

# CURRICULUM VITAE

## PROFESSOR I.L. BOYD FRSE

### PART 1: Personal details

**NAME:** Ian Lamont Boyd  
**DATE OF BIRTH:** 9 February 1957  
**NATIONALITY:** British  
**FAMILY:** Married, 3 children  
**CURRENT EMPLOYER:** University of St Andrews, St Andrews, Scotland  
**CONTACT DETAILS:** Professor I.L. Boyd, NERC Sea Mammal Research Unit, Gatty Marine Laboratory, University of St Andrews, St Andrews KY16 8LB, Fife, UK. Tel: 01334-462630. Fax: 01334-462632. e-mail: ilb@st-andrews.ac.uk

**QUALIFICATIONS:** 1979 B.Sc., (First Class Honours) in Zoology, University of Aberdeen.  
1982 Ph.D., Cambridge University (St John's College).  
1995 D.Sc., University of Aberdeen.

**CERTIFICATES:** Full, clean UK driving licence  
Home Office Project Licence  
CAA Private Pilot's Licence (non-current)  
UK certificate of competence in VHF radio telephony  
Royal Yachting Association Day Skipper Certificate

**CAREER HIGHLIGHTS:**

2007 - present	Chairman, Marine Science Scotland, Scottish Marine Science Pooling
2006	Marshall Award for Freshwater and Marine Conservation, Zoological Society of London
2006 - present	Chief Executive SMRU Ltd
2006 - present	Chief Scientist, Behavioural Response Study (US-Navy)
2002	Elected fellow of the Royal Society of Edinburgh
2001 - present	Professor in Biology, University of St Andrews
2001 - present	Director, Natural Environment Research Council, Sea Mammal Research Unit
1999 - 2008	Editor, Journal of Zoology (Editor-in-Chief, 2006 - 2008)
1998 - 2001	Science Programme Director, British Antarctic Survey
1998	Scientific Medal, Zoological Society of London
1997	Honorary Professorship, University of Birmingham
1995	Bruce Medal, Royal Society of Edinburgh.
1995	DSc, University of Aberdeen.
1995	Antarctic Service Medal of the United States.
1995 - 1997	Honorary Senior Lectureship, University of Birmingham.
1993 - 1995	Honorary Lectureship, University of Birmingham.
1987 - 2001	Senior Principal Scientific Officer, British Antarctic Survey. Promotion UG7 1991. Merit Promotion UG6 1996.
1982 - 1987	Physiological ecologist, NERC Institute of Terrestrial Ecology, Monks Wood, Huntingdon. Promotion HSO to SSO 1986.
1982	PhD, Cambridge University
1980	Churchill Fellowship
1979 - 1982	NERC Research Studentship at Department of Anatomy, Cambridge University and Sea Mammal Research Unit (NERC)
1979	B.Sc. (First Class Honours) in Zoology, University of Aberdeen

### PART 2: Non-academic CV

#### DIRECTORSHIPS/CHARITY WORK:

SMRU Ltd, 2006-present  
SCOTTISH ASSOCIATION FOR MARINE SCIENCE:  
Member of Council, 2003-2008.  
HEBRIDEAN TRUST:  
Member of Council of Management, 1992 - present.  
SEAMARK TRUST:  
Member of Council of Management, 1993 - present.  
REPRODUCTION RESEARCH INFORMATION SERVICES LIMITED  
Member of Board of Management, 1984 - 1989.

#### **MANAGEMENT AND BUSINESS:**

Director, Sea Mammal Research Unit involving:  
Line management of 60+ staff  
Accounting officer for an annual budget >£4 million  
Management of field operations  
Directing strategic planning  
Development of business strategy and ethos  
Raising all funding from external sources  
Health & Safety, COSHH certification  
Animal welfare: Home Office project licence holder  
Development of outreach programmes

Chief Executive SMRU Ltd

SMRU Ltd is a company that is wholly-owned by the University of St Andrews. It has a projected turnover of ~£1.1 million in 2007-2008 and returned a profit of £280k to the University in 2007.

