

# Paul Michael Thompson, FRSE

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**Current Position:** Professor in Zoology and Director, Lighthouse Field Station.

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## Higher Education:

1979-1982 University of York, Heslington, York, YO1 5DD. B.Sc. (Hons) 2.1 in Biology.

1983-1987 University of Aberdeen, Aberdeen AB9 2TN. Ph.D. in Zoology.

Thesis title: The effect of seasonal changes in behaviour on the distribution and abundance of common seals, *Phoca vitulina*, in Orkney.

## Employment History:

Oct 2005 - Present	Professor in Zoology
Oct 2002 - Sept 2005	Reader in Zoology
Oct 1998 - Sept 2002	Senior Lecturer in Zoology
Jan 1994 - Sept. 1998	Lecturer in Zoology.
Sept 1987 - Dec 1993	Research Fellow in Zoology, University of Aberdeen

## Research Profile

My research explores the ecology and conservation of marine systems, with a particular focus on marine top predators. My group's investigation of drivers of change in the behaviour and dynamics of marine mammals and seabirds has been underpinned by the development and maintenance of long-term individual based studies of harbour seal, bottlenose dolphin and fulmar populations in the North of Scotland. In 1990, I established the University's Lighthouse Field Station with the dual aim of supporting these research activities and integrating them into teaching and outreach work. A key aim of the work has been to directly support regional conservation and management programmes, and through this to develop generic understanding and best practice case studies that provide insights into marine resource management issues elsewhere in the world.

Over the last 10-15 years, working with industry and government, I've led the co-production of a strategic marine mammal research and monitoring programme to support offshore wind developments in UK waters. The programme meets developer consent requirements and conducts empirical studies on protected populations to reduce key uncertainties that constrain current climate targets. Much of this work involves studies of responses to different sources of anthropogenic noise. Initial work using baseline data from our pre-existing population studies developed assessment frameworks that underpinned EIA consents. Subsequent research during construction of three commercial windfarms has tested assumptions underlying these frameworks and optimised mitigation measures used by industry and regulators.

## UNIVERSITY RESPONSIBILITIES

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### University Field Stations

1990 – Present: Director of the School of Biological Sciences Lighthouse Field Station.

1998- Present: Responsible for the University's field facility on Eynhallow, an uninhabited island in Orkney.

### Research Student Supervision

Over 30 PGR, 70 PGT and 75 UG students have conducted research projects within my group, most involving work on marine mammals. Others have developed their careers and research skills with us as PDRAs, RAs or Fieldwork Assistants. Many continue to work in marine research and conservation management, and our Alumni include: Marine Mammal Scientific Advisors at Marine Scotland, JNCC, Natural Resources Wales, NOAA; Academics & senior researchers at 5 UK and at 3 overseas Universities; Senior staff within NGOs such as WDC and RSPB; Marine Mammal Specialists within Consultancies such as Natural Power, Royal HaskoningDHV and Xodus.

## EXTERNAL ACTIVITIES

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### Membership of UK committees and advisory groups include:

- DEFRA Underwater Noise Strategic Advisory Group (2023)
- Marine Scotland Science Scientific Advisory Board (2009-2015)
- Marine Alliance for Science & Technology Scotland Science Board (2009-2012)
- Scottish Association of Marine Science Council (2002-2007)
- Scientific Advisor to the Moray Firth SAC Management Group (2000-2009)
- NERC Special Committee on Seals (1993-2007, 2013-2016)
- Scottish Natural Heritage Science Advisory Committee. (1995-1997)
- North-West Regional Board of Scottish Natural Heritage (1991-1997)
- Association for the Study of Animal Behaviour Council (1986-1989)

