

## **GOING WITH THE FLOW: A METHOD TO MEASURE AND MAP UNDERWATER SOUND IN TIDAL-STREAM ENERGY SITES**

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Developers of tidal-stream energy devices need to demonstrate that their devices do not significantly harm the receiving environment and underwater sound is a significant concern. Too loud and devices will introduce a new form of noise pollution, too quiet and they may be undetectable to animals (e.g. marine mammals) raising a collision risk. Good information is therefore needed on both device acoustic output and development-site background noise.

Measuring sound in areas of strong tidal flows is challenging. Most significant is the acoustic contamination produced by the tidal-stream on the measuring hydrophone (seabed or boat mounted). To address this we have developed a new methodology that couples the hydrophone to the flow itself. We use a self-contained drifter mounted hydrophone and recorder. The "Drifting Ear" uses a drogue to match progress with the moving water and hence the hydrophone does not experience passing water as it moves over the ground. The drifter's position is logged with a surface towed GPS. The unit is dropped from a boat upstream of the tidal energy site and then records as it drifts over the site. Using multiple moving drifters, simultaneously, allows ambient sound to be mapped.

We have tested and refined this method at several sites around Scotland particularly the EMEC tidal test site. The method works well in water flowing up to 4 m/s and up to sea-state 5. We suggest that this method can be considered for other high-flow sites where self-noise from water flow will be a significant problem.