

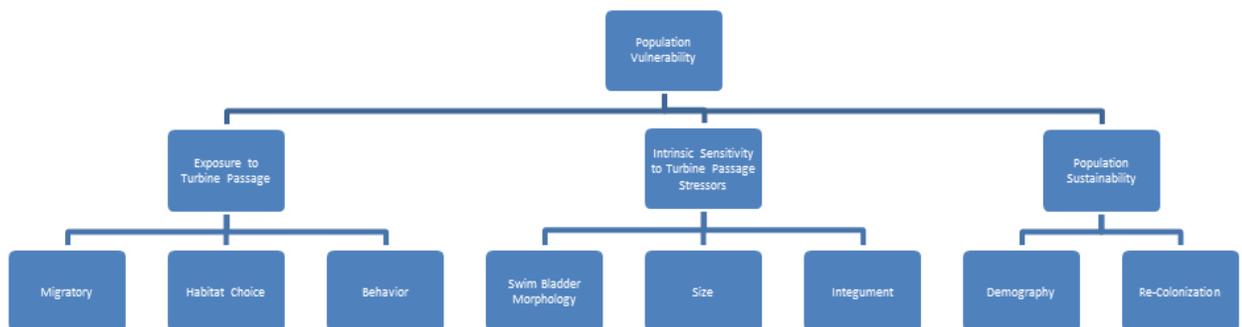
# The Use of Traits-Based Assessment to Estimate Effects of Hydropower Projects on Fish Populations

## Background

Safe downstream passage of fish at conventional hydropower projects affects not only migratory species, but also resident fish by altering biomass, biodiversity, and gene flow. Thus, it is important to maximize turbine-passage and reservoir-passage survival of a wide range of riverine fish. Advanced (fish-friendly) turbines show promise for reducing downstream passage mortality, but data on their beneficial effects are limited to only a few species, mainly salmon and trout. For thousands of untested species and sizes of fish, the particular causes of downstream passage losses and the benefits of advanced turbine designs remain unknown. It is not possible to measure the downstream passage survival of every species of fish for every hydroelectric project or turbine design. We are exploring the use of a Traits-Based Assessment (TBA) approach to group species based on their environmental, biological, behavioral, and life history characteristics.

## Project Objectives

TBA allows us to identify for a river basin the fish species that are most susceptible to turbine passage, identify species sharing similar sensitivities to turbine passage stressors, and consider population sustainability in the event of downstream passage losses. The approach is transferable to fish communities from different biogeographic regions. TBA could be used to identify representative fish species for testing, assess impacts of new hydropower development, and develop mitigation measures.



## Fish species traits that influence the risk of downstream passage losses at hydroelectric power plants

## Products

Presentations have been made at the HydroVision Brazil 2011, the 2012 National Conference on Engineering and Ecohydrology for Fish Passage, and the annual conference of the American Fisheries Society. Annual reports are submitted to DOE, and publications in peer-reviewed journals are being developed.

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