ZSL2000

The Zoological Society of London Annual Report



The Zoological Society of London Registered Charity 208728

Annual Report 2000 Part 2

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The Zoological Society of London

(Registered charity no. 208728)

Patron: Her Majesty The Queen

Principal address	Regent's Park, London NW1 4RY
Also at:	Whipsnade Wild Animal Park, Dunstable, Bedfordshire LU6 2LF

ZSL is established by Royal Charter, and governed by By-laws and Regulations. The ruling body is Council. Members of Council, who include the Officers of the Society (the President, the Treasurer and the Secretary), are listed opposite. Council Members (the Trustees) are elected by the membership by postal ballot. Council has the power to co-opt.

Associated Charity:

The Zoological Society of London Development Trust (reg. no. 293255)

Non-trading holding company: Zoo Operations Ltd (reg. no. 2226414)

Wholly-owned subsidiary trading companies: Zoo Enterprises Ltd (reg. no. 1178687) ZSL (Web of Life) Ltd (reg. no. 3738937) Zoo Restaurants Ltd (reg. no. 570005) Whipsnade Wild Animal Park Ltd (reg. no. 990860)

- Bankers: Royal Bank of Scotland, London Drummonds Branch, 49 Charing Cross, London SW1A 2DX
- Auditors: Ernst & Young, Becket House, 1 Lambeth Palace Road, London SE1 7EU

Investment Advisers: Henderson Investors, 3 Finsbury Avenue, London EC2M 2PA

The objectives of the Society under the Charter are: 'the advancement of zoology by, amongst other things, the conducting of scientific research, the promoting of conservation of biological diversity and the welfare of animals, the care for and breeding of endangered and other species, the fostering of public interest, the improvement and dissemination of zoological knowledge and participation in conservation worldwide.' 19

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Details of the policies and activities of ZSL in furtherance of these objectives are detailed in Part 1 of this Report. There was no change in the objectives or policies during 2000.

The Annual Report was approved by Council on 3 April 2001.

Part 2 edited by Linda DaVolls

Honorary Fellows

Date of election

- 1977 HRH The Prince Philip, Duke of Edinburgh, KG, KT
- 1991 HM The Emperor Akihito of Japan
- 1975 Professor Jean Anthony Museum National d'Histoire Naturelle, 55 rue de Buffon, Paris 53, France
- 1975 Professor Jean Dorst Museum National d'Histoire Naturelle (Mammifères et Oiseaux), 55 rue de Buffon, Paris 53, France
- 1984 Professor Ernst Mayr Museum of Comparative Zoology, Harvard University, Cambridge, MA 02138-2902, USA
- 1988 Professor Dr Milton Thaigo de Mello Instituto de Ciencias Biologicas, Universidad de Brasilia, Brasilia, DF70 910, Brazil
- 1990 Professor Knut Schmidt-Nielsen Department of Zoology, Duke University, Durham, North Carolina 27708-0325, USA
- 1992 Professor Edward O. Wilson Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts 02138-2902, USA
- 1996 Professor John Maynard Smith School of Biological Sciences, University of Sussex, Falmer, Brighton BNI 9QG
- 1997 The Hon. Miriam Rothschild Ashton Wold, Peterborough PE8 5LZ
- 1998 Sir David Attenborough Richmond, Surrey
- 1999 Sir Robert May

Council

	President
6/7	Sir Martin Holdgate, CB, MA, PhD, DSc (h.c.), CBiol, FIBiol
	Secretary
6/7	Professor Paul H. Harvey, BA, MA, DPhil, DSc, FRS
	Treasurer
7/7	Harry Wilkinson, OBE, MA, FCA
1/1	Sheila Anderson, BSc (co-opted 12 December 2000)
7/7	John Barrington-Johnson
7/7	Brian Bertram, MA, PhD, CBiol, FIBiol
5/7	Jonathan Boyce, DM, MA, MSc, MRCP, FFPHM
2/3	David Case*
3/3	Stephen Cobb, BA, DPhil*
3/3	John Edwards, MA, FLS*
4/4	Roger Ewbank, OBE, MVSc, MRCVS, FIBiol†
6/7	Tony Fincham, BSc, PhD
5/7	Professor Mike Hassell, DPhil, DSc, FRS
4/4	Martin Jiggens, FRICS, FSVA, FRSA†
5/7	Nancy Lane, OBE, DPhil, ScD, CBiol, FIBiol, Vice President
2/4	Ken Livingstone MP (resigned 15 June 2000)
7/7	Sophie McCormick, MA, PhD, CBiol, FIBiol
5/7	Professor Paul Racey, MA, PhD, DSc, FRSE, CBiol, FIBiol
4/7	Professor Jeremy Rayner, BA, MA, PhD
1/4	Neville Reyner, BSc, MBA, CEng, FIEE, FIMgt
4/4	Martin Rowson, MA†
2/3	Philip Sapsford, QC*
7/7	Ken Sims, Vice President
2/4	Ted Smith, BSc, CBiol, FIBiol†
4/7	Peter Stevens, BSc, MIBiol

Head, UK Office of Science and Technology

- 3/4 Jane Thornback, BSc, MSc†
- 5/7 Professor Roger Wheater, OBE, CBiol, FIBiol, FRSA, FRSGS, FRZSS, FRSE

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7/7 Robert-Wingate

Attendance: actual/potential † To 13 June 2000 * From 13 June 2000

Committees & Boards 2000

Committees & Boards of Council

Finance & General Purposes Committee

Terms of Reference: To monitor the financial management of the Society and act as an audit committee; and to preview and prepare papers for Council requiring policy or capital investment decisions.

Sir Martin Holdgate, CB, MA, PhD, CBiol, FIBiol, FRSA, FRGS, *Chairman* Tony Fincham, BSc, PhD Professor Paul H. Harvey, BA, MA, DPhil, DSc, FRS Nancy Lane, OBE, DPhil, ScD, CBiol, FIBiol Martin Rowson, MA Ken Sims Harry Wilkinson, OBE, MA, FCA

Conservation & Science Advisory Committee

Terms of Reference: To provide strategic vision, objectives and advice to Council and ZSL staff on conservation and science issues and activities; to monitor all the conservation and science activities of the Society, ensuring that they are implemented to the highest professional standards.

Professor Paul Racey, MA, PhD, DSc, FRSE, CBiol, FIBiol, *Chairman* Professor Paul H. Harvey, BA, MA, DPhil, DSc, FRS David Chivers, PhD Lee Durrell, PhD Tony Fincham, BSc, PhD Bryan Grenfell, PhD Robin Pellew, PhD Professor Ian Swingland, PhD, DSc, CBiol, FIBiol, FRSA, FRGS Jane Thornback, BSc, MSc

Education & Information Advisory Committee

Terms of Reference: To provide strategic vision, objectives and advice to Council and ZSL staff on education issues and projects; to monitor the education and information activities of the Society, ensuring that they are implemented to the highest professional standards.

Sophie McCormick, MA, PhD, CBiol, FIBiol Chairman Geraldine Baker, BSc John Barker

Animal Welfare Committee

Terms of Reference: To advise Council on matters relating to animal welfare in the Collection, at both London Zoo and Whipsnade Wild Animal Park, at the Institute of Zoology and in the work of Field Conservation & Consultancy.

Professor Patrick Bateson, PhD, ScD, FRS, *Chairman* Tony Sainsbury, BVetMed, CertLAS, CertZooMed, MRCVS, *Secretary* Brian Bertram, MA, PhD, CBiol, FIBiol Lynda Birke, MPhil, DPhil Andrew Higgins, BVetMed, MSc, PhD, CBiol, FIBiol, MRCVS Arthur Lindley, MA, DPhil Georgia Mason, PhD David Pritchard, BVetMed, BSc, MPH, MRCVS Christopher Sherwin, BSc, PhD Robert Wingate

Ethics Committee

Terms of Reference: To advise the Director of Science on welfare and ethical aspects of all scientific studies involving interventions with animals carried out by ZSL staff, or by other workers on ZSL premises or on ZSL animals.

Edmund Flach, MA VetMB, Chairman Carol Williams, BTEC, HNC, Secretary Alison Moore, PhD, Home Office Liaison Andrew Higgins, BVetMed, MSc, PhD, CBiol, FIBiol, MRCVS Roger Ewbank, OBE, MVSc, CBiol, FIBiol, MRCVS Paul Pearce-Kelly Ex officio: Georgina Mace, OBE, DPhil Juliet Clutton-Brock, PhD, DSc

Awards Committee

Terms of Reference: Council presents the following awards for contributions to zoology: The Prince Philip Prize, Thomas Henry Huxley Award, Stamford Raffles Award, Silver Medal, Scientific Medal, ZSL Frink Medal for British Zoologists and ZSL Marsh Award for Conservation Biology. The Committee advises Council on all matters relating to these awards.

Professor Michael P. Hassell, DPhil, DSc, FRS, *Chairman* Geraldine Baker, BSc Professor Geoffrey A. Boxshall, PhD, FRS Professor Malcolm Burrows, ScD, FRS Professor Thomas Cavalier-Smith, PhD, FRS Dr Bryan T. Grenfell, DPhil Professor Linda Partridge, DPhil, FRS Professor Sir John R. Krebs, FRS Professor Sir John G. Shepherd, PhD, FRS Professor William J. Sutherland, PhD N

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Giles Clarke, PhD Kate Harris, BA Roger James Vicki Pite Professor Jeremy Rayner, BA, MA, PhD

Institute of Zoology Committee

Terms of Reference: To advise the Society and the University of London under the terms of the Agreement between them; to consider and make recommendations on all matters relating to the Institute of Zoology.

Professor Lance Lanyon, BVSc, PhD, DSc, MRCVS,

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Professor Clive Catchpole, PhD Professor Alan Hildrew, PhD Professor Colin Howard, PhD, DSc, MRCPath, CBiol, FIBiol Professor Linda Partridge, DPhil, FRS Robin Pellew, PhD

Ex officio:

University of London Vice-chancellor Principal Chairman of Convocation Zoological Society of London: President Secretary Treasurer Director of Science

London Zoo Board

Terms of Reference: To provide specialist advice on the objectives of London Zoo and on specific aspects of its management; to approve the annual business and financial plan and recommend it to Council; to approve any in-year variances to the plan; to review and approve any capital developments.

Ken Sims, *Chairman* Michael Daubney Stephen Harrison Jim Humphris Martin Jiggens, FRICS, FSVA, FRSA Peter Stevens, BSc, MIBiol Jonathan Swire Director General, Michael Dixon, BSc, ARCS, DPhil Director, London Zoo: Jo Gipps, OBE, PhD Director of Personnel: Ian Meyrick, BA, FCIPD Director of Finance: Norman Reed, BSc, FCA

Whipsnade Wild Animal Park

Terms of Reference: To provide specialist advice on the objectives of Whipsnade Wild Animal Park and on specific aspects of its management; to approve the annual business and financial plan and recommend it to Council; to approve any proposed in-year variances to the plan; to review and approve any capital developments.

Director of Personnel: Ian Meyrick, BA, FCIPD Director of Finance: Norman Reed, BSc, FCA

Advisory/Editorial Boards for ZSL Publications

Animal Conservation

Editors: Michael W Bruford, PhD John L Gittleman, DPhil Georgina M Mace, OBE, DPhil Robert K Wayne, PhD Book Review Editor: Peter Cotgreave, DPhil Advisory Board: Professor Jared Diamond, PhD Professor Stuart Pimm, PhD Professor Stephen Stearns, PhD Animal Conservation also has an Editorial Board

International Zoo Yearbook

Editors: Peter J. S. Olney, BSc, DipEd, CBiol, FIBiol, FLS Fiona A. Fisken, BSc Assistant Editor: Helen F. Stanley, BSc, PhD Editorial Board: Jeremy J. C. Mallinson, OBE, CBiol, FIBiol, FRGS, Chairman Koen Brouwer, Drs Christopher Helm, BA Nick L. Jackson, MBE Professor Janet Kear, OBE, PhD Georgina Mace, OBE, DPhil Professor Gordon McGregor Reid, PhD, CBiol, FIBiol Miranda Stevenson, MBA, PhD Professor David R. Waugh, PhD

Journal of Zoology

Managing Editor:Dr Juliet Clutton-Brock, PhD, DScEditors:Professor Ian Boyd, PhD, DScProfessor Tim Halliday, MA, DPhilProfessor Philip Rainbow, PhD, DScJournal of Zoology also has an Editorial Board

Library Advisory Group

Peter Olney, BSc, DipEd, CBiol, FIBiol, FLS, *Chairman* John Edwards, MA, FLS Beryl Leigh, PhD Joan Thorne Amanda Pickard, PhD

Professor Roger Wheater, OBE, CBiol, FIBiol, FRSGS, FRSA, FRSE, *Chairman* Professor Simon Bearder Ken Lewis, OBE Neville Reyner, BSc, MBA, CEng FIEE, FIMgt John Edwards, MA, FLS Director General: Michael Dixon, BSc, ARCS, DPhil Director, Whipsnade Wild Animal Park: Stuart Earley, MInstD, FInstM, FInstSMM

Staff

As at 31 December 2000

Directors

Director General: Michael Dixon, BSc, ARCS, DPhil Director of Science: Professor Georgina Mace OBE, DPhil Director, London Zoo: Jo Gipps, OBE, PhD Director, Whipsnade Wild Animal Park: Stuart Earley, MInstD, MInstM, FInstSMM Director of Finance: Norman Reed, BSc, FCA Director of Personnel: Ian Meyrick, BA, FCIPD

CENTRAL FUNCTIONS

Secretary/PA to Director General: Diane Bratby, BSc

Personnel

Director of Personnel: Ian Meyrick, BA, FCIPD Senior Personnel Officer: Marcia Latty, GradCIPD Secretary/Personnel Administrator: Kalleen Egan Pensions Administrator: Peter Carey (p/t)

Health and Safety

Security & Safety Manager: Brian Nutkins Secretary: Brenda Tonks Consulting Medical Referee: Kenneth Lewis, MA, BM, BCh First Aid Attendant: Grace Reay Weekend First Aid Attendant: Lee Stevenson

Switchboard/Reception

Senior Receptionist: Marcia Clarke Receptionists/Telephonists: David Hitchcock (p/t); Joanne Kent (p/t); Gwen Manning (p/t); Veronica Powell; Melody Goldman (p/t)

Finance

Director of Finance: Norman Reed, BSc, FCA Secretary: Susan Morgan Financial Controller: Keith Hayward, FCCA Financial Accountant: Joan Jupp Management Accountant: Charles Biggie Project Accountant: Martin Dowling, BSc Cash Book Keeper: Gill Lewin (p/t) Chief Cashier: Dave Lack Cashiers: Les Oxley; Joe Piggott; Alison Coutts Purchase and Sales Ledger Supervisor: Lynette Archer-Morgan

Membership Department

ZSL Membership Schemes Manager: Marion Hoyland Lifewatch & Adoptions Schemes Manager: Sarah Leggett Membership & Adoptions Manager (WWAP): Paula Stoughton Lifewatch & Adoptions Administrators: Jason Diplock, BSc; Helen Savvides Membership Assistant (WWAP): Andrea Smith, BSc (p/t)

Library

Librarian: Ann Sylph, BSc, MSc, MIInfSc Assistant Librarian: Michael Palmer, BA, MA Library Assistant: Marie Monaghan, BA

Press & PR Office

Senior Public Relations Officer: Debbie Curtis, BSc Public Relations Officer: Peter Beatty, BSc Assistant Public Relations Officer: Joe Laing, BA

PUBLICATIONS

ZSL Scientific Books (International Zoo Yearbook, Conservation Biology and Symposia series, Science for Conservation) Editors: Peter Olney, BSc, DipEd, CBiol, FIBiol, FLS; Fiona Fisken, BSc Assistant Editor: Helen Stanley, PhD, BSc Sales Administrator: Mychael Barratt (p/t)

Journal of Zoology

Managing Editor (Journal of Zoology): Juliet Clutton-Brock, PhD, DSc Editors: Ian Boyd, PhD, DSc; Tim Halliday, MA, DPhil; Philip Rainbow, PhD, DSc Assistant Editor: Linda DaVolls, BA Editorial Assistant: Patricia Manly Scientific Meetings Co-ordinator: Deborah Body, BSc, MSc

Animal Conservation

Editors: Georgina Mace, OBE, DPhil; Michael Bruford, PhD; John Gittleman, DPhil; Robert Wayne, PhD

FIELD CONSERVATION & CONSULTANCY

Director: Vacant Secretary: Jane Loveless Project Manager: Claire Belsham, BSc Project Seahorse Administrator: Alice Courage 21st Century Tiger Administrator: Sam Knowles Project Account: Clive Giles, BCom, BCOMPT

Overseas Staff

Adam Britt, PhD; Jacques Flamand, BSc, BA, VetMB, MRCVS; John Grainger, PhD; Suresh Job; Richard Kock, BA, VetMB, MRCVS; Jessica Meeuwig; Kathryn Monk, PhD; Saeed Mubarak, VetMB; Iyad Nader, PhD; Zelealem Ashenafi Tefera, MSc; Tim Wacher, PhD; Bruce Winney,

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Fundraising

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Fundraising Consultant: Peter Emery (p/t) Fundraising Administrator: Paula Maycock

Information Technology

IT Manager: Rob Jinman IT Support Assistants: Sean McBirnie; Matthew Longley; Gianni Gasparini PhD, Melita Samoilys, PhD

LONDON ZOO

Director: Jo Gipps, OBE, PhD Secretary/PA to Director: Gillian Oliver, BA

Animal Management

ZSL Senior Curator: Nick Lindsay, BSc, CBiol, MIBiol Secretary: Joanne Kingston Conservation Programmes Co-ordinator: Sarah Christie, BSc Registrar: Elspeth Chaplin Zoo Manager: Bill James Curator of Invertebrates: Paul Pearce-Kelly Curator of Lower Vertebrates: Heather Hall, PhD Curator of Birds: John Ellis

Head Keepers: Gerald Asher; Mick Carman; Ray Charter; Dave Clarke; Brian Harman; Paul Harrington; Fred Smith; Linda Walker; Esther Wenman, BA; Frank Wheeler; Brian Zimmerman, BA

Senior Keepers: Alan Alder; Vanessa Asher; Nichola Burnett, BSc; Mike Clark; Matthew Fagg; Amanda Ferguson, BSc; Malcolm Fitzpatrick; Matthew Hennessy; Andy James; Patsy Joseph; Paul Kybett; Margaret Lamb; Tracey Lee; Keith Lloyd; Andrea McKenna; Simon Mannall; Terry March; Jeff Nicklin; Jacqueline Ossowski, BSc; John Pullen; Dave Robinson; Jim Robson; Mike Tiley; Caroline Waddell, BSc; Chris Wickenden; Sarah Young; Steve Young; Craig Walker; Steve Whitelock

Qualified Keepers: Paul Atkin; Margaret Baukham; Tony Cholerton; Rachel Jones, MSc; Karen Nolan, BSc; Lawrence Raybone; Newton Pellatt, BSc; Teague Stubbington, BSc

Trainee Keepers: Nigel Court, BA; Anna Humberstone, BSc; Lyndsey Marsh, BSc; Nicola McKay; Jo Pratt, BSc; Jenny Sprent, BSc; George Sunter, BSc; Marie Whatmaugh, BSc; Marti Everett

Marketing

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Marketing Manager: Caroline Masters, BA Secretary: Becky Ann Chick Group & Conference Sales Executive: Katherine Duffin, (from 05.02.01) Promotions Executive: Jill Ratcliffe, BSc Marketing Administrator: Zoe Greenwood

Visitor Information & Education

Head of Visitor Information & Education: Claire Robinson, BEd Secretary: vacant Education Officers: Catherine Tamplin, BSc, PGCE; Helen Sharman, BSc, PGCE Education Officer (Interpretation): Clare Kelly, BSc Volunteer Co-ordinator: vacant School Visits Co-ordinator: Rebecca Westerland, LLB Graphics Co-ordinator/Print & Stationery Buyer: Adrian Taylor Craftsman: David Boys (p/t) MA (RCA) Plumbers: Martin Foster; Steven Roberts Wireworker: Tony Connolly, Dave Field Fitter: John Froud Head Gardener: Martin Pett, MIHort Gardens Foreman: Noel Heaphy Gardeners: Ian Ament; Rodney Lynch; George Manly; Jacqueline Smith; Graham Southard; Peter Tsirtou Animal Food Stores Chargehand: Bob Ashmore Animal Food Stores Assistant: Thomas Pattison Animal Food Stores Butcher/Storeman: Ron Harrison Maintenance Storeman: Alex James Grounds and Transport Supervisor: Peter Walker-Croft Grounds and Transport Foreman: Jamie Turner Groundstaff: Beatrice Ampong; Graham Bukovics; Sharon Crawford; Colin George; Gerry Houlder; Colin Jeans; Renuka Lutchman; Alice Sarpong; Anna Thornburrow; Odit Tiwari, Kevin Smith Security Gatekeepers: Melvin Brockwell; Paul Brown; George Scofield

Visitor Services

Head of Visitor Services: Yvonne Ubels Purchasing and Administration Manager: Jayne Powell Visitor Sales Manager: Alex Coppin Office Administrator: Elizabeth Allard Administrator: vacant Supervisors: Suzanne Cole; Gary Constantine; Bob McLaughlin; Evon Nicholas; Chivanan Ramdass Warehouse Supervisor: Neil Foot Sales/Warehouse Assistant: Michael Connolly Visitor Services Assistants: Mohammed Bencheikh (p/t); Margaret Brown; Patricia Delius; Fozan Mirza; Patience Djima; Mandy Jones (p/t); Bala Patel (p/t) Christopher Powell; Doris Asiedu (p/t); Kelly Weyman

Events

Events Manager: Roger Tomlinson Senior Presenter: Andy Hallsworth Presenters: Rob Goodchild; Mark Habben, BSc; James Mackie

INSTITUTE OF ZOOLOGY

Director: Georgina M. Mace, OBE, DPhil Institute Administrator: Christina Herterich, LLM, ACIS Conservation Genetics (Acting Head): William Jordan, PhD Ecology: Richard Pettifor, DPhil Reproductive Biology: William V. Holt, PhD Veterinary Science: Anthony W. Sainsbury, BVetMed, CertLAS, CertZooMed, MRCVS

Site & Services

Site & Services Manager: Graham Roden Secretary: Dot Price Maintenance Supervisor: Colin Rolfe Contracts Supervisor: John Fitzgerald Supplies Buyer: Chris Major Electrical Foreman: Robin Fitzgerald Electrician/AV: Peter Smith Trainee Electrician: Garry West Carpenters: Stan Bonsey; Lee Ridsdale Semi-skilled Craftsmen: Jim Baker; John Pearce Painters: Paul Anscombe (p/t); Bill Manly

Administrative and Support Staff Assistant Institute Administrator: Philip G. Cottingham, BTec (CED), MIScT PA to Director of Science: Joanne Keogh Administrative Assistant: Katrine Garn, MSc Secretaries: Anna-Marie Cummins; Catherine Kerr

Honorary Research Fellows

Sarah Cleaveland, VetMB, PhD; Peter Daszak, PhD; George H. DuBoulay, CBE, MB, BSM, FRCP, DMRD; Julie Garnier, DVM; Heather Hall, PhD; Mark Jordan, PhD; Peter Kertesz,

BDS, LDS; Professor James K. Kirkwood, BVSc, PhD, MRCVS; Mark O'Connell, PhD; Amanda Vincent, PhD; Professor Paul F. Watson, BSc, PhD, BVetMed, DSc, MRCVS; Stuart Williams, PhD; Bruce Winney, PhD

Postdoctoral Staff and Veterinary Officers

Peter M. Bennett, PhD; Andrew F. Bourke, PhD; Christopher Carbone, DPhil; Guy Cowlishaw, PhD; Andrew A. Cunningham, BVMS, MRCVS; Sarah M. Durant, PhD; Alireza Fazeli, PhD; Edmund Flach, MA, VetMB, MSc, CertZooMed, MRCVS; Stephan Funk, PhD; Rob Hammond, PhD; Louisa Jenkin, PhD; Paul Jepson, BVMS, MRCVS; Alison Moore, PhD; Christine Müller, PhD; Amanda Pickard, PhD; Andrew Routh, BVSc, CertZooMed, MRCVS; Marcus Rowcliffe, PhD; Taina Strike, BVSc, MSc, MRCVS; Stuart Semple, PhD

Technicians and Support Staff

Chief Technician: David Cheesman, BTec, HNC Chief Technician (Animals): Carol Williams, BTEC, HNC Senior Technicians: Dada Gotelli, BSc; Daphne I. Green, HNC, AIScT

Senior Pathology Technician: Tracy Howard, BSc Senior Technician (Animals): Andrew G. Hartley, BAgricSc Animal Technicians: Mandy Gordon, IIAT; Jake Rozowski Senior Workshop Technician: Selwyn Mundy Senior Photographic Technician: Terry R. Dennett, MinstPl Microbiology Technician: Shaheed Macgregor, HTec, MSc, FIBMF

Technician: Elisabeth Thornton, BSc

General Laboratory Assistant: Breda Farrell

Research Assistants: Rob Deaville, BSc; Robert Hutchinson, MSc

Senior Veterinary Nurse: Gillian Ahearne VN Veterinary Nurses: Gillian Bell, BSc, VN; Christine Dean, VN; Joanne Dodds, VN Temporary Veterinary Nurse: Iiona Furrokh, BSc, VN

Postgraduate Research Students

Johnathan Baillie, MES; Daisy Balogh, MRes; Jacob Bro-Jorgensen, MSc; Angus Carpenter, MSc; Rosella Chapman, MSc; Dave Cope, BSc; Juliet Dukes, MSc; Jim Groombridge, BSc; Katherine Little, MRes; Tom Maddox, BSc; Sue O'Brien, MPhil; Susy Paisley, BSc; Octavio Paulo, BSc; Russell Seymour, MSc; Lisa Thurston, BSc; Saffron Townsend, BSc

WHIPSNADE WILD ANIMAL PARK

Operations

Operations Manager: Linda Hughes GradCIPD Operations Secretary: Suzanne Beaumont Volunteer Co-ordinator/Outreach: Graham Lucas Railway Co-ordinator: Graham Tyler Supervisor, Railway: Mick Dickens Park Services Co-ordinator: Mick Shillingford Supervisor, Park Services: John Bradley Groundsmen: Richard Chalkley; David Hawkins Gardens Chargehand: Rob Scanlan Gardener: Bob Vulling

Projects and Contracts

Projects and Contracts Manager: Ian Gordon Administrator: Sharon Boy Chargehand: Dave Law Craftsmen: Jim Harrold; David Jones; Shaun Smith; Michael Stoughton; Jim Whinnett

Retail and Main Gate

Retail and Gate Manager: Maureen White Assistant Retail/Gate Supervisors: Yasmin Bates; Tessa Roch Gatekeeper: Maria Scanlan

Catering

Banqueting Manager: David Barker Deputy Managers: Zoe Fitzpatrick; Simon Kemp Assistant Managers: Gemma Duffin; Amanda Feenan

Marketing & Development

Marketing & Development Manager: Miranda Kennett-Scott, BA, Msc, MDip, MCIM Marketing Assistant: Andrea Smith, BSc (p/t) Graphics Executive: Simon Hodge PR Executive: Jo Barfoot

Membership

Membership & Adoptions Manager: Paula Stoughton Membership Assistant: Andrea Smith, BSc (p/t)

Education Education Officer: Claire Bidder, BSc

Animal Management

ZSL Senior Curator: Nick Linsday, BSc, CBiol MIBiol Assistant to Curator: Dena Richards Regional Co-ordinators: Rob Hutton; Andy White; Cliff Tack Animal Activities Co-ordinator: Les Radford Deputy Co-ordinators: Clive Bates; Mark Best; Andy Reeve; Lee Sambrook

Director: Stuart Earley, FInstD, FInstM, FInstSMM PA/Office Manager: Dawn Sharpstone

Finance and Information Technology

Financial Controller: Roman Bodnarec, MIDM Senior Accounts Clerk: Carol Davies Assistant Accounts Clerk: Gillian Smallpiece Senior Cashier: Joan Lee Accounts/Cashier's Assistants: Sylvia Black Stores: Tony Latham Senior Keepers: John Baines; Roger Catchpole; Carole Day; Donovan Glyn; Joy Lear; Melvin Lear; Alan Morris; Trevor Moxey; Frank Smith; Marilyn Spittel; Ken Taylor; Craig White; Pete Williams

Qualified Keepers: Rebecca Cooper; Phil Curzon; Sarah Gollop; Jim Gregory, BSc; Mark Holden, BSc; Sian Lamb; Rebecca Raymond; Cheryl Seymour; Sarah Taylor, BSc; Veronica Watkins Trainee Keepers: Kate Aslett; Mike Hayward; Deane

Kingham; Steve Patrick; Louisa Toner

Volunteers

As at 31 December 2000

Animal Management

Gary Bennyworth; Kate Bevins; Amanda Boyd; Dave Brick; Amanda Brown; Andy Brown; Jo Castle; Stacy Clayton; Celeste Coles; Alex Cooke; Samantha Earle; Jenny Fulford; David Gibson; Luisa Guerrio; Glyn Hennessey; Jenny Holden; Darren Jordan; Suzanne Hyde; Sylvie Liemer; Donald MacFarlane; Davide Malone; Phil Marshall; Emma Napper; Jacky Nicholes; Jacky Newman; Peter O'Neil; Russell Pethurst; Kate Siddick; Roger Stanley; Alan Whaley; Peter Whip

Education

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Laurie Allen; Raj Amin; Hazel Amor; Hazel Anderson; Peter Arnold; Arfan Aziz; Alex Bacon; Pam Beanlands; Jill Beck; Graham Beeke; Shirley Biggs; Denise Blackwell; Sally Brough; Joan Browett; Kirsty Brown; Simon Brown; Benedict Burton; Katie Buxton; Lilah Cameron; Debbie Catt; Lei Chung Choy; Steph Claxton; John Clifford

Andrew Colman; Lorna Colquhoun; Mary Colwill; Caroline Conway; Glenys Crane; Daphne Cross; Ann Curtis; Geof Cutting; Gladys Davies; Phil Davies; Jenny Deco; Sian De Sousa; Mary De Zouche; George Fitt; Maureen Fitzsimons; Ann-Katrine Garn; Janet Gates; Celia Gaya; Trish Gibson; Angela Gilham; Valery Golding

Nevil Gorthy; Deanne Gow; Dot Gyngell; Daphne Hamilton; Ron Hart; Patricia Henley; Margaret Hinkley; James Holden; Susan Hyde; Gina James; Janice James; Jenny Jennings; Katharine Jezierski; Edward Jones; Bev Jordan; Natasha Lewis; Neale Lunn; Kate McDonald; Veronica McDougal; Steven McGarrity; Gary McGuire; Rhonda Maclean

Alan Madge; Hilary Marsh; Beryl May; Anna Mentzel; Betty Miller; Rachel Mills; H.A. Moore; Jackie Mutton; Mark Navin; Anne O'Brien; Prafulla Patel; Rosalind Pike; Jonathan Pollard; Pamela Portefield; Nargiz Price; Sharon Reeves; Stuart Reeves; Jean Reich; Renato Ruocco; Jackie Russell; Jo Smith; Julie Smith; Maurice Sobell; Ruth Sober

Susan Street; Mike Taylor; John Thompson; Mike Tigwell; M. Tracy; Ann Turner; Amelia Walker; Antony Walker; Janet Warner; Delene Welch; Jane Wheeler; Christine White; Jill Wilkinson; Michelle Wolfson; David Wooderson; Jonathan Wright

Whipsnade Wild Animal Park

Jean Anderson; Michael Atkins; Heather Bardner; Jill Bilcock; Jill Broad; John Brooker; Allison Brooks; Leile Brown; Carol Butler; Karen Chewter; Maureen Cook; Lee Crossman; Kathleen Eames; Kenneth Eames; Arthur Ellis; Pam Erwood; Elaine Fairey; Wendy Fitzgerald; Denis Garner; Maggie Garrett; Erica Godman; Evelyn Goodman

Nevil Gorthy; Jim Griffin; Norman Hancock; Pam Harry; Peter Hawkins; Pauline Hodgson; Dennis Jones; Miriam Martin; Barbara Maryan; Patricia Anne McBride; Stuart Minall; Patricia Mitchell; David Neave; Audrey Perrott; Ilid Putnam; Elizabeth Richmond; Rebecca Sandifer; Raye Sawyer; Karen Shaerf; Christine Sharpe; Ken Sharpe

Emma Sidders; Gill Smith; Walter Sinclair Smith; Doreen Snoxall; Mary Snoxall; G. R. Speed; Gerald Stevens; Lorna Taylor; Gillian Tomkins; Elizabeth Webb; Naomi White; Pat Wickens; Jenny Wynn; Jean Young; Jo Young; Hans van der Grinten; Christine Vanner

The Society warmly thanks all the volunteers who have done so much to help its work in 2000.

If you are interested in becoming a volunteer, please ask the Volunteer Co-ordinators at London Zoo or Whipsnade Wild Animal Park for further details.

Obituaries

We record with regret the deaths in 2000 of the following pensioners:

Mr W. Cutler; Mr G. Dumbleton; Mr A. W. Elborn; Mr V. A. Ghotti; Mrs E. McLaney; Mr T. S. Moore; Mr J. Murray; Mrs M. A. Noble; Mr G. A. G. Perkins; Mrs N. G. Ross; Mr N. W. Thornton; Mr Cyril Wheatley

We also record the death of Mr Ernest A. Billett, the last

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Ailsa Edwards; Valery Golding; Royce Harris; Hilary Marsh; Maurice Sobell; Andre Verstraete of the original keepers from Whipsnade, who died on 31 December 2000 aged 101.

Collaboration with zoological, conservation, research and other organizations

Anglia Polytechnic Animal Gene Storage Resource Centre of Australia African Wildlife Foundation (Uganda) Antwerp Zoo Asian Conservation Awareness Programme (ACAP) **BBSRC Silsoe Research Institute** Bedfordshire Education Business Partnership BirdLife International Bombay Natural History Society (India) Brigham Young University (USA) Center for Environment, Fisheries & Aquaculture Science (Lowestoft-Burnham-on-Crouch) Centre de Coopération Internationale en Recherche Agronomique pour le Dévelopment (CIRAD) (France) Chester Zoo Chinese Academy of Science, Beijing (China) Columbus Zoo CSIRO Australian Animal Health Laboratory (Australia) Department for International Development Department of Agriculture and Rural Development for Northern Ireland (Veterinary Sciences Division) Department of National Parks and Wildlife Conservation (Nepal) Department of Wildlife (Ghana) Desert Research Foundation of Namibia Direction Generale de Forets (Tunisia) Duke University (USA) Durrell Wildlife Conservation Trust (Jersey) **Dulwich Hospital** Egyptian Environmental Affairs Agency English Nature Estación Experimental de Zonas Aridas, Consejo Superior de Investigaciones Científicas (Spain) Ethiopian Wildlife Conservation Organization, and Regional

Institut für Zoo- und Wildtierforschung, Berlin (Germany) Instituto Nationale per la Fauna Selvatica (Italy) Institute of Animal Health Institute of Oceanography (Vietnam) Institute of Zoo Biology and Wildlife Research (Berlin, Germany) International Zoo Veterinary Group Ishinomaki University (Japan) **IUCN Species Survival Commission** John G. Shedd Aquarium Kadoorie Charitable Foundations Kenya Wildlife Service Kenyan Marine Fisheries Research Institute King Khalid Wildlife Research Centre (Saudi Arabia) King Mahendra Trust for Nature Conservation (Nepal) King Mahendra Trust for Nature Conservation KORA (Switzerland) Laboratory of Genetic Diversity (Maryland, USA) Leiden Museum (The Netherlands) Leuser Development Programme (Sumatra, Indonisia) Leverhulme Trust MAFF Veterinary Laboratories Agency Marwell Zoo Mauritius Wildlife Foundation McGill University (Canada) Michigan State University (USA) Minnesota Zoo (USA) Moredun Research Institute (Edinburgh) Moscow Zoo Murcia University (Spain) National Commission for Wildlife Conservation and Development (Saudi Arabia) National Lottery Charities Board National Museum of Scotland National University of Ireland (Cork) National Wildlife Health Center, Wisconsin (USA) Natural Environment Research Council Natural History Museum People's Trust for Endangered Species Pig Improvement Company Pierre et Marie Curie University (France) Poultry Diagnostic and Research Centre of the Venkateshwara Hatcheries Ltd. (India) Prague Zoo Princeton University (USA) Queensland Department of the Environment and Heritage (Australia)

Fauna and Flora International

Council of Amhara State

Fisheries Research Services (Aberdeen & Pitlochry) Foundation for Nature Research (Norway) FrogLife Glaxo Wellcome Global Tiger Patrol Haribon Foundation for the Conservation of Natural Resources (The Philippines) HM Customs Hornocker Wildlife Institute

Queensland University (Australia) Rotterdam Zoo Royal Society for the Protection of Birds Save The Tiger Fund Sea Mammal Research Unit (Cambridge) Tebodin (Belgium) Thai Zoological Parks Organisation The Wildfowl and Wetlands Trust **Tigris Foundation** Uganda Wildlife Authority Universities Federation for Animal Welfare University of Bern (Switzerland) University of Bristol University of California at Davis (USA) University of Cambridge University of Cardiff University of Columbia (USA) University of Dundee University of East Anglia University of Edinburgh University of Georgia (USA) University of Hong Kong University of Kingston University of Lausanne (Switzerland) University of Leeds University of Leiden (The Netherlands) University of Lisbon (Portugal) University of Liverpool University of London, Imperial College University of London, King's College University of London, Queen Mary & Westfield College University of London, Royal Veterinary College University of London, University College University of Louisiana (USA) University of Luton University of Montpellier (France)

University of Sussex University of Vermont (USA) University of Wageningen (The Netherlands) University of Washington (USA) University of West of England University of York Western Plains Zoo (Australia) WildAid Wildfowl & Wetlands Trust WildInvest (FFI) Wildlife Conservation Society (USA) World Conservation Union (IUCN) World Wide Fund for Nature US World Wide Fund for Nature Hong Kong ZooDent International Zurich University (Switzerland)

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University of New England (Australia??) University of Nottingham University of Oxford University of Paris (France) University of Regensburg (Germany) University of San Juan (Puerto Rico) University of Sheffield University of Stirling University of Stirling University of Stockholm (Sweden) University of Surrey (Roehampton)

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Animal Reproduction Science: William Holt (Member, Editorial Board)

ASLIB Biosciences Group: Ann Sylph (Membership Secretary)

Association of Leading Visitor Attractions: Jo Gipps (Honorary Treasurer and Member of Council); Sharon Ament (Member, Marketing Committee)

Bedfordshire Chamber of Commerce, Training & Enterprise: Stuart Earley (Director and Vice-Chairman)

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Universities Federation for Animal Welfare: Norman Reed (Trustee)

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Natural Environment Research Council: Georgina Mace (Member, Science and Technology Board)

Nottingham Trent University: Whipsnade Industrial Link

Primate Society of Great Britain: Guy Cowlishaw (Council Member)

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ANIMALS IN THE COLLECTION

Key to columns for Mammals, Birds, Reptiles, Amphibians and Fishes: Number of animals in the Collection at 1st January 2000. column 1

column 2 Number of animals received in 2000 by presentation, exchange, purchase, or transfer between the Society's two Collections. The figures in brackets indicate animals which have been so transferred.