Chairman Marine Science Scotland (MSS)

MSS is a new initiative to create an single overarching organisational focus for marine science in Scotland. It involves 9 institutional partners, including about 700 researchers from University and Government Laboratories.

#### **INTERNATIONAL CONSULTANCY:**

European Commission Food Standards Authority (2007)  
US Department of Defense (2005 - 2008)  
The Association of Oil and Gas Producers (2007-2008)  
Review of Steller Sea Lion Recovery Plan – North Pacific Fisheries Management Council and Marine Conservation Alliance (2006 & 2007)  
UK Defence Science and Technology Laboratory (2004-2005)  
Review of Steller sea lion – Pollock interactions for re-licensing of Pollock fishery by the Marine Stewardship Council (2006)  
United States National Marine Fisheries Service Center for Independent Experts (2005, 2006 & 2007)  
United States National Marine Fisheries Service: Review of Steller sea lion research (1995)  
New Zealand Fisheries Board: Review of population management plans for Hooker's sea lions (1997).  
Evidence to the United States Congressional Resources Committee (1999)  
Report on environment to the European Commission on Environmental Variables for inclusion in the Common Fisheries Policy (2003)

### **PART 3: Academic CV**

**PRINCIPAL DISCIPLINE:** Vertebrate ecology

**MAJOR RESEARCH INTERESTS:**

1. ***Behavioural dynamics of marine predators.*** The application of scale-based theoretical and statistical models to examine single- and multi-dimensional behavioural vectors of marine predators, particularly in relation to the distribution of food patches. The objective of this research is to :

- develop and test dynamic models of the way in which predator fitness varies in relation to the distribution and abundance of food and of how this ultimately influences the evolution of life-histories and the viability of predators in different environments;
- characterise the functional relationship (in terms of fitness) of animals to environmental variability and thereby to develop a predictive framework for population trajectories under different environmental conditions;
- examine the impact of marine predators on their food supply.

This research has involved extensive studies of bioenergetics and behaviour including the use of remote recording technology. The results from these studies are providing the foundation for the development of algorithms to calculate the direction and dynamics of energy flux through predators populations.

2. ***Management of marine ecosystems and assessment of environmental risk.*** Development of ecosystem-based management procedures for the sustainable exploitation of marine resources. This interest lies at the interface between ecology, systems modelling and economics. The objective of this research is to:

- use predators at the top of marine food chains as models of sustainable exploitation in marine ecosystems;
- through the use of signals from top food chain predators, to examine the underlying natural levels of variability from large-scale physical forcing of the ecosystem and to develop an appreciation of their role in marine resource management;
- to develop the conceptual and strategic models underlying ecosystem-based management

In the past, this research has been applied in the context of the Southern Ocean, particularly to underpin advice about fisheries management in the South Georgia and South Sandwich Islands Economic Zone and as a fundamental contribution to the development of the philosophy and practice of ecosystem-based management under the Convention for the Conservation of Antarctic Marine Living Resources. I also have knowledge of the Gulf of Alaska and Bering Sea systems. More recent application involve ecosystem management approaches in the North Sea.

A major element of this work involves the development of scientific advice for the UK Government on the management of seal populations. Much of this involves placing specific issues, such as the potential environmental effects of marine renewable energy in the context of assessments of environmental risk. This has led to the building and supply of environmental risk advisory systems for the Royal Navy.

#### **MEMBERSHIP OF NATIONAL/INTERNATIONAL COMMITTEES:**

Member of EUROPEAN MARINE ENERGY CENTRE Research Advisory Committee, 2008-present.

Member of ZOOLOGICAL SOCIETY OF LONDON AWARDS COMMITTEE, 2007-present.

Member of EUROPEAN FOOD STANDARDS AUTHORITY WORKING GROUP ON THE HUMANE KILLING OF SEALS, 2007-present.

