

## **Utilizing Separation by Code to Locate the Source of Hydroproject Fish Mortality**

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This poster describes using SbyC to rule out orifices as the location of a problem that was killing fish at John Day Dam.

From mid-April to mid-May 2010, the Smolt Monitoring personnel at John Day Dam were finding dismembered fish in the daily samples at a rate of about 2%. Numerous investigations failed to locate the problem area so use of the SbyC system was suggested. Although orifice inspections had not revealed a problem, orifices continued to be the primary suspect area because they had recently been worked on and orifice velocities are sufficient to dismember fish.

To rule out orifices as the problem area, we planned a PIT tagged fish release in the bypass channel, downstream of the orifices. If we had similar injuries in the test fish, we could conclude that the problem was not an orifice.

NOAA Fisheries personnel agreed to PIT tag and release 100 yearling Chinook smolts into the farthest upstream location in the bypass system near MU 16. After release, these test fish would be recaptured using the Separation by Code capabilities and examined.

The day before the PIT tagged test fish were to be released, a project maintenance person communicated to the biologist that he had worked on some metal plates in the bypass channel and perhaps they had come loose and could be the cause of the fish injuries. The channel was dewatered and the problem area was revealed. Metal plates had separated from the wall and were protruding into the extremely high velocity area just downstream of the tainter gate. The plates were removed and the system was watered up.

However, since all preparations had been made to release test fish, we decided to proceed with the test to verify that we had found the problem.

Unfortunately, the test results did not help confirm our assumption because we recorded 5% mortality versus the 2% we had been observing. Furthermore, we observed normal background mortality rates that day and the next day which helped confirm that the problem had been fixed and the 5% mortality rate on the test fish was caused by something else.

### **Lessons Learned**

1. PIT tags and the SbyC system can be used to help locate problems in a bypass system.
2. SbyC has proven to be effective at recovering test fish but the test is only as good as the procedures prior to recapture, such as: tagging, holding, transportation, and release.
3. Upon detection of unusual mortality, convene an "all hands" meeting to brainstorm about what work has been done recently and if that work could be the source of the problem.
4. When looking for problems in a bypass, it may be most expedient to dewater the entire bypass immediately and visually inspect the system, if possible.
5. Any work in a fish passage route should be approved by the project biologist before it is done and inspected by the biologist when the work is complete.