Number of animals born or hatched during 2000. column 3

- Number of animals which died in 2000 within 30 days of birth or hatching. The figures in brackets column 4 indicate animals born or hatched during December 1999 which died during January 2000. Stillbirths are not included.
- Number of animals which died during 2000, apart from those included in column 4. column 5
- Number of animals disposed of in 2000 by presentation, exchange, deposit, sale or transfer between the column 6 Society's two Collections. The figures in brackets indicate animals which have been transferred between the two Collections.
- Number of animals in the Collection at 31st December 2000 showing sexes where these are known, column 7 e.g. 1/3/1 indicates 1 male, 3 female, 1 sex unknown.

Key

- Genus new to the Collection G
- Species new to the Collection S
- SS Sub-species new to the Collection
- RT Regionally threatened (species held in a breeding programme)

IUCN threatened species categories

Hilton-Taylor, C. (Compiler) (2000). 2000 IUCN Red List of Threatened Species. IUCN, Gland, Switzerland and Cambridge, UK

**

Free-ranging animals at Whipsnade

censused once a year

EX Extinct EW Extinct in the Wild	CR Critically Er EN Endangered		ed			VU V	ulnerat	ole
LONDON ZOO		1	2	3	4	5	6	7
MAMMALS								
Dasyuromorphia								
Dasycercus byrnei (VU)	Byme's Pouched Mouse (Kowari)	7	-	11	3	2	2	6/5
Dactylopsila trivirgata	Striped Possum	5	-	3		2		2/2/2
Gymnobelideus leadbeateri (EN)	Leadbeater's Possum	1	-	-	-	1	-	-
Diprotodontia								
Macropus rufogriseus frutica	Red-necked (Bennett's) Wallaby	2	-		-		2	
Bettongia penicillata	Brush-tailed Bettong	.4	•	-	•	3	•	1/0
Macroscelidea								
Echinops telfairi	Lesser Hedgehog-tenrec	-	2	-	- 2		-	1/1
Macroscelides proboscideus (VU)	Short-eared Elephant Shrew	13	•	28	8	2	13	10/8
Chiroptera								
Pteropus rodricensis (CR)	Rodrigues Fruit Bat	27	-	14	5	2	7	14/13
Carollia perspicillata	Seba's Short-tailed Bat	~150	-	30	25	45	-	~110

Scandentia Tupaia minor Tupaia tana

Primates Daubentonia

madagascariensis (EN) Varecia variegata variegata (EN) Varecia variegata rubra (CR) Eulemur rubriventer (VU) S Cheirogaleus medius Hapalemur griseus alaotrensis (CR) Loris tardigradus (VU) Nycticebus coucang Nycticebus pygmaeus (VU) Perodicticus potto Galago senegalensis Aotus lemurinus griseimembra (EN) Pithecia pithecia Ateles paniscus Callithrix jacchus Callithrix geoffroyi (VU) Callithrix argentata argentata Callithrix pygmaea Saguinus oedipus (EN) Saguinus imperator subgrisescens Leontopithecus rosalia (CR) Leontopithecus chrysomelas (EN) Callimico goeldii (VU) Macaca nigra (EN) Cercopithecus diana diana (VU) Cercopithecus hamlyni Semnopithecus entellus thersites Presbytis francoisi francoisi (VU) S Francois' Monkey Hylobates gabriellae Hylobates leucogenys leucogenys Hylobates leucogenys x gabriellae Hylobates lar Pan troglodytes (EN) Gorilla gorilla gorilla (EN)

Two-toed Sloth Myrmecophaga tridactyla (VU) Giant Anteater

Rodentia

Choloepus didactvlus

Xenarthra

Sciurus stramineus nebouxii Callosciurus prevostii Tamias sibiricus Jaculus orientalis Hypogeomys antimena (EN) Cricetus cricetus Clethrionomys glareolus caesarius Micromys minutus Lemniscomys barbarus Acomys cahirinus Mus minutoides Rattus rattus Notomys alexis Muscardinus avellanarius (RT)

Pygmy Tree Shrew Large Tree Shrew

Aye-aye Black-&-white Ruffed Len Red Ruffed Lemur Red-bellied Lemur Fat-tailed Dwarf Lemur

Alaotran Gentle Lemur Slender Loris Slow Loris Pygmy Slow Loris Potto Senegal Bushbaby Grey-legged Douroucouli White-faced Saki Monkey Red-faced Black Spider Me Common Marmoset Geoffroy's Marmoset Silvery Marmoset Pygmy Marmoset Cotton-headed Tamarin Emperor Tamarin Golden Lion Tamarin Golden-headed Lion Tamar Goeldi's Monkey Sulawesi Crested Macaque Diana Monkey Hamlyn's Owl-faced Monko Hanuman Langur Buff-cheeked Gibbon White-cheeked Gibbon Gibbon hybrid Lar Gibbon Chimpanzee Western Lowland Gorilla

White-naped Squirrel Prevost's Squirrel Siberian Chipmunk Greater Egyptian Jerboa

Malagasy Giant Jumping Ra

European Hamster

Striped Grass Mouse Arabian Spiny Mouse

Spinifex Hopping Mouse

Common Dormouse

Jersey Vole Harvest Mouse

Pygmy Mouse

Black Rat

-	-	-	and the second distance	-	a land	-	~
	1	2	3	4	5	6	7
	- 1	1	2	2	-		1/1
	4	-	-	-	-	-	2/2
	2	-					1/1
ur	1	-		1		1	0/1
200	4						2/2
		2		1			1/1
	2	2			1		1/1
				100			1/1
	1						2/1
	3				- C	3	2/1
	4	1	- Ö	-	1	1	2/1
	-	. ÷.	3	. 3	1.		
	5 4	-	-			-	2/3
	2	-	2		-	1	3/1/1
	2	2	2	1	•	2	3/2/1
	3	-	1	-		-	3/1
	5 3 5 4 7	-		-		-	3/2
onkey	4	-	-	-	-	-	2/2
	7	-	2	1			4/3/1
	3	-	-	-	1	-	2/0
	2	-	2	2 7	1	-	1/0
	9	-	9	7	1	1	4/2/3
	4		-	-	-	-	2/2
	7	-	8	6	1	3	3/1/1
	11	1	-	-	1	3	6/2
rin	4	-	-	-	1	1	2/0
	4	2		-	1	1	2/2
	7	-	2		1		3/4/1
		-	1			-	2/1
ey	2 3			-		-	1/2
	13	-	1	1	3	-	5/4/1
		4		-		-	4/0
	1	-		-		-	0/1
	1	-		-		-	1/0
		-	1	-			1/0
	3	-		2			1/2
	4		1				1/3
	3	2	- 6	3			1/4
		-					1.4
	2						1/1
	2	-	2	-			1/1
	2	-	2	-	-	-	2/2
	1	-	-	-	-	•	1/0
	4	-	3		1	3	1/1/1
	1	-	-	-	-	-	0/1
	3	-		-	1	-	0/0/2
at	2	2	2	1	1	-	2/1/1
	3 2 2	- 2 1	-	-	1	-	1/1
	6	-	12		5	-	0/0/13
	12	-	5	-	3	10	0/0/4
	~28	-	6		4	8	~22
	40		90	7	62	6	0/0/55
	2	-	1	-			1/1
	~80	3	197	46	126	55	~50
	6		1	40	1	-	0/0/6
	45		6		11		16/24
	45		0				10.24

		1	2	3	4	5	6	7			
Athenana africanus	African Brush-tailed Porcupine	2				1		1.0		Dise	Laura Diash
Myoprocia acouchy	Green Acouchi	6		2	2		1	3/2		Pig	Large Black Middle White
Chinchilla laniger	Chinchilla	4		*	+	1	+	1/2			Tamworth
Octodon degus Heterocepholus glaber	Degu Naked Mole Rat	6 10	-	- 32	32	5 2	:	0/0/1 4/4			Berkshire British Saddle
										Cattle:	Red Poll
Carnivora Character backware (07.0	Maned Wolf									-	Irish Moiled
Chrysocyon brackywnis (VU) Vidpes zerda	Fennec Fox	2		- 23	-	î	i	1/1		Sheep:	Leicester Lon, Norfolk Horne
Amblonya cinereus	Oriental Small-clawed Otter	9				÷.	1	4/4			Soay
Melursus ursinus inornatus (VU)	Sloth Bear	3		2	2	1		1/1		Goat	Pygmy
Adurus fulgens fulgens (EN) Nasua nasua	Red Panda Coatimundi	4	-	1			1	2/2 3/0			Bagot
Potos flavus	Kinkajou	1		2				0/1			Windsor Whit
Suricata suricatta	Moerkat	6	2	+				3/5			
Helogale parvula	Dwarf Mongoose	5		1.1		1		3/1		Total: N	lammals
Mungos mungo Caracal caracal	Banded Mongoose Caracal Lynx	2	*	-	*	*	1	1/1 0/1			
Felix margarita horrisoni	Sand Cat	ż					1	1/2	BIRDS		
Panthera leo persica (EN)	Asiatic Lion	4		-	+		+	1/3			
Panthera tigris sumatroe (CR)	Sunutran Tiger	2	-					1/1	Casuariiformes		
Panthera pardus orientalis (CR) Panthera pardus saxicolor (EN)	Amur Leopard Iranian Leopard	3	1				2	1/0 1/0	Rhea americana	Greater	Rhea
Neofelia nebulosa nebulosa (VU)	Clouded Leopard	1	+		-		-	1/0	Dromains novaekollandise	Emu	
									Sphenisciformes		
Proboscidea									Spheniscus demersus	Blackfor	oted (Jackass) Po
Elephas maximus (EN)	Asian Elephant	3						0/3			
Perissodactyla			19						Pelecaniformes		
Tapina indicas (VU)	Malayan Tapir	1	1					1/1	Pelecana crispus (VU)		an Pelican
Diceros bicornis michaeli (CR)	Black Rhinoceros	2					1	1/0	Pelecana onocrotalus Phalacrocorax lucidus		White Pelican reasted Cormora
									T THE STORY STORY BALL THE ADDRES		Caller Constant
Artiodactyla	Develop IN.								Ciconiiformes		
Sus barbatus S Potamochoerus porcus pictus	Bearded Pig Red River Hog	-	2				1	1/3	Nycticonax nycticonax	Night He	
Tayassu tajacu	Collared Peccary	4		+		4			Ardeole bacchus Bubulcus ibis		Pond Heron
Hexaprotodon liberiensis (VU)	Pygmy Hippopotamus	2		+				1/1	Egretia garzetia	Cattle Eg	
Pudu pada (VU)	Pudu	3		E.			1	2/1	Ciconia abdimii	Abdim's	
Okapia johastoni Giraffa camelopardalis	Okapi Giraffe	3	1	*			1	2/1 1/3	Ciconia episcopia episcopus		oolly-necked St
Tragelaphus euryceros isaaci	Mountain Bongo	ź		1	1		10	1/3	Threskiornis aethiopicus	Sacred I	
Bubalus depressicornis (EN)	Lowtand Anoa	3		1		4		2/2	Geronticus eremita (CR) Theristicus melanopis	Waldrap Black-fa	
Oryx leucoryx (EN)	Arabian Oryx	12		2	2	3		1/8	Eudocimus ruber	Scarlet I	
Gazella gazella arabica	Arabian Gazelle	4						40	Plegadis ridgwayi	Puna Ibé	
Domestic									Phoenicopterus chilensis	Chilean	Flamingo
	Rabbit	6	1			2		0/5	Anseriformes		
	Guinea Pig	8				2	1	2/3	Cygnia atratia	Black Sv	van
	Golden Hamster	1	i			-	-	1/0	Cygnus buccinator	Trumpet	
	House Mouse (domestic) Brown Rat (domestic)	14			1	1		3/0 4/10	Anser cygnoides (VU)	Swan Go	
	Clawed Jird (domestic gerbil)	3	4	-	4	2		5/0	Anser crythropus (VU) Anser indicus		Vhite-fronted Go
	Ferret	5	-			1		4/0	Branta sandvicensis (VU)		fed Goose awaiian Goose)
	Pony: Cream	2		-		-	-	2/0	Cyanochen cyanoptena		nged Goose
	Dartmoor Welsh Mountain	1	+		*	-	-	0/1 2/0	Tadorna ferruginea	Ruddy S	helduck
	Shetland	1					i	- 200	Callonetta leucophrys	Ringed 1	
	Bay	2	+			-		2/0	Aix galericulata (VU) Anat bernieri (EN) S	Mandari Madagas	
	Llama	2				-	-	2/0	Anas sibilatrix	Chiloe W	
	Bactrian Carnel	3	*	. 4	+		-	03	Anas laysonensis (VU)	Laysan T	
	Reindeer	3		-			1(1)	0/2	Anas georgica georgica	South Ge	rorgia Pintail
			-					7			
		1	2	3	4	5	6	1/0	Cabptorhynchus banksii	Retailet	Black Cockator
Anas formosa (VU)	Baikal Teal	1	1	1	5	1	1	01	Cacatua moluccensis (VU)		ested Cockatoo
Anas querquedula Mermaronetto angustirostris (VU)	Garganey Marbled Duck	6	1			3	+	1/1/1	Cacatua haematuropygia (CR)		d Cockatoo
Ayoha myroca (VU)	Ferruginous (White-eyed) Duck	5	(+)	+		+	+1	2/3	Agepornis terente		ged Lovebird
Aythya baeri (VU)	Baer's Pochard	2				1	+	1/0	Agapornis nigrigenis (EN)	Red-tailed	eked Lovebird
Mergelha albelha	Smew	3	-	*		2	1	01	Amazona brasiliensis (EN) Anodorhynchus kyacinthinus (VU)	Hyacinth 1	
Mergia cucullatia Thalasservis leuconotas leuconotas	Hooded Merganser African White-backed Duck	1		-		- 20-	19	1/0	Ara ambigua	Buffon's M	
Industrial stationard stationard	All the second second								Ara ekloroptera		nged Macaw
Falconiformes									Ara rabrogenya (EN)	A COLOR OF COLOR	ed Macaw ated Conure
Cethories awa	Turkey Vulture	5	+	+				3/2	Pyrrhura cruentata (VU) Myiapsitta monachus	Monk Pan	
Milvus migrans	Black Kite	2		-	+	*	2	1/1 1/2	Derophus accipitrinus		ided Parrot
Polyboroides typus	African Harrier Hawk	5 2	-	-		1	-	1/2			
Parabuteo unicinetus Falco biormicus	Harris's Hawk Lanner Falcon	1	1	-		1	1		Cuculiformes		
Falco cherrug	Saker Falcon	-	1				-	0/1	Musophaga violacea		ntain-cater
Phalcoboenus australia	Striated Caracara	-	3	-				1/2	Tauraco erythrolophus Tauraco laucetia		ed Turaco reked Turaco
									Tauraco leucota Tauraco corythaix facheri	Fischer's 7	
Galliformes	Created Wood Duriday	16		28	22	6	6	73			
Rollalas roairoul Gallas gallas	Crested Wood Partridge Red Junglefowl	10	2(2)	-	-	1		1/1	Strigiformes		
Lophara diardi (VU)	Siamese Crested Fireback	4	-			2	-	2/0	Tyto alba	Barn Owl	
Lophara edwardzi (CR)	Edward's Pheasant	4		-	4	2		2/0	Phodilus budius	Oriental E White fac	
Pirvo maticar (VU)	Green Peafowl	1		+	*	-	-	1/0	Otus leucotis Bubo bubo bubo		ed Scops Owl Eagle Owl
Afropavo congensis (VU) Polyplectron emphanum (EN)	Congo Peafowl Palawan Peacock Pheasant	3	1	-		i.	-	1/2	Pulsatrix perspicillata	Spectacle	d Owl
a software on collocrana (17.4)									Spectyto cunicularia Stric holombile	Burrowin Rusty-bar	
· · · · · · · · · · · · · · · · · · ·									Arrist manufactor	PLANTY-CART	111111111111

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Gruiformes

		1	2	3	4	5	6	7
Pig	Large Black		1	11	I.	120	11	2
	Middle White	-	î	7	3	-	5	
	Tamworth		1	4	-		5	
	Berkshire	1	- /	13	5	1.	9	
	British Saddlebuck		-4		+		3	0/1
Cattle:	Red Poll	2	-	1	1		*	0/2
Own	Irish Moiled	4	1	-			1	0/1
Sheep:	Leicester Longwool Norfolk Homed	-	3	4	*	*	5	0.6
	Soay		6				2	0/2
Goat	Pygmy	4			-	-	-	0%
	Bagot	2	-			2	1	.0.4
	Windsor White	3	1	2		ĩ	3	02
Total: N	tammals	781	58	527	163	318	173(1) 712
-								
Greater	Rhea	4						410
Emu			2	100		1	-	40
								002
Blackfor	sted (Jackass) Penguin	41		9	3	з	•	17/21/6
	D. M.							
	in Pelican	9	+		+	+		5/4
	A'hite Pelican	12	+	-	-			3/8/1
w nine-bi	easted Cormorant	2				*	+	0/0/2
Night He	100	1	1	34		1		0/0/1
	Pond Heron	5			12	2	-	2/3
Cattle Eg		35	120	3	1	2	1(1)	3/4/27
Little Eg		20		24	3	1		7/10/24
Abdim's		13		1		3		4/4/3
Asian W	oolly-necked Stork	2		-				1/1
Sacred II	NS	41		8	2	. 8		0/0/39
Waldrap		7	-	2	1			2/3/3
Black-fa		3					+	2/1
Scarlet II		12	2		1	1	-	4/4/5
Puna Ibis		1		+	-	1	1	
Chilean	Flamingo	37				3	•	16/18
Black Sv	-	5			4		1	1/3/1
Trumpet		L		+	-	-	-	01
Swan Go	056	1				-	-	1/0
Lesser W	'hite-fronted Goose	1		+	-	+	-	1/0
Bar-bead	ed Goose	5	-	+		4		1/0
	twaiian Goose)	2					-	1/1
	ged Goose	2		*		-	-	1/1
Ruddy S		4				2		1/0/1
Ringed T		6	1	*		2		3/2
Mandaria		3	3	-	-		-	5/1
Madagas Chiloe W		ŝ	4			1		1/2
Laysan T		1	i		-	1		1/2/2 1/0/3
	orgia Pintail	3		-		i	-	2/0
_			2	3	4	5	. 7	20
Retailed	Black Cockatoo	3						1/2
	ested Cockatoo	4	1	-	-	2		2/2
Salmon	1 Cockatoo	-	1	-				0/1
	ged Lovebird	2	-	-		-		
Red-venter		37		39	*	18		0/0/54
Red-venter Black-win Black-che	rked Lovebird				-	-	-	1/1
Red-venter Black-win Black-cher Red-tailed	Amazon	2						2/4
Red-vente Black-win Black-chev Red-tailed Hyacinth 2	Amazon Macaw	. 11	-			1	4	
Red-vente Black-win Black-che Red-tailed Hyacinth 1 Buffon's M	Amazon Macaw Iacaw	11 2	•	•	•	1	2	-
Red-vente Black-win Black-che Red-tailed Hyacinth I Buffon's M Green-win	Amazon Macaw facaw ged Macaw	11 2 2	• • •		•	•	2	1/1
Red-vente Black-win Black-che Red-tailed Hyacinth M Buffon's M Green-win Red-fronte	Amazon Macaw Iacaw ged Macaw d Macaw	11 2 2 3	•	*		•	2	1/1
Red-vente Black-win Black-che Red-tailed Hyacinth M Buffon's M Green-win Red-fronte	Amazon Macaw facaw god Macaw si Macaw ned Conure	11 2 2	•		•	•	2	1/1

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-6/3 7/1 1/2/2 0/2 -1/0 2/2 1/0 -

Bubo bubo bubo Pulsatrix perspicillata Speotyto cunicularia Strix hylophila Strix nebulosa lapponica Strix nebulosa lapponica

m Owl mental Bay Owl White-faced Scops Owl Eurasian Eagle Owl Spectacled Owl Burrowing Owl Rusty-barred Owl Great Grey Owl Rufous-legged O Ywak Owl

Gruiformes									State also barre	Contra Cont			1		
Grus japonensis (VU)	Red-crowned (Manchurian) Crane	2	+				+	1/1	Strix nebulose lapponica	Great Grey Owl	1	1			
Grus paradises (VU)	Stanley Crane	2		-			1	0/1	Strix rufipes chacoentit	Rufous-legged Owl	4	12			
Gallinula nesiotis comeri (VU)	Gough Island Moorhen	2	4		-	1		0/1	Surnia ulula	Hawk Owl	1				
Rallus striatus	Slaty-breasted Rail	1	1	1.0	1	2	-	1/0							
	Red-legged Scriema		1					0/0/1	Caprimulgiformes						
Cariama cristata	Ned-reffere benefitie								Podargus strigoides	Tawny Frogmouth	3	-			+
CT															
Charadriiformes			1					1/1	Apodiformes						
Actophilornia africana	African Jacana	-				<u> </u>	-		Amazillia sp.	Hummingbird	1	-			1
Burkinus oedicnemus	Stone Curlew	-					*	4/1	Anamann ab						
Vanellus miles miles	Masked Lapwing	3	-		-	1		0/0/3	Coraciiformes						
Larus cirrocephalus poiocephalus	Grey-headed Gull	7				. 4	*	0.0.3		Westerland					
									Dacelo novaeguineae	Kookaburra	1		- 3		
Columbiformes									Coracias caudata	Lilac-breasted Roller	0	1	2		
Gallicolumba criniger (VU)	Mindanao Bleeding Heart Dove	3				1.1		2/0	Anthracoceros malayanas	Black Hornbill	2		- 2		
Ducula aenea aenea	Green Imperial Pigeon	3	4	5	2		2	2/2	Bycanistes subcylindricus	Black-&-white Casqued Hombill	1				-
Ducula aenea paulina	Chestnut-naped Imperial Pigeon	5		- 4	1		3	1/3/1	Buceros bicornis	Great Indian Hornbill	2				
Ducula rufigaster	Purple-tailed Imperial Pigeon	4		1		1		3/2	Buceros rhinoceros	Rhinoceros Hornbill	1	. +			
Ducula concinna	Blue-tailed Imperial Pigeon	1		12	-			1/0							
Ducula pinon	Pinon Imperial Pigeon	2					1.1	1/1	Piciformes						
Ducula pinon Ducula zoene	Zoe Imperial Pigeon	2		1				1/1	Ramphastos tucanus	Red-billed Toucan	1				
	Black-backed Fruit Dove			1		1		2/0	Pterogloana aracari	Black-necked Aracari	4	-	+		
Ptilinspus cinctus albocinctus		2		- 22				2/0	The official material	and the second of the second s					
Philinopus magnificus	Magnificent Fruit Dove				12			2/1	Passeriformes						
Philinopus melanospila	Black-suped Fruit Dove			- 35	12		1	2/1	a montant to the second	Hooded Pitta	1	104	120	223	1
Palinopus superbus	Superb Fnait Dove	1.1	-	10			10	1/0	Pieta sordida	Common Shama	10	1.1	11	1	3
Zenaida graysoni (EW)	Socorro Dove	- 10	4			-		170	Copsychus malabaricus		-	- 63	10	1	1
									Copsychus saularis	Asian Magpie Robin	3	1.2	10	1	
Psittaciformes								1000	Cossypha albicapilla	White-crowned Robin Chat	1		0	- C -	
Trickoglossus johnstoniae (VU)	Mt Apo Lorikeet	-4		3		2		2/2/1	Cossypha niveicapilla	Snowy-headed Robin Chat	2		*	-	- 2
Charmosyna josefinae	Josephine's Lorikeet	1	-					1/0	Oenanthe oenanthe	Northern Wheatear	2	-			4
Charmonyna pulchella rothschildi	Fairy Lorikeet	3		+	-	2		1/0	Rhyacornis fuliginosus	Plumbeous Redstart	1	-	-	-	
Eos cyanogenia (VU)	Black-winged Lory	4				2	+	2/0	Turdus dissimilis	Black-breasted Thrush	4			-	-
Vini australis	Blue-crowned Lory	3	+	- 4	1	1	-	2/2/1	Garrulax galbama	Yellow-throated Laughing Thrush	2	+		-	1
Eolophus roseicapillus	Galah	1	+	-		-	-	1/0	Garrulax chinensis	Black-throated Laughing Thrush	1	-			1
comprise route aprilat	Committee of the second														

Liocichla omeienzia (VU) Nectarinia pulchella Zosterops palpebrosa Zosterops poliogaster S Paroaria coronata Paroaria dominicana Passerina brissonii Tengara arthus Tangara fastuosa (EN) Carduelis cucullate (EN) Chloebia gouldiae (EN) Erythrura psittacea Uracginthus cyunocephala Estrilda troglodytes Neochmia ruficauda (VU) Vidua sp. Vidua macroura Queles queles Euplectes oris Foudia flavicant (VU) Lamprotornis iris Leucopsar rothschildi (CR) Ampeliceps coronatus Basilornis celebensis Pyrrhocorax pyrrhocorax (RT)

Domestic

REPTILES

Testudines Sternothersa odoratus Trachenys scripta elegans Trachenys decoratu (VU) Hostenys grandi (VU) Terrapene coahuila (EN) Melanochelys trijuga trijuga Graptenys kohnil Pysis arachnoides (VU) Homopus areolatus Testudo graeca (VU)

Testudo hermanni Testudo horsfieldi (VU) Testudo kleinmanni (EN) Testudo marginata (VU) Malacochersus tornieri (VU) Geochelone pardalia Cheludina siebenrocki Chelodina longicollia Emydura australia albertaii Pelodiacua sinensia

Acrantophis domersili Eryx conicus Eryx johnii Hydrodynastes gigas Coronella austriaca (RT) Lampropeltis getulus californiae Lampropeltis triangulum sinclose Elaphe taeniura freesei SS Dispholidua typua Pseudeckis colletti Oxyananus scutellatus Acanthophis antarcticus Bungarus candidus Naja siamensis Naja annulifero Naia mossambica Naja pallida Naja sp. Naja kaouthia Naja oxiana Hemachana hoemachana Dendroaspis angusticeps Dendroaspis polylepis Vipera lebetina obtaa Vipera palaestinae Vipera anmodytes anmodytes Vipera raddei Vipera xanthina

					1.201	1.1201	
Omei Shan Babbler	2			1.41	1.00		1/1
Beautiful Sunbird	2	1			-		2/1
Oriental White-eye	4	6	+	-	6		
African Montane White-eye	-	1	1.		1		1
Red-crested Cardinal	3	1	- 20		-		2/1
Pope Cardinal	10		1	-	2	1	514
	6	- 32					
Ultramarine Grosbeak		1			1		3/2
Golden Tanager	1				1	+	0/1
Superb (Seven-coloured) Tanager	3			-	1		1/1
Red Siskin	4			-			2/2
Gouldian Finch	7	- 4		-	1	-	4/6
Red-throated Parrot Finch	6	-	-	-	1		1/4
Blue-capped Cordon-Blea		1			1		-
Black-rumped Waxbill	4	- 20			1	1.	0/0/3
Star Finch		1					0/0/1
Combassou	1	- 22	100				1/0
Pin-tailed Whydah	2	-			1	12	1/0
Red-beaked Weaver (Quelea)	12	10					
		1	-		2	-	0/0/10
Red Bishop	- 1	1	-		1	-	1.0
Rodrigues Fody	1		+	+	1	-	-
Emerald Glossy Starling	5	-	-				4/1
Rothschild's Mynah	9		8	3	1		5/6/2
Golden-crested Mynah	1		4		+	1	
Sulawesi Mynah	2		-	. +	1	1	
Red-billed Chough	3						1/2
Duck: Aylesbury	3			-	1.1	-	2/1
Chicken	11	22		-	8	13	1/9/2
Budgerigar	6	+	*	-	1	1	04
Total: Birds	690	76(2)	185	57	133	70(1)	691
Stinkpot Red-eared Terrapin Hispaniolan Slider Giant Asian Pond Turtle Mexican Box Terrapia	3 4 6 1 5	1		• • • • • • • • • • • • • • • • • • • •			0/0/4 0/0/4 0/0/5 1/0/2 2/2/1
Peninsular Black Turtle	2	-	÷.	12		÷.	0/2
Mississippi Map Turtle	â				- C	12	1/3
Madagascar Spider Tortoise	4	1	2	2	2		
							03
Parrot-beaked Cape Tortoise					1	-	1/1
Spur-thighed Tortoise	3		-				
visuale nastern Spur-thighed	3 16	-	3	-	-	3	5/8/3
Tortoise					-		
Tortoise	16		3	-	-	3	5/8/3
Tortoise Hermann's Tortoise	16 1 8	•	3	-	-	3	5/8/3 1/0/0 6/1
Tortoise Hermann's Tortoise Central Asian Tortoise	16 1 8 5	:	3		- - 1 1	3	5/8/3 1/0/0 6/1 3/2
Tortoise Hermann's Tortoise Central Asian Tortoise Egyptian Tortoise	16 1 8 5 18	•	3	-	-	3	5/8/3 1/0/0 6/1 3/2 7/5/3
Tortoise Hermann's Tortoise Central Asian Tortoise Egyptian Tortoise Marginated Tortoise	16 1 8 5 18 4	•	3		- - 1 1	3	5/8/3 1/0/0 6/1 3/2 7/5/3 4/0
Tortoise Hermann's Tortoise Central Asian Tortoise Egyptian Tortoise Marginated Tortoise Pancake Tortoise	16 1 8 5 18 4 5	•	3		- - 1 1	3	5/8/3 1/0/0 6/1 3/2 7/5/3 4/0 2/1/2
Tortoise Hermann's Tortoise Central Asian Tortoise Egyptian Tortoise Marginated Tortoise Pancake Tortoise Leopard Tortoise	16 1 8 5 18 4 5 1	•	3		- - 1 1	3	5/8/3 1/0/0 6/1 3/2 7/5/3 4/0 2/1/2 0/1
Tortoise Hermann's Tortoise Central Asian Tortoise Egyptian Tortoise Marginated Tortoise Pancake Tortoise Leopard Tortoise Matarnata	16 1 8 5 18 4 5	•	3		- - 1 1	3	5/8/3 1/0/0 6/1 3/2 7/5/3 4/0 2/1/2
Tortoise Hermann's Tortoise Central Asian Tortoise Egyptian Tortoise Marginated Tortoise Pancake Tortoise Leopard Tortoise Matarnata Siebenrock's Snake-necked Turtle	16 1 8 5 18 4 5 1	•	3		- - 1 1	3	5/8/3 1/0/0 6/1 3/2 7/5/3 4/0 2/1/2 0/1
Tortoise Hermann's Tortoise Central Asian Tortoise Egyptian Tortoise Marginated Tortoise Pancake Tortoise Leopard Tortoise Matarnata Siebenrock's Snake-necked Turtle	16 1 8 5 18 4 5 1 1	•	3		- - 1 1	3	5/8/3 1/0/0 6/1 3/2 7/5/3 4/0 2/1/2 0/1 0/0/1 0/0/1 0/0/4
Tortoise Hermann's Tortoise Central Asian Tortoise Egyptian Tortoise Marginated Tortoise Pancake Tortoise Leopard Tortoise Matarnata Siebenrock's Snake-necked Turtle Long-necked Ternapin	16 1 8 5 18 4 5 1 1 - 6		3		- - 1 1	3	5/8/3 1/0/0 6/1 3/2 7/5/3 4/0 2/1/2 0/1 0/0/1 0/0/4 2/2/4
Middle Eastern Spur-thighed Tortoise Hermann's Tortoise Central Asian Tortoise Egyptian Tortoise Marginated Tortoise Pancake Tortoise Leopard Tortoise Matarnata Siebenrock's Snakz-necked Turtle Long-necked Terrapin Chinese Soft-shelled Terrapin	16 1 8 5 18 4 5 1 1 -	· · · · · · · · ·	3		- - 1 1	3	5/8/3 1/0/0 6/1 3/2 7/5/3 4/0 2/1/2 0/1 0/0/1 0/0/4

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Dumenil's Boa

Smooth Sand Boa

Boipevassu Srake

Smooth Snake

Boomslang

Taipan

Collett's Snake

Death Adder

Malayan Krait

Siamese Cobra

Snouted Cobra

Red Spitting Cobra

Monocellate Cobra

Central Asian Cobra

Common Green Mamba

Western Long-nosed Viper

Ringhal's Cobra

Black Mamba

Levantine Viper

Palestine Viper

Armenian Viper

Ottoman Viper

Brown Spitting Cobra

Mozambique Spitting Cobra

Rough-scaled Sand Boa

Californian King Snake

Sinaloan Milk Snake

Stripe-tailed Ratsnake

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Crocodylia		
Alligator sinemix (CR)	Chinese Alligator	5
Sauria		
Tarentola mindiae	Egyptian Gecko	
Nachus serpensinsula	-gypan datas	
serpensionala (VU)	Serpent Island Gecko	2
Stenodactylus sthenodactylus	Elegant Gecko	4
Paroedura pictua	Malagasy Night Gecko	1
Underwoodisaarus mili	Australian Barking Gecko	
unidentified	Gecko	
Phyllodactylus marmoratus S	Marbled Gecko	2
Ocdura lesuenrii	Lesuer's Velvet Gecko	
Oedura tryoni S	Southern Spotted Velvet Gecko	2
Gehyra purpurascens S	Purple Diella	-
Gehyra sp.	Gecko (unidentified)	
Gekko gecko	Tokay Gecko	1
Homopholis wahlbergi	Wahlberg's Velvet Gecko	1
Phelsuma ornata ornata	Ornate Day Gecko	1
Phelrama standingi (VU)	Standing's Day Gecko	4
Eublepharis macularius	Leopard Ground Gecko	3
Cyclura cornuta cornuta (VU)	Rhinoceros Iguana	6
Ophanas canieri	Madagascar Spiny Lizard	1
Amphibolurus muricetus	Jacky Lizard	
Pogona vitticeps	Inland Bearded Dragon	7
Chamaeleo caleptranis	Yemen Chameleon	2
Egornia stokesii	Stolor's Skink	
Chalcides ocellatus	Eyed Skink	1
Corucia zebrata (VU)	Prehensile-tailed Skink	7
Eumeces schneideri	Schneider's Skink	1
Tiliqua rugona	Shingleback	7
Tiliqua nigrolutea	Blotched Blue-tongued Skink	
Tiliqua scincoides scincoides	Eastern Blue-tongued Skink	3
Mabuya perrotetti	Red-sided Skink	1
Gongylamorphus bajerii Gongylamorphus bajerii	Bojer's Skink	1
Gerrhosaurus major Lacerta lepida	Greater Plated Lizard	4
Lacerta lepida lepida	Ocellated Lizard (Berlenga Isl.)	2
Varanus prasinus	Jewelled Lizard	5
Varanus timorensis	Green Tree Monitor Timor Monitor	3
Varanus niloticus	Nile Monitor	í
Heloderma suspectum	THE PRODUCT	
suspectum (VU)	Reticulated Gila Monster	1
Heloderma horridum	The second	1.0
escoperatum (VU)	Rio Grijalva Beaded Lizard	1
Heloderma horridum (VU)	Beaded Lizard	2
Ophisaurus apodus	Scheltopusik (Glass Lizard)	4
Cordylus giganteus (VU)	Sungazer	5
Condulus polyzonus	Karoo Girdled Lizard	2
Serpentes		
Liasis albertisii	D'Albert's Python	4
Morelia spilotes spilotes	Diamond Python	1
Python curtur brongersmal	Blood Python	4
Ython curtus breitensteini	Bomeo Blood Python	3
Yohon molurus bivittatus	Burnese Python	3
Pothon regius	Royal Python	9
picrates subflemes (VU)	Jamaican Boa	3
lanzinia madagascariensis (VU)	Madagascan Tree Boa	6
loa constrictor	Boa Constrictor	2
loa constrictor occidentalis	Argentine Boa	2

