



The Environment Agency is the leading public body protecting and improving the environment in England and Wales.

It's our job to make sure that air, land and water are looked after by everyone in today's society, so that tomorrow's generations inherit a cleaner, healthier world.

Our work includes tackling flooding and pollution incidents, reducing industry's impacts on the environment, cleaning up rivers, coastal waters and contaminated land, and improving wildlife habitats.

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# Science at the Environment Agency

Science underpins the work of the Environment Agency, by providing an up to date understanding of the world about us, and helping us to develop monitoring tools and techniques to manage our environment as efficiently as possible.

The work of the Science Group is a key ingredient in the partnership between research, policy and operations that enables the Agency to protect and restore our environment.

The Environment Agency's Science Group focuses on five main areas of activity:

- **Setting the agenda:** To identify the strategic science needs of the Agency to inform its advisory and regulatory roles.
- **Sponsoring science:** To fund people and projects in response to the needs identified by the agenda setting.
- **Managing science:** To ensure that each project we fund is fit for purpose and that it is executed according to international scientific standards.
- **Carrying out science:** To undertake the research itself, by those best placed to do it - either by in-house Agency scientists, or by contracting it out to universities, research institutes or consultancies.
- **Providing advice:** To ensure that the knowledge, tools and techniques generated by the science programme are taken up by relevant decision-makers, policy makers and operational staff.

Professor Mike Depledge

Head of Science

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## Appendix 1: Ponds in Partnership Project Board

Name	Organisation	Notes
Jeremy Biggs	Ponds Conservation Trust	Project Manager
Mike Briers	Environment Agency	Joined April 2003, left April 2004 due to Environment Agency reorganisation
Dave Cooling	Environment Agency	Corporate Information Service representative
Catherine Duigan	Countryside Council for Wales	Corresponding member, left July 2004 to take up new role at CCW
Chris Glead-Owen	Herpetological Conservation Trust	Representing the proposed National Amphibian and Reptile Recording Scheme
Alastair Ferguson	Environment Agency	Project Executive until April 2004, Corresponding member
Jim Foster	English Nature	Corresponding member
Ian Fozzard	Scottish Environment Protection Agency	
Jane Goodwin	Defra	Left September 2004 to take up new role for Defra
Peter Hale	Environment and Heritage Service, Northern Ireland	Corresponding member
Tristan Hatton-Ellis	Countryside Council for Wales	Corresponding member, joined July 2004
Steve Head	Ponds Conservation Trust	Joined October 2004
Shelley Howard	Environment Agency	Project Manager
Dave Jarrett	Environment Agency	Left July 2003 due to Environment Agency reorganisation
Rob McHale	Environment Agency	Joined January 2003
Paul Logan	Environment Agency	Corresponding member
Geoff Phillips	Environment Agency	Corresponding member
Alastair Picken	Environment Agency	Left April 2003 due to Environment Agency reorganisation
Anne Powell	Ponds Conservation Trust	
Paul Raven	Environment Agency	Corresponding member
Julia Stansfield	Environment Agency	
Graham Storey	Environment Agency	Left January 2003 due to Environment Agency reorganisation
Jon Webb	English Nature	
Karen Williams	Environment Agency	Left January 2003 for sabbatical
Paul Williams	Environment Agency	Project Executive and Corresponding member from April 2004

## Appendix 2: Individuals and organisations involved in the Network

First name	Surname	Organisation
Danny	Alder	Dorset County Council
Giles	Alder	Berkshire, Buckinghamshire & Oxfordshire Wildlife Trust
Paul	Allen	Berkshire, Buckinghamshire & Oxfordshire Wildlife Trust
Hillary	Allison	Woodland Trust
Lynn	Anderson	Oxfordshire Nature Conservation Forum
Moira	Anderson	Defra
Morag	Angus	The Wildlife Trusts
Paul	Appleton	British Trust for Conservation Volunteers
Robert	Aquilina	Ponds Conservation Trust
Sophie	Arbuthnot	Environment Agency
Alexander	Arnold	University of Aberdeen
John	Arundell	Queen Adelaide Farm
David	Askew	Defra
Jill	Attenborough	Woodland Trust
John	Aylott	Individual
Neil	Bailey	Oxford Brookes University
Rachel	Bain	Ulster Wildlife Trust
Chris	Baines	Individual
John	Baker	Norfolk Wildlife Trust
Carolyn	Barber	Sheffield Wildlife Trust
Louise	Bardsley	English Nature
Alison	Barnes	Defra
Richard	Barnes	Greater London Authority
Jenny	Barr	Ponds Conservation Trust
John	Barrett	North East England Biodiversity Forum
Jenny	Beale	Sunderland Museum & Winter Gardens
Amy	Beard	Environment Agency
Anna	Beaumont	Defra
Dave	Beck	South West Lakes Trust
Trevor	Beebee	University of Sussex
Larry	Bellamy	Freshwater Flatworm Recording Scheme
Ian	Bennalick	Cornwall Wildlife Trust
C	Bennett	Freshwater Biologist
Richard	Bennett	British Waterways
Frank	Berry	Individual
Jeremy	Biggs	Ponds Conservation Trust
Dave	Bilton	Plymouth University
Pete	Blythe	Milton Keynes Rangers
Gemma	Bode	Gwent Wildlife Trust
Stefan	Bodnar	Birmingham City Council
Phil	Boon	Scottish Natural Heritage
Nicky	Booth	The Greensand Trust

<b>First name</b>	<b>Surname</b>	<b>Organisation</b>
John	Boothby	John Moores University
Amanda	Bradbury	Wildfowl & Wetlands Trust
Glyn	Bradbury	South West Lakes Trust
Richard	Bradbury	Royal Society for the Protection of Birds
David	Bradley	London School of Tropical Medicine
Lee	Brady	University of Kent, Kent Reptile & Amphibian Group
Richard	Brand-Hardy	Defra
Zosia	Brett	Bath and North East Somerset Council
Andy	Brewer	National Biodiversity Network
Bernice	Brewster	Aquatic Consultancy
Jonathan	Brickland	British Waterways
Ged	Brierly	Chorley Council
Mike	Briers	Environment Agency
Rob	Briers	Napier University
Henri	Brocklebank	Sussex Wildlife Trust / Sussex Biological Record Centre
Sheila	Brooke	Aquatic Heteroptera Recording Scheme
Naomi	Brookes	Cambridge Green Belt Project
Ian	Broomfield	Great North Forest
Pete	Brotherton	English Nature
Andy	Brown	Anglian Water
Marian	Bryant	Defra
Stewart	Bryant	Ponds Conservation Trust
Daryl	Buck	Environment Agency
Seb	Buckton	Wildfowl & Wetlands Trust
Mike	Burke	English Nature
Phillippa	Burrell	Thames Valley Environmental Record Centre
John	Byng	Defra
Julie	Bywater	Environment Agency
Jane	Campbell	Corporation of City of London
Rory	Canavan	Babtie Group
Paul	Carrier	British Dragonfly Society
Laurence	Carvalho	Centre for Ecology and Hydrology
Sara	Carvalho	EcoRecord
Colin	Catto	Bat Conservation Trust
Steve	Cham	British Dragonfly Society
Claudia	Chambers	South East England Regional Biodiversity Forum
Mick	Chatham	South Pennines Natural Area
Morwenna	Christian	Defra
Amy	Clark	Royal Society for the Protection of Birds
Philip	Clark	Cambridgeshire County Council
Stewart	Clarke	English Nature
John	Clayton	Scottish Environment Protection Agency
Becca	Cleaver	Froglife until end 2003

<b>First name</b>	<b>Surname</b>	<b>Organisation</b>
Jo	Cole	Trafford Council
Stuart	Colgate	Berkshire, Buckinghamshire & Oxfordshire Wildlife Trust
Lynne	Collins	English Nature
Esther	Collis	Bat Conservation Trust
Kirsty	Conti	Independent
Andrew	Cooke	Defra
Dave	Cooling	Environment Agency
Sue	Cooper	Independent
Gordon	Copp	Centre for Environment, Fisheries & Aquaculture Science
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Stephen	Corcoran	South Lanarkshire County Council
Debbie	Court	Derbyshire Wildlife Trust
Nicky	Court	Hampshire Biodiversity Information Centre
David	Cowley	Anglesey Council
Allison	Crofts	The Wildlife Trusts
Sheena	Crombie	Highways Agency
Nicola	Crosbie	Environment Agency
Neville	Crowther	British Dragonfly Society
Sally	Cuthbertson	Bucks County Council
Caroline	Daguet	British Dragonfly Society
Dave	Dana	Dragonfly Recorder on Isle of Wight
Will	Darwall	IUCN: The World Conservation Union
Mike	Davidson	Scottish Environment Protection Agency
Amanda	Davies	Wrexham County Borough Council
Bella	Davies	Oxford Brookes University
Rebecca	Davies	Newport Council
Ruth	Davies	Royal Society for the Protection of Birds
Marian	Dawes	Royal Society for the Protection of Birds
Dave	Dawson	Greater London Authority
Rod	D'Ayala	Ponds Conservation Trust
Clive	Dean	North Shropshire Countryside Service
Liz	Dean	Rhondda Cynon Taff Council
Valentina	Della Bella	University of Rome
Mick	Denness	British Trust for Conservation Volunteers
Charles	Dewhurst	Independent Consultant
Mark	Diamond	Environment Agency
Matthew	Dodds	Aylesbury Vale District Council
Kate	Doughty	Defra
Sue	Doughty	Member of Parliament
Ruth	Douglas	Northamptonshire County Council
Martin	Drake	Independent Consultant
Alex	Draper	London Wildlife Trust
Joanna	Drewitt	Scottish Executive



