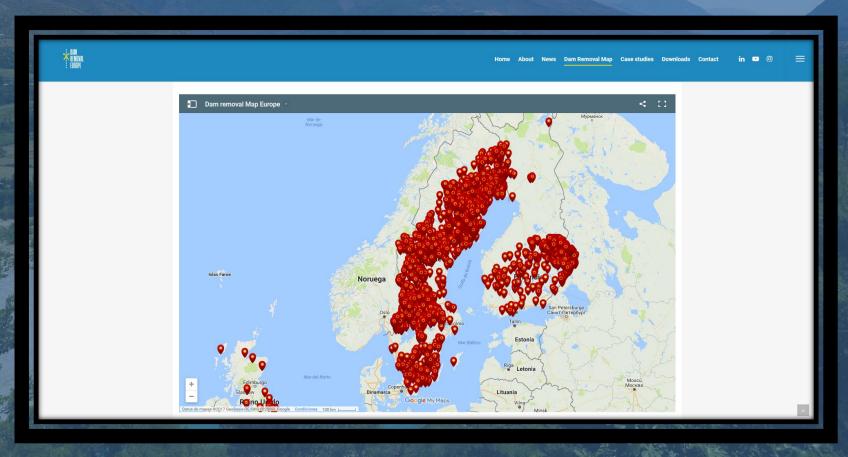
Cost: ?







Over 1,600 removed, mostly small barriers (Source: Länsstyrelsen i Jönköpings lä, County Administrative Board Jönköping)



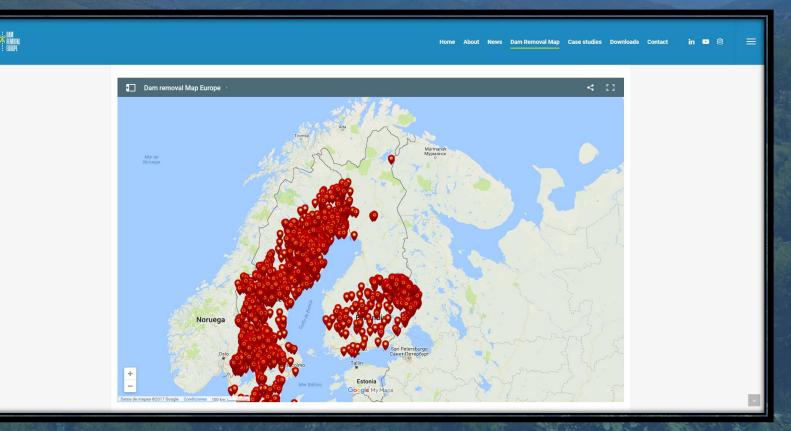


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At least 450 obstacles removed (Source: the Finnish Environment Institute, SYKE)







Finland

- Ownership: Rivers are private
- Drivers: Fishery interest to recover migratory fish stocks, recreation and tourism
- <u>Legislation</u>: There isn't any national law which stimulates dam removal, but there is a national fish passage strategy (2012) to improve migratory fish stocks
- Management:
 - ELY-centers (Centers of Economic Development, Transport and the Environment)
 - Hydropower companies: manage the river reach they impact according to their license
- Authorization:
 - ELY-centers
 - AVI (State Regional Administrative Agency)

Consultation is free of cost The permit/s have cost

- Who pays for dam removal? Until now ELY-Centers (with State money). Now also stakeholders
- Funding: No grants
- <u>Costs</u>: From 10,000 € ...







Upcoming important dam removal in the city center of Vantaa (planned for 2019) will cost 800,000€





Pictures source: Jukka Jormola (SYKE) presentation for ECRR, (Paris, 2017)



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No existence of a national inventory with all river obstacles, only with big dams DAM

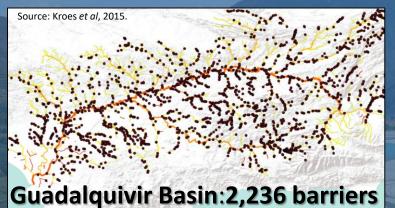
REMOVA



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Spain



(Source: Confederación Hidrográfica del Guadalquivir)



More than 26,000 obstacles collected from different River **Basin Authorities inventories**









- Ownership: Rivers are public owned
- Drivers: River connectivity for WFD
- Legislation: WFD & National law (Public Water Decree and the Public Property Lay 2003)
- Management: River Basin Authorities (National government or Regional Government)

Authorization:

- River managers (River Basin Authority)
- Protected Area manager (Autonomous Region)
- Flora and Fauna managers (Autonomous Region)
- Construction Permit (City Hall)

Free of cost

- <u>Who pays for dam removal?</u> The Promoting Body or interested agency.
 Even though Law obliges water permit holders to pay for the removal after the permit is over.
- Funding: No specific grants for river restoration
- <u>Cost</u>: 3,000 € 1,5 millions €





Source: CHT















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England & Wales: Over 22,000 man-made obstacles









Local Planning DAERA Dfl... Angling assoc., charities...

Environmental grants

Permits:

Who pays?

Funding:

Costs:

Almost never the owner

Environment Permit

Environmental grants, charities funds....

< £10,000 (majority of removals) Almost never the owner

Flood Risk Activity

Permit...

Environmental grants, charities funds....

Water Environment <u>Fund</u> (WEF)

SEPA Permit...

Company,

Grant

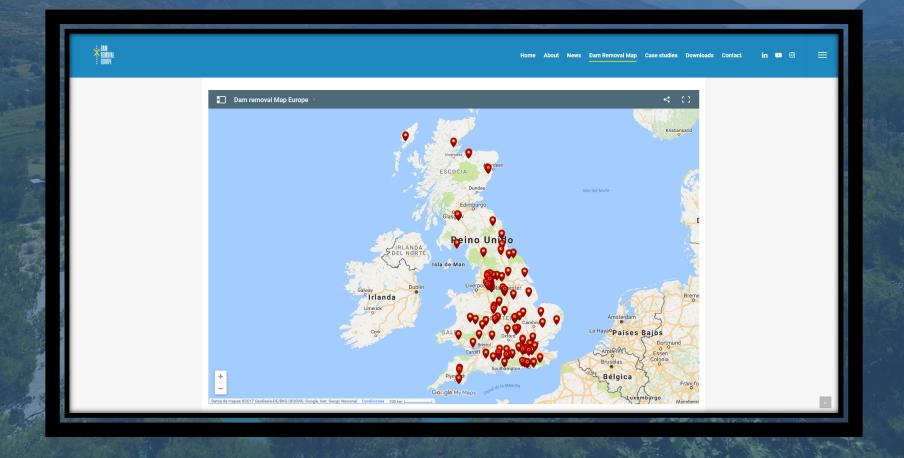
> £50,000







England & Wales: > 129 obstacles removed Scotland: 9 obstacles removed





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Thank you! ¡Muchas gracias!

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