Advisor to the INTERNATIONAL ASSOCIATION OF OIL AND GAS PRODUCERS JOINT INDUSTRY PROGRAM ON THE EFFECT OF NOISE ON MARINE LIFE, 2007-present

Member of THE ADVISORY BOARD OF THE NATIONAL OCEANOGRAPHY CENTRE, SOUTHAMPTON, 2008 - present

Member of ARC ADVISORY GROUP, UNIVERSITY OF HIGHLANDS AND ISLANDS, 2006 - present

Member of BOARD OF DIRECTORS, NERC MARINE SCIENCE, 2005 - present

Chair of MoD/NERC CO-OPERATIVE ARRANGEMENTS FOR RESEARCH IN OCEAN SCIENCE – CAROS 2003 –present

Member of STEERING COMMITTEE, NATIONAL CENTRE FOR STATISTICAL ECOLOGY 2005-present

Chairman, SCOTTISH MARINE SCIENCE POOLING INITIATIVE – MARINE SCIENCE SCOTLAND, 2005-present

Chairman, INTERNATIONAL WORKING GROUP ON MARINE MAMMALS AND NOISE, 2005-present  
 Member of ROYAL SOCIETY OF EDINBURGH ENQUIRY INTO THE FUTURE OF THE SCOTTISH FISHING INDUSTRY, 2003  
 Member of the SCOTTISH SEALS WORKING GROUP, 2002-present  
 Member of NORTH ATLANTIC FISHERIES ORGANIZATION / ICES HARP SEAL WORKING GROUP, 2000-2005  
 Member of Natural Environment Research Council MARINE SCIENCES PEER REVIEW PANEL, 1999-2001  
 Member of Natural Environment Research Council ANTARCTIC SCIENCE PEER REVIEW PANEL 2002-2005  
 SCIENTIFIC COMMITTEE FOR ANTARCTIC RESEARCH (SCAR):  
 Group of Specialists on Seals, 1990 - 2002  
 Secretary, Steering Committee for the Antarctic Pack Ice Seals Research Programme, 1994 - 1999.  
 INTERNATIONAL UNION FOR THE CONSERVATION OF NATURE (IUCN):  
 Seals Specialist Group, 1990 - present.  
 NERC, UK SPECIAL COMMITTEE ON SEALS (SCOS):  
 1993 - present  
 SOCIETY FOR MARINE MAMMALOGY:  
 Member of the board of management, 1992-1994.  
 COMMISSION FOR THE CONSERVATION OF ANTARCTIC MARINE LIVING RESOURCES:  
 Member of the Working Group on Ecosystem Monitoring and Management 1993 - 2001.  
 ICES WORKING GROUP ON BALTIC SEALS  
 Member 1982-1988.

#### **MAJOR FIELD RESEARCH EXPERIENCE (including work at external laboratories):**

2007 Behavioural Response Studies, AUTECH, Andros Island, Bahamas, Aug-Sept 2007  
 2002 Sable Island, Canada, Jan 2002  
 2000 Senior scientist, BAS Research Station, Bird Island, Oct-Dec 2000  
 1999 Field research, Rothera Station, Antarctica, Jan-Feb 1999  
 1998 Senior scientist, BAS Research Station, Bird Island, Oct-Dec 1998  
 1998 Senior scientist, field research, South Georgia, Jan-March 1998  
 1997 Senior scientist, research cruise, Cuba and Haiti, Feb-March  
 1997 Research at Rothera Research Station, Antarctica, Jan-Feb 1999  
 1996 Senior Scientist, BAS Research Station, Bird Island, Oct - Dec  
 1995 Visiting scientist to US National Marine Fisheries Service  
 1995 Member of 6-man international research team, US Coastguard Icebreaker *Polar Star*, to study Antarctic pack ice seals (US National Science Foundation funding).  
 1994 Senior scientist, BAS Research Station, Bird Island, Oct - Dec.  
 1992-93 Senior scientist, BAS Research Station, Bird Island, Nov 1992 - March 1993.  
 1991 Visiting scientist, Scripps Institution of Oceanography, San Diego, USA.  
 1991 Visiting scientist, Institute for Nature Management, Netherlands.  
 1990-91 Senior scientist, BAS operations at South Georgia, Nov 1990 - March 1991. Responsible for science field programmes at Bird Island Station, ship charter and operations of a field camp.  
 1988-89 Senior scientist at BAS research Station, Bird Island, Oct 1988- Jan 1989.  
 1987-88 Fur seal study, Bird Island, South Georgia, Oct 1987- Jan 1988.  
 1979-82 Field work related to research on grey seals on the UK coast, including North Rona, Orkneys, Farne Islands and Isle of May.  
 1981 Harp and grey seal research, Newfoundland and Nova Scotia, Canada.