### Membership of international review panels and committees include:

- US NRC Committee on Ecological Effects of Mariculture. (2008-2010)
- NOAA Review of Cook Inlet Beluga Whales listing under the US Endangered Species Act. (2007)
- Scientific Advisors for the Society for Marine Mammalogy (2004-2010)
- NOAA Review of La Jolla Lab "Ecosystem research in the E. Tropical Pacific Program 2002)
- NOAA Review of US National Marine Fisheries Service Honolulu Laboratory's Research Program (2000)
- IUCN SSC Pinniped Specialist Group (1991-1999)
- US government review of Prince William Sound harbor seal recovery after the Exxon Valdez Oil Spill (1997)
- International Whaling Commission Scientific Committee (1996)
- ICES 'Marine Mammal Committee (1991-95)

## RELEVANT RESEARCH GRANTS & CONTRACTS

Dates	Funding body	Title	Value
2022-25	The Crown Estate	PrePARED	£1,044,516
2023-24	Ocean Winds	Moray Marine Mammal Monitoring Programme IV	£745,000
2021	BEIS	Responses to decommissioning noise	£11,250
2019-22	Moray East OWF	Moray Marine Mammal Monitoring Programme III	£1,465,086
2018-24	SNH	Bottlenose Dolphin Site Condition Monitoring III	£177,000
2017-21	Marine Scotland	Top predator responses to windfarms (PhD)	£42,412
2015-18	DECC	Comparison of windfarm assessment models	£45,600
2014-18	MASTS & MS	Porpoise distribution & activity (PhD)	£53,770
2014-20	Beatrice OWF	Moray Marine Mammal Monitoring Programme II	£1,818,727
2014-16	SG/TCE/HIE	Moray Marine Mammal Monitoring Programme I	£401,086
2012-14	BEIS	Cetacean responses to piling noise	£245,200
2012-18	SNH	Bottlenose Dolphin Site Condition Monitoring II	£167,900
2011-12	Scot Gov	Marine mammal monitoring methods assessment	£148,926
2010-13	Beatrice OWF	Pre-consent review and data gathering for EIA	£119,963
2010-14	Moray East OWF	Pre-consent review and data gathering for EIA	£230,713
2009-13	DECC	Impact of seismic surveys on cetaceans	£1,957,607
2006-09	Scot Gov & SNH	Population structure of Scottish Dolphins	£481,044
2005-08	SNH	Bottlenose dolphins & noise in the Moray Firth	£30,000
2005-07	EU 6 <sup>th</sup> Fr.	DOWNVIND – impacts of offshore windfarms	£166,974
2004-12	SNH	Bottlenose Dolphin Site Condition Monitoring I	£135,370
2002-06	Leverhulme	Integrating science & resource management	£84,266
1999-03	AFEN	Whale distribution in Faroe-Shetland Channel	£405,503
1998-2014	Talisman Energy	Support for core Moray Firth Research	£120,000
1998-2020	Chevron-Texaco	Support for core Moray Firth Research	£50,000
1998	SNH	Development of a dolphin population model	£32,182
1995-97	MAFF	Environmental contaminants & skin diseases in dolphins.	£159,705
1994-97	SOAEFD	Population and foraging ecology of Moray Firth seals	£252,665
1990-93	Greenpeace	Ecology of bottlenose dolphins in the Moray Firth	£59,150

