



# Technology & Development Status Report

## Engineering Program

FY 2009



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**PROJECT:** **Detecting Fish**      **CENTER:** [SDTDC](#)  
**Number:** 4E41L51      **PROGRAM LEADER:** [Alan Yamada](#)  
**SPONSOR:**      **Project Leader:** [Ryan Becker](#)  
**Proposer:**

### **PROJECT OBJECTIVES**

Stream passages at roads are designed using laboratory data to estimate the physical capacity of impacted aquatic species to cross the passage. Verifying that aquatic organisms actually are crossing such passages can be an especially challenging task on Forest Service land, but such assurance is always desired and often required. Current available technology tends to be limited by requirements of daylight and/or intensive manual data collection and reduction. The objective of the project is to locate or develop devices that can be operated in remote stream channels without any modification to the stream channel. The devices should have no impact on the habits of aquatic species, and should operate equally well under all lighting conditions and survivable turbidity levels.

**Changes to objectives:** No single potential device appears to offer the promise of meeting project objectives in all stream channel types or for all species of interest. Project objectives now define four separate regimes of interest; two for stream channel type and two for species size class.

### **SIGNIFICANT ACCOMPLISHMENTS**

- Several commercial products have been identified that partially meet project objectives. Most rely on analog or digital visible-light recording technology, and so require some type of light augmentation under low-light conditions. One system of particular interest is the [Vaki Riverwatcher](#), which uses infrared diode light sources and detectors to detect the passage of organisms without visible light. The system requires construction of a weir to control the passage of fish and thus only partially meets project goals. Project staff are conducting tests of infrared laser rangefinders, which will operate under the same principle as the Riverwatcher, but without a weir to control fish passage.
- Technology utilizing electrical imaging has recently been located. This may prove to be a more robust option, allowing clear imaging in a wider variety of stream channel profiles and flow regimes. The Forest Service recently issued a Request for Information regarding the problem to solicit possible solutions to the identified limitations of existing technology. Information is due mid-June, and early responses and requests for clarification indicate strong interest from both manufacturers and users.

### **Output:**

**Planned:** Contact vendors to discuss project objectives and propose partnership.

Develop infrared laser rangefinding technology to enable in situ measurement of aquatic organisms.

Collect controlled test data to determine operational capabilities of system.

Review submitted information and issue a Request for Proposals if, based on the information, the chance of success of formal development seems high.

**Actual:** SDTDC has developed a novel device that uses a very high-frequency electric field projected from a flexible mat across a streambed to detect fish passage in day or night and at a wide range of turbidities. As of June 2008, the device is undergoing field testing on the Ouachita National Forest in Arkansas. Three additional field tests are planned.

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