#### **MAJOR KNOWLEDGE TRANSFER ACTIVITIES:**

Co-inventor of the environmental risk management capability supplied in 2007 to front-line ships and aircraft of the Royal Navy (partnership with BAE Systems)

Supply of monitoring capability for marine tidal turbine developments

Provision of annual scientific advice to SEERAD and DEFRA.

Support to the Countryside Agencies for the implementation of the EU Habitats Directive.

Support, via JNCC, for the OSPAR Convention: three of the current North Sea Ecological Quality Objectives rely on time series supplied by SMRU.

Creator of the exhibit "*What Ahab Never Saw*" that appeared at the Royal Society Summer Science Exhibition in 2005 and in 2006 (Glasgow). It was also chosen for an exhibition of British science at Buckingham Palace in 2006 and represented NERC at the Cheltenham Science Festival in 2007.

#### **IT CAPABILITY:**

Proficient in low level programming in C and C++. Past experience with Fortran 77 and Basic. Programming in SAS, MATLAB and ORACLE (SQL).

Other IT skills include proficiency in all programmes within the environment of Windows-based operating systems as well as some experience with UNIX and LINUX.

#### **TEACHING:**

1995-2000 Contribution to an advanced level course in vertebrate comparative physiology at Birmingham University. The specific contribution involves lectures and tutorials in ecological energetics.

2001-present Organization of a course in Environmental Physiology; additional lecturing on other courses, supervision of final year student projects. Provision of about 60-80 student contact hours per year.

#### **EDITORIAL BOARD MEMBERSHIP:**

Editor-in-chief, Journal of Zoology  
Editorial Board, Antarctic Science  
Editorial Board, Aquatic Mammals

#### **HIGHER DEGREE SUPERVISION / EXAMINATION:**

##### SUPERVISOR:

###### **Ph.D.**

###### **NERC/SERC Studentships**

Univ. of Aberdeen (with Prof. P.A. Racey; awarded 1988)

Univ. of Aberdeen (with Prof. P.A. Racey, awarded 1994)

Birmingham University (with Prof. P.J. Butler, current)

Cambridge University (with Dr W. Amos, current)

Univ. of St Andrews (7 PhD students currently or recently supervised)

###### **Other**

Open University (awarded 1993)

Univ. of Aberdeen (with Prof J Speakman, awarded 1995)

###### **M.Sc.**

DeMontford University (with Dr J. Fowler, awarded 1995)

Birmingham University (with Prof. P.J. Butler, 1999)

##### EXAMINER:

**Ph.D.** Universities of Monash, Saskatoon, Cape Town, Tromsø, Birmingham, LaRochelle, Stirling, Aberdeen (x 2), Newcastle, Oslo, Bergen and Dalhousie University, St Andrews (x 6).

#### **RESEARCH FUNDING:**

Note that after 2006, much contract research funding has been channelled through SMRU Ltd, which has a projected annual turnover of about £1.1 million during 2007-2008

**Personal research grants awarded/current** (during the past 10 years). Managed research grants and commercial funding (approx £1.4 million/year) not included.