## RELEVANT PUBLICATIONS

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- Fernandez Betelu, O., Graham, I.M., Malcher, F., Webster, E., Cheong, S., Wang, L., Iorio-Merlo, V., Robinson, S. & **Thompson, P.M.** (2024) Characterising underwater noise and changes in harbour porpoise behaviour during the decommissioning of an oil and gas platform. *Marine Pollution Bulletin* 200 <https://doi.org/10.1016/j.marpolbul.2024.116083>
- Benhemma-Le Gall, A., **Thompson, P.**, Merchant, H., Graham, I. (2023) Vessel noise prior to pile driving at offshore windfarm sites deters harbour porpoises from potential injury zones. *Environmental Impact Assessment Review* 103. [doi.org/10.1016/j.eiar.2023.107271](https://doi.org/10.1016/j.eiar.2023.107271)
- Graham, I.M., Gillespie, D., Gkikopoulou, K.C., Hastie, G.D. and **Thompson, P.M.** (2023) Directional hydrophone clusters reveal evasive responses of small cetaceans to disturbance during construction at offshore windfarms. *Biology Letters* 19. [doi.org/10.1098/rsbl.2022.0101](https://doi.org/10.1098/rsbl.2022.0101)
- Robinson, S.P., Wang, L., Cheong, S., Lepper, P., Hartley, J., **Thompson, P.M.**, Edwards, E., Bellmann, M. (2022) Acoustic characterisation of unexploded ordnance disposal in the North Sea using high order detonations. *Marine Pollution Bulletin* [doi: 10.1016/j.marpolbul.2022.114178](https://doi.org/10.1016/j.marpolbul.2022.114178)
- Iorio-Merlo, V., Graham, I.M., Hewitt, R.C., Aarts, G., Pirotta, E., Hastie, G.D. & **Thompson, P.M.** (2022) Prey encounters and spatial memory influence use of foraging patches in a marine central place forager. *Proceedings of the Royal Society B*. [doi.org/10.1098/rspb.2021.2261](https://doi.org/10.1098/rspb.2021.2261)
- Fernandez-Betelu, O., Graham, I.M., Brookes, K.L., Cheney, B.J., Barton, T.R., **Thompson, P.M.** (2021) Far-field effects of impulsive noise on coastal bottlenose dolphins. *Frontiers in Marine Science* 8.
- Benhemma-Le Gall, A., Graham, I.M., Merchant, N.D. & **Thompson, P.M.** (2021) Broad-Scale Responses of Harbor Porpoises to Pile-Driving and Vessel Activities During Offshore Windfarm Construction. *Frontiers in Marine Science* 8.
- Chudzinska, M., Nabe-Nielsen, J., Smout, S., Aarts, G., Brasseur, S., Graham, I., **Thompson, P.** & McConnell, B. (2021) AgentSeal: Agent-based model describing movement of marine central-place foragers. *Ecological Modelling* 440.
- Thompson, PM**, Graham, IM, Cheney, B, Barton, TR, Farcas, A, Merchant, ND. (2020) Balancing risks of injury and disturbance to marine mammals when pile driving at offshore windfarms. *Ecological Solutions & Evidence*. 1:e12034. <https://doi.org/10.1002/2688-8319.12034>
- Hastie, G., Merchant, N. D., Götz, T., Russell, D. J. F., **Thompson, P.**, and Janik, V. M.. 2019. Effects of impulsive noise on marine mammals: investigating range-dependent risk. *Ecological Applications* 29( 5):e01906. [10.1002/eap.1906](https://doi.org/10.1002/eap.1906)
- Graham, I.M., Merchant, N.D., Farcas, A., Barton, T.R., Cheney, B., Bono, S. & **Thompson, P.M.** (2019) Harbour porpoise responses to pile-driving diminish over time. *Royal Society Open Science* 6: [10.1098/rsos.190335](https://doi.org/10.1098/rsos.190335)
- Nabe-Nielsen, J., van Beest, F.M., Grimm, V., Sibly, R.M., Teilmann, J. & **Thompson, P.M.** (2018) Predicting the impacts of anthropogenic disturbances on marine populations. *Conservation Letters* [doi.org/10.1111/conl.12563](https://doi.org/10.1111/conl.12563)
- Pirotta E., Edwards E.W.J., New L. & **Thompson P.M.** (2018) Central place foragers and moving stimuli: A hidden-state model to discriminate the processes affecting movement. *Journal of Animal Ecology* DOI: [10.1111/1365-2656.12830](https://doi.org/10.1111/1365-2656.12830).
- Graham, I.M., Pirotta, E., Merchant, N.D., Farcas, A., Barton, T.R., Cheney, B., Hastie, G.D. & **Thompson, P.M.** (2017) Responses of bottlenose dolphins and harbour porpoises to impact and vibration piling noise during harbour construction. *Ecosphere* 8(5):e01793. [10.1002/ecs2.1793](https://doi.org/10.1002/ecs2.1793)