	Ornate Day Gecko	1			-	-		0/0/1
	Standing's Day Gecko	4	2	1		1	1	4/1/0
	Leopard Ground Gecko	3		2			1	1/2/2
U)	Rhinoceros Iguana	6				1	1	3/1/1
	Madagascar Spiny Lizard	Ť			- 12	1		
	Jacky Lizard	2	2	-	1		1	00/2
	Inland Bearded Dragon	7	1	3		1		
	Yemen Chameleon					2	2	4/1/1
		2	-	-		1		1/0
	Stoke's Skink	-	2	+	1.1		4	0/0/2
	Eyed Skink	1				19		1/0
	Prehensile-tailed Skink	7						3/2/2
	Schneider's Skink	1	-	+	-	-		1/0
	Shingleback	7	-			- 4	-	3/4
	Blotched Blue-tongued Skink		3	1.1		1.4		1/2
es :	Eastern Blue-tongued Skink	3		-				1/2
	Red-sided Skink	1			10	1		
	Bojer's Skink	i.		12		- i -	2	
	Greater Plated Lizard	4			12	3		100
	Ocellated Lizard (Berlenga Isl.)	4		i.	1			1/0
	Jewelled Lizard		-			1		2/1
		2	-	1		1.2		1/1
	Green Tree Monitor	5		1	-	2	-	1/2/1
	Timor Monitor	3			- +			2/1
	Nile Monitor	1	-	-				1.0
	Reticulated Gila Monster	1	4	-	-	-1		
	Rio Grijalva Beaded Lizard	1		1.1			1	-
	Beaded Lizard		2			3	2	2/0
	Scheltopusik (Glass Lizard)	4	-	9	-	i		
	Sungazer	5				1		0/0/12
	Karoo Girdled Lizard		-				*	4/0
	PLando Chinaled Lizzand	2		*	+			2/0
	10000 SQ 1000							
	D'Albert's Python	- 4		-	-		2	1/1
	Diamond Python	1	5	-		1		0/0/5
	Blood Python	4				-		2/2
	Bomeo Blood Python	3	14		-	1		0/0/2
	Burmese Python	3	14	22	1	1		1/1
	Royal Python	9	100		2	1	2	3/1/5
	Jamaican Boa	3	100	-				
(VU)	Madagascan Tree Boa							3/0
(10)		6	1				-	3/3
	Boa Constrictor	2	1		-	-	7.	0/0/3
	Argentine Boa	2					+	0/2
-		-	_		-	-	_	- 22
-		1	1	3	4	5	6	7
								-
	Yellow-handed Poison Frog	4	-	-	-	1	-	0/0/4
	Blue-&-yellow Poison Frog	1		1000		1		1.00
	Strawberry Poison Frog	~16		10			-	~26
	Yellow-&-black Poison Frog	4		2		-	2.00	0/0/6
	Blue Poison Frog	11		13			10	3/2/9
	Kokoe Poison Prog	1		-	-	1		
	Golden Poison Frog	-4	20	-	-	4	8	1/2/9
	Phantasmal Poison Frog	~9	-			-	-	1/2/6
	Marsupial Frog	1	-	-		1		
	White's Tree Frog	à.			1	- 22 -	-	2/2
	American Bullfrog	ĩ		1		1	-	-
	CALIFORNIA DI GALLAND						-	and the second s

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Dendrobates pumilio Dendrobates truncatus Developates assess Phyllobates aurotaenia Phyliobates terribilis Epipedobates tricolor Gastrotheca riobambae Litoria caerulea Rana catesbeiana Bufo calamita Bufo marinus Bufo viridis Bombina orientalis Gymnophiona Typhlonectes natans Caudata Ambyatoma tigrinum Salamandra salamandra

Dendrobates leucomelas

Dendrobates tinctorius

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	_	_		_		-	22
	1	1	3	4	5	6	7
Yellow-handed Poison Frog	4			-			0/0/4
Blue-&-yellow Poison Frog	1				1	-	
Strawberry Poison Frog	~16		10			-	~26
Yellow-&-black Poison Frog	4		2	-	-		0/0/6
Blue Poison Frog	11		13			10	3/2/9
Kokoe Poison Frog	1				1		
Golden Poison Frog	-4	20			4	- 8	1/2/9
Phantasmal Poison Frog	~9	-				-	1/2/6
Marsupial Frog	1	+	-		1		
White's Tree Frog	4			-		+	2/2
American Bullfrog	1	-	2.4		1		
Natterjack Toad	3	-	1.4	4	1		0/0/2
Cane Toad	3		1.0		1	-	0/1/1
Green Toad	1			14	12	-	1/0
Fire-bellied Toad	6		2		-	-	0/0/8
Aquatic Caecilian	4		4				0/0/4
Tiger Salamander	1				4		0/0/1
Fire Salamander	1		-		1		
Total: Amphibians	124	84	48		41	15	197

FISHES

Birds and strengt	Puff Adder	7	1.1	68	58	5		. 1/1/10
Bitis arietans	Gaboon Viper	37				11	7	3/5/11
Bitis gabonica rhinoceros	Carpet Viper	3	19			2		
Echis carinatus ssp.	Saw-scaled Viper	5	1			52	2	0/1/1
Echis carinatus sochareki	Rock Marmishi	2	- 20				1	2/2
Gloydius intermedius saxatalis	A CONTRACT OF A				-	ĩ	1	0.02
Gloydius kalys caragama	Karagonda Mamushi	3	*	15	-		2	0/0/12
Calloselasma rhodostoma	Malayan Pit Viper	9	*	15		199		1/0
Trimeresurus purpureomaculatus	Mangrove Pit Viper	1.0	+					0/1/2
Trimeressaus albolabris	White-lipped Tree Viper	2	1	*	-			
Bothriechia schlegeli	Eyelash Viper		2				÷.	1/1
Bothrops asper	Terciopelo	1					+	0/1
Bothrops monjeni	Moojen's Fer-de-Lance	1	+				1	
Bothrops atrax x moojeni	Fer-de-Lance x Moojen's							
	Fer-de-Lance	12			-	6	6	
Bothrops alternatus	Units	1				1	+	-
Crotalus durissus culminatus	North-western Neotropical							100
	Rattlesnake	1			-			1/0
Crotaha unicolor (CR)	Aruba Island Rattlesnake	18		7	4	4	10	1/1/5
Crotalus vegrandis	Uracoan Rattlesnake	19	-		+	11	-	1/1/6
Croteha atrox	Western Diamondback Rattlesnake	1	-	-				0/0/1
Crotaha virida oreganat	Northern Pacific Ratflesnake	6		-		6		
Crotalus cerastes	Sidewinder	1	*	*		-	-	1/0
	Total: Reptiles	491	70	127	65	123	69	431
AMPHIBIANS								
Anura								
Phrynohyaz resiniferrix	Panda Frog	+	10			9		0/0/1
Mantella aurantiaca (VU)	Golden Mantella	5	64			30		0/0/39
Colostethus trinitatus	Stream Frog	-40	-	20	-			-60
Dendrobates auratus	Green-&-black Poison Frog	4	12	1			+	0/0/5
the second	Contract of Contract of Contract of Contract							

CHONDRICHTHYES

Carcharhiniformes 2 Carcharkinsa melanoptersa Black-tipped Reef Shark 2 4 -. Bonnethead Shark 4 Sphyrna tiburo OSTEICHTHYES Polypteriformes Polypterus Polypterus Polypterus Polypterus Polypterus bichir Polypteria palmas 2 Polypteria retropinnia Polypterus senegalut Polypteria weeksi Polypterus Acipenseriformes Acipenser ruthenus (VU) Sterlet Scaphirkynchus platorkynchus (VU) Shovelnose Stargron 4 . 2 Paddlefish Polyodon spathula (VU) Semionotiformes Spotted Gar Florida Gar Lepisorteus oculatus Lepisosteus platyrhinchus 2 Shortnose Gar Lepisosteus platostomus Amiiformes Bowfin 1 1 Amia calva Anguilliformes Common Eel 1 Anguilla anguilla Echidna zebra 2 -+ . Zebra Moray Eel 5 5

