

Background and context

D2.1 A list of solutions, models, tools and devices, their application range on a regional and overall level, the identified knowledge gaps and the recommendations to fill these

FIThydro (Fishfriendly Innovative Technologies for Hydropower: <http://www.fithydro.eu>) is a 4-year Horizon 2020 Project funded by the EU Research and Innovation Action (duration 2014-2020). The project aims to support decisions on commissioning and operating hydropower plants (HPP) by use of existing and innovative technologies. It concentrates on mitigation measures to develop cost-effective environmental solutions and strategies to avoid individual fish damage and to support the development of self-sustainable fish populations.

FIThydro brings together 26 partners from 10 countries, involving several of the leading companies in the renewable and hydropower energy sector in Europe. The project will examine 16 test cases in four European regions (Scandinavia, France/Belgium, the Alpine region and the Iberian Peninsula). Scenario modelling in the four different geographic, climatic and topographic regions will allow the quantification of effects, resulting costs and comparisons of the test case regions to draw conclusions about future hydropower production mitigation options in Europe.

Workpackage 2 aims to identify and to fill the knowledge gaps for a comprehensive assessment of self-sustained fish populations affected by hydropower. Existing solutions, methods, tools and devices on a regional and overall scale will be identified. This will allow us to build a working basis of existing as well as innovative SMTDs including their application range.

This report is comprised of the following sections:

- (1) Upstream and downstream migration
- (2) Turbines
- (3) Hydromorphology
- (4) Hydropeaking
- (5) E-flows
- (6) Fish characterization and habitat
- (7) Presentation of the Test cases

The first six sections correspond to the different surveys on the subjects: For each section, the needs of research are highlighted and some gaps will be filled during the project. The results coming from the FIThydro project are not included in these sections.

In the seventh section, the test Cases are presented in order to identify the objectives for each site, the SMTD's applied and the gaps to fill.

Workpackage 2 is linked to workpackages 1, 3, 4 and 5. WP1 feeds WP2 through the fish survey, which reviews behaviour, physiology, and population ecology of migrating fishes in large rivers. WP2 is highly linked to WP3 as the two WPs deal with experimentations on the test cases. WP2 aims to identify the knowledge gaps while WP3 try to fill these gaps. WP4 will use the SMTDs identified in WP2 to build a wiki, which will be a guidance to implement the mitigation measures. WP5 fed the E-flow section thanks to its first deliverable, which is a review of the laws related to hydropower in all countries of the project. Please refer to WP1, WP4 and WP5 first deliverables.

[Full deliverable download](#) (29MB)