Title/subject	Agency	Collaboration	Amount sought/awarded	Outcome/status
		PI status		Dates
Weddell seal foraging behavior	NSF	Texas A&M; UCSC	\$225,000	Terminated successfully
		minor co-PI		1997-2000
Marine mammals and the measurement of physical oceanographic variability	Leverhulme		\$27,987	Terminated successfully
		Lead PI		1998-1999
Risk assessment and insurance in marine predator life-histories	NERC-AFI	Prof T.H. Clutton-Brock (Cambridge)	£159,820	ongoing
		Lead PI		2000-2003
Resource requirements and competition between predators in a large-scale marine ecosystem	NERC-AFI	Prof P.J. Butler (Birmingham)	£257,357	ongoing
		Major co-PI		2001-2005
Understanding and predicting the dynamics of marine mammal populations	NERC	Grant to Sea Mammal Research Unit	£3,319,877	ongoing
		Programme Director		2001-2006
Monitoring the fine scaling movements of albatrosses and fur seals using a novel, high-resolution, lightweight, GPS satellite-based, archival animal tracking device ( <i>TrackTag</i> )	NERC-CONNECT	Dr C. Bishop (Bangor) & Navsys UK	£180,000	ongoing
		Minor co-PI		2000-2003
Implications of varying food distributions for fitness in Steller sea lions	US National Marine Fisheries Service	Lead PI	\$658,443	2001-2004
The prediction of marine mammal aggregations by reference to oceanographic observables in the seas to the north and west of the Hebrides	Defense Science & Technology Laboratories JGS885	Lead PI	£244,450	2003-2006
Mitigation of effects of high power sonars on marine mammals	Defense Science & Technology Laboratories JGS879	Lead PI	£272,000	2003-2006
Survey of harbour seals ( <i>Phoca vitulina</i> ) distribution in the Western Isles and patterns of habitat usage, with special reference to harbour seal c/p Special Areas of Conservation	SEERAD & Scottish Natural Heritage	Lead PI (as Director SMRU)	£55,000	2003-2006
Investigating foraging behaviour in grey seals using new camera technology	NERC & Nat. Geog.	CO-PI (with Sascha Hooker)	£29,422.60 & \$20,000	2003-2004
Investigation of monitoring options for harbour seal special areas of conservation	Scottish Natural Heritage	Lead PI (as Director SMRU)	£150,000	2003-2006
Survey of harbour seal distribution in the Western Isles	Scottish Natural Heritage	Lead PI (as Director SMRU)	£70,000	2003-2004

Harbour seal survey of Ireland	DUCHAS	Lead PI (as Director SMRU)	£52,000	2003
Determination of environmental variables of interest to the common fisheries policy	Poseidon Aquatic Resource Management	PI	£7,350	2003
Life history optimization and environmental variability in seals	NERC	CO-PI	£140,000	2004-2007
Interactions between seals and salmon fisheries	Charity	Lead PI	£107,500	2005-2007
Management of seals-salmon interactions in Scotland	Scottish Executive	Lead PI	£219,000	2005-2008
Instrument development and production at SMRU	Various	Manager	£1,700,000 (as of 30 June 2004)	Open-ended
Data management	NERC	Manager	£66,000	2003-2006
Environmental Risk Management Capability for the Royal Navy	MoD	Co-Manager	£750,000	2005-2007
Measuring the effects of tidal turbines on marine mammals	Industry	Manager	£810,000	2006-2010
Commercialisation capacity building	DTI	Manager	£381,000	2006-2009
Equipment and surveys of harbour seals	SNH	Manager	£140,000	2007-2008
Population dynamics of seals in the UK	NERC (strategic)	Manager / PI	£5,100,000	2007-1012
The behavioural response of beaked whales to sonar and predators	US Office of Naval Research	Lead PI	£525,000	2007-2009
Investigating the decline of UK harbour seals	Scottish Executive	Manager	£177,000	2007-2008
Measuring the abundance of beaked whales using passive acoustics	Dstl	Lead PI	£125,000	2007-2010
Since 2006: as leader in various strategic-level grants and developments	Scottish Funding Council	Lead PI	£18 million	2009-2016