			1	2	3	4	5	6	7			1	2		4	5	6	7
	Gymnothorax favaginesa	Leopard Moray Eel	2					2		Gymnotiformes						-		
	Conger conger Heteroconger hassi	Conger Eel Garden Eel	2	10		•	1	*	1	Electrophonus electricus	Electric Eel	1	-			1	÷	
	Cypriniformes									Esociformes								
	Acheilognathus micropterus	Asian Bitterling	2	43			2			Etar lucius	Pike	1			1.5	-		1
	Barbus barbus Capoeta bimaculatus	Barbel Two-spot Barb	3	1		-	2	1	3	Salmoniformes Oncorlynchus mykias	Dulahan Rama							
	Capoeta arulha Capoeta semifasciolatus	Analius Barb Chinese Green Barb	7	1	9	-	1	-	15	Salmo trutta	Rainbow Trout Brown Trout	2	•		-	1	-	4
	Capoeta titieya	Cherry Barb	1		-	12	i	-		Thyailamas diyailamas	Grayling	7	-			6		1
	Osteochilus vittatus Pseudorasbora parva	Bony-lipped Barb Clicking Barb	10		-	-	10	-		Ophidiiformes	C1							
	Carazzina auratus Cyprinus carpio	Goldfish Carp - Koi, mirror, etc.	4	•	-	1	1		3	Carapus homei Carapus boraborensis	Clear Peartfish Brown Peartfish		2 3		-	1		1 2
	Gobio gobio Hypophthalmichthyz malürix	Gudgeon Silver Carp	2		-	+	1	+	1	Gadiformes								
	Leuciscus cephalus	Chub	8	+	-	3	3		5	Gaidropsaurus vulgaris	Three-bearded Rockling		1	1.0		1		+
	Leweisens idus Leweisens leweisens	Ide or Orfe Dace	10 1	-	1	:	3	-	7	Mugiliformes								
	Phaxinus photinus Tanichthys albonubes	Minnow White Cloud Mountain Minnow	~30	- 100	-	1	12 92	-	-18 12	Chelon labrorus	Thick-lipped Grey Mullet	14	13			1	+	26
	Rasbora borapetensis Rasbora elegans	Red-tailed Rasbora Elegant Rasbora	6	-	-	-			6	Atheriniformes								
	Rasbora heteromorpha	Harlequin Rasbora	5			1	5	*	7	Bedotia geași Glossolepis încisur (VU)	Madagascan Rainbowfish New Guinea Red Rainbowfish	38	1	1		15 2	-	23
	Rutilus rutilus Scardinius erythrophthalmus	Roach Rudd	~56 ~50	1	-	-	6 10	-	-50	Melanotaenia boesemani (EN) Pseudomugil mella (EN)	Boeseman's Rainbowfish Honey Blue-eye	3	18	-		-		21
	Tinca tinca Mixtocyprinus asiaticus	Tench Chinese Sailfin Sucker	24 7	-	-	3	6	-	18	Pseudomugil cyanodorsalis Telmetharina celebensis	Blue-back Blue-eyes Sulawesi Rainbowfish	-	23	84	1	ii	-	95
	Sara sinensis Botia macracantha	False Myxocyprinus	-	10		+	i	-	9		Suawest Autoowenn	-		1	-	-	-	12
	Botia modesta	Clown Loach Red finned Botia	3	1	2		1		4	Belontiformes Oryalas celebensis (VU)	Sulawesi Medaka	10				7		1
	Botia sidshimunki (CR) Pseudogastromyzon sp.	Chain Loach Striped Butterfly Plecostomas	7	10	1	-	- 10	-	7	Nomoramphus ebrardtil Nomoramphus leimi leimi	Sulawesi Halfbeak Sulawesi Halfbeak	27		3	-	÷	-	30
	Pseudogastromyzon sp.	Spotted Hillstream Loach		10	-		4	*	6		Subweb Hallbeak	2				4	*	1
	Characiformes									Cyprinodontiformes Pachypanchax omalonotus	Malagasy Killifish	19	4		T	16		6
	Astyonas mexicanus Hemigrammus erythozonas	Blind Cavefish Glowlight Tetra	21	-		-	1	-	20	Pachypanchax sakaramyi (VU) Anableps anableps	Malagasy Killifish Four-eyed Fish	25	12		-	-	-	12
	Hyphessobrycon elachys Pristella maxillaria	Reed Tetra X-ray Tetra		12	+	+	6 2	-	6	Poecilia nigrofasciata	Black-barred Limia	-50	-	-	-	4	-	31 -41
	Gymnocorymbia ternetzi Hazemania nana	Black Widow Tetra	23	-			15	+	8	Poecilia reticulata Poecilia reticulata (wild form)	Guppy (domestic) Fitch-lake Guppy	-500 -100		*	2	3	:	497 -100
	Motynnis argenteur	Silver-tipped Tetra Silver Dollar	2	-		-	6	-	1	Ameca splendens (EW) Zoogsneticus tequila	Butterfly Goodeid Crescent Zoe	~100	-	1	-	11	-	-89
	Serrasalmus nattereri Colossoma macroponium	Red-bellied Piranha Pacu	25	2	1	-	-	-	25 2	Cyprinodon longidorsalis Jordanella floridae	Charco Palma Pupfish		10	19	-	3	-	26
	Triporthes angulatus	Narrow Hatchetfish	6	-	+	•	+	•	6		American Flagfish		10					9
	Siluriformes									Beryciformes Miriprintis adjusta	Bronze Soldierfish	1					1	1
	Pelteobagrua brashnikowi Synodontis clarias	Amur Dragon Catfish Red-tailed Synodontis	5	1	-	*	5	-	1	Myripristis jacobus Myripristis mudian	Blackbar Soldierfish Red Soldierfish	4	-		-	-	-	4
	Synodontis multipunciana Synodontis sp.	Cuckoo Catfish Synodontis	3	1	-	+	-	+	3	Sargocentron diadema	Clown Squirrelfish	î	+	-	-		-	1
	Agamyxis pectinifrons Corveloras aeneus	Spotted Doras Catfish Bronze Catfish	1				1	-	-	Sargocentran rubrum	Redcoat Squirrelfish	2	-	-	*	•	+	2
	Corydoras elegans	Elegant Corydoras	4 5		2	-	2	-	3	Gasterosteiformes Gasterosteus aculiatus	Three-spined Stickleback	-60		16				
	Corydoras haraldschultzi Corydoras paleatus	Harold Schultz's Corydoras Peppered Catfish	4	-	1	•	3	-	1	Nerophis ophidion Syngnathus acus	Worm Pipefish	-	1	-	-	1		-65
	Ancistrus sp. Otocinelus affinis	Bristle-nosed Catfish Dwarf Sucker Catfish	1	-			-		1	Entelierus acquoreus	Greater Pipefish Strall/Srake Pipefish	1	2		-	2	-	2
	Pterygophichthys gibbiceps Hypostamus spp.	Sailfin Plecostomas Catfish	6	-	+	+	5	2	1	Dorhyamphus multiannulatus Hippocampus capensis (EN)	Candy Pipefish Knysna Seahorse	4 736	*		-1200	3	375	1 484
	a state the second s							20	-									
			,	2	3	4	5	6	,~			-	2	3	4	5	6	7
1	Hippocampus kuda (VU) Hippocampus reidi (VU)	Yellow Seahone Slender Seahone	- 0.3	2	3 501 3377	4 229 3234	5 143 147	•	7	Collockromia lepissoma Soatkadus erstkrados	Sardine Cichild Goly: Cichild	1	1 10 7	3	4	5	6. -	7
	Hippocampua reidi (VU) Hippocampua abdominalia (VU)	Slender Seaborse Pot-beilied Seaborse	1 9 3 .	2 6 12	3 501 3377	4 229 3234	147		7 138 5 12	Spathodus erythrodon Eretmodus cyanostictus	Goby Cichlid ' Goby Cichlid	-	2 10 2 3	3	4	5 - 1 1	6 	7 10 1 2
	Hippocampia reidi (VU) Hippocampia abdominalis (VU) Hippocampia fiacua (VU)	Slender Seahorse	1 93						5	Spathodus erythrodon Erebnodus cyanostictus Cyphotilapia frontosa Julidochromis regani	Goby Cichlid Goby Cichlid Blue-banded Cichlid Striped Julie	1	2 10 2 3 -	3	4	5 - 1 1 - 29		7 10 1 2 4 21
	Hippocampua reidi (VU) Hippocampua abdominalia (VU)	Slender Seaborse Pot-beilied Seaborse	1 93	12			147		5	Spathodus erythradon Eretmodus cyanostictus Cyphotilapia frontosa	Goby Cichlid Goby Cichlid Blue-banded Cichlid	1 - - - - - - - - - - - - - - - - - - -	2 10 2 3	3	4			1 2 4
	Hippocampua reidi (VU) Hippocampus abdominelis (VU) Hippocampus fuscus (VU) Scorpaeniformes Taurulus bubalis Pterois volitans	Stender Seaborse Pot-beilied Seaborse Sea Pony Sea Scorpion Lionfish	1 9 3	12			147	• • • • • • •	5	Spathodus eryshrodon Eretmodus cyanostictus Cyphotilapia frontosa Julidochromis regani Dascyllus medjanurus Dascyllus medjanurus Pomacentrus alleni	Goby Cichlid Goby Cichlid Blue-banded Cichlid Striped Julie Marginate Damsel Black-tailed Humbug Neon Damselfish	1 4 -50 1 3 8 1	2 10 2 3	3	4	29 - - 3	*	1 2 4
	Hippocampna reidi (VU) Hippocampna abdominalia (VU) Hippocampna fuacua (VU) Scorpaeniformes Tauruha bubalia Pterois volitans Hypodytes rubripinnia Trigla lucerna	Slender Seaborse Pot-beilied Seaborse Sea Pony Sea Scorpion Lionfish Velvet Waspfish Tub Gurnard	1 93	12 9 1			147 9 1 1 3	· · · · · · · · · · · · ·	5	Spathodus erythrodon Ereimodus cyanostictus Cyphoillapia frontosa Julidochromis regani Dascyllus marginatus Dascyllus melanurus Pomacentrus alleni Pomacentrus alleni Pomacentrus pavo Chromis viridis	Goby Cichlid Goby Cichlid Blue-banded Cichlid Striped Julie Marginate Damsel Black-tailed Hambug Neon Damselfish Blue Damselfish Blue Jamselfish	1 	2 10 2 3	3	*			1 2 4
	Hippocampna reidi (VU) Hippocampna abdominalia (VU) Hippocampna fuscua (VU) Scorpaeniformes Taurulus bubalis Pterois volitans Hypodytes rubripinnis	Slender Seaborse Pot-beilied Seaborse Sea Pony Sea Scorpion Lionfish Velvet Waipfish	1 93	12			147		5	Spathodus erythrodon Erebnodus cyanostictus Cyphotilapia frontosa Julidochronis regani Dascyllus melanurus Pomacentrus alleni Pomacentrus alleni Pomacentrus pavo Chronis viridis Amphiprion akindynos Amphiprion frenatus	Goby Cichlid Goby Cichlid Blue-banded Cichlid Striped Julie Marginate Damsel Black-tailed Hambug Neon Damselfish Blue Damselfish Blue-green Chromis Australian Clownfish Tomato Clownfish	1 3 8 1 27 2 3	2 10 2 3	3		29 3		1 2 4 21 1 3 5 1
	Hippocampna reidi (VU) Hippocampna abdominalia (VU) Hippocampna fuscua (VU) Scorpaeniformes Tauruha bubalia Pterois volitans Hypodysta rubripinnis Trigla lucerna Cyclopterna lumpus Mynxocephalia scorpias	Slender Seaborse Pot-bellied Seaborse Sea Pony Sea Scorpion Lionfish Velvet Waspfish Tub Gurnard Lumpsucker	1 93	12 9 1			147 9 1 1 3	• • • • • • • • • •	5	Spathodus erythrodon Ereimodus cyanostictus Cyphoillapia frontosa Julidochromis regani Dascyllus marginatus Dascyllus melanurus Pomacentrus alleni Pomacentrus alleni Pomacentrus pavo Chromis viridis Amphiprion akindynas	Goby Cichlid Goby Cichlid Blue-banded Cichlid Striped Julie Marginate Damsel Black-tailed Hambug Neon Damselfish Blue Damselfish Blue-green Chromis Australian Clownfish	1 3 8 1	2 10 2 3	3	4	29 3		1 2 4 21 1 3 5 1
	Hippocampua reidi (VU) Hippocampua abdominalia (VU) Hippocampua fuscua (VU) Scorpaeniformes Taurulus bubalia Pterois voliuns Hypodytes rubripinnis Trigla lucerna Cyclopterus lumpus Myoxocephalis scorpius Perciformes Siniperca chuatsi	Stender Seaborse Pot-bellied Seaborse Sea Pory Sea Scorpion Lionfish Velvet Wapfish Tub Gurnard Lumpsucker Bull Rout Chinese Perch	1 93	12 9 1			147 9 1 1 3		5 12 - 2 1 1 - 3	Spathodus erythrodon Erebnodus cyanostictus Cyphoilapia frontosa Julidochromis regani Dascyllus marginatus Dascyllus melanurus Pomacentrus alleni Pomacentrus alleni Pomacentrus pavo Chromis viridis Amphiprion akindynos Amphiprion frenatus Amphiprion ocellaris Premnas biaculeatus Cienolabrus rupestris	Goby Cichlid Goby Cichlid Blue-banded Cichlid Striped Julie Marginate Damsel Black-tailed Humbug Neon Damselfish Blue Damselfish Blue-green Chromis Australian Clownfish Tomato Clownfish False Clownfish Maroon Clownfish Goldainny Wrasse	1 3 8 1 27 2 3	2 10 2 3	3		29 - - - 15 - 4		1 2 4 21 1 3 5 1
	Hippocampna reidi (VU) Hippocampna abdominalia (VU) Hippocampna fuscaa (VU) Scorpaeniformes Taurulus bubalia Pterois voltans Hypodytea rubripinnis Trigla lucerna Cyclopterus lumpus Myosocephalia scorpias Perciformes Siniperea chuatui Dicentrarchus labrax Anthias squamipinnis	Stender Seaborse Pot-beilied Seaborse Sea Pony Sea Scorpion Lionfish Velvet Waspfish Tub Gurnard Lumpsacker Bull Rout Chinese Perch Sea Bass Wreckfish	· · · · · · · · · · · · · · · · · · ·	12 9 1			147 9 1 1 3	• • • • • • • • • • • • • •	5	Spathodus erythrodon Ereimodus cyanostictus Cyphoillapia frontosa Julidochromis regani Datscyllus melanurus Datscyllus melanurus Pomacentrus alleni Pomacentrus pavo Chromis viridis Amphiprion akindynos Amphiprion frenatus Amphiprion frenatus Amphiprion ocellaris Premast biaculeatus Cienolabrus rupestris Labroides dimisliatus Labrus bergylus	Goby Cichlid Goby Cichlid Blue-banded Cichlid Striped Julie Marginate Danuel Black-tailed Hambug Neon Darnselfish Blue Darnselfish Blue Darnselfish Blue-green Chromis Australian Clownfish Tomato Clownfish False Clownfish Maroon Clownfish Goldniny Wrasse Cleaser Wrasse Ballan Wrasse	1 3 8 1 27 2 3 10 1	2 10 23	3	4	29 - - - - - - - - - - - - -		1 2 4 21 1 3 5 1
	Hippocampua reidi (VU) Hippocampua abdominalia (VU) Hippocampua fuscaa (VU) Scorpaeniformes Tauruha bubalia Pterois voliuns Hypodytea rubripinnis Trigle lucerna Cyclopterus lumpus Mynaocephalia scorpius Perciformes Siniperca chuatsi Dicentrarchus labras	Stender Seaborse Pot-bellied Seaborse Sea Pony Sea Scorpion Lionfish Velvet Waipfish Tub Gurnard Lumpsacker Bull Rout Chinese Perch Sea Bass	1 9 3 2 2 4	12 9 1			147 9 1 1 3	• • • • • • • • • • • • • • • • • • • •	5 12 - 2 1 1 - 3	Spathodus erysbrodon Erebnodus cyanostictus Cyphoeilapia fromosa Julidochromis regani Dascyllus melanurus Pomacentrus alleni Pomacentrus alleni Pomacentrus alleni Pomacentrus pavo Chromis viridis Amphiprion akindynas Amphiprion akindynas Amphiprion ocellaris Premnas biaculeatus Cienolabrus rupestris Labroides dimidiatus Labrus mistus Pseudochellinus hesataenia	Goby Cichlid Goby Cichlid Blue-banded Cichlid Striped Julie Marginate Darnsel Black-tailed Humbug Neon Darnselfish Blue Darnselfish Blue-green Chromis Australian Clownfish Tomato Clownfish False Clownfish Maroon Clownfish Goldsinny Wrasse Cleanser Wrasse Ballan Wrasse Cackoo Wrasse Six-lined Pyjama Wrasse	1 3 8 1 27 2 3 10 1	2 10 2 3	3	4	29 3 15 4 13 1		1 2 4 21 1 3 5 1
	Hippocampua reidi (VU) Hippocampua abdominalia (VU) Hippocampua fuscua (VU) Scorpaeniformes Taurulus bubalia Pterois volitans Hypodytes rubripinnis Trigla lucerna Cyclopterus lumpus Myoxocephalis scorpius Perciformes Siniperca chuatsi Dicentrarchus labras Anthias squamipionia Cephalopholis mincatus Cromileptis altivelis Serranus tortugpnum Pseudochromis fridmani	Stender Seaborse Pot-beilied Seaborse Sea Pony Sea Scorpion Lionfish Velvet Waspfish Tub Gurnard Lumpsucker Bull Rout Chinese Perch Sea Bass Wreckfish Red Grouper	· · · · · · · · · · · · · · · · · · ·	12 9 1			147 9 1 1 3	· · · · · · · · · · · · · · · · · · ·	5 12 - 2 1 1 - 3	Spathodus erythrodon Erebnodus cyanostictus Cyphoellapia frontosa Julidochromis regani Dateyillus marginatus Dateyillus melanurus Pomacentrus alleni Pomacentrus alleni Pomacentrus pavo Chromis viridis Amphiprion akindynos Amphiprion akindynos Amphiprion frenatus Amphiprion occillaris Premnas biseuleatus Ctenolabrus rupestris Labroides dimisliatus Labrus bergylus Labrus mixtus Prevulochellinus hesataenia Symphodus melogs Centralabrus exoletus	Goby Cichlid Goby Cichlid Blue-banded Cichlid Striped Julie Marginate Damsel Black-tailed Humbug Neon Damselfish Blue-green Chromis Australian Clownfish Tomato Clownfish Tomato Clownfish False Clownfish Maroon Clownfish Maroon Clownfish Goldainny Wrasse Cleaser Wrasse Ballan Wrasse Cackoo Wrasse Six-lined Pyjama Wrasse Corkwing Wrasse Rock Cook	1 3 8 1 27 2 3 10 1	2 10 2 3 	3	4	29 3 15 4 13 1		1 2 4 21 1 3 5 1
	Hippocampna reidi (VU) Hippocampna abdominalia (VU) Hippocampna fuscaa (VU) Scorpaeniformes Taurulus bubalia Pterois voliums Hypodytes rubripinnis Trigle lucerna Cyclopterus lumpus Myoxocephalis scorpius Perciformes Siniperca chuatsi Dicentrarchus labras Anthias squamipienis Cephalopholis mincatus Cronileptis altivelis Serromus tortuganum Pseudochromis fridmani Calloplesiops altivelis	Stender Seaborse Pot-bellied Seaborse Sea Pony Sea Scorpion Lionfish Velvet Wapfish Tub Gurnard Lumpsucker Bull Rout Chinese Perch Sea Bass Wreckfish Red Grouper Polkadot Grouper/Pantherfish Chalk Bass Orchial Dotyback Marine Betta	1 9 3 2 2 4	12 9 1 			147 9 1 - 1 3 20 1 - 1 2 - 1 2 -	• • • • • • • • • • • • • • • • • • • •	5 12 2 1 1	Spathodus erythrodon Eretmodus cyanostictus Cyphoellapia frontosa Julidochromis regani Datcyllus melanurus Pomacentrus alleni Pomacentrus alleni Pomacentrus alleni Pomacentrus pavo Chromix viridis Amphiprion akindynas Amphiprion akindynas Amphiprion feenatus Amphiprion occllaris Premnas biaculeatus Ctenolabrus rupestris Labroides dinidiatus Labrus bergista Labrus bergista Labrus mixtus Pseudochellinus hexataenia Symphodua melops	Goby Cichlid Goby Cichlid Blue-banded Cichlid Striped Julie Marginate Damsel Black-tailed Humbug Neon Damselfish Blue Damselfish Blue-green Chromis Australian Clownfish Tomato Clownfish Tomato Clownfish Maroon Clownfish Maroon Clownfish Goldainny Wrasse Cleaner Wrasse Ballan Wrasse Cackoo Wrasse Six-lined Pyjama Wrasse Corkwing Wrasse	1 3 8 1 27 2 3 10 1	2 10 2 3	3		29 3 15 4 13 1	· · · · · · · · · · · · · · · · · · ·	1 2 4 21 1 3 5 1
	Hippocampna reidi (VU) Hippocampna abdominalia (VU) Hippocampna fuscaa (VU) Scorpaeniformes Taurulus babalia Pterois voltans Hypodytes rubripinnis Trigla lucerna Cyclopterus lumpus Myosocephalia scorpias Perciformes Siniperca chuatui Dicentrarchus labrax Anthias squamipinnis Cephalopkolis mincatus Cromileptis altivelis Serransa tortuganum Pseudochromix fridmani Calloplesiops altivelis Lapomis gibbosus Lepomis megalotis	Stender Seaborse Pot-beilied Seaborse Sea Pony Sea Scorpion Lionfish Velvet Waspfish Tub Gurnard Lumpsacker Bull Rout Chinese Perch Sea Bass Wreckfish Red Grouper Policadot Grouper/Pantherfish Chalk Bass Orchid Dottyback Marine Betta Pumpkinseed Long-eared Sunfish	3 1 2 2 1	12 9 1			147 9 1 1 3	· · · · · · · · · · · · · · · · · · ·	5 12 - 2 1 1 - 3	Spathodus eryshrodon Eretmodus cyanostictus Cyphotilapia fromtosa Julidockromis regani Dascyllus melanurus Pomacentrus alleni Pomacentrus alleni Pomacentrus alleni Pomacentrus alleni Pomacentrus alleni Pomacentrus Amphiprion akindynos Amphiprion akindynos Amphiprion ocelleris Premnas biaculeatus Conolabrus rupestris Latoroides dimidiatus Latorus mixtus Pseudocheilinus hexatasenia Symphodus melops Centralabrus exoletus Bodianus rufus	Goby Cichlid Goby Cichlid Blue-banded Cichlid Striped Julie Marginate Damsel Black-tailed Hambug Neon Damselfish Blue-green Chromis Australian Clownfish Tomato Clownfish False Clownfish Maroon Clownfish Maroon Clownfish Goldsinny Wrasse Cleaner Wrasse Ballan Wrasse Cleaner Wrasse Ballan Wrasse Six-lined Pyjama Wrasse Corkwing Wrasse Rock Cook Spanish Hogfish Carary Blenny	1 3 8 1 27 2 3 10 1	2 10 2 3	3	4	29 3 15 4 13 1	*	1 2 4 21 1 3 5 1
	Hippocampus reidi (VU) Hippocampus abdominelis (VU) Hippocampus fuscus (VU) Scorpaeniformes Taurulus bubalis Pterois voliums Hypodyses rubripinnis Trigla lucerna Cyclopterus lumpus Myoxocephalis scorpius Perciformes Siniperca chuatsi Dicentrarchus labrax Anthias squamjoinnis Cephalopkolis mincatus Cromilepkis altivelis Serrama tortuganum Pseudochromis fridmani Calioplesiops altivelis Lepomis gibbosus Lepomis megalotis Prera fluvietilis Prera fluvietilis	Stender Seaborse Pot-bellied Seaborse Sea Pory Sea Scorpion Lionfish Velvet Waipfish Tub Gurnard Lumpsucker Bull Rout Chinese Perch Sea Bass Wreckfish Red Grouper Poficadot Grouper/Pantherfish Chalk Bass Orchid Dottyback Marine Betta Pumpkinseed Long-eared Sunfish Perch Indonesian Banggai Cardinal Fish	3 1 2 2 1	12 9 1 			147 9 1 - 1 3 20 1 - 1 2 - 1 2 -	· · · · · · · · · · · · · · · · · · ·	5 12 2 1 1	Spathodus erythrodon Eretmodus cyanostictus Cyphoellapia frontosa Julidochromis regani Datcyllus meslanurus Pomacentrus alleni Pomacentrus alleni Pomacentrus alleni Pomacentrus pavo Chromix viridis Amphiprion akindynas Amphiprion akindynas Amphiprion acellaris Premnas biaculeatus Chenolabrus rupestris Latoroides dimidiatus Latorus bergylus Latorus bergylus Latorus bergylus Latorus mixtus Pseudocheilinus Acuataenia Symphodus melops Centralabrus exoletus Bodianus rufus Meiacanthus onalenenuis Blennius gattorugine Lipophys pholus	Goby Cichlid Goby Cichlid Blue-banded Cichlid Striped Julie Marginate Damsel Black-tailed Humbug Neon Damselfish Blue Damselfish Blue-green Chromis Australian Clownfish Tomato Clownfish Tomato Clownfish Maroon Clownfish Goldainny Wrasse Cleaner Wrasse Ballan Wrasse Cackoo Wrasse Ballan Wrasse Cackoo Wrasse Six-lined Pyjama Wrasse Corkwing Wrasse Rock Cook Spanish Hogfish Canary Blenny Tompot Blenny Shaney Shore-Clingfish/Comish Sacker	1 3 8 1 27 2 3 10 1	2 10 2 3	3	4	29 3 15 4 13 1		1 2 4 21 1 3 5 1
	Hippocampus reidi (VU) Hippocampus abdominelis (VU) Hippocampus fuscus (VU) Scorpaeniformes Taurulus bubalis Pterois volitans Hypodystes rubripinnis Trigla lucerna Cyclopterus lumpus Myotocephalis scorpius Perciformes Siniperca chuatsi Dicentrarchus labrax Anhias squamjoinnis Cephalopkolis mincatus Cromileptis altivelis Serrama tortuganum Pteudochromiz fridmani Calioplesiops altivelis Lepomis megaloás Perco fluvietilis	Stender Seaborse Pot-bellied Seaborse Sea Pory Sea Scorpion Lionfish Velvet Waipfish Tub Gurnard Lumpsucker Bull Rout Chinese Perch Sea Bass Wreckfish Red Grouper Polkadot Grouper/Pantherfish Chalk Bass Orchid Dottyback Marine Betta Pumpkinseed Long-eared Sunfish Perch	3 1 2 2 - 1 21 3 7	12 9 1 	33777		147 9 1 3 20 1 1 2 1 2 1 2 24 3		5 12 - 2 1 1 - - - - - - - - - - - - - -	Spathodus erythrodon Eretmodus cyanostictus Cyphotilapia frontosa Julidochromis regani Dascyllus marginatus Dascyllus melanurus Pomacentrus alleni Pomacentrus alleni Pomacentrus alleni Pomacentrus pavo Chromis viridis Amphiprion akindynos Amphiprion akindynos Amphiprion frenatus Amphiprion aciellaris Premnus biaculeatus Crenolabrus rupestris Latoroides dimidiatus Latorus mixtus Pseudocheilinus kexataenia Symphodus melops Centralabrus exoletus Bodiamus rufus Meiacanthus onalenensis Blennius gattorugine Lipophrys pholis Leopadogaste sp. Synchiropus splendidus Synchiropus pieturatus	Goby Cichlid Goby Cichlid Blue-banded Cichlid Striped Julie Marginate Damsel Black-tailed Humbug Neon Damselfish Blue Damselfish Blue-green Chromis Australian Clownfish Tomato Clownfish Tomato Clownfish Goldainny Wrasse Cleaner Wrasse Ballan Wrasse Cleaner Wrasse Ballan Wrasse Cackoo Wrasse Six-lined Pyjama Wrasse Cockwing Wrasse Rock Cook Spanish Hogfish Canary Blenny Tompot Blenny Shore-Clingfish/Comish Sacker Masdarin Fish Psychedelic/Spotted Mandarin	1 3 8 1 27 2 3 10 1	2 10 2 3	3		29 3 15 4 13 1		1 2 4 21 1 3 5 1
	Hippocampna reidi (VU) Hippocampna abdominelia (VU) Hippocampna fuscaa (VU) Scorpaeniformes Taurulus babalia Pterois volitans Hypodysta rubripinnis Trigla lucerna Cyclopterna lumpss Mynoscephalia scorpias Perciformes Siniperca chuatsi Dicentrarchus labrax Anthias squamipinnis Cephalopholis miscatus Cromileptis altvelis Serransa tortuganum Pteudochromis fridmani Calloplesiops altvelis Lepomis gibbosus Lepomis megalotis Perca fluviatilis Pterapogon kauderni Apogon nematopterus Selene vamar	Stender Seaborse Pot-bellied Seaborse Sea Pony Sea Scorpion Lionfish Velvet Wapfish Tub Gurnard Lumpsacker Bull Rout Chinese Perch Sea Bass Wreckfish Red Grouper Polkadot GrouperPantherfish Chalk Bass Orchid Dotyback Marine Betta Pumpkinseed Long-eared Sunfish Perch Indonesian Banggai Cardinal Fish Pyjama Cardinal Lookdown Fish French Grunt	3 1 2 2 - 1 21 3 7	12 9 1 	33777		147 9 1 3 20 1 1 2 1 2 1 2 24 3	· · · · · · · · · · · · · · · · · · ·	5 12 2 1 1 - - - - - - - - - - - - - - -	Spathodus erythrodon Eretmodus cyanostictus Cyphoellapia frontosa Julidochromis regani Dascyllus merginatus Dascyllus melanurus Pomacentrus alleni Pomacentrus alleni Pomacentrus pavo Chromis viridis Amphiprion akindynos Amphiprion docellaris Premnas biaculeatus Crenolabrus rupestris Labrosides dimidiatus Labrus bergylus Labrus bergylus Labrus bergylus Labrus bergylus Labrus bergylus Labrus bergylus Labrus mixtus Prevalochelilmus Acatasenia Symphodus melops Centralabrus exolétus Bodiamus rufus Meiacanthus onalemensis Blennius gattorugine Lipophrys pholis Leopadoguste sp. Synchiropus splendidus	Goby Cichlid Goby Cichlid Blue-banded Cichlid Striped Julie Marginate Damsel Black-tailed Humbug Neon Damselfish Blue Damselfish Blue-green Chromis Australian Clownfish Tomato Clownfish Tomato Clownfish Goldainny Wrasse Cleaser Wrasse Ballan Wrasse Cleaser Wrasse Ballan Wrasse Cackoo Wrasse Six-lined Pyjama Wrasse Corkwing Wrasse Rock Cook Spanish Hogfish Carnary Blenny Tompot Blenny Shanny Shore-Clingfish/Comish Sucker Mandarin Fish	1 3 8 1 27 2 3 10 1	2 10 2 3	3		29 3 15 4 13 1		1 2 4 21 1 3 5 1
	Hippocampna reidi (VU) Hippocampna abdominelia (VU) Hippocampna fuacaa (VU) Hippocampna fuacaa (VU) Scorpaeniformes Taurulus bubalis Pterois volitans Hypodystes rubripionis Trigla lucerna Cyclopterus lumpso Myotocephalis scorpias Perciformes Siniperca chuatzi Dicentrarchus labrax Anhias squamjoinis Cephalopholis mincatus Cromileptis altivelis Serrama tortuganum Pteudochromiz fridmani Calioplesiops altivelis Lepomis gibbosus Lepomis megaloás Perca fluviatilis Pterapogon kauderni Apogon nematopterus Selne vomer Haemulon melanurum Anisotremas virginicus	Stender Seaborse Pot-bellied Seaborse Sea Pory Sea Scorpion Lionfish Velvet Waipfish Tub Gurnard Lumpsucker Bull Rout Chinese Perch Sea Bass Wreckfish Red Grouper Policadot Grouper/Pantherfish Chalk Bass Orchid Donyback Marine Betta Pumpkinseed Long-eared Stanfish Perch Indonesian Banggai Cardinal Fish Pyjama Cardinal Lookdown Fish Prench Graut Cottowick Grout Porkfish	3 1 2 2 - 1 21 3 7	12 9 1 	33777		147 9 1 3 20 1 1 2 1 2 1 2 24 3	•	5 12 2 1 1	Spathodus erythrodon Erebnodus cyanostictus Cyphoeilapia fromtosa Julidochromis regani Datscyllus melanurus Pomacentrus alleni Pomacentrus alleni Pomacentrus alleni Pomacentrus alleni Pomacentrus alleni Pomacentrus alleni Pomacentrus Amphiprion akindynas Amphiprion akindynas Amphiprion acellaris Premnas biaculeatus Cienolabrus rupestris Labros biaculeatus Labrus biaculeatus Labrus biaculeatus Labrus mixtus Preuslochellinus Aexataenia Symphodus melops Centralabrus exolétus Bodiamus rufus Meiacanthus onalenensis Blennius gattorugine Lipophrys pholis Leopadogaste sp. Synchiropus splendidaa Synchiropus splendidaa Synchiropus picturatus Pomatoschistus microps Gobius niger Gobius niger	Goby Cichlid Goby Cichlid Blue-banded Cichlid Striped Julie Marginate Damsel Black-tailed Humbug Neon Damselfish Blue Damselfish Blue-green Chromis Australian Clownfish Tomato Clownfish Tomato Clownfish Maroon Clownfish Goldsinny Wrasse Cleaser Wrasse Ballan Wrasse Caekco Wrasse Ballan Wrasse Caekco Wrasse Six-lined Pyjama Wrasse Corkwing Wrasse Rock Cook Spanish Hogfish Canary Blenny Shore-Clingfish/Comish Sacker Masdarin Fish Psychedelic/Spotted Mandarin Common Goby Black Goby Rock Goby	1 3 8 1 27 2 3 10 1 17 2 5 3 1 4 6 1 3 2 8 2 4 1 8	2 10 2 3	3		29 - 3 - 15 - 4 - 13 1 3 3 - 3 1 5 - 2 2 8		1 2 4 21 1 3 5 1
	Hippocampus reidi (VU) Hippocampus abdominelis (VU) Hippocampus fuscas (VU) Scorpaeniformes Taurulus babalis Pterois volisuus Hypodytes rubripinnis Trigle lucerna Cyclopterus lumpus Myoxocephalis scorpius Perciformes Siniperca chuatsi Dicentrarchus labrax Anthias squamipionis Cephalopholis mincatus Cromileptis altivelis Serramus fortuganum Pseudochromit fridmani Callioplesiops altivelis Lepomis gibbosus Lepomis gibbosus Lepomis megalotis Pterapogen kauderni Apogon nematopisterus Selene vamer Haemulon melanurum Haemulon melanurum Anisotremus virginicus Sparat aurutus Spandyliosoma caetharus	Stender Seaborse Pot-bellied Seaborse Sea Pory Sea Scorpion Lionfish Velvet Wapfish Tub Gurnard Lumpsucker Bull Rout Chinese Perch Sea Bass Wreckfish Red Grouper Polkadot Grouper Pantherfish Chalk Bass Orchid Dottyback Marine Betta Punpkinseed Long-eared Senfish Perch Indonesian Banggai Cardinal Fish Pyjama Cardinal Lookdown Fish French Grunt Cotonwick Grunt Porkfish Gitthead Bream Black Sea Bream	3 1 2 2 - 1 21 3 7	12 9 1 	33777		147 9 1 3 20 1 1 2 1 2 1 2 24 3	•	5 12 2 1 1 - - - - - - - - - - - - - - -	Spathodus erythrodom Eretmodus cyanostictus Cyphoellapia fromtosa Julidochromis regani Dateyillus marginatus Dateyillus melanurus Pomacentrus alleni Pomacentrus alleni Pomacentrus alleni Pomacentrus alleni Pomacentrus pavo Chromis viridis Amphiprion frenatus Amphiprion accellaris Premnas biaculeatus Cienolabrus rupestris Labroides dimidiatus Labrus biaculeatus Cienolabrus rupestris Labroides dimidiatus Labrus biaculeatus Cienolabrus rupestris Labros beigilus Labrus mixtus Preudocheilinus Acatasenia Symphodus melops Centralabrus exolétus Bodiamus rufus Meiacanthus onalemensis Blennius gattorugine Lipophrys pholis Leopadoguste sp. Synchiropus spiendidus Synchiropus spiendidus Synchiropus pieturatus Pomatoschistus microps Gobius niger Gobius niger Gobius pagonellus Valencienna puellaris Valencienna strigata	Goby Cichlid Goby Cichlid Blue-banded Cichlid Striped Julie Marginate Damsel Black-tailed Humbug Neon Damselfish Blue Damselfish Blue-green Chromis Australian Clownfish Tomato Clownfish Tomato Clownfish Goldainny Wrasse Cleaner Wrasse Ballan Wrasse Cleaner Wrasse Ballan Wrasse Cackoo Wrasse Six-lined Pyjama Wrasse Corkwing Wrasse Rock Cook Spanish Hogfish Canary Blenny Tompot Blenny Share-Clingfish/Comish Sucker Mandarin Fish Psychedelic/Spotted Mandarin Common Goby Black Goby Crange-spot Goby Blue-cheeked Goby	1 3 8 1 27 2 3 10 1 17 2 5 3 1 4 6 1 3 2 8 2 4 1 8 10	2 10 2 3	3	4	29 - 3 - 15 - 4 - 13 1 3 3 - 3 1 5 - 2 2 8 10	*	1 2 4 21 1 3 5 1
	Hippocampus reidi (VU) Hippocampus abdominelis (VU) Hippocampus fuscus (VU) Scorpaeniformes Taurulus bubalis Pterois voliums Hypodytes rubripinnis Trigle lucerna Cyclopterus lumpus Myoxocephalis scorpius Perciformes Siniperca chuatsi Dicentrarchus labrax Anthias squamipionis Cephalopholis mincatus Cromileptis altivelis Serramus tortuganum Pseudochromis fridmani Calioplesiops altivelis Lepomis gibbosus Lepomis megalotis Pterugogan kauderni Apogon nematopterus Selene vomar Haemulon flevolineatum Haemulon melanurum	Stender Seaborse Pot-bellied Seaborse Sea Pory Sea Scorpion Lionfish Velvet Wapfish Tub Gurnard Lumpsucker Bull Rout Chinese Perch Sea Bass Wreckfish Red Grouper Pofikadot GrouperPantherfish Chalk Bass Orchid Dottyback Marine Betta Pumpkinseed Long-eared Sunfish Perch Indonesian Barggai Cardinal Fish Pyjama Cardinal Lookdown Fish Prench Grunt Porkfish Githead Bream	3 1 2 2 - 1 21 3 7	12 9 1 	33777		147 9 1 3 20 1 1 2 1 2 1 2 24 3	•	5 12 2 1 1 - - - - - - - - - - - - - - -	Spathodus erythrodom Eretmodus cyanostictus Cyphotilapia fromtosa Julidochromis regani Dascyllus melanurus Pomacentrus alleni Pomacentrus alleni Pomacentrus alleni Pomacentrus alleni Pomacentrus alleni Pomacentrus alleni Pomacentrus Amphiprion akindynos Amphiprion akindynos Amphiprion occiliaris Premnas biaculeatus Conolabrus rupestris Labroides dimidiatus Labrois des dimidiatus Labros mixtus Pseudochellinus hexatasenia Symphodus melops Centralubrus exoletus Bodianus rupis Mesiacanthus onalenensis Blennius gatorugine Lipophrys pholis Leopadogaste sp. Synchiropus pieturatus Pomotochistus microps Gobius nger Gobius pagonellus Valencienna puellaris Valencienna strigata Gobiusculus flavescens Pomatoscistus minutus	Goby Cichlid Goby Cichlid Blue-banded Cichlid Striped Julie Marginate Damsel Black-tailed Hambug Neon Damselfish Blue Damselfish Blue-green Chromis Australian Clownfish False Clownfish False Clownfish Goldsinny Wrasse Cleaner Wrasse Ballan Wrasse Cleaner Wrasse Ballan Wrasse Cackoo Wrasse Six-lined Pyjama Wrasse Corkwing Wrasse Rock Cook Spanish Hogfish Canary Blenny Shore-Clingfish/Comish Sucker Mandarin Fish Psychedelic/Spotted Mandarin Common Goby Black Goby Rock Goby Rock Goby Crange-spot Goby Blue-cheeked Goby Sand Goby Sand Goby	1 3 8 1 27 2 3 10 1 17 2 5 3 1 4 6 1 3 2 8 2 4 1 8 10	2 10 2 3	3		29 - 3 - 15 - 4 - 13 1 3 3 - 3 1 5 - 2 2 8 10		1 2 4 21 1 3 5 1
	Hippocampus reidi (VU) Hippocampus abdominelis (VU) Hippocampus fuscas (VU) Hippocampus fuscas (VU) Scorpaeniformes Taurulus bubalis Pterois volitans Hypodystes rubripionis Trigla lucerna Cyclopterus lumpus Myoxocephalis scorpius Perciformes Siniperca chustei Dicentrarchus labras Anhias squamjoinis Cephalopholis mincatus Cromilepis altivelis Serranus tortuganum Pteudochromiz fridmani Calioplesios altivelis Lepomis gibbosus Lepomis gibbosus Perca fluviatilis Pterapogon kauderni Apogon nematopterus Selene vamer Haemulon melanurum Anisotremas virginicus Sparat auratus Sparat auratus Chaetodon fuicula	Stender Seaborse Pot-bellied Seaborse Sea Pory Sea Scorpion Lionfish Velvet Waipfish Tub Gurnard Lumpsucker Bull Rout Chinese Perch Sea Bass Wreckfish Red Grouper Polkadot Grouper Pantherfish Chalk Bass Orchid Dottyback Marine Betta Pumpkinseed Long-eared Sunfish Perch Indonesian Barggai Cardinal Fish Pyjama Cardinal Lookdown Fish Prench Grunt Cottowick Grunt Porkfish Githead Bream Black Sea Bream Dot-dash Butterflyfish Falcula Butterflyfish Falcula Butterflyfish	3 1 2 2 - 1 21 3 7	12 9 1 	33777		147 9 1 3 20 1 1 2 1 2 1 2 24 3	•	5 12 2 1 1 - - - - - - - - - - - - - - -	Spathodus erythrodom Eretmodus cyanostictus Cyphotilapia fromtosa Julidochromis regani Datscyllus melanurus Pomacentrus alleni Pomacentrus alleni Pomacentrus Amphiprion akindynos Amphiprion occiliaris Premnas biaculeatus Conolabrus rupestris Labros biaculeatus Labrus mixtus Preudochellinus hexatasenia Symphodus melops Centralabrus exoletus Bodiamus rufus Meiacanthus onalenensis Blonnias gattorugive Lipophrys pholis Leopadogaste sp. Synchiropus picturatus Pomacehians microps Gobius niger Gobius pagonellus Valencienna puellaris Valencienna strigata Gobiusculus flavescens Pomatoscistus minutus Periophthalmus up.	Goby Cichlid Goby Cichlid Blue-banded Cichlid Striped Julie Marginate Damsel Black-tailed Hambug Neon Damselfish Blue Damselfish Blue-green Chromis Australian Clownfish Tomato Clownfish Tomato Clownfish Goldsinny Wrasse Cleaser Wrasse Ballan Wrasse Cleaser Wrasse Ballan Wrasse Cackoo Wrasse Six-lined Pyjama Wrasse Corkwing Wrasse Rock Cook Spanish Hogfish Canary Blenny Shore-Clingfish/Comish Sacker Masdarin Fish Psychedelic/Spotted Mandarin Common Goby Black Goby Rock Goby Change-spot Goby Black Goby Sand Goby Sand Goby Mudskipper	1 3 8 1 27 2 3 10 1 17 2 5 3 1 4 6 1 3 2 8 2 4 1 8 10	23	3	4	29 - 3 - 15 - 4 - 13 1 3 3 - 3 1 5 - 2 2 8 10 14 2 1 -		1242135122361415322354221112
	Hippocampus reidi (VU) Hippocampus abdominelis (VU) Hippocampus fuscas (VU) Scorpaeniformes Taurulus bubalis Pterois voliums Hypodytes rubripionis Trigle lucerna Cyclopterus lumpus Myoxocephalis scorpius Perciformes Siniperca chuatsi Dicentrarchus labrax Anthias spuamipionis Cromileptis altivelis Serrama Pseudochromiz fridmani Calloplesiops altivelis Lepomis gibbosus Lepomis gibbosus Lepomis megalotis Pteruoogan kauderni Apogon nematopterus Selene vomer Haemulon melanurum Anisotremas visipisican Sparus auratus Spondyliosoma cantharus Chaetodon gutatisisimus Chaetodon fulcula Chelmon rostratus Henochus acuminatus Pomacanthus imperator	Stender Seaborse Pot-bellied Seaborse Sea Pory Sea Scorpion Lionfish Velvet Wapfish Tub Gurnard Lumpsucker Bull Rout Chinese Perch Sea Bass Wreckfish Red Grouper Polkadot Grouper Pantherfish Chalk Bass Orchid Dottyback Marine Betta Pumpkinseed Long-eared Sunfish Perch Indonesian Barggai Cardinal Fish Pyjama Cardinal Lookdown Fish French Grant Cottonswick Grant Porkfish Githead Bream Black Sea Bream Dot-dash Butterflyfish Falcula Butterflyfish Falcula Butterflyfish Copperband Butterflyfish Wimpole or Busorerfish Emperor Angelfish	3 1 2 2 - 1 21 3 7	12 9 1 	33777		147 9 1 3 20 1 1 2 1 2 1 2 24 3		5 12 - 2 1 1 - - 3 15 1 - - 1 1 2 - - 1 1 1 2 - - - - - - - -	Spathodus erythrodom Eretmodus cyanosticus Cyphoellapia frontosa Julidochromis regani Datscyllus mesfanurus Pomacentrus alleni Pomacentrus alleni Pomacentrus alleni Pomacentrus alleni Pomacentrus pavo Chromix viridis Amphiprion akindynas Amphiprion akindynas Amphiprion akindynas Amphiprion akindynas Chromix viridis Amphiprion acellaris Premnas biaculeatus Chenolabrus rupestris Labroides dimidiatus Labrus biaculeatus Chenolabrus rupestris Labrus biorgolus Labrus mixtus Preudochellinus keuataenia Symphodus melops Centrolabrus exoletus Bodianus rufus Meiacanthus onalemenuis Blennius gattorugine Lipophrys photis Leopadoguste sp. Synchiropus splendidus Synchiropus splendidus Pomatoschistus micropus Pomatoscistus minutus Periophihabnus sp. Nomateleotris magnifica Lo vulpinus	Goby Cichlid Goby Cichlid Blue-banded Cichlid Striped Julie Marginate Damsel Black-tailed Humbug Neon Damselfish Blue Damselfish Blue Damselfish Blue Damselfish Common Chromis Australian Clownfish Tomato Clownfish Tomato Clownfish Goldainny Wrasse Cleaner Wrasse Ballan Wrasse Cleaner Wrasse Ballan Wrasse Cackoo Wrasse Six-lined Pyjama Wrasse Corkwing Wrasse Six-lined Pyjama Wrasse Corkwing Wrasse Rock Cook Spanish Hogfish Canary Blenny Tompot Blenny Shaney Shore-Clingfish/Comish Sacker Mandarin Fish Psychedelic Spotted Mandarin Common Goby Black Goby Orange-spot Goby Blue-cheeked Goby Two-spot Goby Saan Goby Mudikipper Indian Ocean Firefish Foxface (Rabbitfish)	1 3 8 1 27 2 3 10 1 17 2 5 3 1 4 6 1 3 2 8 2 4 1 8 10	23	3	4	29 - 3 - 15 - 4 - 13 1 3 3 - 3 1 5 - 2 2 8 10 14 2 1 - 16		1242135122361415322354221112
	Hippocampus reidi (VU) Hippocampus abdominelis (VU) Hippocampus fascas (VU) Scorpaeniformes Taurulus bubalis Pterois volitans Hypodytes rubripinnis Trigla lucerna Cyclopterus lumpus Myoxocephalis scorpius Perciformes Siniperca chustui Dicentrarchus labras Anthias spuamipionis Cephalopholis misectus Cephalopholis misectus Comileptis altivelis Serranus tortuganum Pseudochromis fridmani Calipplesiops altivelis Lepomis gibbosus Lepomis megalotis Perca fluviatilis Pterapogan kauderni Apogon nematopterus Selene vamer Haemulon melanurum Anisotremas virginicus Spandyliostoma cantharus Chaetodon gutatisisimus Chaetodon gutatisisimus	Stender Seaborse Pot-bellied Seaborse Sea Pory Sea Scorpion Lionfish Velvet Waupfish Tub Gurnard Lumpsucker Bull Rout Chinese Perch Sea Bass Wreckfish Red Grouper Polkadot Grouper/Pantherfish Chalk Bass Orchid Dotyback Marine Betta Punpkinseed Long-eared Sunfish Perch Indonesian/Banggai Cardinal Fish Pyjama Cardinal Lookdown Fish French Grunt Cotoonwick Grunt Porkfish Gitthead Bream Black Sea Bream Dot-dash Butterflyfish Falcula Butterflyfish Falcula Butterflyfish French Angelfish French Angelfish Scarlet Hawkfish	3 1 2 2 - 1 21 3 7	12 9 1 	33777		147 9 1 3 20 1 1 2 1 2 1 2 24 3		5 12 - 2 1 1 - 3 15 1 - - 1 1 12 - 7 49 1 16 19 10 - 5 2 1 1 1 4 1 - 1 1 1 - - - 1 1 1 - - - - -	Spathodus erythrodom Eretmodus cyanostictus Cyphotilapia fromtosa Julidockromis regani Dascytlus meianurus Pomacentrus alleni Pomacentrus pavo Chromis viridis Amphiprion ocelleris Premnas biaculeatus Centolabrus rupestris Labroides dimidiatus Labrus biaculeatus Centolabrus rupestris Labroides dimidiatus Labrus bergitus Labrus michus Pseudochellinus hexataxenia Symphodus melops Centralabrus exoletus Bodiaus sufitus Resiamus rufus Mesiacanthus omalemensis Blennius gattorugine Lipophrys pholis Leopadogaste sp. Symchiropus splendiabu Synchiropus splendiabu Synchiropus splendiabu Synchiropus strigata Gobius pagamellus Valencienna strigata Gobius eniger Gobius eniger Gobius eniger Bodius eniger Bodius eniger Bodius strigata Gobius eniger Pomatoscistus minutus Periophehadonus sp. Nemeteleotris magnifica Lo vulpinus Naso Ituratus Paracanthus un hepatus	Goby Cichlid Goby Cichlid Blue-banded Cichlid Striped Julie Marginate Damsel Black-tailed Hambug Neon Damselfish Blue-green Chromis Australian Clownfish False Clownfish False Clownfish Goldsinny Wrasse Cleaner Wrasse Ballan Wrasse Cleaner Wrasse Ballan Wrasse Cackoo Wrasse Six-lined Pyjama Wrasse Corkwing Wrasse Rock Cook Spanish Hogfish Canary Blenny Sharey Shore-Clingfish/Comish Sucker Mandarin Fish Pitychedelic/Spotted Mandarin Common Goby Black Goby Rock Goby Rock Goby Crange-spot Goby Blue-cheeked Goby Two-spot Goby Sand Goby Mudikipper Indian Ocean Firefish Fexface (Rabbitfish) Liptick Tang Regal Tang	1 3 8 1 27 2 3 10 1 17 2 5 3 1 4 6 1 3 2 8 2 4 1 8 10	23	3	4	29 - 3 - 15 - 4 - 13 1 3 3 - 3 1 5 - 2 2 8 10 14 2 1 - 16		1242135122361415322354221112
	Hippocampus reidi (VU) Hippocampus abdominelis (VU) Hippocampus fuscas (VU) Scorpaeniformes Taurulus babalis Pterois volisuus Hypodytes rubripinnis Trigle lucerna Cyclopterus lumpus Myoxocephalis scorpius Perciformes Sinjeerca chuatsi Dicentrarchus labras Anthias squamipionis Cephalopholis mincatus Cromileptis altivelis Serrans tortuganum Pseudochromis fridmani Calliplesiops altivelis Lepomis gibbosus Lepomis gibbosus Perca fluviatilis Pterapogon kauderni Apogon nematopisterus Selene vamer Haemulon melanurum Maisotremas virginicas Sparat auratus Spandyliosoma cantharus Chaetodon fulcula Chenon rostratus Heniochus acuminatus Pomacanthus inperator Pomacanthus paru	Stender Seaborse Pot-bellied Seaborse Sea Pory Sea Scorpion Lionfish Velvet Wapfish Tub Gurnard Lumpsucker Bull Rout Chinese Perch Sea Bass Wreckfish Red Grouper Polkadot Grouper Pantherfish Chalk Bass Orchid Dotyback Marine Betta Punpkinseed Long-eared Sunfish Perch Indonesian Banggai Cardinal Fish Pyjama Cardinal Lookdown Fish French Grunt Cottonwick Grunt Pockfish Gitthead Bream Black Sea Bream Dot-dash Butterflyfish Falcula Butterflyfish Falcula Butterflyfish Emperor Angelfish French Angelfish	3 1 2 2 - 1 21 3 7	12 9 1 	33777		147 9 1 3 20 1 1 2 1 2 1 2 24 3		5 12 - 2 1 1 - - 3 15 1 - - 1 1 2 - - 1 1 1 2 - - - - - - - -	Spathodus erythrodom Eretmodus cyanostictus Cyphoeilapia fromtosa Julidochromis regani Datscyllus meianurus Pomacentrus alleni Pomacentrus alleni Pomacentrus alleni Pomacentrus alleni Pomacentrus pavo Chromis viridis Amphiprion akindynas Amphiprion akindynas Amphiprion acellaris Premnas biaculeatus Cenelabrus rupestris Labros disculeatus Cenelabrus rupestris Labrus mixtus Preudochellinus hexataenia Symphodus melops Centrolabrus exoletus Bodiamus nglos Meiacanthus onalemensis Blomius gattorugine Lipophrys pholis Leopadogaste sp. Synchiropus picturutus Pomotosekistus microps Gobius piger Gobius piger Gobius piger Gobius pagamellus Valencienna strigata Gobius pagamellus Parioputus favescens Pomatoscistus minutus Pomatoscistus minutus Prisophabalmus sp. Nemateleotris magnifica Lo vulpinus Naso Isturatus Paracanthus hepatus Zehrazoma favescenn Cienochaetus strigeusa	Goby Cichlid Goby Cichlid Blue-banded Cichlid Striped Julie Marginate Damsel Black-tailed Humbug Neon Damselfish Blue-green Chromis Australian Clownfish Tomato Clownfish Tomato Clownfish Goldsinny Wrasse Cleaser Wrasse Ballan Wrasse Cackoo Wrasse Ballan Wrasse Cackoo Wrasse Six-lined Pyjama Wrasse Corkwing Wrasse Six-lined Pyjama Wrasse Corkwing Wrasse Rock Cook Spanish Hogfish Canary Blenny Shore-Clingfish/Comish Sacker Masdarin Fish Psychedelic:Spotted Mandarin Common Goby Black Goby Rock Goby Orange-spot Goby Blae-cheeked Goby Two-spot Goby Sand Goby Madakipper Indian Ocean Firefish Feoface (Rabbitfish) Liputick Tang Regal Tang Yellow-eye Tang	1 3 8 1 27 2 3 10 1 17 2 5 3 1 4 6 1 3 2 8 2 4 1 8 10	23	3	4	29 - 3 - 15 - 4 - 13 1 3 3 - 3 1 5 - 2 2 8 10 14 2 1 - 16		1242135122361415322354221112
	Hippocampus reidi (VU) Hippocampus abdominelis (VU) Hippocampus fuscus (VU) Hippocampus fuscus (VU) Scorpaeniformes Taurulus bubalis Pterois voliums Hypodytes rubripionis Trigle lucerna Cyclopterus lumpus Myoxocephalis scorpius Perciformes Siniperca chuatsi Dicentrarchus labrax Anthias squamipionis Cephalopholis mincatus Cromileptis altivelis Serramas tortuganum Pseudochromis fridmani Calioplesiops altivelis Lepomis gibbosus Lepomis megalotis Pterapogon kauderni Apogon nematopterus Selene vamar Haemulon flevolineatum Haemulon flevolineatum Haemulon fuevolineatum Haemulon fuevolineatum Haemulon fuevolineatum Haemulon fuevolineatum Haemulon fuevolineatum Haemulon fuevolineatum Haemulon fuevolineatum Haecista singinica Sparus auratus Chaetodon gutatissimus Chaetodon gutatissimus Chaetodon fuevatus Heniochus acuminatus Pomacanthus imperator Pomacanthus imperator Pomacanthus paru Neceirrhitus armatus Phychockromis sp. Paretroplus kieneri (VU)	Stender Seaborse Pot-bellied Seaborse Sea Pory Sea Scorpion Lionfish Velvet Wapfish Tub Gurnard Lumpsucker Bull Rout Chinese Perch Sea Bass Wreckfish Red Grouper Pofiadost GrouperPantherfish Chalk Bass Orchid Dottyback Marine Betta Pumpkinseed Long-eared Sunfish Perch Indonesian Barggai Cardinal Fish Pyjama Cardinal Loodown Fish Prench Grunt Cottonswick Grunt Porkfish Githead Bream Black Sea Bream Dot-dash Batterflyfish Falcula Butterflyfish Capperband Butterflyfish Falcula Butterflyfish Falcula Butterflyfish Emperor Angelfish Scarlet Hawkfish Malagasy Cichlid Damba Mipentina Cichlid Kotsovato Cichlid	3 1 2 2 . 1 21 3 7 17 3 1 5 6 . 1 1 4 1 1 .	12 9 1 	33777	3234	147 9 1 - 1 3 20 1 - 1 2 - 1 2 - 24 3 - 19 2 4 1 - 1 - 4 1 - 1 1 1 -	• • • • • • • • • • • • • • • • • • • •	5 12 2 1 1 - 2 1 1 - - 3 15 1 - - 1 1 2 - - 1 1 - - - - - - - - - -	Spathodus erythrodom Eretmodus cyanosticus Cyphotilapia fromtosa Julidochromis regani Dascyllus melanurus Pomacentrus alleni Pomacentrus alleni Pomacentrus alleni Pomacentrus alleni Pomacentrus alleni Pomacentrus alleni Pomacentrus Amphiprion akindynes Amphiprion akindynes Amphiprion oceillaris Premnas biaculeatus Conolabrus rupestris Labros dimidiatus Labrus mixtus Pseudocheilinus hexatasenia Symphodus melops Centralabrus exoletus Bodianus rufus Meiacanthus omalenensis Blennius gattorugine Lipophrys pholis Leopadogaste sp. Synchiropus spiendidus Synchiropus spiendidus Synchiropus spiendidus Synchiropus spiendidus Synchiropus pieturatus Pomatoschistus microps Gobius pagonellus Valencienna striguta Gobius pagonellus Valencienna striguta Gobius cubus flavescens Pomatoschistus minutus Periophehabnus up Nomateleotris magnifica Lo vulpinus Naso fituratus Paracanthurus hepatus Zobraxoma flavescens	Goby Cichlid Goby Cichlid Blue-banded Cichlid Striped Julie Marginate Damsel Black-tailed Hambug Neon Damselfish Blue Damselfish Blue Damselfish Blue-green Chromis Australian Clownfish False Clownfish False Clownfish Goldsinny Wrasse Cleaner Wrasse Ballan Wrasse Cleaner Wrasse Ballan Wrasse Cackoo Wrasse Six-lined Pyjama Wrasse Corkwing Wrasse Rock Cook Spanish Hogfish Canary Bleany Tompot Bleany Shore-Clingfish/Comish Sucker Mandarin Fish Psychedelic/Spotted Mandarin Commo Goby Black Goby Rock Goby Rock Goby Black Goby Sand Goby Sand Goby Mudskipper Indian Ocean Firefish Foxface (Rabbitfish) Liptick Tang Regal Tang Yellow Sailfin Tang	1 3 8 1 27 2 3 10 1 17 2 5 3 1 4 6 1 3 2 8 2 4 1 8 10	23	3	4	29 - 3 - 15 - 4 - 13 1 3 3 - 3 1 5 - 2 2 8 10 14 2 1 - 16		1242135122361415322354221112
	Hippocampus reidi (VU) Hippocampus abdominelis (VU) Hippocampus fascas (VU) Scorpaeniformes Taurulus bubalis Pterois volitans Hypodytes rubripionis Trigle lucerna Cyclopterus lumpus Myoxocephalis scorpius Perciformes Siniperea chuatsi Dicentrarchus labras Anthias spuamipionis Cephalopholis miscetus Cephalopholis miscetus Constleptis altivelis Serranus tortuganum Pseudochromis fridmani Calipplesiops altivelis Lepomis gibbosus Lepomis megalois Perca fluviatilis Pterapogan kauderni Apogon nematopterus Selene vamer Haemulon fluviolinaatum Haemulon melanurum Anisotremas virginicus Spandyliotsoma cantharus Chaetodon gutatisisimus Chaetodon gutatisisimus Chaetodon gutatisisimus Chaetodon gutatisisimus Chaetodon gutatisisimus Chaetodon gutatisisimus Chaetodon gutatisisimus Chaetodon gutatisisimus Pomacanthus imperator Pomacanthus imperator Pomacanthus sparu Neocirrhitas armatus Pychochromis sp. Paretroplus maculatas (CR) Paretroplus tieneri (VU) Tilapia guinasana (CR)	Stender Seaborse Pot-bellied Seaborse Sea Pory Sea Scorpion Lionfish Velvet Waupfish Tub Gurnard Lumpsucker Bull Rout Chinese Perch Sea Bass Wreckfish Red Grouper Polkadot Grouper Pantherfish Chalk Bass Orchid Dotyback Marine Betta Punpkinseed Long-eared Sunfish Perch Indonesian Banggai Cardinal Fish Pyjama Cardinal Lookdown Fish French Grunt Cottouwick Grunt Porkfish Githead Bream Black Sea Bream Dot-dash Butterflyfish Falcula Butterflyfish Emperor Angelfish Scarlet Hawkfish Malagasy Cichlid Dumba Mipentina Cichlid Kotsovato Cichlid Copikoto Tilapia Barombi Mbo Cichlid	3 1 2 2 . 1 21 3 7 17 3 1 5 6 . 1 1 4 1 1 . 11 40	12 9 1 	33777	3234	147 9 1 3 20 1 1 2 1 2 1 2 24 3	• • • • • • • • • • • • • • • • • • • •	5 12 2 1 1 - 2 1 1 - - 3 15 1 - - - 1 1 2 - 7 49 1 16 19 10 - 5 2 1 1 1 - - - 1 12 - 7 49 1 16 19 10 - 5 2 1 1 1 - - - - - - - - - - - - - - - -	Spathodus erythrodom Eretmodus cyanostictus Cyphotilapia fromtosa Julidochromis regani Dascyllus meianurus Pomacentrus alleni Pomacentrus alleni Pomacentrus alleni Pomacentrus alleni Pomacentrus alleni Pomacentrus alleni Pomacentrus pavo Chromis viridis Amphiprion dealleni Amphiprion dealleni Amphiprion ocelleris Premnas biaculeatus Cenolabrus rupestris Labroides dimidiatus Labrus bergylus Labroides dimidiatus Labrus bergylus Labroides dimidiatus Bodianus rufus Preudochellinus hexataxenia Symphodus meiops Centralabrus exoletus Bodianus rufus Meiacanthus onalenensis Blennius gattorugine Lipophrys pholis Leopadoguste sp. Synchiropus splendialus Synchiropus splendialus Synchiropus aplentatus Pomatoschistus microps Gobius pagamellus Valencienna puelloris Valencienna strigata Gobiusculus flavescens Pomatoschistus sp. Nemateleotris magnifica Lo vulpinus Paracanthurus hepatus Zehranoma flavescens Canochaetus strigata Canochaetus strigata Conochaetus strigata Cenopoma kingsleyae Beliontia signatu	Goby Cichlid Goby Cichlid Blue-banded Cichlid Striped Julie Marginate Damsel Black-tailed Humbug Neon Damselfish Blue Damselfish Blue Damselfish Blue-green Chromis Australian Clownfish Tomato Clownfish Tomato Clownfish Goldainny Wrasse Cleaser Wrasse Ballan Wrasse Cackoo Wrasse Ballan Wrasse Cackoo Wrasse Six-lined Pyjama Wrasse Corkwing Wrasse Rock Cook Spanish Hogfish Canary Blenny Tompot Blenny Shore-Clingfish/Comish Sucker Maadarin Fish Psychedelic Spotted Mandarin Common Goby Black Goby Rock Goby Rock Goby Drange-spot Goby Blae-cheekod Goby Two-spot Goby Sand Goby Muddkipper Indian Ocean Firefish Foxface (Rabbitfish) Liptick Tang Regal Tang Yellow-syet Tang Kingsley's Climbing Perch	138122301172531461328241801432261-2193-2	23	3	4	29 - 3 - 15 - 4 - 13 1 3 3 - 3 1 5 - 2 2 8 10 14 2 1 - 16		12421351223614153223 54221 11221511811 -
	Hippocampus reidi (VU) Hippocampus abdominelis (VU) Hippocampus fuscas (VU) Hippocampus fuscas (VU) Scorpaeniformes Taurulus bubalis Pterois voliums Hypodystes rubripionis Trigla lucerna Cyclopterus lumpus Myoxocephalis scorpius Perciformes Siniperca chustei Dicentrarchus labrax Anhias spuomipionis Cephalopholis mineatus Comileptis altivelis Serrama tortuganum Pteudochromiz fridmani Galloplesiops altivelis Lepomis gibbosus Lepomis megalokis Perca fluviatilis Pterapogen kauderni Apogon nematopterus Selene vamer Haemulon melanurum Anisotremas virginicus Sparat auratus Sparat auratus Spandyliosoma castharus Chaetodon gutatizsimus Chaetodon fuiculus Heniochus acuminatus Pomacanthus imperator Pomacanthus imperator Pomacanthus imperator Pomacanthus paru Neocirchius erumatus Pychochromis pp. Paretroplus maculatus (CR) Sarotherodon lobbergeri (CR) Stornatepia pinduomariae (CR)	Stender Seaborse Pot-bellied Seaborse Sea Pory Sea Scorpion Lionfish Velvet Waipfish Tub Gurnard Lumpsucker Bull Rout Chinese Perch Sea Bass Wreckfish Red Grouper Policadot Grouper/Pantherfish Chalk Bass Orchid Donyback Marine Betta Pumpkinseed Long-eared Sunfish Perch Indonesian Banggai Cardinal Fish Pyjama Cardinal Lookdown Fish Prench Grant Cottowick Grant Perkfish Githead Bream Black Sea Bream Dot-dash Butterflyfish Falcula Butterflyfish Falcula Butterflyfish Copperband Butterflyfish Emperor Angelfish Scarlet Hawkfish Malagay Cichlid Damba Mipentina Cichlid Kotsovato Cichlid Otjikoto Tilapia Barombi Mbo Cichlid Black/Striped Barombi Mbo Cichlid Guenther's Mouthbrooder	3 1 2 2 - 1 21 3 7 17 3 1 5 6 - 1 1 4 1 1 - 11 40 18 4	12 9 1	33777	3234	147 . 9 1 . 1 3 201 . 1 2 . 1 2 243 . 19 2 4 1 . 1 4 1 . 1 1 1 . 6 17		5 12 - 2 1 1 - - 3 15 1 - - 1 1 2 - - 1 1 12 - 7 49 1 6 19 10 - 5 2 1 1 1 4 1 - 1 7 2 1 1 1 4 1 - 1 7 2 1 1 1 - - - - - - - - - - - - - - - -	Spathodus erythrodom Eremodus cyanosticus Cyphoeilapia fromosa Julidockromis regani Dascyllus melanurus Pomacentrus alleni Pomacentrus alleni Pomacentrus alleni Pomacentrus alleni Pomacentrus pavo Chromir viridis Amphiprion akindynes Amphiprion oceilaris Premnat biaculeatus Conolabrus rupestris Labroides dimidiatus Labrus mixtus Preudocheilinus hexatasenia Symphodus melops Centralabrus ecoletus Bodianus rufus Meiacanthus omalemensis Blennius gattorugine Lipophrys pholis Leopadogaste sp. Synchiropus spiendidus Synchiropus spientaratus Pomatoscistus minutus Persiophehabnus up Nono fluratus Naso fluratus Naso fluratus Naso fluratus Naso fluratus Naso fluratus Paracanthurus hepatus Zebraxoma flavescens Cienopoma kingslepue Belontis signatus	Goby Cichlid Goby Cichlid Blue-banded Cichlid Striped Julie Marginate Damsel Black-tailed Hambug Neon Damselfish Blue Damselfish Blue-green Chromis Australian Clownfish False Clownfish False Clownfish Goldsinny Wrasse Cleaner Wrasse Ballan Wrasse Cackoo Wrasse Ballan Wrasse Cackoo Wrasse Six-lined Pyjama Wrasse Corkwing Wrasse Rock Cook Spanish Hogfish Canary Bleany Tompot Blenny Shore-Clingfish/Comish Sucker Mandarin Fish Psychedelic/Spotted Mandarin Commo Goby Black Goby Rock Goby Rock Goby Blae-cheeked Goby Dise-cheeked Goby Two-spot Goby Blae-cheeked Goby Two-spot Goby Sand Goby Mudskipper Indian Ocean Firefish Foxface (Rabbitfish) Liptick Tang Regal Tang Yellow-sye Tang Kingsley's Climbing Perch Combail	138122301172531461328241801432261-2193-2	23	3		29 - 3 - 15 - 4 - 13 1 3 3 - 3 1 5 - 2 2 8 10 14 2 1 - 16		12421351223614153223 54221 11221511811 -
	Hippocampus reidi (VU) Hippocampus abdominelis (VU) Hippocampus fascas (VU) Hippocampus fascas (VU) Scorpaeniformes Taurulus bubalis Pterois volitans Hypodytes rubripionis Trigla lucerna Cyclopterus lumpus Myoxocephalis scorpius Perciformes Sinjeerea chustei Dicentrarchus labras Anhias spuamipionis Cephalopholis mincatus Cromileptis altivelis Serranus tortuganum Pteudochromis fridmani Calipolesiogs altivelis Serranus tortuganum Pteudochromis fridmani Calipolesiogs altivelis Perca fluviatilis Pterapogon kauderni Apogon nematipiterus Selene vamer Haemulon melanurum Anisotremas virginicus Sparsa auratus Sparsa tauratus Chaetodon faicula Chebnon rostratus Hemiochus acuminatus Pomacanthus paru Neocirrhitus arumatus Pychochromis sp. Paretroplas kieneri (VU) Tilapia guinazana (CR) Storaterpia pindu/mariue (CR)	Stender Seaborse Pot-bellied Seaborse Sea Pory Sea Scorpion Lionfush Velvet Waupfush Tub Gurnard Lumpsucker Bull Rout Chinese Perch Sea Bass Wreckfish Red Grouper Polkadot Grouper Pantherfish Chalk Bass Orchid Dottyback Marine Betta Pumpkinseed Long-eared Sunfish Perch Indonesian Banggai Cardinal Fish Pyjama Cardinal Lookdown Fish French Gruat Cottowick Grunt Porkfish Githead Bream Black Sea Bream Dot-dash Butterflyfish Copperband Butterflyfish Falcula Batterflyfish French Angelfish Scarlet Hawkfish Malagasy Cichlid Durnba Mipentina Cichlid Kotsovato Cichlid Otjikoto Tilapia Barombi Mbo Cichlid Black/Striped Barombi Mbo Cichlid	3 1 2 2 . 1 21 3 7 17 3 1 5 6 . 1 1 4 1 1 40 18	12 9 1 	33777	3234	147 9 1 - 1 3 20 1 - 1 2 - 1 2	• • • • • • • • • • • • • • • • • • • •	5 12 2 1 1 - 2 1 1 - - 3 15 1 - - 1 1 12 - 7 49 1 6 19 10 - 5 2 1 1 1 4 1 - 1 7 2 1 1 1 4 1 - - 1 1 12 - 5 2 1 1 1 - - - - - - - - - - - - - - - -	Spathodus erythrodom Eretmodus cyanosticus Cyphoeilapia fromtosa Julidockromis regani Dascyllus melanurus Pomacentrus alleni Pomacentrus alleni Pomacentrus alleni Pomacentrus alleni Pomacentrus alleni Pomacentrus alleni Pomacentrus alleni Pomacentrus pavo Chromis viridis Amphiprion ocelleris Premnas biaculeatus Centolabrus rupestris Labroides dimidiatus Labrus biaculeatus Centolabrus rupestris Labroides dimidiatus Labrus bergitus Labrus michas Pseudochellinus hexataemia Symphodus melops Centralabrus exoletus Bodiarus rufis Meiacanthus omalemensis Blennius gattorugine Lipophrys pholis Leopadogaste sp. Symchiropus splendidus Synchiropus splendidus Synchiropus splendidus Synchiropus strigeta Gobius pagamellus Valencienna strigeta Gobius eniger Gobius eniger Gobius eniger Bodius eniger Somchiropus strigeta Gobius niger Bodius strigeta Gobius niger Neonatoschistus microps Pomatoscistus minutus Periophehadonus sp. Neonatoscistus minutus Periophehadonus sp. Neonatoscistus strigetas Conochaetus strigetas	Goby Cichlid Goby Cichlid Blue-banded Cichlid Striped Julie Marginate Damsel Black-tailed Humbug Neon Damselfish Blue-green Chromis Australian Clownfish Tomato Clownfish Tomato Clownfish False Clownfish Goldainny Wrasse Cleaser Wrasse Ballan Wrasse Cackoo Wrasse Ballan Wrasse Cackoo Wrasse Six-lined Pyjama Wrasse Corkwing Wrasse Rock Cook Spanish Hogfish Canary Blenny Tompot Blenny Shore-Clingfish/Cornish Sacker Maadarin Fish Psychedelic Spotted Mandarin Common Goby Black Goby Rock Goby Rock Goby Sand Goby Muddkipper Indian Ocean Firefish Fexface (Rabbitfish) Liputick Tang Regal Tang Yellow-saithin Tang Yellow-syet Tang Kingsley's Climbing Perch Combrail	138122301172531461328241801432261-2193-2	23	3	4	29 - 3 - 15 - 4 - 13 1 3 3 - 3 1 5 - 2 2 8 10 14 2 1 - 16		12421351223614153223 54221 112201511811 -
	Hippocampus reidi (VU) Hippocampus abdominelis (VU) Hippocampus fuscas (VU) Scorpaeniformes Taurulus babalis Pterois volisuus Hypodytes rubripionis Trigle lucerna Cyclopterus lumpus Myoxocephalis scorpius Perciformes Sinjeerca chuatsi Dicentrarchus labrax Anthias squamipionis Cromileptis altivelis Centrarchus labrax Anthias squamipionis Comileptis altivelis Serrams fortuganum Pseudochromis fridmani Callioplesiops altivelis Lepomis gibbosus Lepomis gibbosus Selene vamer Haemulon melanurum Anisotremas vizginicus Spara auratus Spondyliosoma cantharus Chaetodon gutatissimus Chaetodon gutatissimus Chaetodon fuclula Chemon rostratus Heniochus acuminatus Pomacanthus inperator Pomacanthus aparu Neocirrhitus armatus Photochromis tp. Paretroplas kieneri (VU) Tilapia guinasana (CR) Sarotherodon lohbergeri (CR) Chemon igibagia guentheri Neochromis genemolari Sarotherodon lohbergeri (CR) Chemon costratus (CR) Sarotherodon lohbergeri (CR) Chemonig piedusnarise (CR) Chemonig piedusnarise (CR) Chemon ig piedusnarise (CR)	Stender Seaborse Pot-beilied Seaborse Sea Pory Sea Scorpion Lionfish Velvet Waupfish Tub Gurnard Lumpsucker Bull Rout Chinese Perch Sea Bass Wreckfish Red Grouper Polkadot Grouper Pantherfish Chalk Bass Orchid Dottyback Marine Betta Pungkinseed Long-eared Senfish Perch Indonesian Banggai Cardinal Fish Pyjama Cardinal Lookdown Fish Prench Grant Cottonwick Grant Porkfish Gitthead Bream Black Sea Bream Dot-dash Butterflyfish Falcula Batterflyfish Falcula Batterflyfish Falcula Batterflyfish Falcula Batterflyfish French Angelfish Scarlet Hawkfish Malagasy Cichlid Damba Mipentina Cichlid Kotsovat Cichlid Damba Mipentina Cichlid Black/Striped Barombi Mbo Cichlid Black/Striped Barombi Mbo Cichlid Black/Striped Barombi Mbo Cichlid Black/Striped Barombi Mbo Cichlid Black/faned Fulu Johanni Cichlid	3 1 2 2 1 21 3 7 17 3 1 5 6 1 1 4 1 1	12 9 1 	33777 	3234	147 . 9 1 . 1 3 201 . 1 2 . 1 2 243 . 19 2 4 1 . 1 4 1 . 1 1 1 . 6 17	· · · · · · · · · · · · · · · · · · ·	5 12 2 1 1 - 2 1 1 - - 3 15 1 - - 1 1 2 - 7 49 1 6 19 10 - 5 2 1 1 1 4 1 - 1 7 49 1 6 19 10 - 5 2 1 1 1 - - 1 - - 1 1 2 - - - - - - - -	Spathodus erythrodom Eremodus cyanosticus Cyphoeilapia fromosa Julidochromis regani Dascyllus melanurus Pomacentrus alleni Pomacentrus alleni Pomacentrus alleni Pomacentrus alleni Pomacentrus pavo Chromis viridis Amphiprion akindynas Amphiprion akindynas Amphiprion acellaris Premnas biaculeatus Cenelaltrus rupestris Labros biaculeatus Cenelaltrus rupestris Labrus mixtus Prevelochellinus hexatasenia Symphodus melops Centrolabrus exoletus Bodiamus rufus Meiacanthus onalenensis Blonnias gatorugive Lipophrys pholis Leopadogaste sp. Synchiropus picturatus Pomatoschistus microps Gobius paganellus Valencienna puellaris Valencienna strigata Gobius paganellus Pomatoschistus microps Gobius paganellus Pomatoschistus minutus Previophalanus sp. Nomateleotris magnifica Lo vulpinus Naso Ituratus Paraconturus hepatus Zehrasoms fluvescom Chenocheetus strigous Cenopona kingsleyae Belontia sigeatu	Goby Cichlid Goby Cichlid Blue-banded Cichlid Striped Julie Marginate Damsel Black-tailed Hambug Neon Damselfish Blue-green Chromis Australian Clownfish Tomato Clownfish Tomato Clownfish False Clownfish Goldsinny Wrasse Cleaner Wrasse Ballan Wrasse Cleaner Wrasse Ballan Wrasse Cackoo Wrasse Six-lined Pyjama Wrasse Cockwing Wrasse Six-lined Pyjama Wrasse Cockwing Wrasse Rock Cook Spanish Hogfish Canary Blenny Sharny Shore-Clingfish/Comish Sacker Maadarin Fish Psychedelic: Spotted Mandarin Common Goby Black Goby Rock Goby Rock Goby Rock Goby Sand Goby Madskipper Indian Ocean Firefish Foxface (Rabbifish) Liptick Tang Regal Tang Yellow-eye Tang Kingiley's Climbing Perch Combusil	138122301172531461328241801432261-2193-2	23	3	4	29 - 3 - 15 - 4 - 13 1 3 3 - 3 1 5 - 2 2 8 10 14 2 1 - 16		12421351223614153223 - 54221 112201511811 - 8 11
	Hippocampus reidi (VU) Hippocampus abdominelis (VU) Hippocampus fascas (VU) Hippocampus fascas (VU) Scorpaeniformes Taurulus bubalis Pterois volitans Hypodytes rubripionis Trigla lucerna Cyclopterus lumpus Myoxocephalis scorpius Perciformes Sinjeerea chustei Dicentrarchus labras Anhias spuamipionis Cephalopholis mineatus Comblegits altivelis Serranus tortuganum Pteudochromis fridmani Galloplesiogs altivelis Lepomis gibbosus Lepomis gibbosus Perca fluviatilis Pterapogon kauderni Apogon nematigaterus Selene vamer Haemulon melanurum Maenulon melanurum Anisotremas virginicus Sparsa auratus Sparsa cantus Sparsa cantus Sparsa fastatus Chaetodon faicula Chetonon rostratus Hemiochus acuminatus Pomacanthus paru Neocierhista garu Neocierhista garu Neocierhista garu Neocierhista garu Neocierhista garunatus Pychocheromis sp. Paretroplas kieneri (VU) Tilapia guinazana (CR) Sarotheroden lobbergeri (CR) Stornatepia pinduruma (CR) Sconterodes lobbergeri (CR) Storonidotilapia guenteri Neochromis gozenwoodi Lipochromis melanopterus (CR) Melanochromis johanni Melanochromis chipokae Melanochromis auratus	Stender Seaborse Pot-bellied Seaborse Sea Pory Sea Scorpion Lionfuh Velvet Waupfuh Tub Gurnard Lumpsucker Bull Rout Chinese Perch Sea Bass Wreckfish Red Grouper Polkadot Grouper/Pantherfish Chalk Bass Orchid Dottyback Marine Betta Pumpkinseed Long-eared Sunfish Perch Indonesian/Banggai Cardinal Fish Pyjama Cardinal Lookdown Fish Prench Grunt Cottowick Grunt Pockfish Githead Bream Black Sea Bream Dot-dash Butterflyfish Falcula Butterflyfish Falcula Butterflyfish Prench Angelfish Scarlet Hawkfish Malagasy Cichlid Damba Mipentina Cichlid Kotsovato Cichlid Otjikoto Tilapia Barombi Mbo Cichlid Black/Striped Barombi Mbo Cichlid Black-finned Fuls Johanni Cichlid Black-finned Fuls Johanni Cichlid Black-finned Fuls	3 1 2 2 1 21 3 7 17 3 1 5 6 1 1 4 1 1	12 9 1 	33777 	3234	147 9 1 - 1 3 20 1 1 - 1 2 - 1 2		5 12 2 1 1 - 2 1 1 - - 2 1 1 - - - 1 1 2 - - 1 1 1 2 - - - -	Spathodus erythrodom Ereimodus cyanosticus Cyphoeilapia fromosa Juldockromis regani Dascyllus melanurus Pomacentrus alleni Pomacentrus alleni Pomacentrus alleni Pomacentrus alleni Pomacentrus alleni Pomacentrus alleni Pomacentrus pavo Chromi viridis Amphiprion frenatus Amphiprion ocellaris Premnas biaculeatus Cenolabrus rupestris Latroides dimidiatus Latrus bergitus Latrus bergitus Latrus mixtus Pseudocheilinus Aesatusenia Symphodus melops Cenolabrus rupestris Bodianus rufus Bodianus strigata Bodianus paellari Bodianus	Goby Cichlid Goby Cichlid Blue-banded Cichlid Striped Julie Marginate Damsel Black-tailed Humbug Neon Damselfish Blue-green Chromis Australian Clownfish Tomato Clownfish Tomato Clownfish False Clownfish Goldainny Wrasse Cleaser Wrasse Ballan Wrasse Cackoo Wrasse Ballan Wrasse Cackoo Wrasse Six-lined Pyjama Wrasse Corkwing Wrasse Rock Cook Spanish Hogfish Canary Blenny Tompot Blenny Shore-Clingfish/Cornish Sacker Maadarin Fish Psychedelic Spotted Mandarin Common Goby Black Goby Rock Goby Rock Goby Sand Goby Muddkipper Indian Ocean Firefish Fexface (Rabbitfish) Liputick Tang Regal Tang Yellow-saithin Tang Yellow-syet Tang Kingsley's Climbing Perch Combrail	1381223101125314613282418101432261-2193-2	23	3	4	29 - 3 - 15 - 4 - 13 1 3 3 - 3 1 5 - 2 2 8 10 14 2 1 - 16		12421351223614153223 - 54221 112201511811 - 8 11
	Hippocampus reidi (VU) Hippocampus abdominelis (VU) Hippocampus fuscus (VU) Hippocampus fuscus (VU) Scorpaeniformes Taurulus bubalis Pterois voliums Hypodytes rubripinnis Trigle lucerna Cyclopterus lumpus Myoxocephalis scorpius Perciformes Sinjeerca chuatsi Dicentrarchus labrax Anthias spuampionis Cephalopholis mincatus Cromileptis altivelis Serramas tortuganum Pseudochromis fridmani Calliplesiops altivelis Lepomis gibbosus Lepomis gibbosus Lepomis gibbosus Seren fuviatilis Pterapogon kauderni Apogon nematopterus Selene vamar Haemulon flavolineatum Haemulon flavolineatum Haemulon fuvolineatum Haemulon fuvolineatum Chaetodon gutatistimus Chaetodon gutatistimus Chaetodon gutatistimus Chaetodon gutatistimus Chaetodon fuburger(CR) Stomatepia pindumariae (CR) Stomatepia pindumariae (CR)	Stender Seaborse Pot-bellied Seaborse Sea Pory Sea Scorpion Lionfish Velvet Waupfish Tub Gurnard Lumpsucker Bull Rout Chinese Perch Sea Bass Wreckfish Red Grouper Policadot GrouperPantherfish Chalk Bass Orchid Dottyback Marine Betta Pumpkinseed Long-eared Sunfish Perch Indonesian Barggai Cardinal Fish Pyjama Cardinal Loodown Fish Prench Grunt Costcoswick Grunt Perkfish Gilthead Bream Black Sea Bream Dot-dash Batterflyfish Falcula Butterflyfish Falcula Butterflyfish Eaperor Angelfish Scarlet Hawkfish Malagasy Cichlid Dumba Mipentina Cichlid Kotsovato Cichlid Malagasi Cichlid Black/Sriped Barombi Mbo Cichlid Guetter Mouthbrooder Velvet Black Lake Victoria Cichlid Black-finned Fuls Johanni Cichlid Malay Cichlid	3 1 2 2 1 21 3 7 17 3 1 5 6 1 1 4 1 1 40 18 4 01 2	12 9 1 	33777 	3234	147 . 9 1 . 1 3 201 . 1 2 . 1 2 243 . 19 2 4 1 . 1 4 1 . 1 1 1 . 6 17	· · · · · · · · · · · · · · · · · · ·	5 12 2 1 1 - 2 1 1 - - 2 1 1 - - - 1 1 2 - - 1 1 1 2 - - - -	Spathodus erythrodom Ereimodus cyanosticus Cyphoeilapia fromosa Juldockromis regani Dascyllus melanurus Pomacentrus alleni Pomacentrus alleni Pomacentrus alleni Pomacentrus alleni Pomacentrus alleni Pomacentrus alleni Pomacentrus pavo Chromi viridis Amphiprion frenatus Amphiprion ocellaris Premnas biaculeatus Cenolabrus rupestris Latroides dimidiatus Latrus bergitus Latrus bergitus Latrus mixtus Pseudocheilinus Aesatusenia Symphodus melops Cenolabrus rupestris Bodianus rufus Bodianus strigata Bodianus paellari Bodianus	Goby Cichlid Goby Cichlid Blue-banded Cichlid Striped Julie Marginate Damsel Black-tailed Hambug Neon Damselfish Blue-green Chromis Australian Clownfish Tomato Clownfish Tomato Clownfish False Clownfish Goldsinny Wrasse Cleaner Wrasse Ballan Wrasse Cleaner Wrasse Ballan Wrasse Cackoo Wrasse Six-lined Pyjama Wrasse Cockwing Wrasse Six-lined Pyjama Wrasse Cockwing Wrasse Rock Cook Spanish Hogfish Canary Blenny Sharny Shore-Clingfish/Comish Sacker Maadarin Fish Psychedelic: Spotted Mandarin Common Goby Black Goby Rock Goby Rock Goby Rock Goby Sand Goby Madskipper Indian Ocean Firefish Foxface (Rabbifish) Liptick Tang Regal Tang Yellow-eye Tang Kingiley's Climbing Perch Combusil	1381223101125314613282418101432261-2193-2	23	3	4	29 - 3 - 15 - 4 - 13 1 3 3 - 3 1 5 - 2 2 8 10 14 2 1 - 16		12421351223614153223 - 54221 112201511811 - 8 11
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INVERTEBRATES

