Downstream Fish Passage through Hydropower Turbines

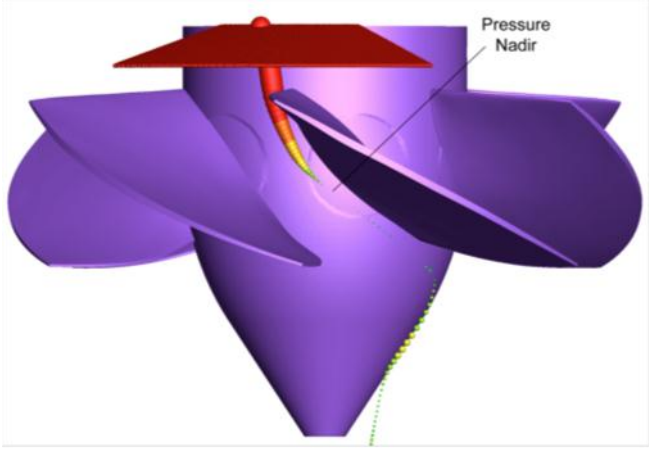
Background

One of the most widespread environmental constraints to the development of hydropower in the U.S. is the provision of adequate fish passage at projects. Mortality of downstream migrating fish, particularly as a result of passing through hydropower turbines, remains a serious problem at many sites. The fish passage task focuses on refining our understanding of turbine and reservoir passage stresses and predicting the responses of a wide range of fish species to those stresses.

Project Objectives

- Better characterization of causes of injury/mortality to fish during turbine passage
- Predictions of injury/mortality among untested fish species using traits-based assessment techniques (or similar approaches)
- Development and experimental verification of computational models to predict turbine passage survival for different species, turbine designs, and operating conditions

Schematic of a turbine runner that depicts the drop in water pressures to low values (nadirs) that are injurious to fish.



Products

The information developed by these studies will be conveyed in conference presentations, technical reports, and peer-reviewed publications. Presentations on these efforts have been made at the International Conference on the Status and Future of the World's Large Rivers, EPRI-DOE Conference on Environmentally-Enhanced Hydro Turbines, and the annual conferences of the Ecological Society of America and the American Fisheries Society. Annual reports are submitted to DOE, and publications in peer-reviewed journals will be developed as appropriate.

Point of Contact:

Marshall Richmond, PI
Pacific Northwest National Laboratory; marshall.richmond@pnl.gov; 509-372-6241

Glenn Cada
Oak Ridge National Laboratory; cadagf@ornl.gov; 865-574-7320