

## **Dr Carol Sparling BSc (Hons), PhD**

### **CURRENT POSITION:**

Director of the Sea Mammal Research Unit, Scottish Oceans Institute, University of St Andrews

### **PREVIOUS:**

Technical Director of SMRU Consulting Europe 2015-2020

Principal Scientist, SMRU Consulting 2010-2015

Senior Ecologist, Strath Caulaidh Ltd 2007-2010

Research Fellow, SMRU, University of St Andrews 2003-2007

Research Assistant, Animal Energetics Gp, Dept of Zoology, University of Aberdeen 1996-1998

### **EDUCATION**

1998 – 2003: PhD The causes and consequences of variation in energy expenditure of grey seals. Sea Mammal Research Unit, Scottish Oceans Institute, University of St Andrews.

1992 - 1996: BSc (First Class Honours in Zoology (Marine Biology)), Department of Zoology, School of Biological Sciences, University of Aberdeen

### **PROFILE**

I specialise in the management and delivery of robust science and evidence based advice to meet the needs of industry, government and society. I have an academic background in seal energetics and behavioural ecology and physiology and over 20 years of experience researching, assessing, monitoring and mitigating the effects of anthropogenic activity on marine mammals, including the effects of underwater noise.

### **Relevant Areas of Expertise**

- While working as a marine mammal consultant (over 13 years) I led on a variety of projects involving the assessment of the impacts of underwater noise on marine mammals. This included the development and application of noise dose-response curves, the commissioning and interpreting of underwater noise predictive modelling, the use of modelling frameworks to predict the individual (energetic and survival) and population level consequences of exposure to underwater noise.
- I have led on marine mammal underwater noise impact assessments and associated Habitats Regulations Assessments for over twenty UK offshore wind farm projects.
- I was one of the experts that participated in the expert elicitation process for the development of the interim Population Consequences of Disturbance Framework (iPCoD). This allowed the incorporation of transfer functions between the exposure to noise and subsequent disturbance, and impacts on vital rates.
- Now representing SMRU as a research group, SMRU produces impartial, independent and innovative science that has high relevance to society, providing major input for the support of environmental policy in the UK. I manage the Unit and its staff, including delivery of major programmes of monitoring and research to deliver science to underpin UK and Scottish policy and decision making. This includes:
- A major strategic marine mammal research project funded by the Scottish Government (the Marine Mammal Scientific Support Research Programme MMSS/003/20), This

project carries out strategic research relevant to the conservation and management of Scotland's marine mammal populations.

- The long term observations of marine mammal ecology and population dynamics. NERC tasks the Sea Mammal Research Unit (SMRU) with addressing the questions it receives about the status of the populations and the drivers of population change from UK government each year. To achieve this SMRU carries out a programme of monitoring to determine the population status and trends of both species of UK seal. In addition, it conducts underpinning scientific research to understand the effect of different marine activities and developments on population growth rates and the survival and reproductive capacity and ecology of the two seal species.

## SELECTED RELEVANT PUBLICATIONS AND OUTPUTS

Hemery, L.G., Garavelli, L., Copping, A.E., Farr, H., Jones, K., Baker-Horne, N., Kregting, L., McGarry, L.P., **Sparling, C.** and Verling, E., (2024). Animal displacement from marine energy development: Mechanisms and consequences. *Science of the Total Environment*, p.170390.

Hague, E.L., **Sparling, C.E.**, Morris, C., Vaughan, D., Walker, R., Culloch, R.M., Lyndon, A.R., Fernandes, T.F. and McWhinnie, L.H., (2022). Same space, different standards: a review of cumulative effects assessment practice for marine mammals. *Frontiers in Marine Science*.

Gillespie, D., Oswald, M., Hastie, G. and **Sparling, C.**, (2022). Marine Mammal HiCUP: A High Current Underwater Platform for the Long-Term Monitoring of Fine-Scale Marine Mammal Behavior Around Tidal Turbines. *Frontiers in Marine Science*, p.283.

Palmer, L., Gillespie, D., MacAulay, J.D., **Sparling, C.E.**, Russell, D.J. and Hastie, G.D., (2021). Harbour porpoise (*Phocoena phocoena*) presence is reduced during tidal turbine operation. *Aquatic Conservation: Marine and Freshwater Ecosystems*, 31(12), pp.3543-3553.

**Sparling, C.**, Hague, E., Sinclair, R. and Booth, C. (2020). Improving Understanding of the Potential Effects and Consequences of Displacement of Marine Mammals by Wave and Tidal Stream Arrays and Development of a Suitable Assessment Framework. UK Marine Biodiversity Impact Evidence Group.

Gillespie, D., Palmer, L., Macaulay, J., **Sparling, C.** & Hastie, G. (2020) Passive acoustic methods for tracking the 3D movements of small cetaceans around marine structures. *PLOSOne* 15(5):e0229058.

Whyte, K. F., Russell, D.J.F., **Sparling, C.E.**, Binnerts, B. & Hastie, G.D. (2020) Estimating the effects of pile driving sounds on seals: Pitfalls and possibilities. *Journal of the Acoustical Society of America*, 147:6, 3948-3958.

**Sparling, C.**, Lonergan, M. and McConnell, B., 2018. Harbour seals (*Phoca vitulina*) around an operational tidal turbine in Strangford Narrows: No barrier effect but small changes in transit behaviour. *Aquatic Conservation: Marine and Freshwater Ecosystems*, 28(1), pp.194-204.

**Sparling, C.**, Gillespie, D., Hastie, G., Gordon, J., Macaulay, J., Malinka, C., Wu, M. and McConnell, B., 2016. Scottish Government Demonstration Strategy: Trialling Methods for Tracking the Fine Scale Underwater Movements of Marine Mammals in Areas of Marine Renewable Energy Development. *Scottish Marine and Freshwater Science*, 7, p.114.

Verfuss, U.K., **Sparling, C.E.**, Arnot, C., Judd, A. and Coyle, M., 2016. Review of offshore wind farm impact monitoring and mitigation with regard to marine mammals. In *The Effects of Noise on Aquatic Life II* (pp. 1175-1182). Springer, New York, NY.

Iverson, S.J., **Sparling, C.E.**, Williams, T.E., Lang, S.L.C. and Bowen, D.W. (2010)  
Measurement of Individual and Population Energetics of Marine Mammals. In Marine Mammal  
Ecology and Conservation: A Handbook of Techniques. Boyd, I.L., Bowen, W.D., & Iverson,  
S.J. (Eds).