<b>First name</b>	<b>Surname</b>	<b>Organisation</b>
Alastair	Driver	Environment Agency
Catherine	Duigan	Countryside Council for Wales
David	Dutton	Bury Metropolitan Borough Council
Phil	Eades	Independent Consultant
Liz	Eagle	South West Lakes Trust
Marie-Claire	Edwards	Royal Borough of Kingston
Matthew	Ellis	Countryside Council for Wales
Judy	England	Environment Agency
Naomi	Ewald	Hampshire and Isle of Wight Wildlife Trust
Elliott	Fairs	Hart Countryside Service
James	Farrell	London Biodiversity Partnership
Alastair	Ferguson	Environment Agency
Bruce	Ferguson	Darlington Council
Deborah	Ferguson	Sedgefield Council
Tanya	Ferry	Environment Agency
Nina	Fielding	Environment Agency
P	Fincham	none
Kay	FitzGerald	Three Rivers District Council
Clare	Fitzgibbon	RPS Ecoscope
Jim	Flanagan	Andrew McCarthy Associates Limited
Carol	Flux	Isle of Wight Partnership
Gwyneth	Fookes	Independent surveyor
Garth	Foster	Balfour Browne Club
Jim	Foster	English Nature
Ian	Fozzard	Scottish Environment Protection Agency
Laurie	Friday	University of Cambridge
Mark	Gallant	Lee Rivers Project
Tim	Ganniccliffe	English Nature
Beth	Gardner	Nottinghamshire County Council
Olive	Gearing	Ponds Conservation Trust
Caroline	Gellor	Royal Society for the Protection of Birds
Tony	Gent	Herpetological Conservation Trust
Nick	Gibbons	Forestry Commission
Liz	Giles	Sheffield Wildlife Trust
Isobel	Girvan	Surrey Wildlife Trust
David	Gledhill	University of Salford
Chris	Gleed-Owen	Herpetological Conservation Trust
Andy	Glencross	Wokingham Council
Andrew	Goodman	Newcastle City Council
Jane	Goodwin	Defra
Malcolm	Gorton	Environment Agency
Hannah	Graves	Berkshire, Buckinghamshire & Oxfordshire Wildlife Trust
Jim	Green	Independent

<b>First name</b>	<b>Surname</b>	<b>Organisation</b>
Maureen	Green	Environment & Heritage Service, Northern Ireland
Simon	Green	Naturebureau
Nigel	Greenhalgh	Ponds Conservation Trust
Paul	Gregory	South West Lakes Trust
Tracey	Grey	Sheffield Wildlife Trust
Leila	Griffiths	British Waterways
Richard	Griffiths	University of Canterbury
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Leonardo	Gubert	AmeyMouchel
Guy	Hagg	Ministry of Defence: Defence Estates
Peter	Hale	Environment and Heritage Service, Northern Ireland
Kevin	Hall	Environment Agency
Tim	Halliday	Open University
John	Hammond	Hadlow College
Martin	Hammond	Ryedale Council
Sean	Hanna	English Nature
Alice	Harding	University of Nottingham
Paul	Harding	British Myriapod & Isopod Group
Maria	Hardy	North East Scotland Local Biodiversity Action Plan
Andy	Harmer	Independent
David	Harper	Independent
Martin	Harper	Plantlife
Rocky	Harris	Defra
Steve	Harris	The Mammal Society
Chris	Hartfield	Defra
Alexandra	Hartridge	University of Southampton
Martin	Harvey	Hampshire WT
Tom	Hastings	East Ayrshire Ranger Service
David	Hatcher	Countryside Council for Wales
Tristan	Hatton-Ellis	Countryside Council for Wales
Carl	Hawke	National Trust
Jane	Hawkins	Institute of Grassland and Environmental Research
Alister	Hayes	London Borough Forum
Julie	Hayes	Environment Agency
Steve	Head	Ponds Conservation Trust
Andrew	Heaton	Environment Agency
Anne	Heeley	Farming and Wildlife Advisory Group
Anne	Heeley	Bradford Council
Brian	Hemsley-Flint	Environment Agency
Fiona	Hemsley-Flint	Oxford Brookes University
Michele	Hendley	Hertfordshire and Middlesex Wildlife Trust
Mary	Hennessey	Scottish Natural Heritage
Katherine	Herne	National Trust

<b>First name</b>	<b>Surname</b>	<b>Organisation</b>
Chris	Hill	Leicestershire & Rutland Wildlife Trust
Tim	Hill	Lee Valley Park
Jenny	Hill	Ponds Conservation Trust
Derek	Hilton Brown	Blyth Valley Council
Virginia	Hodge	Kent BTCV
Tom	Holland	Defra
Geraldine	Holyoak	Conchological Society
Joanna	Hood	Environment Agency
Alan	Hooper	Defra
Anne	Hope Jacobson	Ponds Conservation Trust
Dan	Horsley	Environment Agency
Bryony	Horton	Sheffield Wildlife Trust
Shelley	Howard	Environment Agency
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Ray	Howlington	BTCV
Dave	Hubble	Individual
Bob	Huggins	Environment Agency
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Simon	Hughston Roberts	Countryside Council for Wales
Andy	Hull	John Moores University
Doug	Hulyer	Wildfowl & Wetlands Trust
Anna	Humphries	Bucks County Council
Louise	Hutchby	English Nature
Roger	Hyde	Ponds Conservation Trust
Suzanne	Ibbotson	Royal Society for the Protection of Birds
Mark	Iley	Essex Wildlife Trust
Adam	Ingleby	Westminster City Council
Barbara	Jack	Independent
Debbie	Jackson	Berkshire, Buckinghamshire & Oxfordshire Wildlife Trust
Heather	Jackson	none
Ben	James	Scottish Executive
Trevor	James	National Biodiversity Network
Derek	Jamieson	BTCV
Michelle	Janes	Gwent Wildlife Trust
Sylvia	Jay	Yorkshire Wildlife Trust
David	Jeffreys	English Nature
Mike	Jeffries	Northumbria Univeristy
Lorinda	Jewsbury	Kent and Medway Environmental Records Centre
Tim	Johns	Environment Agency
Ian	Johnson	Defra
Rupert	Johnson	Birmingham & Black Country Wildlife Trust
Charlene	Jones	Birmingham City Council
Cory	Jones	Sheffield Wildlife Trust

<b>First name</b>	<b>Surname</b>	<b>Organisation</b>
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Les	Jones	Ponds Conservation Trust
Tim	Jones	Environment Agency
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Ingrid	Juettner	National Museums and Galleries of Wales
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Klieo	Kalemtzaki	Environment Agency
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Phyl	King	Herefordshire Ponds and Newts Project
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Terry	Langford	University of Southampton
Tom	Langton	Froglife
Neil	Lassus	Sunderland Museum & Winder Gardens
Alison	Lee	Scottish Natural Heritage
John	Lee	Oxford Brookes University
Sue	Leffman	Colne Valley Trust
Ashley	Leftwich	Ash Partnership
Sarah	Leggett	Bat Conservation Trust
Gavin	Leonard	Royal Society for the Protection of Birds
Tom	Lerner	University of Bradford
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Paul	Loughnane	none
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<b>First name</b>	<b>Surname</b>	<b>Organisation</b>
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Pamela	Lynch	Skelton Grange Environmental Centre
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Nicola	Macintyre	Dean Castle Country Park
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Simon	Mageen	Woodland Trust
Cressida	Mansfield	Elmaw Consulting
Stuart	Manwaring	Environment Agency
Nick	Marriot	Berkshire, Buckinghamshire & Oxfordshire Wildlife Trust
Ian	Marshall	Cheshire County Council
Tony	Marshall	none
Steve	Maund	Syngenta
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Louise	McAlavey	Environment and Heritage Service, Northern Ireland
Francis	McCullagh	Defra
Maggie	McDonald	Wiltshire Wildlife Trust
Rob	McHale	Environment Agency
Kearon	McNicol	FreshwaterLife
Julie	McNish	English Nature
Caroline	McParland	Thomson Ecology
Andy	McVeigh	Bucks County Council
Nick	Meade	Suffolk Wildlife Trust
Glen	Meadows	Environment Agency
Rebecca	Mellings	Environment Agency
Charles	Miles	Royal Air Force
Brian	Miller	Berkshire, Buckinghamshire & Oxfordshire Wildlife Trust
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Jo	Miskin	Sandwell Metropolitan Borough Council
Roshni	Mistry	WRc plc
Nicky	Mogford	Devon Wildlife Trust Consultancy Services
Steve	Moon	Bridgend Council
Janet	Moore	Environment Agency
Niall	Moore	Central Science Labs
William	Moreno	London Biodiversity Partnership
Chris	Morgan	Cuerden Wildlife Trust
Elliott	Morley	Minister for Environment and Agri-Environment
Andrew	Morrisse	Environment Agency
Shaun	Mowat	Defra
Richard	Moyse	Kent Wildlife Trust
Nigel	Muddiman	British Dragonfly Society