Ver to exhange										Asteria rubera	Common Star							10.14
Key to columns:										Fomia elegana	Red Starfish	2		2	1	nr		I'NA I'M
column 1 column 2	Arrivals Distbe/Ustabing									Ophiolepia sp.	Serpent Star	22			-	nr		IN
column 3	Births/Hatching Deaths	P								Linkia laevigata	Blue Finger Starfish	3		1		m		IN
column 4	Departures									Henricio oculata	Bloody Henry Starfish	7	+	7				INA
column 5		of year of Eggs/Young (na=r	and amon	aldenis	-	mand	(he)			Crossaster papassa Pseudocolchirus violaceus	Common Sunstar	5		5				INA
column 6		of year of Adult Males/Adult						e ce uit	hout	Paracucumaría sp.	Sea Apple Candy Cucumber		TT	nr.		w		IM
Contains o	gender, or numb		rema	incs mut	ins or e	unkinow	n genoe	r or with	nout	Holothuria atra	Black Sea Cucumber	*	-	6		nr tr		I/D I/D
column 7		Adult numbers represent exac	t mumb	berofi		ale Vo	me and	East a	an ha	Symapia maculata	Spotted Worm Cucumber	1		-		1		IN
Containin 7		Il numbers are approximate.																
column 8		us: M=Maintaining. B=Breed								ANNELIDA								
country		d. na=Not applicable.	ang. D	-Leen	mille re		y acqui	cu spec	ica.	Hirudines								
	in the recorded	or ma reor appressore.								Hirudo medicinatis (RT)	Medicinal Leech	-44		50		nr	0/0/11	I/D
			1	2	3	4	5	6	7/8	P. L. L								
										Polychaeta		2053						
CNIDARIA										Sabella pavona	Feather Duster Worm	3	m	m			0/03	IN
Scyphozoa										MOLLUSCA								
Cassiopeia sp.	Up	side-down Jellyfish		T	n		nr	0/0/5	I/D	Gastropoda								
Aurelia aurita	Mo	oon Jellyfish	142	nr.	nr	20	an.	0/0/15	AM		ana, and Diplomorpha species are for th	e end of t	the year o	Admo				
Anthony										Berghia verucicornia	Nudibranch	8	TE .	ne .	10	10	0/0/35	AR
Anthozoa	C	a Toad	-							Nadibranch sp.	Quazimodo Slug	2	n	m	-	w		UN
Maja sp. Alcoonium sp.		akelocks Anemone	*	w	a nr	1	w	0/0/15	INA	Pachnodus fregatensis	Fregate Island Enid Snail	-	nr	n			0/0/24 1	I/B
Actinia equina		adlet Anemone	43	W	H.	12	m	0/0/76		Pomacea palludosa	Apple Snail		nr	nr		ar	0/0/1501	I/B
Actinia fragacea		awberry Anemone	18	-	18	1	-	-	INA	Achatina achatina Achatina fulica	Giant Land Snail	-	nr	nr	2	mm/40		VB
Metridium sp.	Plur	mose Anemone	+	nr	nr	-	TH .	0/0/1	A/M	Archachatina marginata	Giant Land Snail West African Giant Land Snail	-	w	18		M		VB
Urticina felina		hlia Anemone	24	nr	nr		THE	0/0/3	IN	Strophocheilus oblongus	Mega Snail	-	m	ar .		54		VB VM
Stichodactyla haddon		rpet Anemone		-	2	-	-	0/0/2	VD	Partula clara (CR)	Polynesian Tree Snail			12	1		0/0/1 1 0/0/2201	
Heteractis crispa		od Anemone	-	m.	1	-	nr	0/0/1	1/D	Partula dentifera (EW)	Polynesian Tree Snail		1	-	2		0/0/83 1	
Heteractis sp. Sinularia brassica		bble Anemone ft Coral	1	m	-		nr.	0/0/1	IN	Partula faba (EW)	Polynesian Tree Snail						0/0/78	
Sarcephyon sp.		adstool Soft Coral	-			÷.	12 17	0/0/11 0/0/2	CM	Partala gibba (CR)	Polymesian Tree Snail		-	+		na/66	0/0/27 1	VD
Pocillophora damico		rd Coral	ĩ	1	-	2	NT .	0/0/2	CM	Partula hebe bella (EW)	Polynesian Tree Snail	+	-	-	-	na/1		ŀΜ
Stylophore pistillate		rd Coral	2				HT .	0/0/4	C/M	Partula kyalina (CR)	Polynesian Tree Snail	8	1	1				M
Seriatopora kystrix	Han	rd Coral	1		2	4	+	-	C/NA	Partula labrusca (EW) Partula lirata	Polynesian Tree Snail Fijian Tree Snail			-	-	na na S		D D
Pavona decussota		rd Coml	-	+	+	+	nr	0/0/1	C/M	Partula mirabilis	Polynesian Tree Snail						0/0/7 1 0/0/1071	VD VB
Hydnophora sp.		rd Coral	1	*	*		M	0/0/2	C/M C/M	Partula mirabilis x taeniata	Polynesian Tree Snail hybrid			+	*	na/1	0/0/3 1	
Caulastrea furcata Clavularia violacea		rd Coral rd Coral	2				nr nr	0/0/2	CN	Partula mooreana (EW)	Polynesian Tree Snail		+	+	+		0/0/52 1	
Fungia sp.		rd Coral	ĩ			-	nr nr	0/0/2	C/N	Partula nodesa (EW)	Polynesian Tree Snail	+		+	*	ma/7		M
Euphyllia glabracen		rd Coral	1				m	0/0/1	CN	Partula otaheitana (CR)	Polynesian Tree Snail	*				-		M
Turbinaria reniformi		nd Coral	1			+	nr	0/0/1	CN	Partula radiolata (CR) Partula rosca (CR)	Guarn Tree Snail Polynesian Tree Snail		*	4	+			M
Echinopora sp.	Han	rd Coral	1	-		-	nr	0/0/1	C/N	Partula suturalis strigona (EW)	Polynesian Tree Snail Polynesian Tree Snail		1		*	ma/174	0/0/2 1 0/0/131 1	
Psannocora		rd Coral	1		-		nr	0/0/1	ON	Partula suturalis vexillum (EW)	Polynesian Tree Snail	1	- S				0/0/1361	
Pectinia		rd Coral	1			*	nr	0.01	CN	Partula suturalis mixed sap.	Polynesian Tree Snail		+	-		na/6		M
Merulina Ricordia fiorida		rd Coral rd Coral	1	2		-	nr	0/0/1	ON	Partula toeniata nucleola (EW)	Polynesian Tree Snail		-	-		-		N
Zoanthus sp.		f Coral	-	-	nr		m/3 m/	0/0/1	O'N O'B	Partula toeniato simulans (EW)	Polynesian Tree Snail			-		ma/8	0/0/10 1	M
Nephthea sp.		1 Bush Coral	î	-		2	-	0/0/1	ON	Partula tohiveana (EW)	Polynesian Tree Snail		-	-	•		0/0/84	
Helichondria panicea		adenumb Sponge	5		5		2		ONA	Partula tristis (EW)	Polymesian Tree Snail		-	-			0/0/64 1	1 C C C C C C C C C C C C C C C C C C C
Flustra foliacea		mwrack	2		2				ONA	Partula turneri Partula varia (CR)	Vanautu Tree Snail Polymesian Tree Snail							NA.
Discosoma sp.		shroom Anemone	+	15	nr	-	117	0/0/20	1/8	Partula sp.	Polynesian Tree Snail	-	-	-	0		0/0/50 1	
Discosoma sp.		abroom Anemone	+	20	nr		nr	0/0/30		Samoana ganymedes	Marguesan Tree Snail	12		-	1			/B
Discosoma sp.	Mus	shroom Anemone	10	m	TE		n	0/0/10	IN	. Diplomorpha delatouri	Varuatu Snail		-	-	-			D .
ECHINODERM/	ATA									Trochomorpha sp.	Tahitian Trochomorph Snail		1	2				M
Diadema septosum		ng-spined Sea Urchin		10	12			0/0/8	173	Liardetia normalia	Tahitian Tree Snail			+	-		0/0/20 1	
Ophiocoma sp.		tile Star	8	THE .	III	1.	n	0/0/16		Astrae tectum Turbo castaneus	Turbo Snail Super Turbo Snail	179	m	nr			0/0/60 A	
Asteria gibbosa		diion Star		ne .	m		15	0/0/60		Trochur sp.	Trochus Snail	24	nr nr	nr	2		0/0/6 A	VM.
											- Arter and a second	1000	100	-		200 20		
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							4		2.0			1	1	3			70	
			1	1	3	4	5	6	7/8			1	1	3	4	5 4	6 T/	R .
Planorbis sp.		mshorn Snail	1		w	4	nr	0/0/10	IM	Lasiodora parahybana	Brazilian Bird-rating Spider	1	1	3	4		0/2 1/	м
Lymnaea sp.	Pop	nd Snail	1	ar W	III III	4	nr nr	0/0/10 0/0/50	IM IM	Grammostola spatulata	Chile Rose Bird-eating Spider	1	1	3	4	-	0/2 V 0/2 V	R .
Lymnaea sp. Littorina littorea	Pon Peri	nd Snail iwinkle	1 64	ar IV II	n II II	*	nr nr nr	0/0/10 0/0/50 0/0/10	IM IM AM	Grammostola spatulata Stromatopelma calcenta	Chile Rose Bird-eating Spider Feather-leg Baboon Spider	1	1	3	4	-	0/2 1/ 0/2 1/ 0/1 1/	M
Lymnaea sp.	Pop	nd Snail iwinkle	1 64 8	ar W	III III	4	nr nr	0/0/10 0/0/50	IM IM AM	Grammostola spatulata	Chile Rose Bird-eating Spider	1	1	3			0/2 V 0/2 V 0/1 V - 1 0/2 I	M M M NA M
Lymnaca sp. Littorina littorea Patella vulgata	Pon Peri	nd Snail iwinkle	1 64 8	ar IV II	n II II	4	nr nr nr	0/0/10 0/0/50 0/0/10	IM IM AM	Grammostola spatulata Stromatopelma calcenta Metriopelma sp. Poecilotheria regalis Poecilotheria sulfutca	Chile Rose Bird-eating Spider Feather-leg Baboon Spider Bird-eating Spider Indian Omamental Spider Sri Lankan Omamental Spider	1	1	3			0/2 V/ 0/2 V/ 0/1 V - 1 0/2 I 0/1 I	M M M NA /M
Lymnaea sp. Littorina littorea	Pon Peri Lim	nd Snail iwinkle	1 64 8	ar IV II	n II II	4	nr nr nr	0/0/10 0/0/50 0/0/10	IM IM AM IN ID	Grammostola spatulata Stromatopelma calcenta Metriopelma ip. Poecilotheria regalis Poecilotheria subfutca Poecilotheria subfutca	Chile Rose Bird-eating Spider Feather-leg Baboon Spider Bird-eating Spider Indian Ornamental Spider Sri Lankan Ornamental Spider Sri Lankan Ornamental Spider	1	1	3			0/2 V/ 0/2 V/ 0/1 V 0/1 V 0/2 V 0/1 V 0/1 V	M M M M M M
Lymnaea sp. Littorina littorea Patella vulgata Cephlapoda	Poo Peri Lim Con	od Snail iwinkle spet	1 64 8 2	ar IV II	ur ur ur	4	nr nr nr	0/0/10 0/0/50 0/0/10	IM IM AM IN	Grammostola spatulata Stromatopelma calcenta Metriopelma sp. Poecilotheria regalis Poecilotheria subfutca Poecilotheria ornata Unidentified lycosid species	Chile Rose Bird-eating Spider Feather-leg Baboon Spider Bird-eating Spider Indian Ornamental Spider Sri Lankan Ornamental Spider Sri Lankan Ornamental Spider Wolf Spider		1	3 1 			0/2 V/ 0/2 V/ 0/1 V - 1 0/2 V 0/1 V - 1 0/1 V - 1	M M M M M M M M
Lymnaea sp. Littorina littorea Patella vislgata Cephlapoda Sepis officinalia Eledone cirrhosa	Poo Peri Lim Con	od Snail iwinkle npet nmon Cuttlefish	1 64 8 2	ar IV II	ur ur ur	4	-	0/0/10 0/0/50 0/0/10 0/0/15	IM IM AM IN ID	Grammostola spatulata Stromatopelma calcenta Metriopelma sp. Poecilotheria regalis Poecilotheria subfutca Poecilotheria ornata Unidentified lycosid species Nephila senegalenzia	Chile Rose Bird-eating Spider Feather-leg Baboon Spider Bird-eating Spider Indian Ornamental Spider Sri Lankan Ornamental Spider Sri Lankan Ornamental Spider		1 • • • • • • • • • • • • • • • • • • •	3 			0/2 1/ 0/2 1/ 0/1 1/ 0/2 1/ 0/1 1/ 0/1 1/ - 1/ 1/6 1/	M M M M M M
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Archimandrita tessellata	Bullshead Cockroach		n	w	•	ma/150	0/0/50	1/8
Mantodea								
Sphodromantis sp.	African Praying Mantis	3	nr	nr	1	0/1	1/2	1/8
Phasmatodea								
Acrephvila wweifingi	Queensland Titan Stick Insect		TT .	nr	1.1	50/0		VB
Eurycantha calcarata	Indonesian Spiny Stick Insect		nr	nr.	43	100/11	1/3	I/B
Exterioroma tiaratum	Macleay's Spectre Stick Insect	113	n	TIT .		100/31	1/0	I/B
Heteroptervx dilatata	Malaysian Jungle Nymph	11	TT	nr		100/66	2/2	I/B
Caratalita moreasus	Indian Stick Insect	24	n	nr			0/40	I/B
Sypyloides sipylas	Pink-wing		u	nr		1.0		1/8
Coleoptera								
Unidentified species	South African Large Dung Beetle	-	nr	nr	-	tr .	0/0/3	I/D
Unidentified species	Ball-rolling Dung Boetle	10	n	nr		TT.	0/0/1	I/N
Scarabarus sp.	European Dung Beetle	6	nr	nr	nr	IF	0/0/3	IN.
Kheper sp.	Purple African Dung Beetle	20	nr	nr	-	n	0/0/3	IN
Polposipus herculeanus (CR)	Giant Fregate Beetle		237	51	20	m/200	0/0/283	IB.
Anthia sexputtota	Domino Beetle	-	-	2	-	m	0/0/1	1/D
Anthia duodecimguttata	Domino Beetle	-4	-	1		107	0/0/3	IN
Dynastes granti	Grant's Rhinoceros Beetle	4	TT .	-4			-	I/NA
Pachnoda sp.	Marginated Flower Beetle	30	nr	nr		30/0	0/0/3	IN
Xidoturpes gideon	Sumatran Rhino Beetle		n	nr	-	ne/13	-	I/M
Unidentified species	Chequered Ground Beetle			5	14			I/NA
Blant sp.	Large Desert Boetle	2	nr	nr		10	0/0/1	1/D
Blaps sp.	Desert Beetle	25	nr.	TIT	-	12	0/0/25	1M
Blagu sp.	Small Pitted Desert Beetle	7	n	nr		m	0/0/1	1/D
Cybister laterimarginalia	Diving Boetle	-	nr	nr	4	nr	0/0/2	1/D
Unidentified species	Ground Weevil	10	n	10		-	*	INA
Diptera								
Drosophila melanogastar	Fruit Fly	m	n	nr	-	nr	0/0/1	CM
Calliphora vomitoria	Bluebottle	se	n	nr	-	nr.	0/0/1	CM
Lepidoptera								
Heliconius melpomene	Postman Butterfly		nr	nr	54		-	A/N/
Dryas julia	Flambeau Butterfly	65	nr	65	-			INA
Bombyx mori	Silkworm	20	nr	nr		300/0	+	A/M
Attacus atlas	Atlas Moth			6	-		-	INA
Hymenoptera								
Ampulex compressa	Jewel Wasp	*	nr	nr		m:46	9/4	1/D
Apis mellifera	Honeybee	1	nt	1		nr	100	C/M
Atta cephalotes	Leaf-cutting Ant	1	•	1		m	0/0/2	CM
Hemiptera								-
Notonecta glauca	Water Boatman		TH .	nr	-	nr	0/0/10	AM

Total Invertebrates at 31.12.00: approx.7371 specimens (adults & young); 52 colonies; approx. 174 species

