

IEA Hydro Annex on Hydropower and Fish: A Roadmap for Best Practice Management

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ABSTRACT: Hydropower has been recognized as a significant source of renewable energy globally, with an increasing number of countries investing in its development. However, despite its benefits, hydropower has adverse effects on the natural environment, and fish are one of the most affected animals in freshwater ecosystems. While the relationship between hydropower and fish has been extensively studied, there is still a lack of standardized, widely applicable solutions to address the challenges associated with their coexistence. This roadmap provides a framework for designing and implementing mitigation measures to address the impacts of hydropower development on fish and their habitats.

The roadmap suggests a multi-phased process for evaluating the need for fish passage facilities and other solutions at new and existing dams. The first step is to analyze the existing policies and requirements for addressing the impact of hydropower on fish in the country or region of interest. This includes understanding the legal requirements for mitigation measures and identifying any conflicts between policies and goals. The roadmap then provides sustainable options for further consideration and decision-making, including flowcharts as decision-support tools to guide readers through the mitigation option selection process. The final important step is to establish an operational monitoring program that evaluates the effectiveness of the selected mitigation option.

The roadmap provides a valuable resource for practitioners in the hydropower sector and other stakeholders involved in managing hydropower and fish. By addressing relevant measures to mitigate changes in hydro-morphological conditions, water quality and quantity due to hydropower development, the roadmap offers a clear pathway towards viable solutions for the identified challenges. While the main focus of the roadmap is to provide relevant and effective sustainable solutions for fish populations, many of the same measures may also be beneficial for other aquatic species and their habitats. With the continued global expansion of the hydropower industry, the roadmap's framework based on understanding the impacts of hydropower on fish will be crucial in improving the decision-making process for designing and implementing relevant mitigation measures. By doing so, we can promote the sustainable development of hydropower while minimizing its impact on the environment and its inhabitants.

The roadmap was published in April 2023, and is available for download here [Hydropower and Fish - a Roadmap for Best Practice Management | Zenodo](#)