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Monica	O'Donnell	Defra
Kevin	O'Hara	Northumberland Wildlife Trust
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Jo	O'Leary Quinn	Defra
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Marcus	Olozulu	Bucks County Council
Imelda	O'Neill	Environment & Heritage Service, Northern Ireland
Sarah	Oppenheimer	Royal Society for the Protection of Birds
David	Orchard	Independent Surveyor
John	Osmond	Defra
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Sue	Paice	Northamptonshire County Council
Margaret	Palmer	Freshwater Biological Association
Naomi	Paterson	Emu Ltd
David	Patrick	Grantham Brundell & Farran
Bridget	Peacock	Natural History Museum
Julian	Perrett	Encompass Ecology
Val	Perrin	British Dragonfly Society
James	Perrins	exeGesIS
Martin	Perrow	University of East Anglia
Tony	Perry	Deeside Urban Wildlife Group
Geoff	Phillips	Environment Agency
Mike	Phillips	Kent BTCV
Paul	Phillips	Derby College
Paul	Phillips	Rushcliffe Borough Council
Ellen	Pisolkar	Independent Surveyor
Jo-Anne	Pitt	Environment Agency
Matt	Pitts	Cranfield University
Roger	Poland	Kings School Taunton
Anne	Powell	Ponds Conservation Trust
Phil	Precey	Derbyshire Wildlife Trust
Alan	Price	Oldham Borough Council
Jonathan	Priddy	Environment Agency
Stuart	Priestly	Durham Wildlife Trust
Ceris	Probert	Sheffield Wildlife Trust

<b>First name</b>	<b>Surname</b>	<b>Organisation</b>
Deborah	Proctor	Joint Nature Conservation Committee
David	Pryce	Environment Agency
Simon	Pryor	Forestry Commission
J	Purves	none
David	Quick	Environment Agency
Geoff	Radley	Defra
John	Ramsay	Scottish Executive
Alison	Rasey	Bat Conservation Trust
Paul	Raven	Environment Agency
Claire	Rawcliffe	South Tyneside Council
Jane	Redrup	Defra
Katy	Reed	Middlemarch Environmental
Sue	Rees	Ponds Conservation Trust
Beverley	Rhodes	Derby City Council
Tim	Rich	Cardiff Museum
Nicky	Richardson	Independent Consultant
Rachel	Riley	Forestry Commission
Anthony	Roberts	Oxford City Council
Hugh	Roberts	Ponds Conservation Trust
Mark	Rosenburg	Defra
Terry	Rowell	Countryside Council for Wales
Matt	Royle	Cuerden Wildlife Trust
Lyndsey	Rule	Hertfordshire County Council
Tony	Sangwine	Highways Agency
Judy	Sauter	Surrey Wildlife Trust
Jo	Sayers	Wiltshire Wildlife Trust
Deborah	Sazer	Berkshire, Buckinghamshire & Oxfordshire Wildlife Trust
Graham	Scholey	Environment Agency
Cheryl	Scott	Aylesbury Vale District Council
Vanessa	Scott	Kent County Council
Trudy	Seagon	Royal Society for the Protection of Birds
Nigel	Selby	Friends of Winterset
Ellis	Selway	Cambridge City Council
David	Sewell	University of Kent
Matt	Shardlow	Buglife
Dave	Sheahan	Defra
Catharine	Shellswell	Berkshire, Buckinghamshire & Oxfordshire Wildlife Trust
Tom	Sherwood	Environment Agency
Peter	Sibley	Environment Agency
Ann	Skinner	Environment Agency
Craig	Slawson	Staffordshire Ecological Records Centre
David	Smallshire	Defra
Heidi	Smith	University of Bradford

<b>First name</b>	<b>Surname</b>	<b>Organisation</b>
Mick	Smith	Colne Valley Trust
Steve	Smith	Kent and Medway Environmental Records Centre
Zoe	Smith	English Nature
Debbie	Snook	Independent Surveyor
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Heather	Sohl	South West England Biodiversity Partnership
Martin	Spray	Wildfowl & Wetlands Trust
Sam	Stalker	English Nature
Abigail	Stancliffe-Vaughan	Brecks Countryside Project
Julia	Stansfield	Environment Agency
David	Stanton	British Waterways
Mark	Stevenson	Defra
Ed	Stocker	Norfolk County Council
Vicky	Stone	Brecks Countryside Project
Andy	Stott	Defra
Ian	Strachan	Joint Nature Conservation Committee
Giles	Strother	Berkshire, Buckinghamshire & Oxfordshire Wildlife Trust
Judy	Stroud	Independent
Mark	Stroud	English Nature
Mary	Swan	British Herpetological Society
Roger	Sweeting	Freshwater Biological Association
Richard	Tanner	Cuerden Wildlife Trust
Alistair	Taylor	Natural History Museum
Gareth	Taylor	Sheffield Wildlife Trust
Jeremy	Taylor	Environment Agency
Trevor	Taylor	Independent Ecologist
Caroline	Tero	Environment Agency
Fiona	Thackeray	Thrive
Huw	Thomas	Defra
Andrew	Thompson	Warwickshire Wildlife Trust
Emma	Thompson	Environment Agency
Polly	Thompson	St Andrews University
Stewart	Thompson	Oxford Brookes University
Izzy	Thorne	Cumbria Wildlife Trust
Jamie	Townend	Ponds Conservation Trust
Sarah	Tunstall	none
Shona	Turnbull	Hull Council
John	Tweddle	Natural History Museum
Mike	Tynen	Cheshire Wildlife Trust
Beatrice	Underwood	Somerset Wildlife Trust
Louise	Valentine	Peak District National Park
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Patrick	Waring	Independent Consultant
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Pat	Waring	Independent
Stuart	Warrington	National Trust
Danny	Watkins	none
Alisa	Watson	English Nature
Will	Watson	Herefordshire Ponds and Newts Project
Iain	Webb	Cambridge Green Belt Project
Jon	Webb	English Nature
Rachel	Webb	Ponds Conservation Trust
Sarah	Webster	Defra
Christopher	Weddell	Royal Horticultural Society
David	Westbrook	Somerset Wildlife Trust
Lejla	White	Defra
Malcolm	Whitehead	Wildfowl & Wetlands Trust
Lynette	Whitehouse	Northumberland Wildlife Trust
Mericia	Whitfield	Ponds Conservation Trust
Debbie	Wicks	Hampshire Wildlife Trust
Christopher	Widger	National Trust
Lizzie	Wilberforce	The Wildlife Trust of South and West Wales
Corin	Wilkins	Farming and Wildlife Advisory Group
Vicky	Wilkins	Ponds Conservation Trust
Paul	Wilkinson	East of England Biodiversity Forum
Jonathan	Willet	North Lanarkshire Council
David	Williams	Defra
Paul	Williams	Environment Agency
Penny	Williams	Ponds Conservation Trust
Rhys	Williams	Countryside Council for Wales
Will	Williams	North West England Biodiversity Forum
Richard	Wilson	Naturebureau
Sarah	Wilson	Defra
Stuart	Wilson	Highways Agency
Kim	Wisdom	Lancashire Wildlife Trust
David	Withrington	English Nature
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Nicholas	Wray	University of Bristol
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<b>First name</b>	<b>Surname</b>	<b>Organisation</b>
Julia	Wycherley	Ponds Conservation Trust
Marian	Yallop	University of Bristol
Sarah	Yarwood-Buchanan	Oxford Brookes University
Barbara	Young	Environment Agency

### **Organisations involved in the Network**

The table below gives details of organisations involved in Network activities beyond involvement of individuals in training courses, the project launch, or discussions about the Network.

