SSA's Easy-to-Install, Low-Cost Culvert Baffle Helps Fish Get to the Other Side

Students installing Flexi Baffles in Bon Accord Creek, Surrey, British Columbia, as part of the Salmon Habitat Restoration Program. The Flexi Baffle can be quickly installed using hand tools.

In August, the Biden administration announced nearly $200 million in federal infrastructure grants to improve culverts that prevent fish from migrating upstream. Washington State will receive $58 million of those funds—more than any other state—on top of the $3 billion that the state has already authorized for those improvements. Removing those thousands of barriers can be time consuming and costly. But SSA Environmental, based in Vancouver, Washington, has a simple fix: a flexible culvert baffle and other easy-to-install solutions. In this interview, owner Shane Scott talks about how the company is helping utilities and transportation agencies manage and prioritize their culvert solutions.

Municipal Water Leader: Please tell us about your background and how you came to be in your current position.

Shane Scott: For the last 30 years, I have represented public utilities in the Pacific Northwest, providing input and guidance on hydro development and fish and wildlife mitigation activities. In the 1990s, I started working for Tacoma Power as a fisheries biologist. Then, I moved to the Washington Department of Fish and Wildlife as the Columbia River policy coordinator. For the last 20 years, I have worked on fish passage issues at the big federal dams on the Columbia River, from Grand Coulee down to Bonneville. I have seen the great progress we have made on improving fish passage and survival at these dams.

Municipal Water Leader: Please tell us about SSA.

Shane Scott: Although dams are the number 1 issue for fish passage, culverts are a close second. We can get fish

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over dams, but once they get to culverts, that is quite often the end of the road. In 2010, I met Kelly Huges from New Zealand, who had developed a suite of products that improve fish passage through culverts. In 2020, I formed SSA Environmental to bring these technologies to North America. We currently work with land owners, natural resource and transportation agencies, Native American tribes, First Nations, and conservation groups—any entity that works on fish passage issues at culverts. I work with the client to characterize the passage issue and then recommend a solution. We supply the various fish passage solutions, then work with the client on installation and monitoring. We are working to onshore our manufacturing, so now most of our products are made in the United States.

Municipal Water Leader: Would you tell us about the problem posed by culverts?

Shane Scott: Culverts under roads often create barriers to fish and other aquatic organisms. Often the water in the culvert is too shallow and fast to allow fish and other organisms to pass through and access habitats upstream. A few years ago, Washington State was sued by the Puget Sound–area tribes over salmon habitat as part of a larger process of litigation that has been going on since the 1970s. The settlement in that lawsuit, which went to the U.S. Supreme Court, required the state to fix culverts that are blocking salmon from their spawning habitat. In Washington State, there is a massive program of about $3.8 billion to be spent by 2030 to remove fish passage barriers. Culvert removal or replacement can be expensive: Removing some of the larger culverts might take $1 million for planning and another $1–$10 million for the removal itself. Washington State has about 19,000 fish passage barriers, over 80 percent of which are culverts. Extrapolate from the state's numbers to all of North America and you will see that we have a big problem.

Municipal Water Leader: Tell us about your flexible culvert baffle.

Shane Scott: The first product that SSA developed was the Flexi Baffle, a flexible rubber weir that is put into a culvert at certain intervals of space to create more stream-like conditions and, in a sense, turn your culvert into a fish ladder. The main benefit of a flexible baffle is that it bends over in high water and does not catch debris. This flexibility also maintains the hydraulic capacity of the culvert. The baffles are made of a long-lasting nontoxic rubber. For a few hundred dollars, you can install baffles and improve fish passage in a culvert. It is a low-cost, low-risk installation.

We also supply a Floating Culvert Ramp that provides the hydraulic connection between the plunge pool and the culvert. By combining the floating ramp and the baffles, you can create a passage through a culvert, especially for strong-swimming fish. These things are very inexpensive compared to removing or replacing a culvert.

In August, I was in Surrey, British Columbia, helping a group of high school and college students install Flexi Baffles in a large concrete flume as part of the city's Salmon Habitat Restoration Program. The water depths in the flume were too shallow and the velocities too fast to allow salmon to pass upstream to available habitat. The Flexi Baffles slowed the water and increased its depth to improve fish passage conditions. We expect salmon to be passing through the flume this fall for the first time in decades.

One benefit of a flexible baffle such as the Flexi Baffle is that it bends over in high water and does not catch debris.

Municipal Water Leader: What other products does SSA offer?

Shane Scott: Another product we are excited about is our Fish-Friendly Tide Gates. In tidal areas, the land gets flooded during high tide, and in some places, there are tide gates that close during high tide to prevent saltwater intrusion. Salmon have a hard time navigating traditional flap gates. Our tide gate is designed to stay open a little longer during an incoming tide so that more water and salmon can pass through. When the water reaches a certain velocity or elevation, they close.

We have also developed a comprehensive fish passage barrier assessment and prioritization program that helps clients identify and manage culverts and other fish passage barriers. This program consists of two integral components: a field assessment program and a fish passage barrier management database. The field assessment program includes a field application designed for the collection of data on barriers. Each client then receives a customized structures management database that they can use to manage barriers. Existing inventories of fish passage barriers can also be added to this database. As new barriers are identified or mitigation measures are executed, information about them is added to the database, enabling real-time status updates about fish passage barriers. Barriers can also be categorized

Another Flexi Baffle installed in a culvert.

to prioritize mitigation actions based on specific management objectives.

Municipal Water Leader: What results have your clients seen from installing your products?

Shane Scott: I have heard reports that people see small trout swimming through culverts even while they are installing the baffles, so the reward is nearly immediate. As you eliminate the velocity barrier and increase the water depth, you improve fish passage conditions in the culvert. We can also provide computational fluid dynamics modeling to demonstrate how we improve the culvert hydraulics to support better fish passage.

Municipal Water Leader: What is the process for a potential client who is interested in your products or services?

Shane Scott: When we are contacted by a potential client about a barrier, we work with that agency's biologist or engineer to develop what I call a prescription for the barrier. We look at its size, shape, and gradient and whether there is a plunge pool at the end. We look at the type of fish and other organisms that are in the creek or river. We develop a recommendation for the spacing of the baffles to maintain a certain amount of water throughout the culvert.

After an order is placed, my son and I go to my shop and cut the Flexi Baffles to size, put them on a pallet, and take them to a trucking company. We offer simple products that can be installed by our clients using hand tools, typically in a few hours. The process is quite simple and inexpensive compared to installing a solid baffle or removing a culvert.

Municipal Water Leader: What is your vision for the future of your company?

Shane Scott: My vision is to improve fish passage at every culvert. The next phase of service that we're bringing to North America is culvert management prioritization. We can help cities or smaller jurisdictions that don't have the time and staff to manage all their culverts to figure out how to prioritize that work, and we can integrate our management with that entity's programs. M

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