



## STAGE DE RECHERCHE M2 ECOLOGIE EVOLUTION GENOMIQUE

### Rentrée 2020

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# **Assessment of the temporal and spatial variation of acoustic receiver detection efficiency and how it effects ability to estimate salmonid smolt mortality during their estuarine migration**

### **Context**

The European Interreg SAMARCH project, started since 2017, aims to gain new information on salmonids marine phase in order to implement the regulations of both species Atlantic salmon (*Salmo salar*) and sea trout (*Salmo trutta*) in the English Channel area.

As part of SAMARCH, a tracking project has been realised in 2018-2019 in four estuaries: Tamar and Frome (UK), Bresle and Scorff (France). Acoustic tags, transmitting every 30 seconds, have been inserted in Atlantic salmon and sea trout smolts to study the mortality of these smolts during their migration through estuarine environments where water parameters variation and human activities are intense.

In parallel, acoustic range tests have been performed in the 4 studied estuaries to determine the acoustic detection efficiency at each acoustic receiver. These tests are rarely performed however this information is essential to pass from acoustic detection data to an estimation of mortality of salmonids through estuaries.

Acoustic detection efficiency decreases with the distance to the receiver that is why range tests are generally performed in line by deploying static tags a certain amount of time at different distance from an acoustic receiver, as it is recommended by acoustic providers. However, acoustic detections can also vary with the nature and shape of the bottom, with the environmental noise and the biofouling.

In this study, range tests have been performed in 8 directions around each receiver to assess the detection efficiency depending on the nature and shape of the bottom. Also tests tags were not deployed at a fix location but mobile to be representative of fish movement and get more realistic data.

### **Internship**

The Game and Wildlife Conservation Trust (East Stoke, Wareham, UK) offers a six-month internship within the SAMARCH smolts tracking project.

The student will have to develop an R script to analyse the existing acoustic range tests as well as the acoustic receiver's data to determine the acoustic efficiency in 3D of each deployed acoustic receiver. If the sanitary situation allows it, the student will also have to design and realise new acoustic tests to assess the impact of biofouling on the acoustic detection efficiency in Poole harbour where heavy biofouling occurs in spring.

Time allowing, the student would also develop a model integrating the acoustic receiver efficiency method with a simple smolt migration mortality process using simulated acoustic smolt detections and receiver efficiencies as input.

Supervision of the student will be done by Dr Céline Artero and Dr Stephen Gregory (GWCT) at the riverlab in Wareham (England) however online supervision will be considered in case of travel restriction due to the sanitary situation.

### **Pre-requisite**

- R software
- English speaking
- Able to work on a boat

### **Skills**

- Good level of R software
- Good scientific writing skills
- Autonomous
- Ability to work in a small team

To apply, please send a resume and a cover letter to Céline Artero ([cartero@gwct.org.uk](mailto:cartero@gwct.org.uk)) and Stephen Gregory ([sgregory@gwct.org.uk](mailto:sgregory@gwct.org.uk)) before the 31<sup>st</sup> of October 2020. Selected students will be interviewed by video conference.