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# FROM SEA TO SOURCE

International guidance for the restoration of  
fish migration highways



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# EXAMPLE

## Removing unused weirs to restore salmon connectivity

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### INTRODUCTION

Obstacles are probably responsible for the extirpation of more migratory fish populations worldwide than any other stressor. Low-head dams and weirs can greatly limit the distribution and abundance of Atlantic salmon and other migratory salmonids in streams. Weirs can significantly increase the vulnerability of migratory fish to anglers, alter natural migration patterns, and exacerbate the effects of opportunistic predators.

Overcrowding of fish at downstream pools can also facilitate the spread of parasites and infectious diseases, magnify the impact of pollution incidents, and increase the risk of mass mortalities, particularly at low flows. Yet, the benefits of removing low head dams and small weirs (i.e. those that do not represent a permanent or insurmountable barrier to fish migration) are only recently beginning to be addressed.

### WHAT DID WE DO?

At least 40 weirs and low head dams have been removed in 20 Spanish rivers for environmental reasons (chiefly to increase the area accessible to salmon and other migratory fish) during the last two decades, and many more are due to be removed within the next few years. These have ranged in height from 0.6 to 6.5 m (mean height = 2.4 m). Various benefits are sought from weir removal, including:

- 1 To facilitate upstream fish passage, particularly to the spawning and nursery grounds

(typically of higher quality and located in the headwaters and tributaries);

- 2 To ease downstream migration of smolts, particularly at low flows;
- 3 To reduce mortalities caused by stress, spread of infectious diseases, poaching, predation and increased vulnerability to angling.

### HOW DID IT WORK OUT?

The first weir to be breached in Spain for environmental reasons was possibly the Sinde weir (2 m) in the River Ulla, which was breached with hand tools during 1993. A few years later, in 1999, five unused weirs were demolished or breached in the River Asón with the aid of a hydraulic backhoe digger fitted with a hammer/breaker. Work was carried out during the summer to minimize silt transportation and run off. In some cases, the largest slabs and rocks removed from the weirs were used to stabilize the river banks. In other cases, these were simply left in place and were carried away with the subsequent autumn flows. A few months after the demolition of some of these weirs, migratory salmonids were seen ascending and spawning in areas formerly of difficult or impossible access.

### LESSONS LEARNED

Not all barriers can be removed easily, thus some form of prioritization strategy is required. We used a simple decision flow chart to demolish unused weirs in the salmon rivers of North Spain based on a field inventory. Abandoned weirs or

those without water abstraction rights are first targeted as these are legally easier to demolish. Although experience in removing weirs in Spain is still small and fragmentary we found the following advantages and disadvantages of weir removal over other solutions:

#### Advantages

- 1 Solves upstream and downstream fish passage;
- 2 Typically cheaper than any fish pass;
- 3 Achieves direct, integral stream restoration;
- 4 Addresses other problems (e.g. structural

safety);

- 5 Does not hinder future options.

#### Disadvantages

- 1 Not always practical or feasible;
- 2 Short-term mobilization of sediments, potentially toxic;
- 3 Limited experience in Europe (compared to fish passes);
- 4 Societal & cultural issues, historical value of some weirs;
- 5 Paperwork and red-tape: may take a long time to do it.

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#### WEIR REMOVAL IN PRACTICE

*The removal of the Trefilerias weir in the River Gandara which is a tributary of the River Ason (Cantabria).*

