

PNNL-30973

***Umida AG Fish Protection  
Prize, Cooperative Research  
and Development Agreement  
Final Report (CRADA) PNNL***

*CRADA 487*

February 2021

David R. Geist

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**CRADA Final Report**  
**Cooperative Research and Development Agreement Final Report**  
**Report Date: February 6, 2021**

In accordance with Requirements set forth in the terms of the CRADA, this document is the CRADA Final Report, including a list of Subject Inventions, to be provided to PNNL Information Release who will forward to the DOE Office of Scientific and Technical Information as part of the commitment to the public to demonstrate results of federally funded research.

**Parties to the Agreement:**

**PNNL/Battelle Memorial Institute**  
**Drought Diet Products, dba: Umida AG**

**PNNL CRADA Number: 487**

**CRADA Title: Umida AG Fish Protection Prize**

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**Joint Work Statement Funding Table showing DOE funding commitment:**

Estimated Costs	PNNL Shared Resources	Participant Shared Resources	Participant Funds In	Totals
Year 1	\$11,000	\$30,000	\$ 0	\$41,000
TOTALS	\$11,000	\$30,000	\$ 0	\$41,000
Fed Admin Charge on Funds-in	----	----	----	

**Executive Summary of CRADA Work:** In FY2020, the National Renewable Energy Laboratory (NREL) initiated a Prize competition with support from Pacific Northwest National Laboratory (PNNL), and sponsored by the U.S. Department of Energy Water Power Technologies Office (DOE WPTO), to support the development of innovative methods for excluding fish from water diversions and intakes: the Fish Protection Prize. Proposed solutions can include new ideas for addressing fish exclusion or improvements to existing technologies. Solutions can be applied to river and canal diversions, unscreened diversion pipes, or intakes at dams.

The Fish Protection Prize competition under this phase had three stages:

1. Concept stage (January - June 2020): WPTO announced the Prize competition, solicited submittals, and worked with NREL and PNNL to select up to 10 Finalists to advance to the second stage.
2. Incubation stage (June - September 2020): Nine finalists received up to 50 hours of voucher support each from PNNL as they prepared for the third stage.
3. Pitch Contest stage (September 2020): The 9 finalists competed in a “Pitch Contest” that occurred during the American Fisheries Society Annual Meeting in September (a virtual meeting in 2020). At the end of the Pitch Contest, the DOE WPTO Prize judges selected three Grand Prize Winners to receive up to \$700,000 of combined cash prizes and additional voucher support from PNNL to develop their proposals in FY21.

**Summary of Research Results:**

- In FY20 PNNL provided voucher support in the form of technical reviews and support, as well as graphics and presentation support, in helping the 9 finalists prepare for the Pitch Contest at the American Fisheries Society (AFS) virtual meeting.
- No subject inventions, patent applications, copyrights, and trademarks under this CRADA.
- Products Developed: Abstract and link to American Fisheries Society presentation (attached).

**Abstract Copied From AFS 2020 Meeting Website:** This solution is a byproduct from our innovation irrigation pipe (Aquifer Pipe, patent pending). The Aquifer Pipe is designed to create a virtual water table subsurface, by distributing water like a subterranean water stream. For fish protection, we use the same Aquifer Pipe (upside down) in reverse to withdraw water. Mimicking nature's way of infiltration, the technical term is downwelling. A very flexible solution able to manage 1 csf up to 5,000 csf or more.

The Aquifer Pipe is placed 1 to 2 feet below the river's bottom and covered with gravel to mimic spawning grounds. The water flows through the gravel at 1 inch per second (downwelling). The gravel and sand act as filters to avoid any aquatic life from entering the pipe. Plus the Aquifer Pipe is shaped like an upside "U" and the large  $\frac{1}{4}$  seep holes are placed on the underside of the "U", this prevents any fish eggs from entering the pipe. We can even create an upwelling by pushing water into the Aquifer Pipe (a fish spawning benefit). Since the Aquifer Pipe is made from recycled plastic, it should have a useful life of 100 years or more with little to no maintenance.

**Link to presentation video at AFS 2020 Meeting website:**

<https://afs.confex.com/afs/2020/meetingapp.cgi/Paper/44426>