RECLAMATION
Managing Water in the West

Water Prize Competition Center

Improving Fish Exclusion from Water Diversions and Intakes

Planned Launch: March 2019

Problem Statement: The development of water resource infrastructure and operational criteria must conform with federal and state regulations that protect the environment and public health and safety. One specific environmental concern is the movement of aquatic species, most notably fish, out of natural habitats and into unnatural environments which may be harmful or deadly. This movement is referred to as "entrainment." Opportunities to reduce entrainment at diversions and intakes will promote more sustainable and reliable water resource systems that can provide public benefits to a larger extent.

While effective fish exclusion for some fish species and life history stages can be achieved, improvements are needed to increase effectiveness and decrease the costs associated with fish exclusion devices. For example, physical exclusion barriers such as fish screens can have high operation and maintenance costs and are prone to biofouling as well as clogging by debris, sediment, and ice. Fish screens must maintain specific hydraulic operating conditions to prevent entrainment and impingement, which is especially challenging to optimally achieve for hydropower because of both fish species diversity and the broad range of conditions involving river hydraulics and hydropower plant designs. In addition, fish screens do not successfully exclude larval fish and eggs. Non-physical barriers such as strobe lights, sound, bubble, electricity, and louvers have been used with varying degrees of success for certain species and life stages but have lower exclusion rates than fish screens in some applications.

The Solution We Seek: Reclamation, Department of Energy's Water Power Technologies Office, U.S. Geological Survey, NOAA Fisheries, U.S. Fish and Wildlife Service, U.S. Army Corps of Engineers, State of Washington Department of Fish and Wildlife, and Pacific Northwest National Laboratory seek innovative methods for excluding fish from water diversions and intakes. Proposed solutions can include alternatives to fish screens or improvements to existing fish screens and can be applied to river and canal diversions or unscreened diversion pipes. Solutions must improve fish protection efficiencies and/or reduce costs compared to conventional methods. During this competition, submissions for a broad range of species of concern (e.g. salmon, sturgeon, eels) will be accepted.

Prize Competition Scope: This theoretical prize competition will encourage technology innovation and out-of-the-box thinking for a broad range of fish exclusion applications. A theoretical competition requires submission of a white paper describing in detail how the proposed solution can successfully exclude a certain species and size class of fish from a diversion or intake in a cost-effective manner.

Learn More: https://www.usbr.gov/research/challenges/fishexclusion.html

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