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	MAL PARK	1	2	3	*	5		7
MAMMALS								
Diprotodontia								
Macropus rufogriseus frutica	Red-necked (Bennett's) Wallaby**	~600		1.4		-	+	-144
Macropus rufogrizeus	White Wallaby	15	-	2	4	-4		2/9/2
Macropus parma	White-fronted Wallaby	4	+ -	2	+		3	1/1/1
Primates								
Lemur catta (VU)	Ring-tailed Lemur	.8	7					140
Varecia variegata variegata (EN)	Black-&-white Ruffed Lemur	2	1					1/1
	White-faced Saki Monkey	3		1				
Pithecia pithecia		12		5			1	2/1 7/10
Saimiri bolivienziz	Black-capped Squirrel Monkey		-		+			
Callibrix argentata argentata	Silvery Marmoset	5	-	3				44
Callinico goeldii (VU)	Goeldi's Monkey		3				12	1/2
Leontopithecus chrysomelus (EN)	Golden-headed Lion Tamarin	3	+	1.1	2.4			2/1
Pan troglodytes (EN)	Chimpanzee	8					. *	50
Rodentia								
Cynomys hudovicianus	Black-tailed Prairie Dog**	-100				-	+	~50
Dolichotis patagonum	Mara**	-155						-16
Muscardinus avellanarius (RT)	Common Dormouse	30	1	24	2	9	4	16/2
Cambuses								
Carnivora Cenis lupus	Grey Wolf	14		4		3		7/8
	Brown Bear	5			12	1		1.4
Ursus arctas		9	î.				2	3/5
Allurus fulgens fulgens (EN)	Red Panda	5	C1	1	22			
Helogale parvula	Dwarf Mongoose		*	2	1		1	2/4
Panthera tigris altaica (CR)	Amur (Siberian) Tiger	4	-		1	10		2/2
Acinonya jubatus (VU)	Cheetah	5	1			1		2/3
Pinnipedia								
Zalophus californianus	Californias Sealion	3		2	1	+	+	2/2
Phoca vitulina	Common Seal	1	+	-				1/0
Halichoerus grypus	Grey Seal	1						0/1
Proboscidea								
Elephas maximus (EN)	Asian Elephant	4		1				13
Baulana da stada								
Perissodactyla	17	1.1						
Equus burchelli chapmanni	Chapman's Zebra	1		87				1/0
Equus grevyi (EN)	Grevy's Zebra	5	1	1	1.5	100	. *	1/5
Equas hemionus onager (EN)	Asiatic Wild Ass	7			1		-	1/6
Equus przewalskii (EW)	Przewalski's Horse	11	2				2	0/11
Rhinoceros unicornis (EN)	Greater One-horned Rhinoceros	4	+	1		+		13
Ceratotherium simum simum	Southern White Rhinoceros	8		3			. •	1/10
Diceros bicornis michaeli (CR)	Black Rhinoceros	2	•					14
Artiodactyla								
Hippopotamus amphibisa	Hippopotamus	2		1	-	-		1/2
Hexeprotodon liberiensis (VU)	Pygmy Hippopotamus	4	1	1	+	-	1	2/3
Lama glama	Llama (domestic)	2					4	20
Lama pacos	Alpaca (domestic)	2	-			1		10
Cameha bactrianus	Bactrian Carnel (domestic)	15		34		1	3	2.9
Muntiacus reevesi	Reeves's Mantjac**	-25	1000		1	1	1	-18
		35		16	4	12	2	7/15
Dama dama	Fallow Deer							
	Fallow Deer (black form)**	-50		-	1.	-		-75
Dama dama	Axis Deer	55	-	26	11	4		24/3
Aris axis				0	6	12	-	14/1
Axis axis Axis porcinus	Hog Deer	34		- 60	1 T T			
Aris axis		34 40 33	•	16 10	8 4	14	3	7/24

Elaphurus davidianus (CR)
Rangifer tarandua
Hydropotes inermis
Giraffa camelopardalis reticulata
Tragelaphus angasi
Tragelaphus spekei
Tragelaphus strepsiceros
Boselaphus tragocamelus
Bubalus depressicornis (EN)
Bas gaurus (VU)
Bos grunniens
Syncerus caffer nanud
Bison bison bison
Bison bonasus (EN)
Hippotragua equina
Hippotragua equinua bakeri
Kobus ellipsiprymnus
Kobus megaceros
Orya gazella gazella
Oryx dammah (CR)
Antilope corvicapra (VU)
Ovibos moschatus
Ovis orientalls maximon (VU)

Père David's Deer

Reindeer (domestic)

Reticulated Giraffe

Nyala

Gaur

Sitatunga

Greater Kudu

Nilgai Lowland Anoa

Yak (domestic)

European Bison

Roan Antelope

Nile Lechwe

Gemsbok '

Blackbuck

Musk Ox

Mouflon

Donkey

Horse: Shire

Cream Pony

Welsh Pony (Cream form)

Dwarf Forest Buffalo

Roan Antelope Common Waterbuck

Scimitar-homed Oryx

American Prairie Bison

Chinese Water Deer**

Domestic

eroneny									and the second sec							
	2	-	-	-	-	-		Mergellus albellus		2	2		-	-8		2/2
Cattle: Belted Galloway	1					-	1/0	Lophodytes cucullatus	Hooded Merganser	5	4	-	-	-	+	4/5
	1	1.	-		1	-	0/1	Bucephola albeola	Bufflehead	2	1	-	-	+		2/1
			1.2	192				interpretation interesting								
	10			- 55	1.00			Falsentformer								
	10	-	1.1	-	10	-			1/2-112-1220-1220-1220-1220-1220-1220-12							
	1				1			Coragops atratus		1	-	+	-	+	-	1/0
Goat: Windsor White	6	9	6	2	9			Catharnes aura	Turkey Vulture	1				-		1/0
Pygmy	5	-		1	-	-	0/5	Halianter indus	Brahminy Kite	1						0/0/1
								Haliaeeta Iswoocethaha		1			-			0/1
										1			1			0/0/1
Total-Mammals	1802	27(1)	206	65	121	11	2685		a provide sector of the sector s				120			2/2
rotae. Wanninan	1002		200	0.5			2000									0/1
										1	1	-	+	*		
										2	1	-	. * .	-		2/1
								Falco biarmicus	Lanner Falcon	3	-			-	- 51	3.0
								Falco cherrug	Saker Falcon	1					1	
								Falco peregrinus minor	South African Peregrine Falcon	1	-		-	+		1/0
										1	- 1	-			1	0/1
	1.0							T THE COMPANY AND								
Ema	10		3		-	2	1/2/1	Callifornia								
										1		-	-		-	1/0
King Penguin	9		1	1	3		3/3	Gallus gallus	Red Junglefowl**	-40					-(2)	-45
	15		12	1.1		-	8/5/2	Pavo cristatus	Common Peafowl**	-109		-	-			~88
								Lonhura adwardzi (CR)	Edward's Pheasant	1	-	-				1/0
manacolaris renguns		-	1				101211		the set of	1	1				1	
								Consequent manachar have (+ c)	DIOTOTIC LIFE I INCOME.							
								0-10-11								
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White Stork	18	-	9		1	.9	5/9/3			3					1	1/1
Scarlet Ibis	12	1	+			3	4/5/1	Grus vipio (VU)	White-naped Crane	4	-	2	1			2/3
			4	14	2	22		Grus rubicunda	Brolga	3	-	-	-	-		2/1
	1									3		5	3		1	3/1
Oreaser Familingo			1.2	197	12		0.01			4			1	1		2/1
																1/0
								Carlana cristina	wen-willing personn	1	-		-	-		00
	Pig: Poe-bellied Pig Cattle: Belted Galloway Red Poll Sheep: Lincoln Longwool Hampshire Black-faced Goat: Windsor White Pygmy Total: Mammals Emu King Penguin Rockhopper Penguin Humbold's Penguin Humbold's Penguin Cattle Egret White Stork Scarlet Ibis Rosy Flamingo Greater Flamingo	Pig: Pos-bellied Pig 2 Cattle: Belted Galloway 1 Red Poll 1 Sheep: Lincoln Longwool 1 Hampshire 10 Black-faced 1 Goat: Windsor White 6 Pygmy 5 Total: Mammals 1802 Emu 10 King Penguin 9 Rockhopper Penguin 15 Humbold's Penguin 42 Cattle Egret - White Stork 18 Scariet Ibis 12 Rosy Flamingo 46	Pig: Pot-bellied Pig 2 Cattle: Belted Galloway 1 Red Poll 1 Sheep: Lincoln Longwool Hampshire 10 Black-faced 1 Goat: Windsor White 6 9 Pygmy 5 Total: Mammals 1802 27(1)	Pig Pot-bellied Pig 2 - - Cattle: Belted Galloway 1 - - Red Poll 1 - - - Sheep: Lincoln Longwool 1 - - Hampshire 10 - - - Black-faced 1 - - - Goat: Windsor White 6 9 6 Pygmy 5 - - - Total: Mammals 1802 27(1) 206 Ema 10 - 3 King Penguin 9 - 1 Rockhopper Penguin 15 - - Humboldf's Penguin 42 - 3 Cattle Egret - 1(1) - White Stork 18 - 9 - Scarlet Ibis 12 1 - Reny Flamingo 46 - 4	Pig Pot-bellied Pig 2 -	Pig: Pot-bellied Pig 2 - 10 - - - 10 - - 10 - 3 1 -	Pig: Pot-bellied Pig 2 - -	Pig: Pot-bellied Pig 2 - - - - 02 Cattle: Belted Galloway 1 - - - - 10 Red Poll 1 - - - - 01 Sheep: Lincoln Longwool 1 - - 10 - - 011 Black-faced 1 - - 10 - - 10 - - 010 - - 011 - - 011 - - 011 - - - 011 - - - 011 - - - 015 Goat: Windsor White 6 9 6 2 9 - 278 Pygmy 5 - - - 015 Total: Mammals 1802 27(1) 206 65 121 33 2685 Ema 10 - 3 1 - 2 7/2/1 King Penguin 9 - 1 <t< td=""><td>Pig: Pet-bellied Pig 2 - - - 0.02 Mergelha albella Catle: Bellad Galloway 1 - - - 1.0 Lophodyter cavallation Red Poll 1 - - - 0.1 Buccphella albeella Sherp: Lincoln Longwool 1 - - 10 - Black-faced 1 - - 1 - - Compyre avants Goat: Windsor White 6 9 6 2 9 - 2.0 Cadhertes avan Pygrny 5 - - - 0.05 Halizatur indus Mammah 1802 27(1) 206 65 121 33 2685 Gyps africanus Gyps africanus Fate 1802 27(1) 206 65 121 33 2685 Gyps africanus Gyps africanus Gyps africanus Gyps africanus Gyps africanus Gyps africanus Gyps africanus</td><td>Pig: Peck-belied Pig 2 - - - 0.02 Mergehlar albedia Sterew Cattle: Beled Galloway 1 - - - 0.01 Laphadyter carculinar Hooded Merganiser Sheep: Lincoln Longroool 1 - - - 0.01 Laphadyter carculinar Hooded Merganiser Black-fored 1 - - 1 - - - Goat Windsor White 6 9 6 2 9 - 0.5 Halisstart indust Balak Vulture Foral: Mammals 1802 27(1) 206 65 121 33 2685 Gatherites arm Tarkey Vulture Total: Mammals 1802 27(1) 206 65 121 33 2685 Gatherites arm American Black Vulture Total: Mammals 1802 27(1) 206 65 121 33 2685 Gathastartes arm American Black</td><td>Pice Peek-Billed Fig. 2 - - - 0.02 Margedina abbellas Snew 2 Cartie Belted Gallonay 1 - - - 0.01 Buecphaln abbellas Snew 2 Sheep: Lincoln Longwool 1 - - 0.01 Buecphaln abbellas Hooded Merganser 5 Black-field Gild 1 - - 10 - - Buecphaln abbellas Hooded Merganser 5 Goat: Windor White 6 9 6 2 9 Corrapy arona American Black Valuer 1 Total: Mammals 1802 27(1) 206 65 121 33 2685 Goagy arona American Black Valuer 1 Total: Mammals 1802 27(1) 206 65 121 33 2685 Gyp argenesphaln Black Field Call African Pergine Takend 1 Total: Mammals 1802 27(1) 206 5</td><td>Pig: Pot-belied Pig 2 - - - 0.2 Margella albella Since 2 2 2 Cartie Belded Galoway 1 - - - 0.0 Laphobistic scalina Hooded Merganser 5 4 Belde Galoway 1 - - - 0.01 Laphobistic scalina Hooded Merganser 5 4 Sheep: Lincoln Langwool 1 - - 10 - - Back-faced 2 1 - - - Eraconiformes -</td><td>Pig: Pock-Bild Pig 2 - - - 0.2 Margolia albella Since 2 2 2 - Cattle Belde Gallonay 1 - - - 0.0 Margolia albella Since 2 2 2 4 - Bed Poll 1 - - 1 - - 0.01 Margolian albella Since 2 1 - Sheep: Lincoh Longwool 1 - - 1 - - Consummation Hooded Margolian albella Margolian albela Margolian albela Margolian albela Margolian albela</td><td>Pig: Pocketlind Pig: 2 - - - 0.02 Margablan abbellan Snew 2 2 - - - - - 0.02 Margablan abbellan Snew 2 2 - - - - - 0.01 Margablan abbellan Snew 2 2 - <th< td=""><td>Pig: Pocketlikel Pig 2 - - - 0.02 MargeNar albellar Snew 2 2 - - - - - 0.01 Cattle Belded Gallowsy 1 - - - 0.01 MargeNar albellar Bondel Merganer 5 4 -</td><td>Price Pock-bellied Pig 2 - - - 0.02 Marge/Mathellating Since w 2 2 -<</td></th<></td></t<>	Pig: Pet-bellied Pig 2 - - - 0.02 Mergelha albella Catle: Bellad Galloway 1 - - - 1.0 Lophodyter cavallation Red Poll 1 - - - 0.1 Buccphella albeella Sherp: Lincoln Longwool 1 - - 10 - Black-faced 1 - - 1 - - Compyre avants Goat: Windsor White 6 9 6 2 9 - 2.0 Cadhertes avan Pygrny 5 - - - 0.05 Halizatur indus Mammah 1802 27(1) 206 65 121 33 2685 Gyps africanus Gyps africanus Fate 1802 27(1) 206 65 121 33 2685 Gyps africanus	Pig: Peck-belied Pig 2 - - - 0.02 Mergehlar albedia Sterew Cattle: Beled Galloway 1 - - - 0.01 Laphadyter carculinar Hooded Merganiser Sheep: Lincoln Longroool 1 - - - 0.01 Laphadyter carculinar Hooded Merganiser Black-fored 1 - - 1 - - - Goat Windsor White 6 9 6 2 9 - 0.5 Halisstart indust Balak Vulture Foral: Mammals 1802 27(1) 206 65 121 33 2685 Gatherites arm Tarkey Vulture Total: Mammals 1802 27(1) 206 65 121 33 2685 Gatherites arm American Black Vulture Total: Mammals 1802 27(1) 206 65 121 33 2685 Gathastartes arm American Black	Pice Peek-Billed Fig. 2 - - - 0.02 Margedina abbellas Snew 2 Cartie Belted Gallonay 1 - - - 0.01 Buecphaln abbellas Snew 2 Sheep: Lincoln Longwool 1 - - 0.01 Buecphaln abbellas Hooded Merganser 5 Black-field Gild 1 - - 10 - - Buecphaln abbellas Hooded Merganser 5 Goat: Windor White 6 9 6 2 9 Corrapy arona American Black Valuer 1 Total: Mammals 1802 27(1) 206 65 121 33 2685 Goagy arona American Black Valuer 1 Total: Mammals 1802 27(1) 206 65 121 33 2685 Gyp argenesphaln Black Field Call African Pergine Takend 1 Total: Mammals 1802 27(1) 206 5	Pig: Pot-belied Pig 2 - - - 0.2 Margella albella Since 2 2 2 Cartie Belded Galoway 1 - - - 0.0 Laphobistic scalina Hooded Merganser 5 4 Belde Galoway 1 - - - 0.01 Laphobistic scalina Hooded Merganser 5 4 Sheep: Lincoln Langwool 1 - - 10 - - Back-faced 2 1 - - - Eraconiformes -	Pig: Pock-Bild Pig 2 - - - 0.2 Margolia albella Since 2 2 2 - Cattle Belde Gallonay 1 - - - 0.0 Margolia albella Since 2 2 2 4 - Bed Poll 1 - - 1 - - 0.01 Margolian albella Since 2 1 - Sheep: Lincoh Longwool 1 - - 1 - - Consummation Hooded Margolian albella Margolian albela Margolian albela Margolian albela Margolian albela	Pig: Pocketlind Pig: 2 - 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Anseriformes

Black Swan

Swan Goose

Whooper Swan Coscoroba Swan

Bar-headed Goose

Emperor Goose

Ross' Goose

Barnacle Goose

Egyptian Goose

Mandarin Duck

Ringed Teal

American Wigeon

European Pochard

Barrow's Goldeneye

European Eider

Bahama Pintail

Falcated Duck

Baikal Teal Rosybill Red-crested Pochard

Common Shelduck

Red-breasted Goose

Nene (Hawaiian Goose)

White-faced Whistling Duck

North American Wood Duck Australian Wood Duck

North American Ruddy Duck

Lesser White-fronted Goose

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Cygnut about

Cygnus cygnus

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Coscoroba coscoroba

Anser cygnoides (VU) Anser indicus

Anser crythropus (VU)

Branta leucopsis Branta ruficollis (VU) Branta sandvicensis (VU)

Alopochen acgyptiacus

Dendrocygna vidanta

Chenonetta jubata Callonetta leucophrys

Tadorna tadorna

Aix galericulata

Anas americana Anas bahamensis

Anas formosa (VU)

Bucephala islandica

Oxyura jamaicensis jamaicensis Somateria mollissima mollissima

Anas falcata

Netta rigina

Aythya ferina

Netta peposaca

Aix sponsa

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Charadriiformes								
Haematopus ostralegas	Eurasian Oystercatcher	3				1		0/0/2
Burhinus bistriana	Double-striped Thick-knee	2	-	-	+			1/1
Himantopus himantopus mexicanus	Black-necked Stilt	2	1	-			1	1/1
Recurvirostra avosetta	Pied Avocet	3		-	*	1	+	0/0/2
Psittaciformes								
Prittocus erithocus erithocus	Grey Parrot	2	-				120	1/1
Agapornis personata	Masked Lovebird	4		2				0/0/4
Ara ararauna	Blue-&-yellow Macaw	3		-				2/1
Ara macao	Scarlet Macaw	2		-				20
Ara militaris (VU)	Military Macaw	5					-	0/0/5
Mylopsitta monachus	Monk Parakeet	2		+				1/1
Strigiformes								
Onus leucotis	White-faced Scops Owl	2						1/1
Bubo bubo bengalensis	Bengal Eagle Owl	1	-	+	-	-	+	0/1
Nyetea scandiaca	Snowy Owl	1	-	*				1/0
Strix aluco sylvatica	Tawny Owl	5				1		1/0/3
Strix walensis	Unal Owl	1	-	-			*	1/0
Speotyto cunicularia	Barrowing Owl	+	1	*				0.01
Coraciiformes								
Dacelo novaeguineae	Kookaburra	1		*				0/0/1
Tookus erythronkynchus	Red-billed Hombill	2	1	3	3	1		1/1
Piciformes								
Ramphastos vitellinus citreolaemus	Citron-throated Toucan	1	-	-	-	1		+
Passeriformes	Prove Prove	2.2	1					-
Spreo superbus Cyanopica cyana	Superb Starling Azure-winged Magpie	2	4	12	7	4		2/1/1
	Total: Birds	567	34(1)	80	21	67	27(2)	550
REPTILES								
Testudines				20			100	
Testudo hermanni Testudo kleinmanni (EN)	Hermann's Tortoise	21	3	2	1	1	6	3/11/.
Testudo horsfieldi (VU)	Egyptian Tortoise Central Asian Tortoise	8	- 2	6			1	3/3/8
Chelus fimbriatus	Matamata	2		1	12			0/0/2
Crocodylia Osteolaemus tetraspis (VU)	West African Dwarf Crocodile	0					4	1/1/3
Sauria								
Phelsuma standingi (VU)	Standing's Day Gecko	2						1/1
Gecko gecko	Tokay Gecko	2	-	-	-	*	-	1/1
Basiliscua plumifrons Iguana iguana	Plumed Basilisk Common Iguana	1	1	-			1	02
Opluna cuvieri	Madagascar Spiny-tailed Iguana	÷.	3				-	0/0/3
Mabuya perrotetti	Red-sided Skink	2			-	2		
Gerrhosaurus major	Greater Plated Lizard	1	3	-		2		1/0
Uromastyx hardwickil	Indian Spiny-tailed Lizard	5				3		0/0/2
Chamaeleo calypirana	Yemen Chameleon	14		5				0/0/1
Tupinambis teguinin nigropunctatus	Golden Tegu Lizard	-	2	+	-	-	-	0/2
Varanus albigularis	Bosc's Monitor	1	*	-		1		*
Angel profession particular	Percula Chinemitah	-	-	-	-		-	-
Amphiprion clarkit Amphiprion melanopus	Clark's Clownfish Pacific Fire Clownfish	2						
Premnas biaculeatus	Maroon Clownfish	î						
Chromis viridia	Blue-green Chromis	20						
Valenciennea strigata	Blue-cheeked Goby	2						
Siluriformes								
Otocincha affinia	Dwarf Sucker Catfish	2						
	Plecostomus Catfish	10						
		4						
Plecostomus sp. Corydoras aeneus	Bronze Catfish							
Plecostomus sp.	Peppered Catfish	3						
Plecostomus sp. Corydoras aeneus		,						
Plecostomus sp. Corydonas acneus			r. 34 spe	cies				
Plecostomus sp. Corydoras aeneus	Peppered Catfish		s. 34 spc	cies				
Plecostomus sp. Corydonas acneus	Peppered Catfish		s. 34 spe	cies	+ 1			
Plecostomia sp. Corydoras acneia	Peppered Catfish		s. 34 spe	cies				
Plecostomus sp. Corydoras aenena Corydoras paleana	Peppered Catfish		x. 34 spe	cies				
Plecostomus sp. Corydoras aenena Corydoras poleana	Peppered Catfish		s. 34 spe	cies	+			
Plecostomus sp. Corydoras aenena Corydoras paleana INVERTEBRATES	Peppered Catfish		s. 34 spe	cies	+			
Plecostomus sp. Corydorus aenena Corydorus paleatus INVERTEBRATES ARACHNIDA	Peppered Catfish Total Fishes: approx. 803 specims Red-kneed Bird-eating Spider		x. 34 spe	cies	+			
Plecostomus sp. Corydoras acneus Corydoras paleatus INVERTEBRATES ARACHNIDA Araneae	Peppered Catfish Total Fishes: approx. 803 specims Red-kneed Bird-eating Spider Chile Rose Bird-eating Spider	ens appro	x. 34 spe	cies	+			
Plecostomus sp. Corydoras acneus Corydoras paleatus INVERTEBRATES ARACHNIDA Araneae Brachypelma smithi Grammostola cala Lasiodora parahybana	Peppered Catfish Total Fishes: approx. 803 specims Red-kneed Bird-eating Spider Chile Rose Bird-eating Spider Brazilian Bird-eating Spider	0/1 0/1 0/1		cies	*			
Plecostomus sp. Corydoras aenena Corydoras poleatua INVERTEBRATES ARACHNIDA Araneae Brachypelma smithi Grammostola cala Lasiodora parahybana Steatuda albomaculata	Peppered Catfish Total Fishes: approx. 803 specims Red-kneed Bird-eating Spider Chile Rose Bird-eating Spider Brazilian Bird-eating Spider Gambian False Widow Spider	0/1 0/1 0/1 0/1 Colo		cies	+			
Plecastomus sp. Corydoras aenena Corydoras poleana INVERTEBRATES ARACHNIDA Araneae Brachypelma smithi Grammastola cala Lasiodora parahybana	Peppered Catfish Total Fishes: approx. 803 specims Red-kneed Bird-eating Spider Chile Rose Bird-eating Spider Brazilian Bird-eating Spider	0/1 0/1 0/1 0/1 0/1 0/1 0/1 0/1		cies	+			

		1	2	3	4	5	6	7
r pentes kon molurus bivittatus stalua unicolor (CR)	Burmese Python Aruba Island Rattlemake	1	•	• •	• •	:	•	0/1 1/0
	Total: Reptiles	80	9	15	•	8	n	85
IPHIBIANS								
ura								
lostethus trinitatus	Stream Frog	-	10	1		3		0/0/7
sdrobates auratus	Green-&-black Poison Frog	34				10	-	0/0/24
udrobates azureus	Blue Poison Frog	5				3	-	0/0/2
udrobates leucomelas	Yellow-banded Poison Frog	2				1	1	
where the second	Yellow-&-black Poison Frog	21		-	-	12	5	0/0/4
аторкуз стальной	Chacoan Homed Frog	1	*		•	*	*	1/0
	Total: Amphibians	63	10	-		29	6	38
		_	_	_	_	_	_	

The numbers given for fishes and invertebrates at Whipsnade represent the numbers held at the end of 2000.

FISHES

Sery Pyck Crot

AM

Ann Colo Dena Dena Dena Dena Cera

Cypriniformes		
Barbodes schwanenfeldi	Tinsel Barb	4
Barbuz schuberti	Golden Barb	7
Labeo bicolor	Red-tailed Black Shark	1
Labeo erythmenut	Red-finned Shark	1
Gyrinocheilus aymonieri	Sucking Loach	6
Characiformes		
Serrasalmus nattereri	Red-bellied Piranha	18
Cheirodon axelrodi	Cardinal Tetra	15
Cyprinodontiformes		
Ameca splendens (EW)	Butterfly Goodeid	~10
Poecilia sp.	Molly	-20
Xiphophorus variatus variatus	Platy	-20
Xiphophorus helleril	Red Swordtail	-20
Pachypanchax omalonotus	Madagascan Killifish	-35
Gasterosteiformes		
Hippocampus kuda (VU)	Yellow Seahorse	10
Hippocampus capensis (EN)	Knysna Seahorse	19
Gymnotiformes		
Electrophorus electricus	Electric Eel	1
Perciformes		
Stomatepia sp. (CR)	Barombi Mbo Cichlid	~50
Tilapia sp.	Tilapia	-200
Astronota ocellatua	Oscar	1
Zebrasoma flavescens	Yellow Sailfin Tang	8
Paracanthurus kepatus	Regal Tang	7
Monodactylus argenteus	Malayan Angel	23
Pterophyllum scalare	Angel Fish	4
Chrysiptera parasema	Yellow-tailed Blue Damsel	3
Synchiropus splendidus	Mandarin Fish	1

INSECTA Orthoptera	
Schistocerca gregaria	Desert Locust
Gryllut binaculatus Pholeogryllus geertsi	African Field Cricket Cave Cricket
e manage your general	Care Contes
Blattodea	
Gromphadorhina portentosa	Malagasy Hissing Cockroach
Mantodae	
Sphodromantis sp.	African Mantis
Coleoptera	
Packnoda nactigali	African Sun Beetle
Blaps sp.	Desert Boetle
Lepidoptera	
Heliconius melpomena	Postman Butterfly
Parculype berberata	Barberry Carpet Moth

Hymenoptera Acromyrmex octospinosus

MARINE INVERTEBRATES

Ophiocomina sp.	Brittle Starfish	1
Clibinarius vittetta	Hermit Crab	6
Lysmata amboinensis	Cleaner Shrimp	3
Sabella pevona	Feather Duster Worm	7

Leaf-cutter Ants

Scorpiones			
Pandinus imperator Opisthophthalmus carinatua	Imperial Scorpion Desert Scorpion	0/03 0/0/1	Total Invertebrates: approx. 45
MYRIAPODA			
Chilopoda Scolopendra sp.	Giant Centipede	1010	
Diplopoda			
Cambula annulata	Giant Millipede	Colony	

45 specimens; 11 colonies; approx. 24 species

Colony Colony Colony

Colony

Colony

Colony 0/0/12

Colony Colony

Colony

SUMMARY

	1	2	3	4	5	6	7	Number of species (excluding domestic) at 31.12.2000
London Zoo								
Mammals	781	58	527	163	318	173 (1)	712	91
Birds	690	76 (2)	185	57	133	70 (1)	691	133
Reptiles	491	70	127	65	123	69	431	102
Amphibians	124	84	48	-	41	18	197	17
Fishes	3293	572	6228	4667	1709	496	3221	174
Total	5379	860 (2)	7115	4952	2324	826 (2)	5252	517

Domestics: mammals - 15 species; birds - 3 species

Total	2512	80 (2)	301	86	225	77 (2)	3358	161	
Amphibians	63	10	-	-	29	6	38	5	
Reptiles	80	9	15	-	8	11	85	15	
Birds	567	34 (1)	80	21	67	27 (2)	550	78	
Mammals	1802	27 (1)	206	65	121	33	2685	63	
Whipsnade Wild	l Animal Parl	¢							
Invertebrates: approx. 7371 specimens (+ 52 colonies) approx. 174 species									

Note: births, deaths, arrivals and departures of free-ranging animals at Whipsnade are not recorded.

Domestics: mammals - 5 species

Estimated nur	nber of fishes and inverteb	rates in the Collection at 31 De	cember 2000:
Fishes:	approx. 803 specimens		34 species
Invertebrates:	approx. 45 specimens	(+ 11 colonies; + larvae)	24 species

Grand Total Zoological Society				5000			0/10	(22)
of London	7891	940	7416	5038	2549	903	8610	623* excl. fishes

at Whipsnade

Grand Total of fishes: approx. 4024 specimens of 194 species* Grand Total of invertebrates: approx. 7416 specimens (+ 63 colonies) of 183 species*

* The species common to London Zoo and Whipsnade Wild Animal Park are counted as one



The Zoological Society of London Annual Review 2001



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Front cover: Okapi Images: PA©

Above: ZSL staff worked on a large number of conservation and research projects throughout the world in 2001. Many other collaborations are in development.

ZSL MISSION

To achieve and promote the worldwide conservation of animals and their habitats.

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nent.

ZSL pursues this mission by: I keeping and presenting animals at London Zoo and Whipsnade Wild Animal Park in accordance with best practice; 2 giving priority to species that are threatened in the wild; 3 increasing public understanding of animals and their welfare and of the issues involved in their conservation; 4 maintaining an outstanding education and information programme, particularly for schoolchildren and families; 5 undertaking field conservation programmes, both in Britain and abroad; 6 developing its role as a leading

centre for research and conservation biology and animal welfare;

7 fulfilling its role as a learned

society and force for zoology and animal conservation through publications, scientific meetings, lectures, the award of prizes for
outstanding achievement and the promotion of conservation policy.

PRESIDENT'S INTRODUCTION

As this *Annual Review* makes clear, 2001 was a difficult year for ZSL. The outbreak of Foot and Mouth Disease with suspected (though happily unconfirmed) cases only ten miles away made our closure of Whipsnade inevitable. We feared large financial losses, and the fact that instead we ended the year in surplus is a testimony to the skill of our Officers, Directors and staff in cutting expenditure sharply.

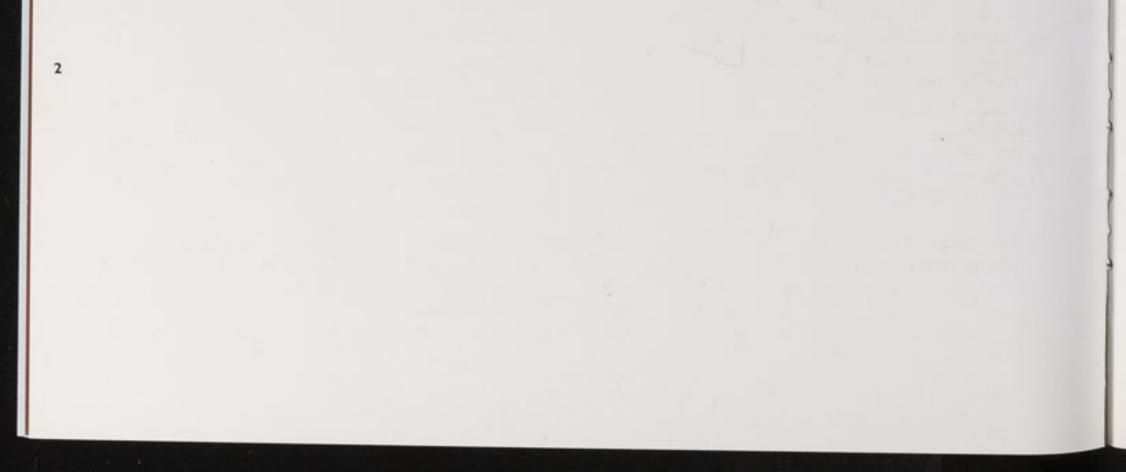
Of course this sudden economy did damage, although much of the work we would have done was deferred rather than abandoned, and essential development – like the new elephant housing at Whipsnade – went ahead. But the proximity of the epidemic raised major issues of policy to which I alluded last year. Happily, the supreme international body on animal diseases, the Office International des Epizooties (OIE) in Paris, recommended last April that collections of rare and threatened species in zoos could be protected by vaccination without prejudice to the FMD-free status of a country, provided that the animals concerned were properly isolated. The European Union accepted this proposal, recognising that endangered species are a valuable part of the global heritage and should be protected as far as possible. We did not need to press the Government to use this vaccination option in 2001, but the OIE and EU decisions make the horrible prospect of compulsory slaughter of some of the world's rarest animals less threatening.

Managing the complex finances of a body like the ZSL is never easy. Last year it imposed particular demands on our Finance Department, and on our Treasurer, Harry Wilkinson. Our Society, like many charitable organisations of its kind, is directed on a day-to-day basis by the Director General and staff, but managed and administered by its Officers and Council on behalf of the Fellowship. In the past year, Harry Wilkinson put in a great many hours on our behalf. He has now stepped down as Treasurer, and I would like to record here our gratitude to him for his seven years of outstanding service.

May I conclude by thanking all my fellow Officers, Council Members, Fellows, Directors and the staff of the Society for their dedication in the past year. I have every confidence that, thanks to their efforts, 2002 will be a much better year for ZSL.

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Sir Martin Holdgate President



THE ZOOLOGICAL SOCIETY OF LONDON



Patron: Her Majesty The Queen

Members of Council during 2001

President Sir Martin Holdgate, CB, MA, PhD, DSc (h.c.), CBiol, FIBiol

Treasurer

Harry Wilkinson, OBE, MA, FCA (to 31 December 2001) Paul Rutteman, CBE, BSc (Econ), FCA (from 1 January 2002)

Secretary

Professor Paul H Harvey, BA, MA, DPhil, DSc, FRS

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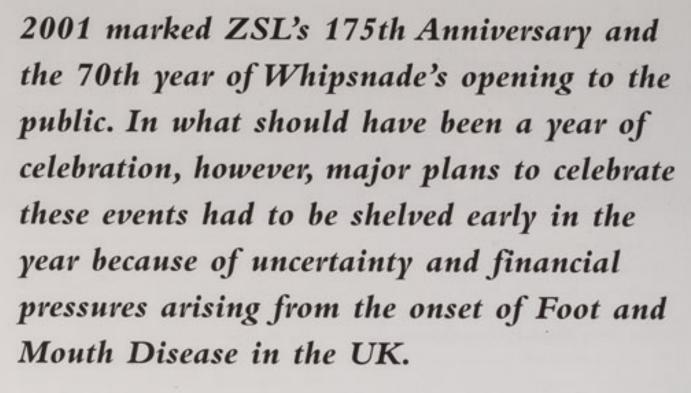
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† To 19 June 2001 * From 19 June 2001

REVIEW OF THE YEAR





In the third week of February the first case of Foot and Mouth Disease was identified at Great Warley in Essex and over the next few days more and more cases were confirmed in Essex and Northumbria. ZSL's veterinary science group quickly established effective communication with MAFF officials so that we were aware both of new confirmed cases and locations under investigation. This latter information indicated suspected cases within ten miles of Whipsnade and led to the early decision to close the Park to the public on 22 February. At the same time, precautionary measures were applied at London Zoo, so extra barriers, foot dips and disinfectant matting became a way of life for staff and visitors for an extended period.

As the disease epidemic spread, distinct clusters emerged well away from London and Whipsnade. After an enormous effort to implement precautionary measures on a big site with many free-roaming susceptible animals, we were able to reopen Whipsnade to visitors on foot on 19 April and subsequently to cars during the third week of July. However, the damage had been done. Visitor numbers at Whipsnade were down by around 85,000 at that time and at London Zoo, visitor numbers in March and April had been half of those normally expected, resulting in a 40,000 deficit. Thereafter, the weekly visitor numbers were subject to the normal vagaries of the weather, which was broadly worse than average. As a result, total visitor numbers for the year

at Whipsnade were around 350,000 and at London Zoo 910,000.

The financial impact of Foot and Mouth Disease was forecast early on during the epidemic and a loss of gate income of more than $\mathcal{L}1M$ was predicted. We applied cost saving measures across ZSL, and these were significant enough not only to cancel out the lost income but also to cover a downward revaluation of our investments as the result of the stock market decline, especially following 11 September. As the Treasurer's Report shows, the financial outcome for the Society was exceptional under such difficult circumstances.

The financial pressures resulting from lost zoo visitors resulted in efforts to advance the development of new income sources. A particular success during the year was the sale of animal adoptions over the internet. Working with lastminute.com, London Zoo's adoptions team ran a Christmas campaign which was highly successful, netting over £100,000 in the run up to the holiday and contributing to an increase of nearly 70% in income over the previous year. Adoptions were well up at Whipsnade too, and during the Park's closure many people took out adoptions



Above: Signs of the times: closed gates at Whipsnade and vehicle spraying at London Zoo during the height of the Foot and Mouth Disease crisis.

Below: Electronic media

proved highly successful in attracting Animal Adopters.