## PUBLICATIONS:

### A. Books

1. Boyd, J.M. & Boyd, I.L. (1990) *The Hebrides*. Collins (New Naturalist), 416pp.
2. Boyd, I.L., Ed. (1993) *Marine mammals: advances in behavioural and population biology*. Zoological Society of London Symposium, 1992, Clarendon, Oxford.
3. Reijnders, P.J., Brasseur, S., van der Toorn, J., van der Wolf, P., Boyd, I.L., Harwood, J. Lavigne, D.M. & Lowry, L. (1993) *Seals, fur seals, sea lions, and walrus: Status Survey and Conservation Action Plan*. IUCN, Gland, Switzerland.
4. Boyd, J.M. & Boyd, I.L. (1996) *The Hebrides: a natural tapestry*. Birlinn.
5. Boyd, J.M. & Boyd, I.L. (1996) *The Hebrides: a mosaic of islands*. Birlinn.
6. Boyd, J.M. & Boyd, I.L. (1996) *The Hebrides: a habitable land?* Birlinn.
7. Crofts, R. & Boyd, I.L. (eds) (2005) *Nature Conservation in Scotland*. Birlinn.
8. Boyd, I.L., Wanless, S. & Camphuysen, C.J.. (2006) Management of marine ecosystems: monitoring change in upper trophic levels. Cambridge University Press.
9. Boyd, I.L., Bowen, W.D. & Iverson, S. (in prep). Techniques in marine mammal biology. Oxford University Press.
10. Baxter, J.M., Boyd, I.L., Cox, M., Cunningham, L., Holmes, P., Moffat, C.F. (Editors) (2008). Scotland's Seas: towards understanding their state. Fisheries Research Services, Aberdeen. 174 pp.

B. Chapters in books / conference proceedings

1. Boyd, I.L. (1985) Rabbit reproductive rates in relation to length of the breeding season. In: *Population Dynamics and Epidemiology of Terrestrial Animals*, edited by D. Mollison & P. Bacon, 23-24. (Merlewood research and development papaer no. 106). Grange-over-Sands: Institute of Terrestrial Ecology.
2. Boyd, I.L. (1986) Factors controlling the length of the breeding season in wild rabbits. *Mammal Review*, 16, 125-130.
3. Boyd, I.L. & Bray, C.J. (1989) Nutritional ecology of the wild rabbit - an input to the timing of reproduction. *Proceedings of the Nutrition Society*, 48, 81-91.
4. Lunn, N.J. & Boyd, I.L. (1993). Influence of maternal characteristics and environmental variation on reproduction in Antarctic fur seals. In: *Marine mammals: advances in behavioural and population biology*. Ed. I.L. Boyd. Zoological Society of London Symposium 66, 115-128.
5. Boyd, I.L. (1993). Introduction: trends in marine mammals science. In: *Marine mammals: advances in behavioural and population biology*. Ed. I.L. Boyd. Zoological Society of London Symposium 66, 1-12.
6. Woakes, A.J., Butler, P.J., Bevan, R.M. & Boyd, I.L. (1993). The metabolic rate of free ranging Antarctic animals. *Biotelemetry XII*, 215-223.
7. Boyd, I.L., Arnbohm, T. & Fedak, M.A. (1994) Biomass, diet and energy consumption of the South Georgia stock of southern elephant seals. *Elephant seals: population ecology, behavior and physiology*. B.J. Le Boeuf and R.M. Laws (eds.), pp 98-117, University of California Press, Berkley, Los Angeles, London.
8. Fedak, M.A., Arnbohm, T., McConnell, B., Chambers, C., Boyd, I.L. and Harwood, J. (1994) Acquisition, expenditure and investment of energy in southern elephant seals. *Elephant seals: population ecology, behavior and physiology*. B.J. Le Boeuf and R.M. Laws (eds.), pp 354-373, University of California Press, Berkley, Los Angeles, London.

