A framework to identify cost-effective mitigation measures using Influence Diagrams

Adeva-Bustos A[1], Carolli M[1], Harby A[1]

[1]SINTEF Energy, Trondheim, Norway

Email corresponding author: ana.adeva.bustos@sintef.no

ABSTRACT: Hydropower's impacts on the aquatic ecosystem and the benefits that hydropower generates as a renewable energy source have been and are widely investigated. However, how to find the most cost-effective mitigation measures to maintain a sustainable fish population while maintaining or maximizing the benefits of hydropower production is still a challenge. This challenge is partly triggered by the uncertainties related to the lack of data, difficulties related to finding one or more indicators to measure effectiveness, and the transferability of data from different case studies to a more general context. To deal with these challenges and as part of the EU-funded research project FIThydro (Grant Agreement number 727830, duration 2016-2021), we have been working in a framework that uses Influence Diagrams as probabilistic networks for identifying cost-effective mitigation measures (both stand-alone and in combination) based on their likelihood of success and their costs. This framework has been applied in three different test-cases: Las Rives in France, Anundsjö in Sweden, and Guma/Valdecondes in Spain. Each case had different challenges and mitigation measures. The development of the framework for each site and the results shows that it can be used to provide an initial guideline for water managers and stakeholders, identify potential knowledge gaps, trigger discussions, and offer first indications on where efforts should be placed to find potential mitigation measures. The method has been furtherly disseminated and promoted in a follow-up project, the FITHydro FORSTERK project (RCN 333224), focusing on the Scandinavian context.