REVIEW OF THE YEAR

as a way of helping in difficult times. Over 50% of the adoptions during the year were generated through the website, demonstrating the major impact of this developing aspect of our activities.

During 2001 negotiations took place with the Greater London Authority to allow free school visits to London Zoo for London's schoolchildren. In an innovative agreement signed for the new school year which started in September, the GLA is subsidising visits for up to 180,000 schoolchildren by providing the funds for ZSL to employ more teaching staff and to invest in our educational facilities. The initial signs are that this scheme will be very popular. It is intended to spread the visits over the full school year and we have 'capped' daily visits at around 2,000 children. The result will be more schools visiting in the autumn, winter and spring, so providing undercover picnic facilities was an important consideration. We are grateful to Thames Water for sponsoring the provision of these facilities.

The year saw significant change in the team of Directors at ZSL. Council approved a change in the management structure, moving from a divisional to a cross-Society functional basis. Over the second half of the year the new model was implemented, changing the roles undertaken by individual Directors. Along the way Stuart Earley, Dr Jo Gipps and Norman Reed each chose to move on to new roles in the visitor attraction world, and we record here our thanks to them for their work for ZSL over the years and wish them well for the future. In the final quarter of the year, four new Directors joined - Chris West (Zoological), Dr Glyn Davies (Conservation Programmes), Brian Oldman (Commercial) and Michael Bird (Finance). They joined the existing team of Dr Michael Dixon (Director General), Ian Meyrick (Human Resources) and Professor Georgina Mace (Science).



large number of changes over the assessment period, and this confirms that the Institute's research is attaining national significance in all areas, and international importance in some. The Institute had a good year for grant applications with 15 new grants won, six of which were over $\pounds 100,000$ in lifetime value.

In October, ZSL's difficult year was compounded by the tragic death of Senior Elephant Keeper, Jim Robson, in the course of his work at London Zoo. This tragedy, still the subject of internal and official inquiries at the time of writing, shook the staff throughout ZSL. We take the opportunity of paying tribute to his years of dedicated work for ZSL, primarily with elephants and in expressing our heartfelt sympathy



As with other UK academic research establishments, the Institute of Zoology was subjected to HEFCE's Research Assessment Exercise, the results of which were announced in December. A rating of Grade 4 was retained, something of an achievement given the to his family.

Subsequently the three London Zoo elephants were moved to their permanent new home at Whipsnade, where the magnificent newly expanded facilities were completed in December. The transfer of the elephants, one at a time but all in one day, was almost certainly the most complex inter-zoo move of large animals ever undertaken in the UK. Memorials to Jim Robson at both London Zoo and Whipsnade, where he was to relocate with the elephants he loved, are planned for implementation shortly.

Above, top: Jim Robson, Senior Elephant Keeper, at London Zoo. 5

Above: Flowers were left as a tribute following Jim's tragic death.

REVIEW OF THE YEAR





Above, top left and right: Sunrise: Layang Layang, one of London Zoo's elephants, is loaded onto the transporter and (right) arrives at her new home, Whipsnade.

Above: Reception in the Web of Life. Dr Abdul Aziz Abuzinada (centre)

Our overseas conservation work continued during the year with some projects coming to an end and others continuing to develop. The project to establish self-sustaining veterinary clinics in the buffer zone around the Chitwan National Park in Nepal was completed and we will watch with interest how these clinics fare in the future. The donors for the project, the Department for International Development (DFID), the Kadoorie Foundation and the King Mahendra Trust for Nature Conservation have each reported positively on the outcome.

ZSL was represented by three Directors at the opening of a new laboratory block at the King Khalid Wildlife Research Centre (KKWRC) in Saudi Arabia, built through the generosity of His Royal Highness Prince Bandar Al Faisal Bin Abdulaziz. The laboratory facilities increase the capability to undertake molecular genetic work at KKWRC and a full time geneticist is based there looking at the phylogeny of indigenous populations of animals in the region. In July we held a reception in London Zoo's *Web of Life* for Dr Abdul Aziz Abuzinada, Secretary



General of the Saudi National Commission for Wildlife Conservation and Development, for whom we manage KKWRC. Our mutual commitment to this long running project increased during the year, establishing ZSL as a major active force in desert ecosystems and their management.

This Annual Review outlines some of ZSL's activities in more detail. The contributions of our dedicated staff, our fellows, volunteers, committee members, visitors and donors are acknowledged by Council with grateful thanks. We have shown that ZSL now has both the financial and organisational resilience to withstand even such a difficult year as 2001, and this augurs well for our future development.

I Horve

and Dr Iyad Nader (right).

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Below: ZSL's new team of Directors: Michael Dixon, Michael Bird; Glyn Davies; Georgina Mace; Ian Meyrick; Brian Oldman; Chris West. Professor Paul H Harvey FRS Secretary



AWARDS & HONOURS

ZSL recognises outstanding achievements in the field of zoological research and conservation through its annual presentation of awards and prizes. The awards for contributions to zoology for 2001 are:

The ZSL Frink Medal for British Zoologists

(for significant and original contributions by professional zoologists to the development of zoology in its wider implications) to Professor Nick Davies, FRS, of the University of Cambridge, in recognition of his contribution to behavioural ecology.

The Scientific Medal

(awarded to zoologists 40 years of age and under, in recognition of scientific merit) to Dr Alan Cooper, of the University of Oxford, for his research in phylogeography.

The ZSL Marsh Award for Conservation Biology

(for contributions of fundamental science and its application to the conservation of animal species and habitat)

to Dr Eleanor Jane Milner-Gulland, of the Imperial College London, for her contribution to conservation biology.

The Stamford Raffles Award

(for distinguished contribution to zoology, open to amateur zoologists or to a professional zoologist in recognition of contributions which are outside the scope of his or her professional activities and principal specialisation) to Dr Norman Moore for his research on the ecology and behaviour of dragonflies.

The Thomas Henry Huxley Award

(for original work submitted as a doctoral thesis) to Dr Stephen Rossiter, of the University of Bristol, for his thesis The causes and consequences of genetic structure in the greater horseshoe bat (Rhinolophus ferrumequinum).

The ZSL Marsh Award for Conservation Biology and the Thomas Henry Huxley Award are sponsored by the Marsh Christian Trust.



Honorary Fellowship

to Professor Patrick Bateson, FRS, Provost of King's College, Cambridge and Biological Secretary of the Royal Society. In recognition of a career as a world leader in ethological research.

Left: Katherine Herborn, winner of the Prince Philip Prize 2000, with (left to right) Sir Martin Holdgate, President, ZSL; Brian Marsh, Marsh Christian Trust; and Julian Foster, Peter Symonds College.

CONSERVATION & SCIENCE

In our research laboratories, in the field, and in the zoos, ZSL's staff carry out a unique mix of fundamental science, applied conservation biology and practical conservation work to further our goal to maintain populations of wild animals. Here, we present some examples of work completed during the year.

Underpinning analyses and investigations

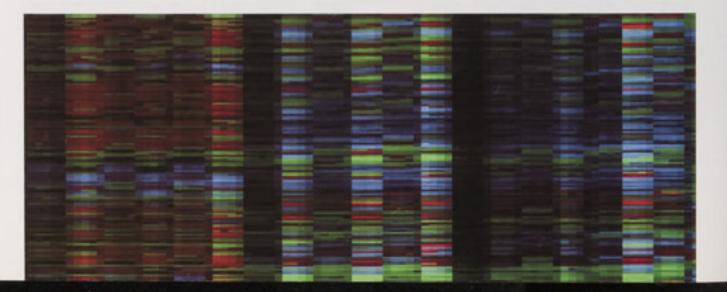
Strategies and plans to conserve wild species and their habitats need to be based on a sound biological understanding of the target organisms. Whether it involves laboratory work, data analyses, ecological or genetic modelling, ZSL staff continue to contribute advice and guidance based on strong science.

Captive breeding and reintroduction are high profile and expensive methods of conserving species, so it is important that animals included in such programs are correctly identified. The Saudi gazelle, Gazella saudiya, was first described in 1935 at a meeting of the Zoological Society of London. Since then, like many other species of large mammal in Arabia, it has suffered from over-hunting and has been considered extinct in the wild for more than ten years. In the early 1990s, three captive populations of gazelles in Arabian Gulf states were identified as Saudi gazelles. These collections were considered possible sources of animals for a captive breeding/reintroduction programme. However, DNA and chromosomal analyses showed that the populations were different from one

another, and that one population was likely to be a mixture of two species, one of them possibly being the Saudi gazelle.

In collaboration with the National Commission for Wildlife Conservation and Development in Saudi Arabia, we sequenced a region of the cytochrome b gene from museum skins of Saudi gazelles collected in the 1930s. This showed that the true Saudi gazelle is a close relative of African dorcas gazelles but is a distinct taxon. Unfortunately, none of the three captive populations of putative Saudi gazelles matched the sequences from the museum skins, but they did match sequences from extant gazelle species from Africa and central Asia. From this we have to conclude that there are no known living specimens of Gazella saudiya and it is likely that the species is extinct. Although this is a depressing outcome, the genetic analysis averted a potentially expensive conservation programme that would have bred and possibly reintroduced non-native gazelles.

Right: An image of cytochrome b sequence data. Each vertical lane represents an individual animal and each colour represents one of the four bases that go to make up DNA: by examining the sequence of colours in each lane it is possible to decipher the DNA sequence for that gene in that animal. A review of how the disciplines of population and evolutionary biology can assist in defining strategies for the effective storage, management, and use of





frozen semen banks led to some important practical conclusions. These included how individuals should be selected to contribute to the banks in order to maximise genetic diversity and thereby help meet population survival goals, and how species should be selected for storage to help meet biodiversity conservation goals. There are many advantages in using genome resource banks in conservation programmes that require active management of isolated populations of threatened species. In the face of increasing restrictions on the movement of live animals, material from genome banks can be an important means to maintain gene flow. However, perhaps the greatest benefit is providing security against the increasing pressures facing many wild populations. Before these advantages can be realised, however, a considerable research effort will be required for each species to enable effective selection of donors and recipients to meet genetic goals, and to identify procedures for optimal storage

in order to minimise the variation in the genetic contribution. Substantial increases in effective population size can be achieved, but the effectiveness of the method depends on factors such as the genome size, fertility, male/female ratio and the marker information available.

Understanding about the genetic similarity and the past history of natural populations can be an important part of conservation strategies. Using genetic tools, one can estimate contemporary exchange of breeding individuals, the extent to which populations have interbred in the past and the influence of historical changes in population size.

For example, genetic analysis of the population structure of sika deer (Cervus nippon) in Japan has revealed a complex picture of ancient and contemporary influences. The underlying population structure of sika in Japan probably stems from the last ice age. It consists of two distinct lineages of deer, one in northern and one in southern Japan. Within these groups the genetic similarity of the deer is generally related to geographical distance. However, this ancient population structure has been perturbed by contemporary human influences such as habitat fragmentation and over exploitation leading to genetic bottlenecks. Bottlenecks have caused rapid genetic changes so that some populations are more genetically distinct from close neighbours than they are from populations in distant parts of Japan. The genetic influence of habitat fragmentation follows the pattern of economic development in Japan. The biggest effects of fragmentation are seen on Honshu, the most developed island, where there is no contemporary genetic exchange between populations. In Hokkaido, which is still heavily forested, there are only minor effects of fragmentation and contemporary exchange of breeding individuals remains high.

Left: Frozen semen banks in the Institute of Zoology.

Below: Sika hind. Genetic analysis of the population structure of sika deer in Japan has revealed a complex picture of ancient and contemporary influences. Photo: Simon Goodman



and utilisation of germplasm between stored and living populations.

A major genetic problem in maintaining small populations (in zoos, natural reserves, etc.) is the inescapable genetic changes associated with inbreeding and genetic drift over time. This puts them in jeopardy of immediate extinction due to inbreeding depression and also risks their survival in the long run due to the depletion of genetic variation and loss of evolutionary potential. To minimise inbreeding and drift, a simple method was developed. This optimises the use of DNA marker and pedigree information

The taxonomic status of the wildcat in Scotland has long been the subject of controversy. Skeletal evidence suggests that an indigenous British wild cat (*Felis silvestris*) has been present since



the end of the last ice-age. However, the presence of domestic cats (Felis catus) in pre-Roman iron-age settlements is well documented. There is therefore the possibility that hybridisation, coupled with persecution of wild-living cats, has led to the partial or complete replacement of the ancestral wildcat. In collaboration with Scottish Natural Heritage, we carried out a genetic survey of wild-living cats in Scotland using microsatellite markers. We have discovered that the wild-living cats comprise two genetic groups, with many intermediates. One group is genetically very similar to a control sample of domestic cats, and the other has morphological characteristics that have been traditionally considered 'wildcat'. We have therefore concluded that there is still evidence of the continued existence of the ancestral wildcat in Scotland. However, it is also clear that there has been

Scientific studies of natural populations

In the UK and overseas, in terrestrial, marine and freshwater habitats, our staff are involved in studying a diverse range of wild species and the threats that they face. New techniques and the application of a broad skill base have led to some important conclusions from our work over the past year.

In August 1768, Sir Joseph Banks set sail in *The Endeavour* on a famous voyage of discovery. In the English Channel he recorded his first biological observation: "... saw this Even a shoal of fish which are particularly called Porpoises by the seaman, probably the *Delphinus Phocoena* of Linneaus, as their noses are very blunt". Today we would be very fortunate to observe schools of porpoises in these waters. Indeed, a detailed survey in the mid-1990s failed to sight any harbour porpoises in the Channel.

In the light of this situation, the UK Marine Mammal Strandings Project (UKMMSP) was set up to co-ordinate research into the health, biology and toxicology of stranded marine mammals within the UK from 1990. The research of UKMMSP is conducted by the Institute of Zoology in partnership with the Natural History Museum and the Scottish Agricultural College (Inverness), and is funded by the Department of the Environment, Fisheries and Rural Affairs.

Environmental pollution has been proposed as one threat to the harbour porpoise (Phocoena phocoena), and we investigated whether long-term exposure to heavy metals, including immunosuppressive metals like mercury, is associated with infectious disease. Post-mortem investigations on 86 harbour porpoises found dead along the coasts of England and Wales, between 1990 - 1995, identified some that were healthy but had died from physical trauma (most frequently entrapment in fishing gear) while others had died of infectious diseases caused by parasitic, bacterial, fungal and viral pathogens. We found that mean liver concentrations of mercury were significantly higher in the porpoises that died of infectious disease compared to healthy porpoises that died from physical trauma, supporting the idea that environmental pollution is an important threat to cetaceans living in UK waters.

Above: Scottish wildcat, subject of a genetic survey in Scotland. Photo: Scottish Natural Heritage

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substantial hybridisation.

In 2001 ZSL published the first edition of the Global Tiger Projects Database, which documents non-governmental organisation (NGO) funding for tiger projects worldwide. The database shows that 21st Century Tiger (our fundraising coalition with Global Tiger Patrol, which passed the half-millionpound fundraising mark during 2001) is a significant force. ZSL's co-ordination of the zoo tiger programme in Europe and Russia expanded to also cover Australasia, at the request of the Australasian Zoo Association.



More recent research (during 2000 and 2001) has shown that entanglement in fishing gear (bycatch) was the most common cause of mortality of the stranded common dolphins (*Delphinus delphinus*). However, the most common cause of death in stranded harbour porpoises during 2000 and 2001 was fatal attack from bottlenose dolphins (*Tursiops truncatus*).

The research programme continues, and will now be applied to marine turtles because every year a number strand on the coastline of the UK. Most are leatherback turtles (*Dermochelys coriacea*) although strandings of other turtle species have been recorded. This new research topic will allow us to learn more about the threats posed to these fantastic



creatures, and it will also form part of the implementation of the UK Biodiversity Action Plan for marine turtles.

Scientists have long been fascinated by the vocalisations of the non-human primates. Of particular interest has been the question of whether primates can recognise social companions just from their voices. We examined this question in yellow baboons (Papio cynocephalus cynocephalus) in Kenya, focussing on the calls given by females during mating. Acoustic analyses indicated that calls from individual females were distinct. Experiments in the field further demonstrated that males could tell females apart on the basis of these vocal signals. These results suggest that male baboons could use mating calls to monitor the location and sexual behaviour of females in their group, and modify their mating strategy accordingly.



To understand animal populations from the standpoint of both conservation and basic science, it helps to know their genetic structure. For this reason, our researchers have carried out a detailed genetic investigation of the ant *Leptothorax acervorum*. The social structure of this twig-nesting ant is particularly interesting, as each colony may house several queens. The research confirmed that cohabiting queens are generally related, and established that each queen mates with a single, unrelated male. This shows that many queens do not disperse from the natal Above, top: UK Marine Mammal Strandings Project.

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Above: Institute of Zoology researchers have carried out a detailed genetic investigation of the ant.

Left: Yellow baboon: Do primates recognise social companions just from their voices? Photo: Stuart Semple





nest, but they must avoid inbreeding by mating only with males from other nests.

We studied the effects of several potentially important factors on offspring survival in one of our rarest mammals, the greater horseshoe bat (Rhinolophus ferrumequinum). Surprisingly, a genetic measure thought to reflect outbreeding was found to be more important than any of the ecological factors examined. This has implications for conservation management. Most genetic mixing among colonies probably occurs through mating behaviour, when female horseshoe bats from different colonies visit solitary territorial males, in widely distributed caves. Our results suggest that these mating sites, often overlooked by conservationists, should be protected, since they provide opportunities for outbreeding, thereby potentially promoting offspring survival.

The monitoring and management of species depends on reliable population estimates, and this can be both difficult and very costly for cryptic large animals that live in forested habitats. Recently developed camera trap techniques have been used as an effective means of estimating population size of individually identifiable species, such as tigers (using mark-recapture estimates).

We reviewed camera trapping information on tigers from 19 studies across the species' range, and found that the number of camera days per tiger photograph is related to estimates of tiger density. This led to a new method which does not rely on individual identity and may be particularly useful for providing an index of population density of other species that cannot be individually identified. We used these data to predict the effort required to determine whether tigers, or other rare species, exist in an area. We also used these techniques to investigate tigers living in an oil palm plantation in south Sumatra, to develop management protocols that will allow tigers to use plantations as corridors between isolated forested areas.

Conservation of rare and endangered populations in the wild

Often our work focuses on pressing conservation issues, and our expertise is called upon to provide specific advice and guidance. Here we review some of the issues that members of ZSL staff have tackled over the last year.

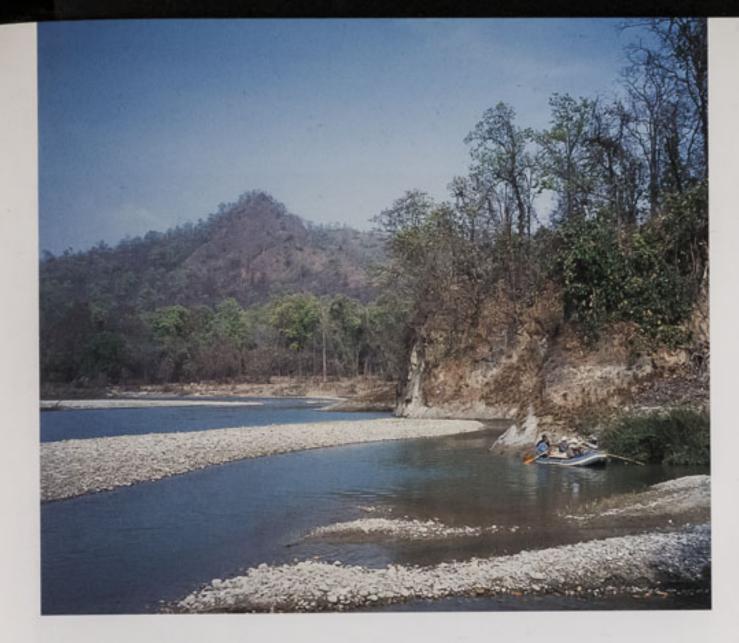
Two species of vulture in India, the Indian white-backed (*Gyps bengalensis*) and long-billed vulture (*Gyps indicus*), have declined by > 90% during the last decade. Both species were once regarded as very common, but now they are listed as critically endangered. With funding from the UK Government's Darwin Initiative for the Survival of Species, we



Above: Setting a camera trap, and (below) one of the first pictures.

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Right: ZSL is working to find out the cause of population declines in Indian white-backed and long-billed vultures. Photo: Guy Shorrock, RSPB







are working to find out the cause of these declines and to develop a recovery programme for the affected species. So far, along with our partner organisations the Bombay Natural History Society (BNHS), the Royal Society for the Protection of Birds (RSPB) and the National Bird of Prey Centre (NBPC) we have staffed and equipped a vulture diagnostic laboratory in India. A Vulture Care Centre, for the study of sick birds, is under construction. We are also training Indian scientists in the techniques required to investigate the declines and to implement a recovery plan. More information on this project can be found on the website www.vulturedeclines.org

ZSL staff participated in a pilot study looking at the effects of a dam on fish populations in the Babai River, an exceptionally diverse, warm-water river in western Nepal. Its rich diversity was Project Seahorse now has 38 staff working in seven countries and territories. In the Philippines, teams supported through ZSL by the Community Fund are engaged in both biological and socioeconomic research. Surveys of 38 fishing grounds in the Danajon Bank area have shown disturbingly low seahorse populations in reef habitats that have been largely reduced to rubble by dynamite fishing. Discussions with local fishers resulted in a Fishers' Alliance that identified illegal fishing as the major problem and alternative livelihoods as a need. Surveys of six marine protected areas established through the project continue, testing the recovery of habitats and fish populations. The aquaculture programme has ended in Vietnam, and the results will be used as one alternative livelihood option in the Philippines.

Above, left: Electrofishing surveys on the Babai River, western Nepal.

Above, right top: Women

illustrated by the 819 fish, of 33 species, sampled in only four days. Studies of the dam and structured interviews with local inhabitants, however, revealed that fish populations have decreased over the last ten years due to the dam, which was constructed on the river in the early 90s, and an increase in local populations. This is concerning to the local communities who depend on fishing for food as well as it being an important cultural tradition. A longer term study is planned to gather more detailed baseline information and develop a conservation action plan for the area.

COMMUNITY FUND

Lottery money making a difference



tapi fishing.

Above, right: Fish measurement training at the Babai River Dam. Nepal photos: Alice Courage

Left: Teams supported through ZSL by the Community Fund are engaged in research. Joel Erediano, Project Seahorse, running socioeconomic interview feedback sessions with fishers in the Philippines. Photo: Project Seahorse 13





Above, top: Jacques Flamand at handover of Jagatpur Veterinary Clinic to Clinic User Group.

Above: Phoenix Public

21st Century Tiger, mentioned earlier, had another successful year and funded five projects: habitat mapping and public inspectors enforcing anti-poaching measures, in the Russian Far East; a jeep for anti-poaching patrols in India; a research project in primary rainforest in Malaysia; and mapping and predicting habitat loss in Sumatra. No data on tigers and prey had previously been collected in Taman Negara, Malaysia, so the project used camera traps to estimate population. Sixteen individual tigers were photographed, plus an abundance of prey, so the next stage is to analyse and make recommendations for tiger

the Pan African Disease Surveillance Programme (PACE) programme, in eastern Africa, is focused on rinderpest eradication. Work was carried out in Western Ethiopia, Kenya and Tanzania, and also on lion, rhino and buffalo mortality in Ngorongoro. The most important action was in response to finding an unexpected outbreak of rinderpest in buffalo, in Meru National Park, Kenya - a zone which had just been declared free from the disease by the authorities. This beautiful protected area is frequently invaded by Somali cattle, which are the presumed source of the virus. Work in collaboration with the wildlife and livestock authorities continues to assist in understanding the epidemiology of the last foci of this potentially devastating virus, as well as providing novel insights into the disease ecology, critical to ensuring its final eradication globally.

Anti-poaching Inspectors Project: members of the

14 team with confiscated weapons.

> Below: Sinai rosefinch, St Katherine's Protectorate.

Photo: Dina and Ali Rafiq

management in the future.

Two field programmes have been working on the disease links between livestock and wildlife, which must be managed for conservation benefits: one in East Africa, the other in Nepal. The second year of ZSL technical assistance to the wildlife component of

In Royal Chitwan National Park, Nepal, the Wildlife and Domestic Veterinary Programme reached its conclusion in September after four years. During the year, wildlife captures and investigations of disease of wildlife were undertaken as part of ongoing wildlife management programmes. These provided an opportunity to further train Nepali staff

in improving their wildlife skills, which had increased noticeably. The last of the four veterinary clinics in the buffer zones surrounding the Park was established. At this and the previously established clinics, there was an emphasis on reinforcing the veterinary skills of the technicians and developing their business skills to ensure a sustainable future for the clinics. All the technicians in charge are managing their clinics under the supervision of a local clinic Management Committee. The Wildlife & Domestic Veterinary Programme has proved to be a model project, combining community interests with long-term conservation benefits. The main beneficiaries have been Chitwan National Park and the communities around it where issues of disease and economy are important.



In January, the third group of captive-bred black-and-white ruffed lemurs (Varecia varecia) - an adult female and three male offspring - were released by the Madagascar Fauna Group into the Betampona Reserve, eastern Madagascar. The group has adapted well and have had contact with their wild counterparts. Although the group required supplementary feeding in the winter months, they have so far successfully avoided predation by the fossa (Cryptoprocta ferox). One male released in 1997 has fully integrated into a wild group, and is independent and thriving. The daughter of a pair from the first release is now paired with a wild adult male, but it will be several years before she is old enough to breed. Overall there are good reasons to be optimistic that the remaining released lemurs will interbreed with the resident population.

which were reintroduced to the steep limestone gorges of the Ibex Reserve near Howtah in 1991. In a new project, ZSL field staff have also initiated an exciting study of the reserve's population of Nubian ibex. This is the first study of these ibex involving yearround observation and has already produced new insights into breeding behaviour and movements. The importance of our long-term commitment to post-release monitoring and research in this environment is becoming increasingly clear, as the slow changes in rainfall pattern and plant growth in the reserve become apparent, and clearer understanding of gazelle population changes has also been gained.

Work continues in the St Katherine's Protectorate, Sinai, where we have been providing technical support over the past eight years to ensure that tourism development is environmentally sensitive. This requires taking account of pollution and urban development issues, as well as rural development plans for Bedouin tribes, to ensure that the integrity of the protected area is not disrupted and desert animals, such as the Nubian ibex and Sinai rosefinch, continue to survive. Tourist conservation awareness and guide literature have been developed, including a CD-ROM showing plant, animal and cultural diversity in the unique mountainous area.

In the Congo Basin, ZSL has provided technical support to develop patrolbased monitoring techniques for a UNESCO programme in Democratic Republic of Congo (former Zaire).



Above: Leaping ibex caught on camera trap, Ibex Reserve, Saudi Arabia. Photo: King Khalid Wildlife

Research Centre

Left: Black-and-white ruffed lemurs. Photo: Adam Britt

Below: Wild animals are hunted and trapped throughout West and Central Africa, and this 'bushmeat' supports an annual trade exceeding US \$500 million. More than two million tonnes of bushmeat are traded each year.



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During the year ZSL's staff at the King Khalid Wildlife Research Centre have maintained long-term post-release monitoring of the Mountain gazelles The programme objectives are to provide financial, logistical and diplomatic support to the Congolese Wildlife Agency in its efforts to maintain the country's five World Heritage Sites (Garamba, Okapi, Virunga, Kahusi Biega and Salonga) through the civil war that has devastated the central African country since 1996. The approach involves ground patrol teams collecting and collating information, such as hunting and trapping, to refine management priorities, which gives a basis for a performance-based salary supplement that improves staff morale.

EDUCATION & INFORMATION



Education is central to ZSL's mission and covers every area of our activity. Through the two zoos we reach around 1.5 million visitors each year, providing them with information on wildlife and conservation and raising awareness of current issues such as the illegal trade in bushmeat; animal presentations, keeper talks and touch tables also enhance their understanding of the natural world. The work of the Society is also brought to an international audience through our scientific lectures, talks, courses and publications.

Visitor education

As a member of the European Association of Zoos and Aquaria, ZSL supported the EAZA Bushmeat Campaign, which became one of our most important educational activities this year. Zoos in 21 European countries joined forces to campaign against the illegal and unsustainable trade in bushmeat that is seriously threatening many endangered species, particularly gorillas, chimpanzees and other primates. The main aims of the campaign were to raise awareness of unsustainable hunting and loss of biodiversity in Central and West Africa and of the illegal trade in Britain, and to collect signatures on a petition.

at both zoos. The 10,400 signatures collected by ZSL on the petition were taken to Brussels where the total 2.2 million was handed to the European parliament. Our information panels travelled, too, and provided a backdrop for MEPs and EAZA campaign organisers when they met EU commissioners and asked for their support in addressing the trade with African Heads of State and with those running development projects.

Interpretation is a vitally important part of ZSL's education work. Through information panels and labelling we are able to achieve anything from explaining basic biological facts about a species to raising awareness of conservation needs and demonstrating good conservation practice.

Opposite: A poster produced by ZSL and used throughout the organisation.

Below: 10,400 signatures collected by ZSL were taken

to Brussels.

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Identical information panels on the bushmeat trade were mounted near the chimpanzee enclosures at both Whipsnade and London Zoo whilst additional panels identified all other species in the collection that are hunted for food. Volunteers led activities at London where visitors painted their hands and printed them onto a paper gorilla hand to show their support, while information was woven into keepers' talks and animal presentations

At Whipsnade we have focussed on the new Macaw Aviary in the Bird Garden and a continuation of the work started in 2000 in the Discovery Centre. Following the completion of the Rainforest and Desert areas of the latter, we began work on the Ocean area and Conservation Room. The Ocean exhibits were fitted with new species identification labels in keeping with the style used throughout the other areas. The interpretation for the

What is **Bushmeat**?

Bushmeat is wild animals hunted for food.

For thousands of years, bushmeat has been a traditional source of food for many local people, especially those that live in forests.

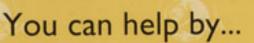
It is important that these indigenous peoples can continue their way of life.



Monkeys for sale in market



Slaughtered gorilla family



However.....

...hunting for bushmeat has now become big business and some of it is illegal.

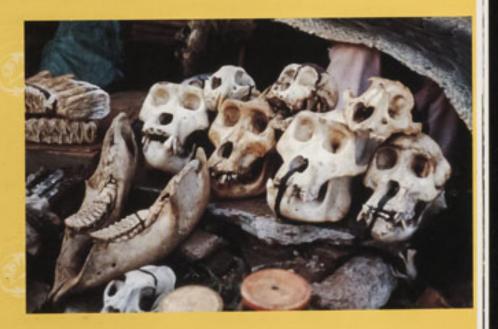
Wild animals are now hunted for food on a vast scale and the meat is transported to towns and cities.

Among the animals killed are many endangered species such as gorillas and chimpanzees. This hunting is illegal and threatens these species with extinction within the next few decades.



ugip d'up

- Learning more about the bushmeat trade
- Signing the petition against illegal bushmeat
- Looking out for bushmeat on restaurant menus in Britain, Europe and abroad - DO NOT order it!



EDUCATION & INFORMATION





Conservation Room utilises a computer which has kindly been donated; a PowerPoint presentation was designed to illustrate species that can be seen in the Conservation Room and to explain the various breeding programmes which are currently being carried out there.

Three interpretation panels were produced for the Macaw Aviary; each panel tells a different story relating to macaws in the wild or the macaws at Whipsnade, and once again follows the format now used at various other enclosures around the Park.

At London Zoo, we have introduced a set of panels containing a life-sized sculptured hand or foot of an elephant, gorilla, camel and lion. These have proved very popular with children who place their own hand over the top and compare texture and shape. A new system of mounting information was installed for all basic labels on the aviaries. Light-weight frames allow staff to swap labels instantly and keep up-to-date with the movement of birds in and out of the collection, or to another aviary. The Conservation in Action interpretation panels were revised and up-dated and many labels were prepared for new stock in the aquarium.

each day were to raise awareness of the animal through keeper talks and quizzes, to enhance the visitor experience through activities and to raise funds. The days were well attended with some visitors travelling considerable distances to see their favourite animal.

Programme for schools and colleges

A key achievement this year was the production of an educational wallchart that has been distributed to all schools in the country. We have long wanted to raise awareness of ZSL's work in breeding endangered species and to counter some of the lack of understanding about the role of a modern zoo – a lack that is all too easily exploited by the anti-zoo lobby; a wallchart was our favoured means



Above: Interpretation panels at Whipsnade.

Right: A Good Zoo, ZSL's wallchart for schools.

Throughout the summer, a series of special events – Discovery Days – were held at Whipsnade, run by staff from a number of departments. A different animal was featured each Friday in the school summer holidays. The aims of of achieving this aim and was made possible this year due to sponsorship by The British Land Company PLC. Entitled A Good Zoo, the poster explains how conservation breeding is managed by working co-operatively with other good zoos around the world, and how we look after the animals in our care. On the reverse of the wallchart are several activities appropriate for Key Stages 3 and 4. The poster features animals from both London Zoo and Whipsnade and has also been taken by other Federation zoos for their own use.

The temporary closure of Whipsnade and the perception that London Zoo might also have to close due to precautions against Foot and Mouth Disease had a substantial effect on school bookings. Despite a strong start to the year at Whipsnade, we finished the year 9,000 visits down on the same period in 2000. Similarly, organised school visits at London fell by 6,000.

However, numbers received a major boost in the autumn with the generous funding of free school visits for London schools by the Greater London Authority. The Mayor of London, Ken Livingstone, a Fellow and former Vice-President of ZSL, is keen to provide city children with the opportunity to see wild animals and to take advantage of our wide-ranging educational programme. The scheme was launched in September with a mailing to all London state schools and gives the opportunity for every state school to send one year group (secondary) or two classes (primary) on an educational visit each year.





follows a different theme and is led by an Education Officer or Volunteer. This addition to the education programme was well received, with over 900 children having received a guided tour by the end of July. We are looking forward to expanding this activity in 2002.

Another addition to the Whipsnade education programme was a new outreach scheme, which allows an Education Officer to bring conservation into the classroom. The first visit involving live animals was delayed due to Foot and Mouth Disease precautions, but the venture has been well received and will be developed in 2002.

During the year, ZSL became involved in an exciting new project with King's College, London, to develop science education. A collaboration between King's College, The Exploratorium at San Francisco and the University of

Above: Taking conservation into the classroom: Whipsnade's outreach scheme.

MAYOR OF LONDON

The GLA funding has enabled the London Education team to take on two extra Education Officers and two assistants to welcome schools at the Zoo entrance and help them orientate themselves at the start of their visit. We have also benefited from some additional equipment and teaching materials and the redecoration of the Education Centre.

For the first time for some years, Whipsnade offered guided tours to school groups throughout the spring and summer terms. Each of the four tours

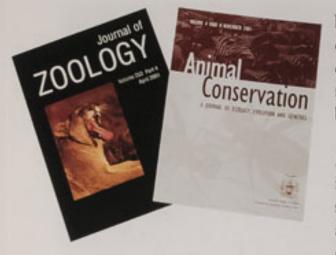
Santa Cruz, has recently founded CILS (Centre for Informal Learning and Schools). The Centre aims to develop and improve science education and



Far left: The Mayor of London, Ken Livingstone, a Fellow and former Vice-President of ZSL, is keen to provide city children with the opportunity to see wild animals and to take advantage of our wide-ranging educational programme.

Left: A Discovery Day at Whipsnade.

EDUCATION & INFORMATION



learning in schools and science centres; our initial involvement will be in the development of web-based learning for schools, based upon key breeding programmes.

Alconbury Elementary School (pictured in ZSL's 2000 Report) continued their support of the red pandas at Whipsnade and a special Outreach session was laid on for the school, when a donation to Whipsnade was also received.

Representing ZSL

ZSL education staff continue to play an active part in the wider zoo world. London Zoo's Head of Education was invited as guest speaker at the ALPZA (Latin American Zoo) Conference in Buenos Aires where she presented a paper on the development of Web of Life. She was also invited to Rabat Zoo in Morocco to help develop their education programme and to advise on interpretation and routing visitors around the Zoo. We are represented on the Federation of Zoos Education Committee, with the Whipsnade Education Officer being both the Vice Chair of the Committee, and the Eastern Regional Zoo Educators Co-ordinator.

Qualifications and training

Eight students at the Institute of Zoology were awarded PhD degrees. Saffron Townsend received her degree for work on the genetic diversity and the history of domestication in sheep (Ovis). Andrew Cunningham completed his thesis on the epidemiology and actiology of unusual mortality of the common frog (Rana temporaria) in Britain. Octavio Paulo was awarded a PhD for his studies on genetic differentiation and conservation of reptile populations in the Iberian Peninsula. Juliet Dukes worked on the role of gene diversity and regulation of olfactory receptors in the homing behaviour of the migratory Atlantic salmon (Salmo salar). Jonathan Baillie received a PhD for his field and analytical work on factors associated with persistence and vulnerability of island endemic birds. Susanna Paisley studied the ecology of Andean bears and their interaction with people in Apolobamba, Bolivia. Jakob Bro-Jorgenson completed his empirical

studies in the Serengeti on lekking behaviour of Topi, and Russell Seymour investigated the impact of low level taxonomy on conservation policy with his comparative studies on the species complex of giraffes.

The Master of Science Course in Wild Animal Health (MSc WAH), jointly run with the Royal Veterinary College (RVC), continues to attract a great deal of interest from veterinarians and a full complement of 15 are attending the 2001/2002 course. There are now a total of 85 graduates of the course from 32 countries situated in six continents. Each student carries out a research project and the results are published as theses. Several are currently drafting papers for refereed journals to communicate their important findings. Graduates from the course go on to work in zoos, national parks, universities and other institutes, working with both captive and free-living wild animals. Graduates from the previous year's course have fanned out across the globe to take up challenging positions in Indonesia, Japan, Botswana, Spain and the USA, amongst other locations.

