

# AFS 2011 - SEATTLE

96-20 Use of Fixed and Mobile Acoustic Telemetry Systems to Understand Fish Responses to Habitat Variability in a Large River (Rhône, France)

*Wednesday, September 7, 2011: 2:30 PM  
304 (The Conference Center)*

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The presentation would summarize the advantages and limitations of both fixed and mobile acoustic telemetry equipment deployed in a fast flowing large river : the Rhône river (France). The objectives were to describe fish behavior in term of fish movements as responses to habitat variability due to the production of peaking electricity and temperature heterogeneity (natural or due to a nuclear power plant release).

At a local scale we used a fixed automatic acoustic telemetry system to record continuous movements of n=62 fish during short term (lower than day) habitat variability. The study was conducted in a 2 km long river stretch, from July to September 2009. In a 35 km long study site, we used a mobile acoustic telemetry system to record weekly position of n=108 fish over different seasons and different habitat conditions (low or high flows; low or high temperature...), from March to December 2010. Discharge and abiotic conditions (temperature, depth, velocity or substrate) were known (with an accuracy comparable with fish positioning accuracy) every where at any time (i.e. any discharge) using hydraulic 2D model calibrated and validated for the whole discharge range observed during telemetry studies.

Fixed telemetry system (accuracy of few square meters) enabled to define individual habitat use during different short habitat variability configuration (flow increase, flow decrease, temperature increase....). Three main species were represented : two native cyprinids, chub (*Leuciscus cephalus*) and barbel (*Barbus barbus*), and an invasive species, wels catfish (*Silurus glanis*). We analyzed habitat used, habitat preference, fish movement patterns versus habitat variability.

Mobile telemetry system (accuracy of few hundred square meters) enabled to evaluate space and time utilisation of fish (mainly the same species than for fixed telemetry study) at a larger scale and during different seasons encompassing the reproduction period, the summer or the winter periods. The different results obtained by both telemetry systems will be presented to illustrate the advantages and limitations of those systems in a large river to address fish displacement in response to discharge and temperature variability. This comparison also emphasized the contribution of a 2D hydrodynamic model to understand fish behaviour.