9. Boyd, I.L. (1995) Steller sea lion research. Report to the United States National Marine Fisheries Service, National Marine Mammal Laboratory, Seattle, Washington, U.S.A.. 90pp.
10. Boyd, I.L. (2002) Pinniped life history. In Perrin, W.F., Wursig, B. & Thewissen, H. (eds). *Encyclopedia of Marine Mammals*. Academic Press.
11. Boyd, I.L. (2002) Antarctic Marine Mammals. In Perrin, W.F., Wursig, B. & Thewissen, H. (eds). *Encyclopedia of Marine Mammals*. Academic Press.
12. Boyd, I.L. (2001) Seals (including sea lions, fur seals and walrus). In Steele, J., Thorpe, S. & Turekian, K. (eds). *Encyclopedia of Ocean Sciences*. Academic Press.
13. Boyd, I.L. (2001) The krill-eating crabeater seal. *Encyclopedia of mammals*. In MacDonald, D.W. (ed). Andromeda Press, London. April 2000
14. Boyd, I.L. (2001) Deep divers: mammals as foragers in the deep oceans. *Encyclopedia of mammals*. In MacDonald, D.W. (ed). Andromeda Press, London. April 2000. April 2000
15. Hooker, S.K., Boyd, I.L., Brandon, M.A., Hawker, E.J. (2000). Living probes into the marine environment - apex predators as oceanographic platforms. *Ocean Challenge*.
16. Boyd, I.L. (In press) Ecosystem approaches to management of the Earth system. In: *Nature Conservation in Scotland*. R. Crofts & I.L. Boyd (eds). Tuckwell Press
17. Boyd, I.L. & Crofts, R. (In press) Conclusions. In: *Nature Conservation in Scotland*. R. Crofts & I.L. Boyd (eds). Tuckwell Press
18. Boyd, I.L. (2004) Migration of Marine Mammals. In: Werner, D. *Biological Resources and Migration*. Pp 203-209. Springer, Berlin.
19. Boyd, I.L. (2006) Studying complexity: are we approaching the limits of science? In: *Interdisciplinary Research : Diverse Approaches in Science, Technology, Health and Society*, pp 25-40. John Atkinson and Malcolm Crowe (eds). Wiley, New York.
20. Boyd, I.L., Wanless, S. & Camphuysen, C.J. (2006) Introduction. In: *Management of marine ecosystems: monitoring change in upper trophic levels*. Ian Boyd, Sarah Wanless & C.J. Camphuysen (2006), pp 1-10. Cambridge University Press.

C. Papers (refereed journals)

1. Boyd, I.L. (1981) Population changes and the distribution of a herd of feral goats (*Capra* sp.) on Rhum, Inner Hebrides, 1960-78. *Journal of Zoology, London*. 193, 287-304.
2. Boyd, I.L. (1983) Luteal regression, follicle growth and the concentration of some plasma steroids during lactation in grey seals (*Halichoerus grypus*). *Journal of Reproduction and Fertility*, 69, 157-164.
3. Boyd, I.L. (1984) The relationship between body condition and the timing of implantation in pregnant grey seals (*Halichoerus grypus*). *Journal of Zoology, London*, 203, 113-123.
4. Boyd, I.L. (1984) Development and regression of the corpus luteum in grey seal (*Halichoerus grypus*) ovaries and its use in determining fertility rates. *Canadian Journal of Zoology*, 62, 1095-1100.
5. Boyd, I.L. (1984) Occurrence of hilar rete glands in the ovaries of grey seals (*Halichoerus grypus*). *Journal of Zoology, London*, 204, 585-588.
6. Hobson, B.M. & Boyd, I.L. (1984) Concentrations of placental gonadotrophin, placental progesterone and maternal plasma progesterone during pregnancy in the grey seal (*Halichoerus grypus*). *Journal of Reproduction and Fertility*, 72, 521-528.