Four trainee keepers at London and two at Whipsnade passed the City & Guilds examination in Zoo Animal Management. Two gained distinctions in the written exam paper. All ZSL's trainee keepers study for this qualification, which comprises written assignments, researching an individual project and undergoing practical assessment in husbandry skills.

Meetings

An essential part of ZSL's work is

facilitating the communication of information between professional zoologists, researchers and the general public. We hold four series of meetings, which are open to the public as well as to members of staff.

Tuesday Talks are aimed at a general audience. Nine talks were held during the year, covering a wide range of topics, including Aliens of inner space, Exposing wildlife crime: the undercover work of the Environmental Investigation Agency, The real gold of Ghana and The changing status of British birds. Making waves, a lavishly illustrated talk by Martha Holmes, a series

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EDUCATION & INFORMATION

producer on *The Blue Planet*, BBC1's landmark production on the world's oceans, described how the series was made and was particularly well attended.

At each Scientific Meeting three speakers provide an overview of important research within a particular field. The six meetings held during the year covered diverse subjects, such as Population genetics and conservation of wolves in Europe, Lemurs – Madagascar's vanishing treasures, The return of the beaver, European red squirrels: a species at risk? and The invaders! The impact of biological invasions and hybridization on native taxa. In December 2001 a Scientific Meeting entitled ZSL into the 21st Century celebrated 175 years at Regent's Park and 70 years at Whipsnade Wild Animal Park.

The Science and Conservation seminars held by the Institute of Zoology comprised talks by invited speakers on subjects relevant to our research; for example, Vocal communication and social knowledge in elephants, Consequences of inbreeding in butterfly metapopulations, and Sperm competition and the evolution of ejaculates.

The 2001 Sir Stamford Raffles lecture, *Embryonic development – from the egg to five fingers*, was given by Professor Lewis Wolpert, CBE, FRS, of the Department of Anatomy and Developmental Biology, University College London. The Singapore Tourism Board and Singapore Airlines again generously sponsored the event.

Publications

Journal of Zoology, ZSL's pre-eminent international journal dedicated to A member of The Blue Planet production team will be here to talk about the making of the BBCTV series



Tuesday 6th November at 6.30pm

Production of Volume 38 of the International Zoo Yearbook began. The special section (Zoo Challenges: Past, Present and Future) includes 15 articles that address the historical trends and future aims of zoos in relation to animal management.

The Conservation Biology series, published in association with Cambridge University Press, includes internationally significant advances in the science that underpins conservation biology. Titles are based on either symposia held at ZSL or other topics which meet these aims. During 2001 two titles were published: Carnivore Conservation, edited by John L. Gittleman, Stephan M. Funk, David Macdonald and Robert K. Wayne, and Conservation of Exploited Species, edited by John D. Reynolds, Georgina M. Left: Making waves, a Tuesday Talk, described how the BBC series The Blue Planet was made.

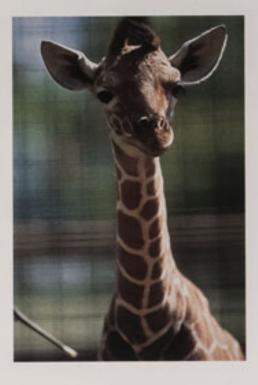
academic zoology, continues to attract contributions from top researchers. During the year 158 original peerreviewed articles were published in 12 monthly parts of Volumes 253–255, providing comprehensive coverage of the latest research and developments in zoology.

ZSL's quarterly journal *Animal Conservation* provides an important forum for the rapid publication of rigorous empirical or theoretical studies relating to species and population biology. Volume 4 was published in 2001 and contained 39 articles. Mace, Kent H. Redford and John G. Robinson.

The Zoological Record, published jointly with BIOSIS, is the oldest continuous information service for the life sciences. As a record of all aspects of zoological research, it is considered the foremost publication in its field. The continued generous support of various institutions, principally the British Library Document Supply Centre at Boston Spa and The Natural History Museum, London, in providing access to material for indexing is gratefully acknowledged.



THE ZOOS AT WORK WHIPSNADE WILD ANIMAL PARK



ZSL's animal collection at London Zoo and Whipsnade Wild Animal Park gives us a wonderful opportunity to interact with visitors of all ages, and to inspire support for our conservation mission. Despite a very difficult year, a number of notable successes were recorded, culminating in Whipsnade being nominated as Zoo of the Year 2002.

Sadly, as elsewhere in this Review, it is not possible to write about the work of the zoos without referring to the impact of Foot and Mouth Disease (FMD), which affected all aspects of our work at London and Whipsnade throughout most of 2001. The overall result was a relatively quiet year for the animal collection, but a tremendous response from the staff and support from our visitors enabled us to continue our important work on many fronts. The main objective for all departments was to reduce expenditure to cushion the financial impact, and this was achieved more successfully than could be anticipated, whilst not totally curtailing our activities.

Animals

Many animal moves were not possible through the main period of the disease and even at the end of the year restrictions were still in place, complicating the movement of susceptible species. Staff movement was restricted to avoid direct contact with susceptible species outside the collection, which resulted in the absence of some staff for several weeks where this was unavoidable.

The major event of the year was the transfer of the three elephants from London Zoo to Whipsnade. The move was not possible until the majority of the new facilities at Whipsnade were completed and these had initially been delayed by FMD restrictions and then by bad weather in the autumn. The result at the end of the year is one of the finest elephant facilities in Europe and a herd of one male and six females for ZSL.

Fortunately, the majority of the significant breeding programmes remained unaffected by FMD precautions. At Whipsnade, births occurred in the Amur tiger, Grevy's zebra, reticulated giraffe, Persian onager and Californian sealion. The year finished on a high with the 50th white rhino birth, a magnificent record. The Bolivian squirrel monkeys gave the best results in the European Endangered Species Programme following changes in the recommended management protocols. First breedings at Whipsnade were seen in smew and Baikal teal, together with other significant hatchings in the spreo starlings, European eider ducks, white-naped cranes, Stanley cranes and king penguins.

Above and below: Births at Whipsnade included reticulated giraffe and

Amur tigers.

22 Giraffe photo: J R Day



At London Zoo the okapis bred for the first time in 14 years, with the handreared female rearing a female calf successfully; they have pride of place on our cover. This was complemented by bongo births and a female sloth bear. Superb tanagers were bred for the first time in the UK at London Zoo together





with significant breedings of black-footed penguins and Pope cardinals. By the end of the year the macaw aviary housed three pairs of hyacinthine macaws, and the signs are encouraging that at least one pair will breed.

The Reptile House recorded successful hatching of Kleinman's tortoises as well as snouted cobras, but the problems presented by Ophidian paramyxovirus started to have a real impact. The development of new management protocols for the golden mantella frogs resulted in good success through the year both in Web of Life and the Reptile House. Two new species of Barombi Mbo cichlids were bred for the first time and over 250 seahorses bred were sent to aquaria in the USA and Europe. In December the first of full second generation giant weta crickets hatched in addition to significant breeding of the Seychelles scorpion and the Fregate beetles.

Poznan Zoo as a new species to the Clore Pavilion and big-bellied seahorses as a new species to the seahorse programme.

The Native Species programmes continued well through the year with over 1100 wart biter cricket eggs being handed to English Nature at the end of a ten-year contribution to the Species Recovery Programme. Two new field populations have been established from ZSL stock in this time as well as invaluable data being collected. Breeding of the hazel dormouse at London Zoo enabled Whipsnade to play its part in the reintroduction programme by holding stock from several collections prior to transfer to the reintroduction site. Several hundred Barberry carpet moth larvae from Whipsnade were also used by English Nature as part of that species' reintroduction programme with the aim of establishing new populations in suitable habitat in southern England.

Above Eemale cleth been

Despite the restrictions on moves, both London Zoo and Whipsnade saw new species in the collection including redbilled hornbills and aracaris in Whipsnade and a rather fine Abyssinian ground hornbill at London. New hyacinthine macaws, keel-billed toucans, toco toucans and eastern white pelicans were brought into London to enhance the populations. A female Amur leopard arrived from the USA as part of the programme for this critically endangered species and a new male Hamlyn's monkey was obtained from a very small European population of this enchanting species. A group of feather-tailed gliders were received from

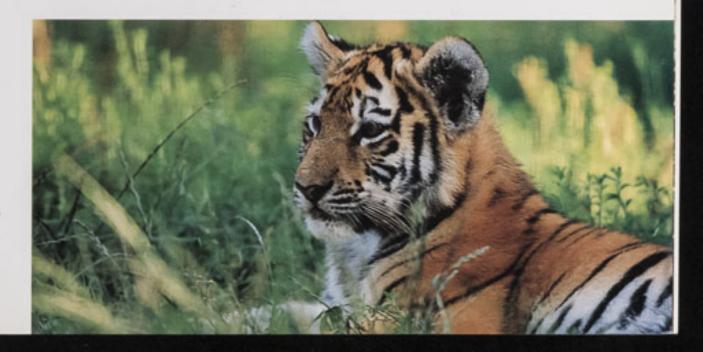
A new Native Species Programme

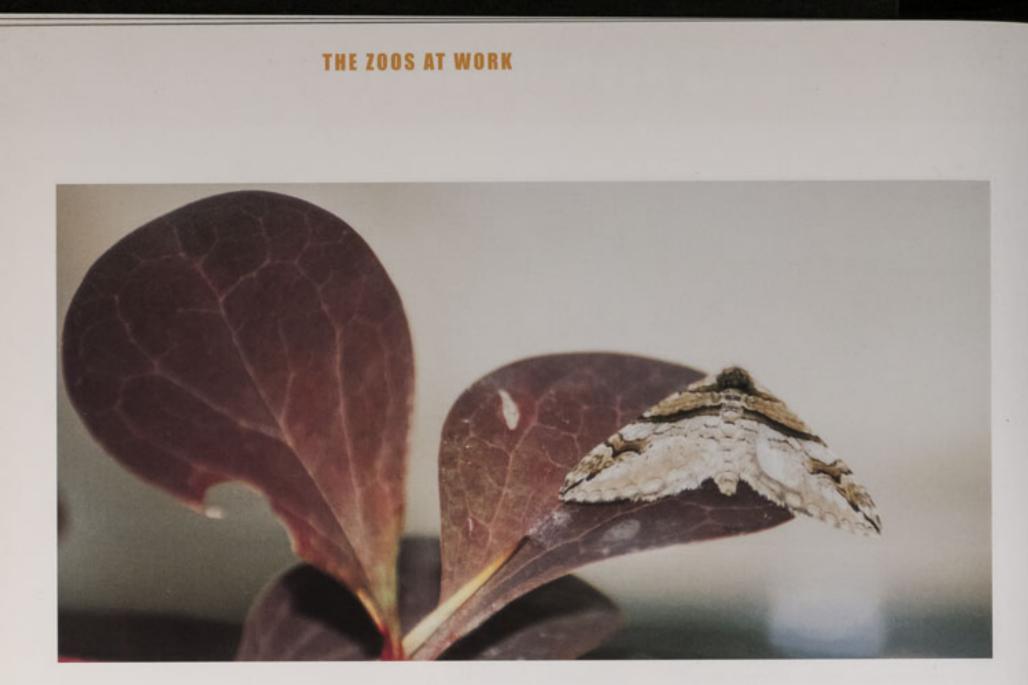
was undertaken in the year with

Above: Female sloth bear cub and mother.

Below: Amur tiger cub.

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15 corncrakes arriving from quarantine at Chester Zoo as a joint programme with RSPB and English Nature. London Zoo's role in the International Partulid Programme continues with exceptional results for Partula tristis, P. radiolata, P. gibba and P. clara during a year-long husbandry trial to develop the correct protocol for these species. Husbandry guidelines are now underway. The new Partula Species Management System programme was completed allowing a major advance in the studbook elements and other management and analysis considerations for these species. This work in Web of Life is linked to the field programme led by Dr Trevor Coote, which this year focused on establishing Partula reserves on Tahiti and related survey work as part of development of a regional conservation strategy for the endemic snail fauna. This survey work with the French Polynesian Government was supported by ZSL, Edinburgh and Bristol Zoos. A £10,000 grant was provided by the Biodiversity Trust for the construction of the Tahiti reserves.

and found to have an enormous abdominal mass. With the help of surgeons from the Royal Veterinary College she was operated on in December and the 5.5kg mass, an abnormal uterine tract and ovaries, was removed, a particularly difficult operation because of the adhesions between the mass and other tissues. The whole operation took over six hours but she recovered well, only to collapse 45 minutes later, an emergency which required the administration of adrenaline and resuscitation. The mass has subsequently been identified as an endometrioid carcinoma, a tumour arising from her ovaries. Further complications with digital necrosis, and a further operation, followed for Minouche and it was six weeks before she was fully fit but after a long ordeal she is now doing well.

Above, top: Barberry carpet moth, and tending to them at Whipsnade.

Above: A hazel dormouse, bred at London Zoo.

Opposite: Whipsnade's 50th white rhino calf.

Veterinary work

The Wild Animal Health and Welfare Unit is faced with new challenges in zoo medicine every day, but occasionally some unusually demanding cases arise. One such case concerned London Zoo's Minouche, the lowland gorilla, who was sedated in November to determine the cause of a short illness Another demanding case was first seen in September. Steffi, the giraffe at London Zoo, was found to have a fracture of her lower jaw, a condition which required correction under anaesthesia. Anaesthesia is still a high risk procedure for giraffe, but drawing on our experiences of several recent anaesthetics at Whipsnade and using the same team, anaesthesia was successfully carried out. A surgeon from the Royal Veterinary College, who had dealt with similar cases in cattle, wired the jaw back in place and when Steffi was re-examined in December good healing was found to have occurred.



THE ZOOS AT WORK







Buildings and exhibits

No major new developments took place at either London Zoo or Whipsnade Wild Animal Park except for the completion of the Whipsnade elephant facilities with the paddock extension and the construction of the Bull House, a major capital investment project.

However, a number of smaller projects were undertaken by staff, continuing the improvements and upgrades to many areas of both sites. In the London Zoo Aquarium we continued the tremendous progress made in recent years both in the public viewing halls and behind the scenes. Old systems have been replaced by new, enabling new species to be brought in including brown bamboo sharks, alligator gar, arowana, arapima and freshwater stingrays. A new Caribbean reef tank was installed with a range of fish and invertebrate species and the old shark tank was finally completed and stocked with lookdowns, grunts and grey trigger-fish.

A new set of amphibian exhibits has been developed in the Reptile House as well as ongoing progress behind the scenes. At Whipsnade three new large owl aviaries were completed using funds raised by the Whipsnade volunteers specifically for this project.

Business

On the business front, 2001 proved very challenging. Precautions against FMD led to the closure of Whipsnade to visitors and restrictions to car entry on reopening; London Zoo was affected more indirectly, with visitor levels adversely affected by the strong public perception that all animal attractions were either likely to be closed or with severely restricted access. The tragic events on 11 September in New York had a strong negative influence on the tourism market in the south east of England. The combined effect of these external events resulted in visitor numbers at London Zoo falling by 27,000 and Whipsnade by 73,000 compared with the previous year.

Above: A major capital investment project at Whipsnade – the Bull Elephant House. These reduced visitor numbers were, however, partly offset by the average spend per visitor in both shops and catering operations being ahead of that achieved in 2000, with a particularly good performance at Whipsnade.

THE ZOOS AT WORK



The banqueting facilities at London Zoo, managed by Leiths of London, were partly refurbished at the beginning of 2001. What was promising to be a good trading year changed significantly after the events of 11 September. This provoked uncertainty in the corporate world, having the effect of reducing the Christmas party business, a key trading time. Banqueting at Whipsnade was adversely affected by the closure of the Park in the spring; however, business in the latter half of the year improved.

Levels of recruitment to our membership schemes were adversely affected by the lower visitor numbers, with overall growth in line with inflation. The winter membership scheme at Whipsnade continued to be popular. Marketing activity had to be significantly revised in response to the FMD cost-cutting exercise. However, visitors' awareness of our advertising increased from 17% to 24%.

As the year ended, ZSL received two pieces of good news. London Zoo won a prestigious Zoo Animal Welfare Award for *Web of Life* invertebrate and lower vertebrate care facilities. The Universities Federation for Animal Welfare (UFAW) competition, recognises new initiatives in zoo animal husbandry and housing. In December, Whipsnade was voted 'Zoo of the Year' by the *Good Britain Guide* for 2002. These achievements were particularly pleasing in such a challenging year.



Above: Bongo calf at London Zoo.

Left: David Bellamy presenting the UFAW Zoo Animal Welfare Award.

FUNDRAISING & GRANTS











TWININGS

ZSL has continued to receive tremendous support during 2001 from organisations sympathetic to our work and has prospered by developing closer relationships with current and new donors.

Our activities are funded from a number of sources. Each year many companies choose to help ZSL by sponsoring species and exhibits. This year was no exception, with several new organisations joining our *Animal Partners* scheme including UKCeB, British Gas, BT Cellnet and Alfa Aggregates. In addition to our new sponsors, we have continued to work with our loyal members of the *Animal Partners* scheme such as Yell Ltd, London Power Networks and Nationwide Building Society.

Many of these companies decided to take advantage of our facilities to promote their partnership with ZSL by holding receptions, product launches, family fun days and other similar functions here.

Sponsorship of exhibits and species is not the only way in which companies can contribute towards ZSL's cause. Gifts in kind also help to reduce our operating costs. To this end a number of companies have generously helped by donating products and equipment to all parts of the organisation over the course of the past year, with more Avery Berkel continued to donate weighing scales to numerous sections at Whipsnade and London Zoo. These scales help keepers monitor the growth rates and health of various species, from baby anteaters to snakes. Woolworths has provided us with pressure washers to keep our animals cool in the summer and to help us to keep their enclosures clean.

As detailed in the Education and Information section of this *Review*, The British Land Company PLC sponsored the design and production of *A Good Zoo*, one of a series of educational wallcharts that the company has produced and is circulating to every primary and secondary school in the country.

We are very pleased to announce that Landor Associates, one of the world's leading brand agencies, has been undertaking a critical look at ZSL's brand structure and market positioning. The cover of this *Review* bears the new corporate identity which resulted from this work.

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The Mitsubishi Corporation Fund for

28 BRITISH SALT

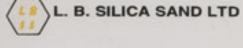
under negotiation.

Twinings Tea has donated herbal fruit infusions to London Zoo's gorillas for several years and continues to support them. British Salt has provided salt for the sealion pool at Whipsnade Wild Animal Park for the past four years.

Two new sponsors, L B Silica Sands and Three Valleys Water helped us to complete the new Bull Elephant facility at Whipsnade by donating sand and special drinking troughs respectively. Europe and Africa has paid the final instalment of its sponsorship of the *Web of Life* website. Mitsubishi has been extremely generous to us in the past and we hope to be able to work together again in the future.

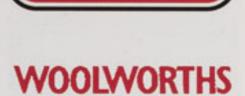
Singapore Tourism Board and Singapore Airlines have kindly sponsored ZSL's prestigious Stamford Raffles Lecture for a number of years and will do so again in 2002, despite the difficulties facing their respective industries in the aftermath of 11 September. We are very grateful for this continued support







THREE VALLEYS WATER



Avery Berkel

We are always looking at new ways in which to increase funds and to reach new supporters and one way of achieving this has been setting up The American Friends of London Zoo as a registered non-profit organisation in the United States. It will enable US taxpayers anywhere to obtain full tax deductibility on their donations to ZSL.



More UK taxpayers can now help us due to the recent changes in the Gift Aid Scheme. We can now recover standard rate income tax (currently 22%) on all donations from UK taxpayers, whether by lump sums or covenanted over a period of years. This means that for every

Major scientific grants

The Institute's core research work is supported by an annual grant from HEFCE. This funding provided a basis for external fundraising, and Institute staff were successful in several competitive research funding competitions. These included:

- Drs Andrew Bourke and Bill Jordan: £271,311 from NERC (Relatedness and information in reproductive conflicts in social groups)
- Dr Christine Muller £49,844 from NERC (The structure of pollinatorparasite interaction webs and habitat modification).
- Dr Guy Cowlishaw NERC 5 year Advanced Fellowship (Dynamics of species extinctions)
- Professor Georgina Mace and Dr





Singapore TOURISM BOARD

£100 donated, ZSL can recover an extra £28 at no additional cost to the donor. Under certain circumstances, membership and zoo entry fees can also be treated as donations under Gift Aid and this has already given a significant boost to our income.

As ZSL receives help from a great number of sources it would be impossible to thank everyone through these pages. However, your support is much appreciated and we hope to continue working with you in the future. Andy Purvis (Imperial College) £172,719 from NERC (Threatening processes and the conservation status of contemporary mammals)
Dr Bill Jordan and collaborators 297,117 Euros from EU (Impact of aquaculture on the immune response genes in natural salmonid populations)
Dr Bill Holt and collaborators £405,536 from DEFRA (Identification of genetic indicators of semen freezing susceptibility in boars)

• Dr Andrew Cunningham and RSPB collaborators £148,411 from DETR (Darwin Initiative) (Conservation of critically endangered vultures in India).



Above: Yell held a Meerkat Funday at London Zoo in September with actress Wendy Richard.

ZSL IN THE NEWS

This was a busy year for ZSL in the media, with the UK Foot and Mouth Disease outbreak dominating press interest in the early part of the year and issues surrounding elephants towards the end. Conservation science stories also made the headlines with research into elephant communication and disease investigation. Together with animal arrivals, births and other stories, we were never out of the news for long.



New animal arrivals and births throughout the year provided a steady flow of stories and photocalls to help raise our profile and attract visitors through the gates. Notable arrivals and new media stars at London Zoo were Ursula, the female sloth bear cub, a young bongo calf, and Horatio, the Abyssinian ground hornbill, who charmed even the hardiest photographers and TV crews with gifts of dandelions through the wire. The photocalls for these animals and the usual hot weather and silly season stories were well attended, resulting in excellent coverage in national and regional press as well as regional TV News.

their press debut being carried by the scruff of their necks by their mother, producing a lovely picture which was featured by the *Daily Express*, *Evening Standard* and local papers. The Park's continued success with breeding white rhinos saw the latest arrival featured in *Hello!*, the *Funday Time*s and local papers.

As well as the planned PR activities, the most was made of unexpected media opportunities. One such event was the sighting of a large spotted cat in a back garden in Golders Green in May. Instead of being the expected well fed domestic moggy, 'The Beast' turned out to be a female European lynx which was captured by the Head Keeper of the Lion Terraces and brought back to London Zoo. 'The Beast of Cricklewood', as she was duly named by the press, caught their imagination and, following a restricted photocall, most of the national newspapers and London's regional TV News ran the story.

Above: Horatio – a new media star. Whipsnade saw the birth of three beautiful Amur tiger cubs, who made The two zoos not only produce a great series of stories and photocalls. London Zoo was used as the location for part of the latest Hugh Grant film *About a Boy* and Whipsnade featured in one of Sainsbury's adverts with 'Naked Chef' Jamie Oliver. Three other large corporates - Vodafone, Harvester Restaurants and Thomas Cook - all used London Zoo as a filming location for their adverts.



The onset of Foot and Mouth Disease (FMD) brought constant media interest about the risks to our endangered species and the precautions being taken. Our website came into its own and was an extremely useful means of communication to potential visitors and the press about the precautions that were in place at Whipsnade and London Zoo. National newspapers covered the implications for the endangered species in ZSL's collection and the financial impact on visitor attractions. TV news crews interviewed ZSL staff, and local media covered the closure and reopening of Whipsnade.

The third series of Imago Production's documentary *Whipsnade* was featured on Anglia TV. The series showed everyday activities at the Park and was well ' received by viewers. Both zoos were featured in two other programmes produced by Imago: *Wild @ Heart* was a ten part series for Anglia TV and *Adopt a Wild Animal*, an all day programme featuring endangered species, was on Discovery Channel. Both featured ZSL's conservation work and at the end of each In April, *Science* published a paper by Dr Karen McComb of the University of Sussex and Dr Sarah Durant of the Institute of Zoology. The paper explored the role of female elephants as guardians of social knowledge and ZSL hosted the press conference. Radio 4 *Today* programme, *Radio Ulster* and *London Live* interviewed the authors in London Zoo's elephant house and Children's BBC *Newsround* pre-recorded an interview with both scientists for their afternoon programme.

The Institute's UK Marine Mammal Strandings project continued to get regional coverage as cetacean strandings occurred. The local London press was particularly interested in a female bottlenose dolphin that had been swimming in the Thames and stranded on the river bank. The project recently extended its remit to stranded turtles and in May a huge leatherback turtle was brought to ZSL from Cornwall for post-mortem examination. A photocall of ZSL's Veterinary pathologists with



Shauna Lowry is filming 'Wild at Heart' for screening on Anglia TV in the New Year.

Above, top: ZSL had its fair share of celebrity visitors with the pop band Hear'Say doing an interview for GMTV at London Zoo. Other visitors during the year included Jon Bon Jovi, David Baddel, Jude Law, Ann Widdecombe and Louis Theroux, who

programme viewers were encouraged to support these activities by adopting the animals through ZSL's scheme. the animal was featured in the Independent and Daily Telegraph Magazine as well as regional press.

visited either with their families or for location filming.

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Left: Following an extremely cold winter, the UK's zoos responded to appeals made by tiger conservationists in Russia and funded the building of crates to transport hungry wild tigers out of villages and back to the forests. The work was covered by national and regional TV and radio. Photo: WCF

ZSL IN THE NEWS





Press activity was used to appeal for more information about incidents of garden bird mortality. ZSL's joint research project with UFAW and RSPB, which was highlighted in the *Daily Express* and regional press, has shown a large number of deaths due to infection with salmonella, thought possibly to be associated with large numbers of birds feeding at bird tables. The Vulture Mortality Project also received a great deal of international press interest and this should continue as the project develops. this included London Zoo and we received a lot of coverage and interest as a result.

PR activities supported several fundraising corporate sponsorships, with British Gas holding a national photocall at Whipsnade's penguin pool after donating money for sprays and misters, and Barclays' Private Banking, which carried out a photographic project for a brochure.

The whole year was clouded by the tragic event on 20 October, when Senior Keeper Jim Robson was killed by one of London Zoo's elephants. Within an hour of the incident, reporters and photographers were on site and ZSL issued a series of statements as updates from the hospital were received and, sadly, following his death later that afternoon. There was much speculation in the national media about what had occurred, which individual animal was responsible and about the welfare of London Zoo's elephants. Initially, little information was available and we had to ensure that ZSL was not drawn into debates while official investigations were carried out. The next few months were a time of intense media scrutiny.

A long-term plan to move the elephants to join ZSL's breeding herd at Whipsnade had already been in place. However, Jim's death and the great media interest in the elephants' future brought the announcement of the move forward. On 30 October, a press release was issued explaining ZSL's plans to move the three London elephants. A debate on whether the elephants should move or stay began in the newspapers, with strongly voiced opinions expressed by correspondents.

Above: 'A Week of Magic' at London Zoo during October half term. Harry Potter mania hit London Zoo in the form of 'A Week of Magic' during October half term in the build up to the release of *Harry Potter and the Philosopher's Stone*. The British Tourist Authority produced a Harry Potter map of the UK showing locations where the movie was filmed; Once the complex move had occurred, a press release was issued with our own photographs of the operation and these were featured in the national newspapers. Despite great pressure from the press to follow the move it was essential that the welfare of the elephants and the safety of staff were not compromised by outside influences and so access was restricted to zoo staff only. By the end of the year, the elephants were settling well and a press conference was being planned for early 2002, to show the three cows in their new home and to explain how and why they were moved.

LIBRARY

Our Library continues to maintain its pre-eminence as the largest collection of books and periodicals on the subject of zoology and animal conservation in private ownership in the world, but despite its private nature it is one of the most readily accessible. Much of the material is available for Fellows of ZSL to borrow.



From the beginning of 2001 access has been widened to Friends of London Zoo and Friends of Whipsnade, who are now welcome to use the Library for reference. Previously they had to purchase a separate Reference Ticket to obtain access.



The series of exhibitions about the noted painter of animals, Joseph Wolf (1820-1899), has continued this year with material from our collections being displayed at the National Museum of Natural History in Leiden and the Natural History Museum in London visiting the Library, mainly to consult the Daily Occurrence books, the 19th-Century Council minutes and Minutes of Scientific Meetings. There has been a stream of historical and genealogical enquiries throughout the year.

The Library staff continued to lend books to Fellows, provide reference use of the Library to members of the public, give introductory tours to new staff, students and Library users; and answer enquiries both zoological and historical. A number of special behind the scenes tours were held for specialist groups including ASLIB Biosciences Group, Friends of the V&A, the Library Association Retired Members Guild and library staff from the University of Portsmouth.

New services in the Reading Room include internet access and online access to a number of journals. Residual circuit devices (RCDs) were installed allowing visitors to plug in their laptops.



ZSL's Librarian was interviewed by Nicholas Parsons in a Channel 4 *Collectors' Lot* programme about the work of Edward Lear which featured books and watercolours from our collections. *Under the Zoo* was a series of five radio programmes about the history of ZSL, broadcast on Radio 4 during Easter week. Presented by Chris Packham, it included interviews with staff and Fellows; extensive use was made of our archives and historic books.

Interest in the archives has continued to increase, with a variety of researchers

As always, we are extremely grateful to our Library volunteers for all their hard work throughout the year and to Fellows, organisations and members of the public who have made donations to the Library.

Through the generosity of the Wolfson Foundation the Library has undergone some redecoration and refurbishment. Although this meant closing for a twomonth period, the result is a brighter Reading Room and more pleasant environment for Library users for many years to come. Above, top: Illustration by Edward Lear.

Above: The Library has undergone redecoration and refurbishment. Photo: Terry Dennett

Left: Shoebills by Joseph Wolf.

TREASURER'S STATEMENT

ZSL experienced a turbulent and difficult year during 2001. The spread of the Foot and Mouth Disease epidemic over the UK during the early part of the year caused the closure of Whipsnade for two months and a significant fall in visitor numbers at London Zoo. At the time the Trustees' Report for 2000 was being written many zoos in the UK had major cash problems and ZSL itself was under threat of a fundamental review of its viability. To our relief the threat receded and the operations for the remainder of the year returned almost to normal. Cost control measures approved by Council were implemented by management and enabled ZSL to record a surplus for the year in spite of the significant loss of income.

The attached summarised financial statements are based on the format required by the Charity Commission's Statement of Recommended Practice issued in 2000.

The attached summarised financial statements show the overall results of ZSL for the year to 31 December 2001. As the summarised financial statements indicate, the Society recorded a consolidated surplus on operations of $\pounds 0.9$ million and an overall surplus, after charging losses on investments, of $\pounds 0.4$ million. These compare with figures of $\pounds 3.0$ million operating surplus in 2000 and an overall surplus of $\pounds 2.9$ million; however both of these amounts for 2000 included the capital grant for the *Web of Life* building of $\pounds 2.2$ million.

The results for 2001 were severely affected by the loss of gate income arising from the Foot and Mouth Disease epidemic. Whipsnade was closed from mid-February to mid-April 2001, thus missing the popular February half-term and Easter periods, while London Zoo suffered a major decline in visitor numbers in March and April 2001. Overall the shortfall in gate receipts cost the Society approximately $\pounds 1.0$ million of income compared to budget. However, management introduced stringent cost control measures which enabled costs, primarily for permanent and temporary staff and for marketing, to be reduced by over $\pounds 0.8$ million against budget. Encouragingly both zoos' numbers for the period after April 2001 were generally in line with budget and with the previous year, in spite of the decline in tourism generally experienced by other attractions. This, together with higher spends by visitors, unbudgeted legacies and the timing of certain grant income enabled ZSL to record a surplus in a year in which a loss might have been expected.

Both the Institute of Zoology and Conservation Programmes recorded better results this year than previously, but their income is effectively ringfenced and in certain cases has been received and recorded in advance of the related expenditure in accordance with the requirements of charity accounting.

Capital expenditure during the year amounted to $\pounds 1.5$ million; the main item was the construction of the elephant facility at Whipsnade, which will house not only the bull elephant but also the three elephants transferred from London at the end of the year. Other capital expenditure has been largely on refurbishment of exisiting facilities at both sites.

ZSL's balance sheet remains similar to last year. The carrying value of investments has fallen due to the general fall in stock market values resulting in an unrealised loss of \pounds 561,000, while debtors increased by \pounds 428,000, partly due to gift aid recoveries outstanding.

During the year Purcell, Miller Tritton, a firm of architects and historic building consultants, completed a review of the Regent's Park site. The consultants concluded that, overall, considerable work was needed to restore the site to a 'greener' condition. Their preliminary estimate of costs was approximately \pounds 31 million spread over a 20-year period. The situation is currently under review to determine the future content and character of London Zoo and to make plans for development of the capital programme to meet the costs. A similar review is being carried out at Whipsnade where the problems are considerably less onerous.

The continuing support of members and donors is vital for the future development of the zoos and the achievement of ZSL's mission.

V. J. Kuttoman

Paul Rutteman, FCA Treasurer

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Consolidated Statement of Financial Activities for the year ended 31 December 2001

	Year to 31.12.01	Year to 31.12.00
Incoming resources	£000	2000
Incoming resources from operating activities of the charity:		
Activities in furtherance of objects:		
Admission, membership and similar income	9,496	9,561
Publication sales and similar income Contract and fee income	389	397
	517	455
Grants	2,649	4,375
Activities for generating funds:		
Merchandising income and catering	4,000	4,089
Facility fee and rental income	225	210
Other sales and fees	542	480
Donations, legacies and other income	398	525
Interest and investment income	443	482
Total incoming resources	18,659	20,574
Resources expended		
Cost of generating funds:		
Fundraising costs	152	101
Merchandising and catering costs	2,581	2,475
Charitable expenditure:		
Cost of activities in furtherance of objects:		
Animal collection costs	10,512	10,722
Science and research	3,487	3,117
Conservation programmes	639	687
Management and administration	417	475
Total resources expended	17,788	17,577
Operating surplus for the year	871	2,997
osses on investments	(432)	(126)
Surplus for the year	439	2,871
Total funds balance brought forward	22,668	19,797
Total funds balance carried forward	23,107	22,668

Summarised Cash Flow Statement for the year ended 31 December 2001

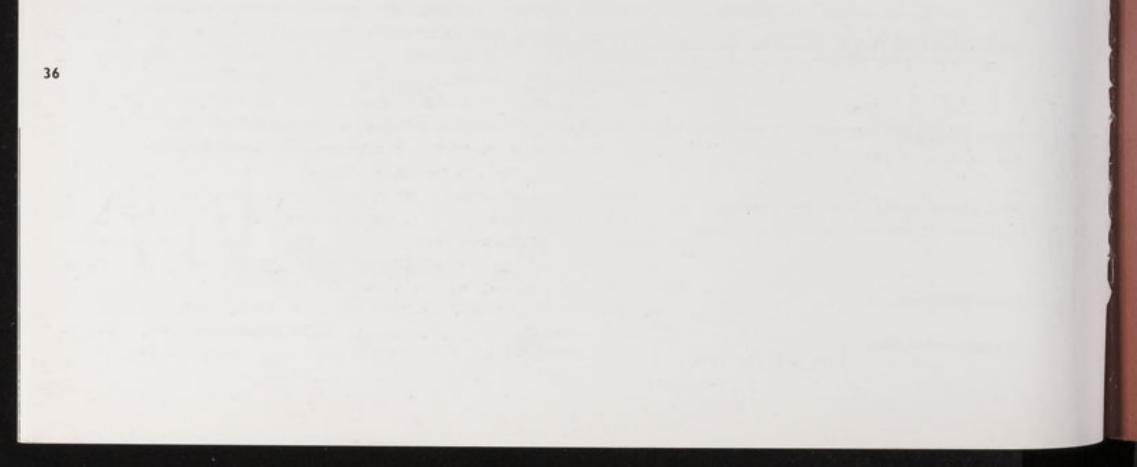
	Year to 31.12.01 £000	Year to 31.12.00 £000
Surplus for the year	439	2,871
Add: Depreciation	1,212	1,229
	1,651	4,100
Less: Purchase of Tangible Fixed Assets (Net of Disposals)	(1,712)	(1,307)
Purchase of Fixed Asset Investments (Net of Disposals)	(107)	(939)
	(168)	1,854
Changes in other Assets and Liabilities	71	(725)
Net cash (outflow)/inflow	(97)	1,129

SUMMARISED FINANCIAL STATEMENTS CONTINUED

Consolidated Balance Sheet at 31 December 2001

	31.12.01 £000	31.12.00 £000
Fixed Assets		2000
Tangible Assets	12,982	12,714
Investments	3,232	3,557
	16,214	16,271
Current Assets		
Stocks	378	417
Debtors	1,574	1,146
Cash at Bank and in Hand	7,477	7,574
	9,429	9,137
Creditors: Amounts falling due within one year	(2,189)	(2,219)
Net Current Assets	7,240	6,918
Total Assets Less Current Liabilities	23,454	23,189
Creditors: Amounts falling due after more than one year	(347)	(521)
Net Assets	23,107	22,668
Funds		
Unrestricted – General	17,017	16,496
- Designated	2,502	2,448
Restricted – Endowments	834	842
- Other	2,754	2,882
Total Funds	23,107	22,668

The summarised financial statements are based on the Society's full Trustees' report and financial statements. These summarised financial statements may not contain sufficient information to allow for the full understanding of the financial affairs of the Society. For further information, the full Society's Trustees' report and financial statements, and Ernst & Young LLP's audit report on them which is unqualified, should be consulted. A full set of the Society's Trustees' report and financial statements is obtainable on request from the Finance Director.



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