<b>Organisation</b>	<b>Involvement with the Network</b>
Anglian Water	Made proposals to Water UK to fund NPMN
Aquatic Heteroptera Recording Scheme	Carrying out pond surveys
Bat Conservation Trust	Plans for joint project in Phase 2
Berkshire, Buckinghamshire & Oxfordshire Wildlife Trust	Ran training course for staff
Birmingham City Council	Carrying out Great Crested Newt Survey and public participation garden pond survey
Botanical Society of the British Isles	Involved in New Forest Ponds project
British Dragonfly Society	Joint project developed dragonfly pond recording form, sent to 1,600 BDS members
British Trust for Conservation Volunteers	Carrying out pond surveys
British Waterways	Committed to use PSYM and send data to the NPMN
Bucks County Council	Ran Ponds, Pools and Puddles project
Bury Metropolitan Borough Council	Carrying out amphibian survey
Cardiff Museum	Carried out numerous pond surveys
Centre for Environment, Fisheries & Aquaculture Science	Potential for fish survey activity
Colne Valley Trust	Carrying out pond surveys
Conchological Society	Carrying out pond surveys
Cornwall Wildlife Trust	Ran public participation survey of alien plants in ponds
Corporation of City of London	Interested in running pond monitoring project involving volunteers
Countryside Council for Wales / Cyngor Cefn Gwlad Cymru	Represented on the Project Board
Cranfield University	Carrying out pond surveys
Cumbria Wildlife Trust	Running Cumbria Tarns project
Defra	Funded JVA pond project, represented on the Project Board
English Nature	Funded collation of list of ponds of biodiversity importance, represented on the Project Board
Environment & Heritage Service, Northern Ireland	Represented on the Project Board, helping with development of international pond survey standards

<b>Organisation</b>	<b>Involvement with the Network</b>
Environment Agency	Funded Phase 1 of NPMN
Forestry Commission	Involved in New Forest Ponds project
Freshwater Biological Association	Involved in Cumbria Tarns project, helping with development of international pond survey standards
FreshwaterLife	Helped with database development
Froglife	Carried out pilot Great Crested Newt survey
Hampshire Biodiversity Information Centre	Involved with New Forest Ponds project
Hampshire and Isle of Wight Wildlife Trust	Co-ordinated New Forest Ponds project
Herefordshire Ponds and Newts Project	Carrying out pond surveys
Herpetological Conservation Trust	Planning National Amphibian and Reptile Recording Scheme, represented on the Project Board
Hertfordshire Biological Records Centre	Pond project using PSYM underway.
Kent and Medway Environmental Records Centre	Application to fund pond activities in Kent and Calais pas de Nord has been submitted
Ministry of Defence: Defence Estates	Published article in internal magazine, commissioning pond surveys
Napier University	Carrying out research on pond data
National Biodiversity Network	Funded pond data project
National Trust	Carrying out pond surveys
Oldham Borough Council	Carrying out pond surveys
Oxford City Council	Carrying out pond surveys
Ponds for People	Carrying out pond surveys
Royal Society for the Protection of Birds	Preparing PSYM for schools material
Scottish Environment Protection Agency	Represented on the Project Board
Sheffield Wildlife Trust	Carrying out pond surveys
Syngenta	Funding pond surveys
Thames Valley Environmental Record Centre	Promoting pond surveys by volunteers
The Mammal Society	Joint project underway: national water shrew survey.
The Wildlife Trusts	Potential for joint national project to survey for water vole use of ponds in Phase 2
University of Bradford	Carrying out pond surveys
University of Kent	Carrying out pond surveys
University of Salford	Carrying out pond surveys
University of Sheffield	Carrying out pond surveys
Warwickshire Wildlife Trust	Carrying out pond surveys
Wildfowl and Wetlands Trust	Great Pond Safari project will contribute data on pond locations to the Network

## **Appendix 3: The National Pond Monitoring Network Strategy**

*The National Pond Monitoring Network: a strategy for pond monitoring, surveillance and inventory development* was published by the Ponds Conservation Trust and the Environment Agency (2003), copies can be obtained from the Ponds Conservation Trust.

### **1. Introduction**

#### **1.1 About the National Pond Monitoring Network**

##### **1.1.1 Background**

The National Pond Monitoring Network (NPMN) aims to develop a national monitoring programme for ponds, stimulate standardised pond survey activity and provide a UK focus for pond survey data. It has been established through the 'Ponds in Partnership' project, funded by the Environment Agency and the Ponds Conservation Trust, and incorporating representatives from the statutory agencies, the NGO sector and Government departments.

This strategy document is intended for potential partners in the Network. It outlines the aims of the NPMN, develops plans for its implementation, and suggests potential roles for project partners. A final version of this strategy document, incorporating input from partners, will be published at the end of the current phase of the Ponds in Partnership project.

The Network is needed because, despite increasing recognition of the ecological importance of ponds, little is known about their status and how they are changing regionally or nationally. Ponds are exceptionally vulnerable habitats and are at risk from a range of pollutants, alien plants, overstocking of fish and waterfowl, and inappropriate management. There are now perhaps only a quarter of the water bodies that existed 100 years ago. Despite this, many high quality ponds remain, and even more play an important role in maintaining catchment biodiversity. In order to formulate appropriate policies to protect and enhance this resource good information is required on the status of ponds, how they are changing and where they are threatened. The Network will enable the many organisations with an interest in ponds and pond species to work together to obtain this information. Section 2 describes in more detail the need for the Network and the benefits it will provide.

##### **1.1.2 Aims of the National Pond Monitoring Network**

The National Pond Monitoring Network has six interrelated aims.

1. To establish a programme of monitoring to assess the current status of ponds in the UK, particularly their ecological quality and biodiversity value, and identify trends over time.
2. To stimulate and co-ordinate additional pond survey activity through targeted surveys and by developing an inventory of pond locations and any associated data. Targeted surveys will address issues which arise from monitoring, or focus on particular species or geographic locations.
3. To create a UK focus for pond survey data by bringing together the datasets generated by the activities described above, and by collating existing datasets. The database created will be publicly accessible via the project website.
4. To use the data collected to report on the state of the UK's ponds and feed into policy development to protect the habitat, with associated biodiversity and quality of life benefits.
5. To create a UK centre of pond survey expertise through collaboration with partners, which will encourage standardisation and co-ordination, promote standard survey methods and provide technical support, training and quality assurance.
6. To promote public awareness of, and involvement in, pond conservation through volunteers carrying out pond surveys, and through using the project website to contribute to the pond inventory and to find out about local ponds, with associated social and educational benefits.

### 1.1.3 Questions the NPMN will address

Data collected and collated through the National Pond Monitoring Network will help answer a number of critical questions about the status and quality of ponds, including the following.

- What is the ecological quality of ponds in the UK; is it improving or declining at a regional and national level?
- Where are ponds of high conservation value or ecological quality found? Are they associated with particular areas of the country or particular landscapes?
- Are pond numbers changing, regionally or nationally?
- Are the ranges of pond species of conservation concern increasing or decreasing (e.g. Great Crested Newt, Lesser Silver Water beetle, Starfruit, scarce dragonflies)?
- How important are ponds for species which are not widely recognised as typical 'pond species' (e.g. bats, water shrews, native crayfish, hover flies)?
- Are ponds in protected areas reaching the required standards e.g. are those designated as SSSIs meeting the statutory targets for "favourable condition"?
- What threats do ponds face e.g. to what extent are ponds impacted by diffuse and point source pollution; how vulnerable are ponds to climate change?
- How widespread are invasive alien species in ponds and are they spreading?
- Do new ponds adequately replace the large number of ponds lost each year?
- How do different management regimes affect the quality of ponds e.g. ponds managed in various ways for wildlife, fishing etc?
- How effective are measures to promote the protection of ponds, such as agri-environment schemes, the development of Sustainable Urban Drainage Systems (SUDS), the Water Framework Directive or inclusion of ponds in designated areas?

The Network will also generate testable ideas about the management of ponds and stimulate experimental and theoretical investigations; further details are given in Section 5.

### 1.1.4 Data the NPMN will collect

The Network will include ponds throughout the UK countryside and urban areas and will collect data on the numbers, physico-chemical quality and biota of ponds including plants, invertebrates, amphibians and mammals. It will include data on species of conservation concern (e.g. BAP species) and will stimulate studies of biota which are often considered problematic in ponds, such as fish and alien plants. The definition of a pond and a list of the types of ponds included are given in Appendix 2.