7. Boyd, I.L. (1985) Pregnancy and ovulation rates in two stocks of grey seals on the British coast. *Journal of Zoology, London*, 205, 265-272.
8. Boyd, I.L. (1985) Investment in growth by pregnant wild rabbits in relation to litter size and sex of the offspring. *Journal of Animal Ecology*, 54, 137-147.
9. Boyd, I.L. (1985) Effect of photoperiod and melatonin on testis development and regression in wild European rabbits (*Oryctolagus cuniculus*). *Biology of Reproduction*, 33, 21-29.
10. Boyd, I.L. (1986) Photoperiodic regulation of seasonal testicular regression in the wild European rabbit (*Oryctolagus cuniculus*). *Journal of Reproduction and Fertility* 77, 463-470.
11. Boyd, I.L. (1987) Gonadotrophin secretion and pituitary responsiveness to LHRH in castrated and intact male rabbits exposed to different photoperiods. *Journal of Reproduction and Fertility*, 79, 627-633.
12. Boyd, I.L. & Myhill, D.G. (1987) Seasonal changes in condition, reproduction and fecundity in the wild European rabbit (*Oryctolagus cuniculus*). *Journal of Zoology, London*, 212, 223-233.
13. Boyd, I.L. & Myhill, D.G. (1987) Variations in the post-natal growth of pipistrelle bats (*Pipistrellus pipistrellus*). *Journal of Zoology, London*, 213, 750-755.
14. Boyd, I.L., Myhill, D.G. & Mitchell-Jones, A.J. (1988) Uptake of gamma-HCH (Lindane) by pipistrelle bats and its effect on survival. *Environmental Pollution*, 51, 95-111.
15. Boyd, I.L. & Stebbings, R.E. (1989) Population changes of brown long-eared bats (*Plecotus auritus*) in bat-boxes at Thetford Forest. *Journal of Applied Ecology*, 26, 101-112
16. Mitchell-Jones, A.J.; Cooke, A.S.; Boyd, I.L. & Stebbings, R.E. (1989). Bats and remedial timber treatment chemicals - a review. *Mammal Review*, 19, 93-110.
17. Boyd, I.L. & McCann, T.S. (1989) Pre-natal investment in reproduction by female Antarctic fur seals. *Behavioural Ecology and Sociobiology*, 24, 377-385.
18. Boyd, I.L. (1989) Spatial and temporal distribution of Antarctic fur seals (*Arctocephalus gazella*) on the breeding grounds at Bird Island, South Georgia. *Polar Biology*. 10, 179-185.
19. Boyd, I.L. (1990) Mass and hormone content of grey seal placentae related to fetal sex. *Journal of Mammalogy* 71, 101-103.
20. Boyd, I.L., Lunn, N.J., Duck, C.D. & Barton, T. (1990) Response of Antarctic fur seals to immobilization with ketamine, a ketamine-diazepam or ketamine-xylazine mixture, and Zoletil<sup>®</sup>. *Marine Mammal Science* 6, 135-145.
21. Croxall, J.P., Rodwell, S. & Boyd, I.L. (1990) Entanglement of Antarctic fur seals in marine debris at Bird Island, South Georgia. *Marine Mammal Science* 6, 221-233.
22. Boyd, I.L., Lunn, N.J. & Rothery, P. (1990) Age distribution of female Antarctic fur seals at the breeding grounds as an indicator of population status. *Canadian Journal of Zoology* 68, 2209-2213.
23. Boyd, I.L. & Duck, C.D. (1991) Mass change and metabolism of territorial male Antarctic fur seals (*Arctocephalus gazella*). *Physiological Zoology* 64, 375-392.
24. Boyd, I.L. (1991) Changes in plasma progesterone and prolactin concentrations during the annual cycle and the role of prolactin in the maintenance of lactation and luteal development in the Antarctic fur seal (*Arctocephalus gazella*). *Journal of Reproduction and Fertility* 91, 637-647.
25. Shore, R., Boyd, I.L., Leach, D., Stebbings, R.E. & Myhill, D.G. (1990). Organochlorine residues in roof timbers and possible implications for bats. *Environmental Pollution* 64, 179-188.
26. Lunn, N.J. & Boyd, I.L. (1991) Fidelity of female Antarctic fur seals to pupping sites at Bird Island, South Georgia. *Journal of Mammalogy* 72, 202-206

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