

Go with the Flow?

Understanding salmon response to redirected flows



Hylsfjorden, Norway



Atlantic Salmon (*Salmo salar*) in River Suldalslågen

Potential impacts of hydroelectric related dam construction include redirecting large volumes of water through channels and turbines from the original river system. Redirected water flow may affect the migratory behaviour in diadromous fish by elucidating a sensory response that misleads fish into recognizing the redirected water as the mouth of its home river.

In 1996, the Norwegian Institute for Nature Research (NINA), with funding from the Suldal Salmon Project, through Statkraft Engineering and the Norwegian Directorate for Nature Management, initiated an acoustic telemetry project at the mouth of the Suldalslågen water system in southwestern Norway. The purpose of the study was to investigate the impact of redirected river water on the migratory behaviour of Atlantic Salmon (*Salmo salar*). The research was conducted using telemetry equipment as well as on-site engineering support provided by **Lotek Marine Technologies Inc.**

An acoustic telemetry system was designed to automatically detect and record the passage of tagged fish, so as to ascertain the ability of the study population to find and enter the river. Telemetry systems were deployed near the spillway and at the river mouth. The stations consisted of hydrophones and SRX_400 datalogging receivers configured for digitally encoded acoustic transmitter reception. Noise baffles were mounted to the hydrophones to assist in rejecting noise and echoes from the walls of the fjord, as well as to

create a directional response. An echo filtering feature, capable of ignoring unwanted echo pulses, further mitigated high reverberation levels associated with these geological features.

Thirty-five salmon were caught, tagged with the acoustic transmitters and released in the fjord. Behavioural differences in the Atlantic Salmon were observed by researchers during periods when the Hydro power station was running and the river water was being redirected. The results also clearly demonstrated the ability to record the presence and swimming direction of all tagged fish entering the River Suldalslågen and passing by the telemetry stations.

Lotek Marine is pleased to have played a supportive role in this project. Innovative acoustic products are continuing to assist researchers in answering critical questions regarding the impact of natural and anthropogenic perturbations on the behaviour of Atlantic Salmon, in Norway's fjords and elsewhere. Through its products and engineering services, **Lotek Marine** looks forward to participating in such challenging and important research projects.



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