- Williamson, L.D., Brookes, K.L., Scott, B.E., Graham, I.M. & **Thompson, P.M.** (2017) Diurnal variation in harbour porpoise detection - potential implications for management. *Marine Ecology Progress Series* 570:223-232
- Williamson, L.D., Brookes, K.L., Scott, B.E., Graham, I.M., Bradbury, G., Hammond, P.S. & **Thompson, P.M.** (2016) Echolocation detections and digital video surveys provide reliable estimates of the relative density of harbour porpoises. *Methods in Ecology and Evolution*. DOI: 10.1111/2041-210X.12538
- Farcas, A. **Thompson, P.M.** & Merchant, N.D. (2016) Underwater noise modelling for environmental impact assessment. *Environmental Impact Assessment Review*, 57:114-122].
- Pirotta, E., Harwood, J., **Thompson, P.M.**, New, L., Cheney, B., Arso, M., Hammond, P.S., Donovan, C. & Lusseau, D. (2015) Predicting the effects of human developments on individual dolphins to understand potential long-term population consequences. *Proceedings of the Royal Society, B*. 282: 20152109. DOI: 10.1098/rspb.2015.2109.
- Russell, D.J.F., McClintock, B.T., Matthiopoulos, J., **Thompson, P.**, Thompson, D., Hammond, P.S., Jones, E.L., MacKenzie, M., Moss, S. & McConnell, B.J. (2015) Intrinsic and extrinsic drivers of activity budgets in sympatric grey and harbour seals. *Oikos*, 124: 1462-1472.
- Pirotta, E., Merchant, N.D., **Thompson, P.M.**, Barton, T.R. & Lusseau, D. (2015) Quantifying the effect of boat disturbance on bottlenose dolphin foraging activity. *Biological Conservation* 181: 82-89.
- Cheney, B., Corkrey, R., Durban, J.W., Grellier, K., Hammond, P.S., Islas-Villanueva, V., Janik, V.M., Lusseau, S.M., Parsons, K.M., Quick, N.J., Wilson, B., **Thompson, P.M.** (2014) Long-term trends in the use of a protected area by small cetaceans in relation to changes in population status. *Global Ecology and Conservation* 2: 118-128
- Bailey, H., Brookes, K.L. & **Thompson, P.M.** (2014) Assessing environmental impacts of offshore wind farms: lessons learned and recommendations for the future. *Aquatic Biosystems* 10
- Thompson, P.M.**, Brookes, K.L. & Cordes, L.S. (2014) Integrating passive acoustic and visual data to model spatial patterns of occurrence in coastal dolphins *ICES J. Mar. Sci.*, DOI:10.1093/icesjms/fsu110.
- Pirotta, E., Brookes, K.L., Graham, I.M. & **Thompson, P.M.** (2014) Variation in harbour porpoise activity in response to seismic survey noise. *Biology Letters*, 10: 20131090.
- Pirotta, E., **Thompson, P.M.**, Cheney, B., Donovan, C.R. & Lusseau, D. (2014) Estimating spatial, temporal and individual variability in dolphin cumulative exposure to boat traffic using spatially-explicit capture-recapture methods. *Animal Conservation*, DOI: 10.1111/acv.12132.
- Merchant, N.D., Pirotta, E., Barton, T.R. & **Thompson, P.M.** (2014) Monitoring ship noise to assess the impact of coastal developments on marine mammals. *Marine Pollution Bulletin*, 78: 85-89.
- Pirotta, E., **Thompson, P.M.**, Miller, P.I., Brookes, K.L., Cheney, B., Barton, T.R., Graham, I.M. & Lusseau, D. (2014) Scale-dependent foraging ecology of a marine top predator modelled using passive acoustic data. *Functional Ecology*, 28: 206-217.
- Thompson, P.M.**, Brookes, K.L., Graham, I.M., Barton, T.R., Needham, K., Bradbury, G. & Merchant, N.D. (2013) Short-term disturbance by a commercial two-dimensional seismic survey does not lead to long-term displacement of harbour porpoises. *Proceedings of the Royal Society, B*. 280: 20132001. DOI: 10.1098/rspb.2013.2001

**Thompson, P.M.**, Hastie, G.D., Nedwell, J., Barham, R., Brookes, K.L., Cordes, L.S., Bailey, H. & McLean, N. (2013). Framework for assessing impacts of pile-driving noise from offshore wind farm construction on a harbour seal population. *Environmental Impact Assessment Review*, 43: 73-85.

