



## COMMUNICATING SCIENCE SERIES

# CONSERVATION BIOLOGY OF THE EUROPEAN EEL

Tuesday, 12 January 2010

The Meeting Rooms, The Zoological Society of London, Regent's Park, London NW1 4RY

**Chair: Brian Knights, King's College London**

### **Declining European eel recruitment – background and a case study**

*Matthew Gollock, Interim Marine and Freshwater Programme Manager, ZSL*

Natural populations fluctuate for many reasons, and species will often adapt accordingly. However, in the case of the European eel (*Anguilla anguilla*) numbers have declined to such a level over the past 20 years that it has become an urgent concern to both biologists and policy-makers. In some cases, populations have been suggested to have declined by up to 95%. While this is obviously of huge concern in relation total eel numbers, it will also potentially have effects on species both up and down the food chain.

This talk will provide a background to the factors that have been implicated in the decline of eel recruitment across Europe. These impacts are both naturally occurring and anthropogenic, exist both in the marine and freshwater environments, and include habitat loss, disease, pollution, barriers to migration, changes in hydrological processes and exploitation. It is very likely that these impacts act synergistically and due to our poor knowledge of the eel and its remarkable life-cycle, we are only beginning to understand how the factors interact, and most importantly, how we might be able to counteract some of them.

Members of ZSL's Tidal Thames Conservation Project – part of the Marine and Freshwater Conservation Programme – have been actively monitoring the upstream elver movement in a number of tributaries in the Thames catchment for the last five years. The results and challenges of such a monitoring programme will be discussed. The potential factors that affect eel populations in the Thames will also be described.

### **Eel passes and closed-circuit television monitoring in the Somerset Levels and Moors**

*A. M. Don, Environment Agency*

In this talk I will describe the application of novel surveying techniques to assess the recruitment of European Eels, *Anguilla Anguilla*, into a low lying, heavily regulated watercourse, the King's Sedgemoor Main Drain (KSD) in the Somerset Levels and Moors. I will also examine developments in eel passes and recommend various best practices that could be adopted elsewhere based on the data that were successfully collected locally.

Upstream eel movements were first recorded by CCTV at Greylake Sluice (NGR ST39719 34458) on the KSD in May 2008. This was primarily done to assess the functioning of two

newly installed eel passes specified by the local Environment Agency Fisheries team as part of a Flood Defence capital renewal of this structure. A large number of data were collected in a short time and it was therefore decided to record all the eel movements over these passes as the basis of a formalized survey. These data were able to feed into and inform the newly created Eel Management Plan. Due to the nature of the recorded footage, it was not only possible to perform a direct count of the eels using the passes, but behavioural traits could also be observed and inferred which themselves have been of great value in understanding the mechanics and stimuli for upstream eel migration. Eel movements have been compared with environmental criteria provided by various telemetered sites that the Environment Agency control. This talk examines the methodology, the data and the implications for eel pass design and construction, with recommendations for future work.

#### **Acknowledgements**

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#### **Further reading**

Moriarty, C. (1978): *Eels: a natural and unnatural history*. Newton Abbot, UK: David & Charles.

Tesch, F.-W. (2003): *The Eel*. Oxford, UK: Blackwell Science.

Wallace, K. (1993): *Think of an Eel*. London, UK: Walker Books.

### **What do silver eels do all day? Secrets of the oceanic migration of the European eel**

*David Righton, Centre for Environment, Fisheries and Aquaculture Science, Pakefield Road, Lowestoft, NR33 0HT*

The location of the spawning area of European eels (*Anguilla anguilla*) was discovered by the Danish scientist Johannes Schmidt in a series of research surveys nearly a century ago. The revelation that eels spawn in the distant Sargasso Sea has puzzled scientists ever since because, despite enormous effort to find them, no adult eels have ever been caught or observed in oceanic waters and attempts to track eels beyond the European continental shelf have had very limited success. As a consequence, almost nothing is known about the biology and ecology of eels during the second oceanic phase of their life (the first being their larval migration to Europe). Recent developments in electronic tags now make it feasible to track the migrations of eels over great distances and to collect information on their behaviour in unprecedented detail. With eel stocks in serious decline in Europe, understanding the oceanic influences on spawning behaviour and consequently on population dynamics is more important than ever. In this talk, I will present results collected from a study using miniaturized pop-up satellite archival transmitters (PSATs) that reveal for the first time the behaviour and environmental experience of European eels as they migrate across the Atlantic Ocean. The results are both surprising and illuminating. I will place these findings in the context of what we already know about the spawning migrations of eels, and how this information fits into the efforts being undertaken to safeguard the future of eel populations in Europe.

#### **Further reading**

Fort, T. (2003): *The Book of Eels*. London, UK: Harper Collins.

Schmidt, J. (1923): Breeding places and migrations of the eel. *Nature* **111**: 51–54.

Tesch, F.-W. (2003): *The Eel*. Oxford, UK: Blackwell Science.

van den Thillart, G., Dufour, S. and Rankin, C.J. (Eds) (2009): *Spawning Migration of the European Eel*. New York, USA: Springer.