The vision for building up a comprehensive dataset describing the UK's ponds by co-ordinating survey layers made up from the contributions of each partner is described in Section 3. Three types of data will be collected. The national *core monitoring programme* will consist of repeated comprehensive surveys of representative sites across the UK (Section 4). Additional *targeted surveys* will address specific questions (Section 5). The *pond inventory dataset* will contain pond name and location data, and also survey data where it is available (Section 6). Pre-existing data will be included wherever possible.

These data will be collated into the Network database which will be publicly accessible via the Internet and will be a component part of the National Biodiversity Network. The database will be used to report on the ecological quality of ponds at a national and regional level and to detect any trends in pond quality and biodiversity value, and to help identify the causes of any change. It will also be a source of information on the location and biodiversity value of individual ponds.

Together, the data will provide policy makers, statutory bodies, NGOs and the public with information that will increase understanding of the freshwater resource that ponds support and ensure their protection and enhancement.

## 1.2 Who's involved?

### 1.2.1 Co-ordinating organisations

The National Pond Monitoring Network is a collaborative project building on the work of the many organisations and individuals with an interest in pond ecology and conservation.

The initial two year phase of the Ponds in Partnership (PIP) project (2002-2004), which aims to establish the framework for the NPMN, is being funded by the Environment Agency and the Ponds Conservation Trust (PCT). Other organisations represented on the project board are the Department for Environment, Food and Rural Affairs, English Nature, the Countryside Council for Wales, the Scottish Environment Protection Agency and the Environment and Heritage Service (Northern Ireland). The NGO sector is represented by PCT, the Herpetological Conservation Trust and Froglife.

### 1.2.2 Partnerships

Organisations which undertake pond surveys will be invited to become partners in the project. Details of proposals for partnerships are given in Section 7.

Although the National Pond Monitoring Network is still in the planning and development stages a number of organisations have already joined the Ponds in Partnership project consortium and / or initiated projects as part of the NPMN. Table 1 gives some examples of partnerships underway and under discussion. More details of current and potential partners are given in Appendix 1.

*Table 1: Partnerships underway and under discussion.*

Organisation / Project	Partnership
The Mammal Society	The current national water shrew survey will contribute data to the NPMN on sites for which comprehensive datasets are held.
New Forest Ponds Project	This is a NPMN pilot project to identify high value ponds in the New Forest. It is being undertaken by the Hampshire and Isle of Wight Wildlife Trust, the Ponds Conservation Trust, the Natural History Museum, the Forestry Commission and others with field survey work to be undertaken by volunteers.
Froglife and The Herpetological Conservation Trust	The proposed National Amphibian and Reptile Recording Scheme (NARRS) will work in partnership with PIP to benefit both projects.
The Ponds Conservation Trust 'Ponds for People'	PCT's 'Ponds for People' community ponds project will use standard NPMN survey methods and will contribute data to the NPMN.
British Dragonfly Society (BDS)	BDS is keen to participate in the NPMN, through development of standard methods for pond surveys of adult dragonflies and damselflies and through collaboration in survey work.
British Trust for Conservation Volunteers (BTCV)	BTCV Pond Warden schemes in southern England include data collection. Discussions are underway about how BTCV volunteers UK wide could be involved in the NPMN.
The Bat Conservation Trust (BCT)	Initial studies show a high proportion of ponds are visited by bats for feeding. Discussions with BCT staff indicate considerable potential for collaboration on survey work.

## 2. The need for a National Pond Monitoring Network

### 2.1 Introduction

Ponds have high biodiversity value and are at serious risk from a range of environmental threats. They are often perceived as less important than rivers and lakes, but there is increasing evidence that ponds are at least as rich in species as other aquatic habitats, and support many species of conservation concern (e.g. BAP species, Red Data Book species). Certain ponds and pond species are subject to statutory protection. Despite this there are no monitoring programmes assessing pond quality in the UK so it is currently difficult to formulate appropriate policies for this valuable and vulnerable habitat.

### 2.2 Ponds are important for biodiversity

Ponds are a common, rich and varied component of the UK landscape. There are, on average, 1.5 ponds per square kilometre in Britain, reaching 20 to 30 per square kilometre in some areas, and about 400,000 ponds (standing water bodies below 2 ha in area) in the British countryside as a whole (Haines-Young *et al.* 2000). Recent studies at the catchment level in Britain and other parts of Europe have shown that ponds support up to 70% of aquatic plant and macroinvertebrate species across the landscape, more than rivers, lakes or streams. In Britain ponds have been shown to support at least as many invertebrate species as rivers and more rare species (Biggs *et al.* 2000a), e.g. Figure 1 below.

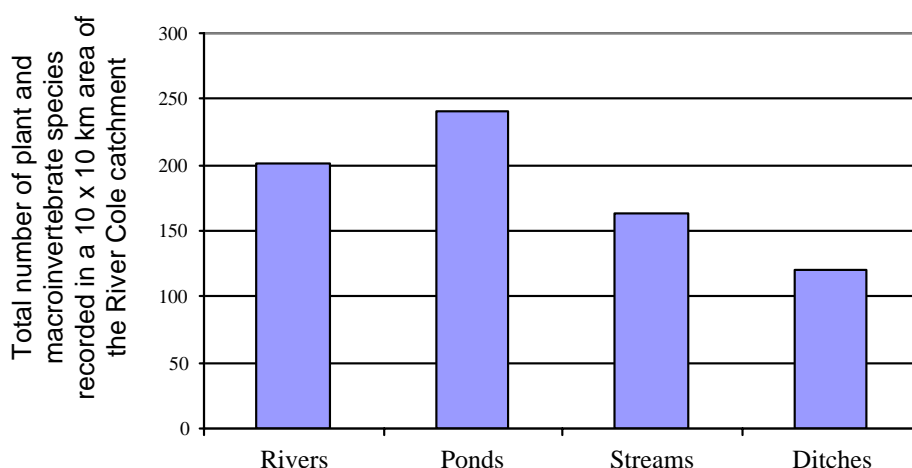


Figure 1. In a 10 x 10 km area of the River Cole catchment in southern England (Williams *et al.*, in press), plant and macroinvertebrate regional species richness (gamma diversity) was greater in ponds than in rivers, streams or ditches. Samples were collected from a standard 75 m<sup>2</sup> survey area from a stratified random sample of rivers, streams, ponds and ditches (20 of each).

Ponds are an important resource for aquatic species of conservation concern. At least 65 BAP priority species are associated with ponds, including the tadpole shrimp, medicinal leech, lesser silver water and spangled water beetles, starfruit, and three-lobed crowfoot. A full list of BAP species associated with ponds is given in Appendix 3. Ponds also support or provide habitat for aquatic species for which the UK has international obligations including great crested newt, Atlantic stream crayfish and otter.

Ponds are a functionally critical habitat. They are recognised internationally under Article 10 of the EC Habitats Directive for their role as stepping-stone habitats: providing isolated patches of habitat in areas where other aquatic habitats are now scarce. They also provide habitats for many species that do not spend all their life in water, including all native species of amphibians and many mammals (e.g. water vole and Daubentons bat) and birds. Ponds also support a large number of semi-terrestrial invertebrates and plants, some rare, that are associated with damp margins. Within the urban environment ponds provide refuges for biodiversity and a focus for community activity, environmental awareness and education so

improving the quality of life of residents and creating a focus for the regeneration of degraded areas.

### **2.3 Ponds are under threat**

Ponds are an exceptionally vulnerable habitat in the UK. Their small size means they have little capacity for dilution of pollutants, and that it is feasible for them to be filled in completely.

Although pond numbers have now stabilised (Haines-Young *et al.*, 2000) turnover remains high: about 1% of existing ponds are replaced each year by new ponds. Little is known of the value of new ponds and it has been suggested that a large proportion are fed by seriously polluted water sources or stocked with high densities of fish. There are probably now only a quarter of the ponds that existed 100 years ago, and individual ponds are much more isolated than in the past, reducing potential for between-pond dispersal.

Loss of numbers is often thought of as the most serious problem for ponds, but deterioration in quality is probably even more serious. They are exposed to point and diffuse source pollution, acid rain, biocides and urban runoff. On average, ponds in the 'ordinary' countryside support only half of the expected number of water plant species found in undegraded ponds, probably because of widespread pollution (Williams *et al.* 1998b). Such ponds are often functionally 'lost' since they no longer provide habitats for species requiring clean water. The habitat value of ponds may be similarly reduced if they are inappropriately stocked with fish or wildfowl, or inappropriate management techniques are used.

Although a large proportion of the impacts affecting ponds are due to intensive rural and urban land use, ponds in protected areas are also at risk from air-borne pollution (e.g. acid rain, nutrient-enriched rainfall) and climate change, to which small shallow waterbodies are particularly vulnerable. Alien invasive plant species are also a serious problem. For example, in the New Forest candidate Special Area of Conservation, which contains one of the most important concentrations of high quality ponds in Britain, *Crassula helmsii* was found in over one third of ponds surveyed (Crutchley & Wicks 2001).