Merchant, N.D., Barton, T.R., **Thompson, P.M.**, Pirootta, E., Dakin, D.T. & Dorocicz, J. (2013) Spectral probability density as a tool for ambient noise analysis. *J. Acoust. Soc. Am.* 133, EL262, DOI:10.1121/1.4794934.

New, L. F., J. Harwood, L. Thomas, C. Donovan, J. S. Clark, G. Hastie, **P. M. Thompson**, B. Cheney, L. Scott-Hayward, and D. Lusseau. (2013) Modeling the biological significance of behavioural change in coastal bottlenose dolphins in response to disturbance. *Functional Ecology*, 27: 314-322.

**Thompson, P.M.**, Lusseau, D., Barton, T., Simmons, D., Rusin, J. & Bailey, H. (2010) Assessing the responses of coastal cetaceans to the construction of offshore wind turbines. *Marine Pollution Bulletin* 60: 1200-1208

Bailey, H., Parvin, S., Senior, B., Simmons, D., Rusin, J., Picken, G. & **Thompson, P.M.** (2010) Assessing underwater noise levels during pile-driving at an offshore windfarm and its potential effects on marine mammals. *Marine Pollution Bulletin* 60: 888-897.

Bailey, H. & **Thompson, P.M.** (2006). Quantitative analysis of bottlenose dolphin movement patterns and their relationship with foraging. *Journal of Animal Ecology*, 75, 456-465.

Hastie, G.D., Wilson, B., Wilson, L.J., Parsons, K.M. & **Thompson, P.M.** (2004) Functional mechanisms underlying cetacean distribution patterns: hotspots for bottlenose dolphins are linked to foraging. *Marine Biology* 144, 397-403.

Van Parijs, S.M., Corkeron, P.J., Harvey, J., Hayes, S., Mellinger, D., Rouget, P., **Thompson, P.M.**, Wahlberg, M. & Kovacs, K.M. (2003) Global patterns in vocalizations of male harbor seals. *Journal of the Acoustic Society of America*, 113, 3403-3410.

Hastie, G.D., Wilson, B., Tufft, L.H., **Thompson, P.M.** (2003) Bottlenose dolphins increase breathing synchrony in response to boat traffic. *Marine Mammal Science*, 19, 74-84.

**Thompson, P.M.**, Van Parijs, S. & Kovacs, K.M. (2001) Local declines in the abundance of harbour seals; implications for the designations and monitoring of protected areas. *Journal of Applied Ecology*, 38: 117-125.

Denardo, C., Dougherty, M., Hastie, G., Leaper, R., Wilson, B., & **Thompson, P.M.** (2001) A new technique for investigating variability in spatial relationships within groups of free-ranging cetaceans. *Journal of Applied Ecology* 38: 888.

**Thompson, P.M.**, Wilson, B., Grellier, K. & Hammond, P.S. (2000). Combining power analysis and population viability analysis to compare traditional and precautionary approaches to the conservation of coastal cetaceans. *Conservation Biology*, 14: 1253-1263.

Van Parijs, S.M., Hastie, G.D. & **Thompson, P.M.** (2000). Individual and geographic variation in display behaviour of male harbour seals, *Phoca vitulina*, in Scotland. *Animal Behaviour*, 59: 559-568.

Wilson, B., Hammond, P.S. & **Thompson, P.M.** (1999). Estimating size and assessing status of a coastal bottlenose dolphin population. *Ecological Applications*, 9: 288-300.

Janik, V.M. & **Thompson, P.M.** (1996). Changes in surfacing patterns of bottlenose dolphins in response to boat traffic. *Marine Mammal Science*, 12: 597-602.