U.S. DEPARTMENT OF ENERGY

Advancing Hydropower for Fish & Industry

HYDROPASSAGE
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The hydropower community is faced with a major environmental challenge: balancing safe fish passage with cost-effective facility operations. HydroPASSAGE is focused on providing information and tools to increase fish survival through turbines and other hydropower structures across the U.S. and around the world.

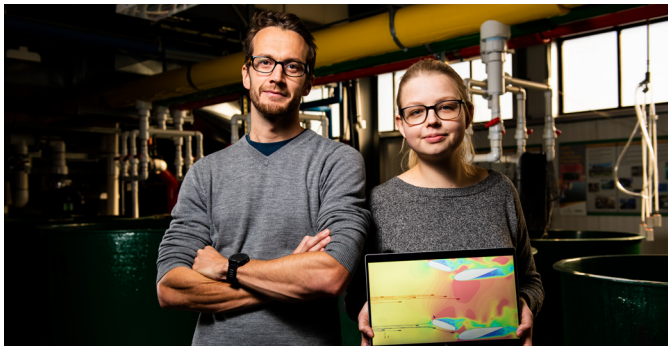
The HydroPASSAGE project builds on over 25 years of Department of Energy-supported basic and applied research aimed at understanding the impacts of hydropower on fish. This is a research and development collaboration between engineers and biologists from the U.S. Department of Energy's Pacific Northwest and Oak Ridge National Laboratories that is finding solutions to improve downstream fish passage conditions through turbines and other hydropower structures.

HydroPASSAGE Tools

Through the HydroPASSAGE project, researchers are working to develop biological response models to understand how fish are likely to respond when exposed to hydraulic and physical stressors associated with turbines and other hydropower structures.

HydroPASSAGE toolsets allow researchers to assess fish biological responses, supporting downstream passage evaluations of over 20 different fish species, such as American eel, Chinook salmon, and American shad. These toolsets and technologies enable improved fish passage through better design and evaluation which are critical to supporting the development of new and refurbishment of existing hydropower facilities.

HydroPASSAGE toolsets are currently being used by diverse stakeholders during the decision-making process when developing new turbines, refurbishing old turbines, or designing new structures at existing plants to improve fish survival.



Biological Performance Assessment Toolset (BioPA)

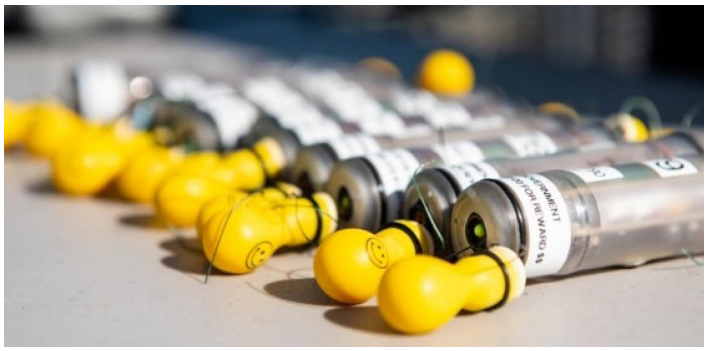
BioPA informs the design and operation of hydropower turbines by relating computational fluid dynamics (CFD) models of hydraulic conditions to fish biological response models.

BioPA enables hydropower manufacturers and owners with CFD models of their turbines to assess the potential impacts to fish and estimates the relative risk of adverse effects that fish may experience during turbine passage.

Hydropower Biological Evaluation Toolset (HBET)

HBET relates data collected by field-based sensors (e.g., Sensor Fish, acoustic telemetry) to biological response models for downstream fish passage at hydropower facilities.

This information enables hydropower operators and hydropower turbine designers to the identify risks and physical stressors that may impact fish and come up with alternatives to improve biological performance.



Sensor Fish

The Sensor Fish, commercially available through Advanced Telemetry Systems (ATS), is a small autonomous sensor package that can be deployed in a laboratory or field environment to provide physical measurements for acceleration, pressure, rotational velocity and orientation. This can be correlated to what real fish may experience during downstream passage.

For information about licensing:

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