### **2.4 Statutory responsibilities**

A range of UK statutory bodies have responsibility for the protection of aquatic habitats. Information on the status of small water bodies and species which use the habitat is needed for responsibilities for water pollution control and biodiversity legislation to be fulfilled.

The Environment Agency, the Scottish Environment Protection Agency and the Department of the Environment, Northern Ireland are responsible for water pollution monitoring and control. Responsibilities apply largely to 'controlled' waters. This includes c.50,000 ponds fed by rivers or streams in England and Wales. The number in Scotland is unknown, but is probably larger.

The EC Water Framework Directive (WFD; 2000/60/EC) requires that the ecological quality of *all* fresh waters is maintained in a catchment context. Consultation on interpretation is currently underway. The UK Technical Advisory Group has agreed that there should be no lower size limit for water bodies to be included so long as certain significance criteria are met. These include being important for SPA, SAC or SSSI objectives, or for national or international biodiversity targets, or to give an overview of the general condition of small water bodies within a river basin district. The PSYM method for assessing pond ecological quality, which is a key component of the NPMN, provides a standard method which is reference based in line with WFD requirements.

As well as pollution control legislation, UK statutory authorities are responsible for protection of habitats and species under biodiversity legislation. The UK has international obligations for the following six EC Habitats Directive Annex I habitat types, which are represented wholly or partly by ponds.

- Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae)



- Oligotrophic to mesotrophic standing waters with vegetation of the Littorelletea uniflorae and/or of the Isoëto-Nanojuncetea
- Hard oligo-mesotrophic waters with benthic vegetation of Chara species
- Natural eutrophic lakes with Magnopotamion or Hydrocharition-type vegetation
- Natural dystrophic lakes and ponds
- Mediterranean temporary ponds

There are currently no standardised monitoring programmes for these habitat types, although some ad hoc studies have been undertaken (e.g. on Mediterranean temporary ponds in the New Forest and the Lizard in Cornwall (David Bilton, pers. comm.)). Habitats Directive Annex II species which use ponds include great crested newt, Atlantic stream crayfish and otter, and information on the distribution of these species is needed to fulfil European reporting requirements. The Habitats Directive recognises the essential role of ponds as stepping stones for species migration, dispersal and genetic exchange, and in improving the ecological coherence of Natura 2000 sites.

Many of the highest quality ponds occur in sites designated as SSSIs, SACs & SPAs, administered by the statutory nature conservation organisations (SNCOs: EN, SNH, CCW, EHS (NI)). The SNCOs have a duty to ensure that these sites retain their value. The current Government Public Service Agreement target is for 95% of SSSIs to be in favourable or recovering condition by 2010. Since ponds are often not the main reason for site designation (the recent designation of great crested newt SACs is a notable exception), monitoring has been limited. Increasing recognition of the contribution ponds make to the total habitat quality of a site and their value to the species for which sites are designated, will increase the need for standardised pond survey data.

At the national level the England Biodiversity Strategy identifies the threat to ponds, and aims to protect them through Local Biodiversity Action Plans (LBAPs), agri-environment schemes and the local planning process. The UK Biodiversity Standing Committee has accepted the scientific case for a new Habitat Action Plan (HAP) for “Ponds of High Ecological Quality”, and will consider its approval after BAP reporting in 2005. Monitoring will be required to assess the success of the England Biodiversity Strategy and any forthcoming Pond HAP.

Some pond sites are included in existing national HAPs and LBAPs for eutrophic standing waters, aquifer fed naturally fluctuating water bodies, blanket bog, coastal and floodplain grazing marsh and mesotrophic lakes. 57 local action plans include “standing open water and canals”. Many areas have LBAPs specifically for ponds which often require collection of pond data (e.g. Oxfordshire Pond HAP). Species Action Plans have also stimulated pond survey work (e.g. Starfruit and Tassel Stonewort). All of these can both contribute to and benefit from the NPMN.

## **2.5 Additional requirements for pond monitoring data**

There is currently no way to assess the overall quality of the UK’s ponds and any changes through time. This needs to be changed because of the statutory requirements described above, and the increasing recognition of the importance of ponds in maintaining freshwater biodiversity in the UK. Through promoting and co-ordinating monitoring and surveillance using standardised methods, and collating data, the NPMN will provide the information required to develop scientifically based national and local policy for pond conservation.

The Network will enable the effectiveness of measures to protect and enhance the freshwater environment to be tested, and will provide a valuable addition to State of the Environment reporting. It will allow comparison between local areas and other regions and determining the status of species of conservation concern (e.g. BAP species). It will also allow the location of high quality or threatened ponds to be identified providing a valuable local resource for planners, environmental organisations and members of the public.

The stimulation of survey activity and the collation of survey data will allow questions about the conservation management of ponds to be addressed. Monitoring will be required to measure the success of agri-environment schemes, the management of Sustainable Urban Drainage Schemes (SUDS), environmental impact assessments, mitigation success and pollution control measures. As well as assessing ecological quality monitoring will generate testable ideas and form the basis for more detailed studies. For example, monitoring data on the extent of diffuse pollution in ponds could stimulate experimental research on the effectiveness of buffer zones, low tillage systems or reduced fertiliser inputs in pond catchments. The Network will encourage investigation of the fundamental ecology of ponds. For example, Oxfordshire pond survey data have recently been used to investigate new theoretical approaches to reserve selection and conservation indicators (Briers 2002, Onal and Briers 2002, Briers and Biggs 2003).

Collection of pond data as part of a co-ordinated programme, and collating new and existing data into an accessible resource (see below) will meet the needs of, and be useful to, a wide variety of parties with an interest in ponds and pond species, including the following.

- DEFRA to report on the quality of an important component of the UK countryside, assess quality of life measures, assess agri-environment schemes etc.
- Government agencies with statutory responsibility to report on pond quality and pond species (Environment Agency, SEPA, EHS (NI), EN, CCW, SNH).
- UK BAP reporting process.
- Local authorities for biodiversity and local planning issues.
- Local record centres with an interest in species and habitats.
- Non Government Organisations with special interests (e.g. The Wildlife Trusts, Froglife, The British Dragonfly Society, The Mammal Society).
- Organisations whose land includes pond habitats and who are involved with their management (e.g. The Highways Agency, The National Trust, The Forestry Commission).
- A major resource for academic research.
- The public and groups working with the public and the environment (BTCV, Ponds for People), with associated quality of life benefits.
- An environmental educational resource for schools and other organisations.

## **2.6 Benefits of a co-ordinated approach**

### **2.6.1 Overview**

Numerous surveys of small standing water bodies are carried out in the UK each year by a range of organisations and individuals. At present, lack of co-ordination, quality control and standardisation means these are not used to their maximum value. A key objective of the Network is to overcome these current inefficiencies in use of resources, effort and data. Co-ordination of effort and the use of standardised methods and quality control procedures will create an effective partnership based national monitoring programme and complementary surveillance strategy.

### **2.6.2 Data creation and collation**

As well as stimulating new and higher quality work, the NPMN also aims to make better use of existing and new data through the creation of a central database, available through the Internet. It is estimated that survey data exist from 10-15,000 UK ponds, but these are in inaccessible reports and databases. The NPMN will archive existing and new datasets to make them publicly available through the project website and to feed into the National Biodiversity Network.

### **2.6.3 A centre for pond survey expertise**

The NPMN will create a focus for information on survey techniques, encourage standardisation of methods and provide training. The project will build on the methods developed for the National Pond Survey (NPS) run by the Ponds Conservation Trust. These provided the foundation for the DETR (now DEFRA) Lowland Pond Survey and the Environment Agency PSYM programme (see Appendix 4 for more details). Standard methods for other biotic surveys (e.g. amphibians, dragonflies) will be developed with partners. Standard methods will be promoted through the project website and training sessions on the methods will be held.

Standardisation and co-ordination will be encouraged through networking undertaken by the project. At present many pond survey projects occur independently from one another which creates a barrier to the use of standard methods. Networking will also increase the value of data collected by, for example, co-ordinating surveys in different areas to provide national coverage.

### 3. Vision: how the NPMN will work

#### 3.1 Overview

The working vision for the NPMN is defined by: (i) the types of survey and methods included, (ii) how data will be supplied to users and used to report on the state of the UK's ponds, (iii) the resources required for carrying out the work, and (iv) the timeframe for the project.

