

PAMBuoy acoustic monitoring system helps protect salmon rising at new Forth Road Bridge crossing

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The new PAMBuoy acoustic monitoring system officially launched last month by SMRU Ltd, the spin out from the Sea Mammal Research Unit at University of St Andrews, is being used to protect salmon in the River Forth estuary during the construction of the new Forth Road Bridge.

PAMBuoy systems are installed from the legs of the existing road bridge, with [hydrophones](#) in the water, monitoring the noise generated from construction activities. The measurements are sent back to FCBC (Forth Crossing Bridge Constructors) the construction consortium client, and SMRU Ltd using 3G smartphone technology ensuring real-time, up-to-date information is available for operational decision making. In addition PAMBuoy is delivering a remote monitoring unit which the FCBC team are using to get [real-time data](#) on their activities whilst deployed from a drifting vessel.

The Forth Replacement Crossing (FRC) is being delivered by Transport Scotland on behalf of the Scottish Government. It is the biggest civil engineering infrastructure project in Scotland for a generation, and is designed to safeguard a vital connection in the country's transport network.

Supplied on a rental basis by SMRU Ltd and Marine Instrumentation Ltd, PAMBuoy systems have just completed their first 12 month's deployment, monitoring the marine construction noise levels to ensure

safe passage for salmon and lamprey to protected areas further up the River Forth.

Dr Cormac Booth, the scientist on the project says: " We have set this PAMBuoy device specially to detect noise levels that would affect salmon and lamprey fish...especially those focused on noise frequencies they hear best. In the last 12 months that we have been doing this, no noise levels have exceeded the regulatory thresholds, keeping the estuary open and safe for these fish allowing them to get upstream and enabling the bridge team to continue construction without any fear of breaking environmental laws."

Neil Abraham, FCBC Environmental Manager, said: "FCBC's aim is for this project to be seen as a benchmark for world class environmental care in large scale construction projects. The underwater work we are doing is especially important and the PAMBuoy acoustic monitoring equipment is playing a vital and fundamental role in mitigating impacts on Atlantic salmon during our operations."

The contractor building the new bridge is Forth Crossing Bridge Constructors (FCBC) which is an international consortium comprising Hochtief Solutions AG, Dragados, American Bridge and Morrison construction. They are well under way in constructing the new cable stayed bridge across the Firth of Forth, west of the world famous road and rail bridges. The existing Forth Road Bridge has been deemed unsuitable as the only road crossing longer term, and the new [bridge](#), when it opens in 2016, will take all the traffic in its place.

The construction methods require the use of explosives and other potentially "noisy" methods resulting in increased noise in the marine environment. SMRU Ltd and PAMBuoy are using their patented real-time smartphone technology to deliver noise measurements to the FCBC team so they can ensure the impact on the marine environment and the

sea animals living in it is limited. This is accessed through a bespoke part of the PAMBuoy website, where customers can see the noise levels being monitored and reported in real time.

In effect if [noise levels](#) reach an unacceptable level for marine legislation requirements, piling and other construction activities can be stopped immediately. This is one method of deploying PAMBuoy technology but it can be used in other applications such as on a buoy at sea. SMRU Ltd and the SAMMO (Scottish Acoustic Marine Mammal Observatory) project, run by Dr Luke Rendell from the Sea Mammal Research Unit, has three buoys deployed off the east coast of Scotland, at St Andrews Bay, Stonehaven and at Arbroath, which are being used for scientific purposes to measure the activity of sea mammals.

Douglas Mundie, commercial director of SOI Group Ltd which is the holding company for SMRU Ltd, and has been involved from the outset in the development of this new technology: "This is an exciting PAMBuoy project and reflects increasing interest in marine mammal and noise monitoring and the value in having real-time information. Not only do we have our first commercial sale of PAMBuoy in Australia last month, and three buoys deployed offshore Scotland for the science teams at the university, we also have a test PAMBuoy in Puget Sound Seattle, "listening" for orcas (killer whales). We have other trials underway and great interest from across North America. "

More information: www.pambuoy.com/

Provided by University of St Andrews

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