#### 3.2 Survey layers and types of data included

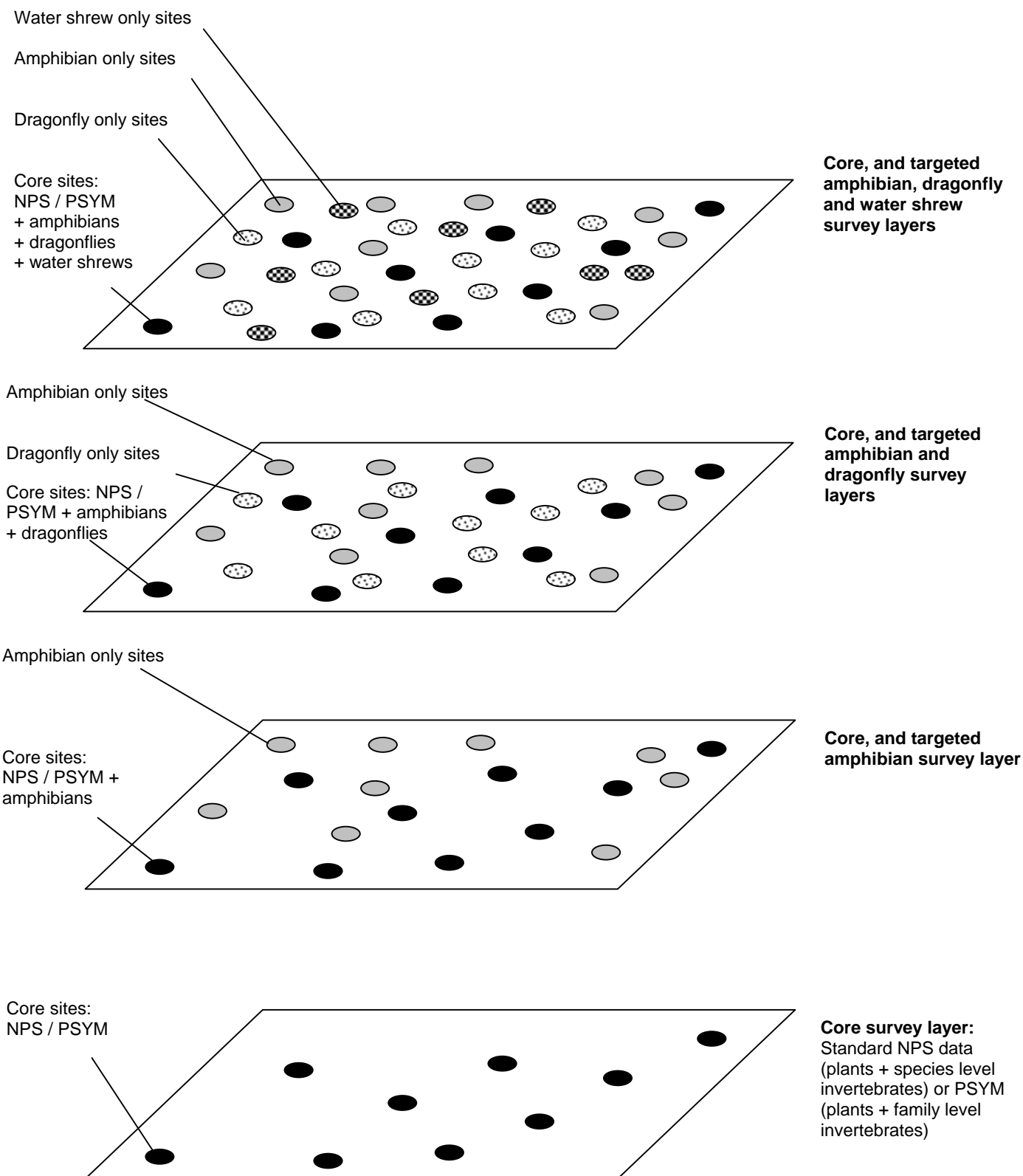
The Network will bring together pond survey data by building up survey layers of data from different sources (Figures 2 to 4). A survey layer may be defined by the type of survey (e.g. PSYM or amphibian surveys), or by the geographic area it covers (e.g. Wales or Scotland), or by the organisation resourcing it. The concept of survey layers allows many partners to contribute to the Network through independent, but centrally co-ordinated, survey activities, so if one partner withdraws from the Network, it still exists.

The Network will include three types of data. More details are given in Sections 4 to 6.

1. *The core monitoring programme* will be a formal programme of surveys repeated at regular intervals. It will have UK coverage with comprehensive surveys carried out on a stratified random sample of sites representative of the UK landscape. The core monitoring programme will provide trend information and answer policy questions about ponds at a national level.
2. *Targeted surveys* will address specific pond conservation questions (e.g. change in status of BAP species, impacts of pollution etc). Surveys will be co-ordinated through the Network to maximise the value of data collected, for example by being designed to collect data on additional taxa from core monitoring sites, or to address questions raised by the core monitoring programme.
3. *The pond inventory* will include information from as many ponds in the UK as possible, from basic names and location data to one-off comprehensive surveys for environmental impact assessments, or local surveys for BAP species.



*Figure 2. The core survey programme will be based on a stratified random sample of pond sites representative of the UK landscape, such as those used for the DEFRA Countryside Survey which surveyed 569 1km x 1km squares. A subset of 150 of these squares was used for the Lowland Pond Survey 1996 which provides data on pond physical features, water chemistry and wetland macrophytes. Further examples of how survey layers of data can be built up for the core monitoring programme and through targeted surveys are given in Figures 3 and 4.*



*Figure 3. Survey layers will be built up through targeted surveys focusing on specific groups of organisms or geographic regions. Overlapping layers will have core sites common to all surveys and additional sites with only data on specific biotic groups (e.g. amphibians, dragonflies). This will enable two types of analysis: (i) sites where data on all biotic groups are available can be used to answer comparative questions (e.g. Are ponds which are good for plants also good for water shrews, and so can we use the same assessment and management methods for both? Are amphibians and dragonflies affected by eutrophication as much as plants?) (ii) ponds from specific data layers can answer questions dealing just with that biotic group (e.g. Where are the best amphibian or dragonfly ponds? Which factors influence the distribution of water shrews?).*



Figure 4. Both core and targeted survey layers may be built up nationally or regionally.

### 3.3 Standard methods

The use of standard methods will allow comparison between datasets so that pond quality and species occurrence can be assessed in a national context.

Standard methods have been developed and widely applied for wetland plants and macroinvertebrates during the National Pond Survey (NPS), the DETR (now DEFRA) Lowland Pond Survey, and a number of regional pond surveys (e.g. Oxfordshire, Cardiff). The NPS methods were used as a basis for PSYM, the Predictive SYstem for Multimetrics, developed by the Environment Agency and the Ponds Conservation Trust. PSYM assesses the ecological quality of ponds by using a computer model to compare the observed state of a pond with that predicted for a reference non-degraded site with similar environmental variables e.g. location and altitude. This is valuable to put pond quality into context for national monitoring, to compare the quality of ponds in different areas and assess trends though time, and for a range of reporting purposes. Full details of the PSYM method are given in Appendix 4.

Standard survey methods are also available for certain other taxon groups. Survey components for which a national standard is not currently available will be developed with

NPMN partners with expertise in that area. Table 2 shows which standard methods exist and which need to be developed. The full suite of methods will be promoted as the UK standards for pond survey work and will be available through the NPMN website.

**Table 2. Methods for components of NPMN surveys.**

<b>Category</b>	<b>Module</b>	<b>Standard NPMN method available?</b>
Pond location and description	Site name & grid reference	NPS standard
	Description: including dimensions, etc	NPS standard
Physico-chemical data	Full environmental data	NPS standard
	PSYM analysis: 12 measurements required	PSYM standard
Aquatic plants	Full identification of all macrophyte species	NPS and PSYM standard
	Method for each taxon group of interest: BAP species / others	To be developed
Invertebrates	Full identification of macroinvertebrates to species level (except certain groups)	NPS standard
	PSYM method: identification to family level	PSYM standard
	Method for each taxon group of interest e.g. BAP species / dragonflies & damselflies / water beetles / microcrustaceans, etc	Beetles: Foster (2000) Others to be developed
Amphibians	Full: all amphibian species	Gent and Gibson (1998)
	Method for each taxa of interest e.g. BAP species / Great Crested Newt, etc	To be developed
Mammals	Method for each taxa of interest e.g. BAP species / water shrew / water vole, etc	Mammal Society
Historic / amenity	Historic / archaeological / amenity variables	NPS standard

### 3.4 Website and National Ponds Database

#### 3.4.1 Overview

The project website (via [www.pondstrust.org.uk](http://www.pondstrust.org.uk)) currently contains information on the project and PSYM. It will be developed to contain information on the Network, standard survey methods and survey forms, NPMN reports and to provide access to the database of pond survey information.

The National Ponds Database will provide access to a previously unavailable UK dataset of physico-chemical and biotic information about ponds and their locations. It will contain both pre-existing datasets and those collected as part of the NPMN. It will be available to all, but a password system will be used to restrict access to sensitive or commercial data. It will be a component of the National Biodiversity Network.

The database is currently being developed as part of the Ponds in Partnership project, and will be available and populated with a variety of existing data by December 2003.

#### 3.4.2 Pre-existing datasets

The database will initially be populated with the pre-existing datasets held by organisations involved in pond survey work. It is expected to include data from the National Pond Survey (NPS) held by the Ponds Conservation Trust (c. 500 sites), the Oxfordshire Pond Survey

(100 sites), the Tandridge Pond Survey (2000 sites), the Christleton (Cheshire) Pond Surveys (c. 200 sites) and the National Amphibian Survey (2000 sites) (Table 3 gives further examples). These datasets contain information on plants, invertebrates and amphibians and are typical of the types of existing survey data available. The most comprehensive data are from the NPS which contains information on plants, invertebrates and physico-chemical features of a stratified random survey of ponds in semi-natural and wider countryside areas.

### 3.5 Reporting

The NPMN database will enable reporting for a variety of purposes including the following.

- Regular formal reporting: the “state of the UK’s ponds” report giving trends in pond ecological quality across the UK and highlighting issues of concern.
- Reporting on specific parts of the Network e.g. to meet statutory responsibilities such as a report on the quality of ponds in protected areas.
- Increasing understanding of pond ecology, reporting on the results of in-depth analysis of the datasets (e.g. Onal and Briers 2002).
- Contributing to public understanding of the value of ponds through magazine articles for nature conservation, education, landowners and farmers.
- Maintaining and strengthening the Network through the publication of newsletter reports on the website for NPMN partners and users.

### 3.6 Resources

Phase 1 of the Ponds in Partnership project is funded by the Environment Agency and the Ponds Conservation Trust. This stage of the project will produce a ‘road-map’ for future development of the project focussing on the three following main data collecting activities.

1. *Development of the core monitoring programme* is likely to take several years as the full partnership and funding are built up. This work requires the continued support of a dedicated Project Officer. Separate resources are expected to be needed for the core monitoring survey.
2. *Targeted surveys* require co-ordination, training and support. It is likely that 5-10 such surveys would be in progress at any one time. In the first phase of the project, prior to extensive development of the Network, two projects have already been initiated, the Mammal Society water shrew survey and the New Forest Ponds Project. This work will also require continued support from a dedicated Project Officer.
3. *The pond inventory* will be created from many different surveys. Development of this dataset will again require dedicated time from a Project Officer.

Overall, the future requirements for resources can be resolved into:

- (a) on-going support for a PIP Project Officer to plan the core programme and co-ordinate targeted surveys and the pond inventory;
- (b) a long term resource commitment for the core monitoring programme.

### 3.7 Timeframe

Phase 1 of the Ponds in Partnership project, to develop the framework for the NPMN, runs from January 2002 until early 2004. By then the database, populated with existing data, will be accessible through the Internet. Initial PSYM training courses and partnership meetings will have been held and a significant number of partners will have joined the project.

Phase 2 of the project will develop the core national monitoring programme. Since this may be built up as a rolling programme it could take several years to be fully implemented. Phase 2 is therefore anticipated to run from 2004 – 2007. This phase will also see extensive development of the targeted survey programme and the pond inventory dataset, and the expansion of the Network to involve the public and as an educational resource.



## **4. The core monitoring programme**

### **4.1 Overview**

The National Pond Monitoring Network will bring together three complementary types of pond data, the core monitoring programme, targeted surveys and the pond inventory. This section describes plans for the core monitoring programme.

### **4.2 Characteristics of the core monitoring programme**

The core monitoring programme will be a statistically rigorous national monitoring programme repeated at regular intervals. The detailed specification for the programme will be developed in partnership with the organisation(s) which support the work. The issues involved in developing a national survey strategy for small water bodies are explored in detail in the Environment Agency Biological Techniques of Still Water Quality Assessment Phase 1 Scoping Study (Williams *et al.* 1996) and the Lowland Pond Survey scoping study (Biggs *et al.* 1996).

The core monitoring programme will have the following characteristics.

- National coverage.
- Large number of sites (at least 500).
- Carried out by trained accredited surveyors.
- Fully quality assured.
- Use of standard NPMN methods.
- At minimum, use of the PSYM method for surveying plant, invertebrate and physico-chemical variables to give an assessment of pond ecological quality.
- Stratified random site selection to be representative of the UK's land classes.
- Preliminary investigation to determine statistical power to detect change (the datasets required for this are available through existing NPS data held by the Ponds Conservation Trust).
- Repeated at regular intervals (every 6 years?).
- Will be the basis for reporting on the quality of the UK's ponds.

### **4.3 Questions addressed by the core monitoring programme**

The core monitoring programme will assess the ecological quality of the UK's ponds and detect any trends through time. The specific questions addressed include the following.

- What is the quality of ponds in the UK; is it improving or declining? This will include ponds in the countryside, in urban areas, in protected sites, and community ponds. Each category will be assessed individually and in combination.
- To what extent have alien species invaded the UK's ponds?
- Are ponds designated as typical of the UK's small standing waterbody resource for Water Framework Directive purposes meeting the required quality standards?
- Are pond numbers changing nationally or regionally?
- Is the quality of new ponds an adequate replacement for the many ponds being destroyed?
- Can policy recommendations be made based on the relationship between pond quality and other variables such as land use?

## **4.4 Survey strategy**

### **4.4.1 Site selection**

Detailed development of the survey strategy will ensure that the core monitoring programme has sufficient statistical power to answer the questions above. It is likely that the sites will be mainly selected by a stratification which is representative of the UK land use types.

One possible contribution to the core programme is for a pond quality element to be included in future DEFRA Countryside Surveys. 569 1 km x 1 km squares were surveyed for Countryside Survey 2000 which included counts of the number of ponds in each square. 150 of these squares were also surveyed for wetland plants and environmental variables for the Lowland Pond Survey in 1996 (Williams *et al.* 1998b). Repeat surveys of the 1996 squares would give, for the first time, an indication of change in pond quality in lowland Britain. However, in order to fully assess changes in UK pond quality the survey area will need to be extended to other areas included in the Countryside Survey, and also to urban areas and, potentially, Northern Ireland.

### **4.4.2 Surveyors**

Surveyors for the core monitoring programme will be trained and accredited. Training and quality control of the survey teams work will be undertaken by partner organisations.

### **4.4.3 Survey methods**

The standard NPMN methods outlined in Table 2 will be used and will include, at a minimum, collection of comprehensive wetland plant, macroinvertebrate and physico-chemical data.

The PSYM method (the Predictive SYstem for Multimetrics, see Appendix 4 for more details) has been developed specifically as a standard survey method to assess pond ecological quality based on plant, macroinvertebrate and physico-chemical data. PSYM will be recommended as the minimum level of survey for core monitoring. In addition, collection of full environmental data and identification of macroinvertebrates to species level will be recommended to give a full assessment of the UK's pond habitats and pond species. Surveys of groups of interest including amphibians, mammals, zooplankton and fish will be undertaken with partner involvement.

### **4.4.4 Quality Assurance**

Quality assurance methods will be developed which will include repeat survey, repeat invertebrate sorting and identification, and repeat data entry on 10% of the survey sites.

### **4.4.5 Reporting**

Datasets produced will form the basis for regular "state of the UK's ponds" reports which will be produced as part of the monitoring cycle. The programme will enable research into specific questions. Findings will be published as scientific papers and promoted more widely to the public and policy makers. Copies of all reports will be available on the project website.

## **4.5 Resourcing the core monitoring programme**

The core monitoring programme requires a commitment to large scale repeat sampling. This can be done either through a single large scale programme resourced through a national organisation, or by building up component survey layers, each resourced by a partner organisation, which in combination provide national stratified coverage.

Layers could be provided by organisations with an interest in monitoring for different purposes e.g. the Environment Agency and SEPA may run Water Framework Directive monitoring programmes, while the Statutory Nature Conservation Organisations could survey ponds in designated sites. However, the core programme must be sufficiently robust that if one partner's contribution is withdrawn the remaining programme is still able to provide the required data.

## **5. Targeted surveys**

### **5.1 Overview**

The National Pond Monitoring Network will bring together three complementary types of pond data, the core monitoring programme, targeted surveys and the pond inventory. This section describes plans for the targeted survey programme.

Targeted surveys are a critical component of the NPMN since they will address specific questions of concern for the conservation and management of ponds and the occurrence of key species. They may address issues of interest to partner organisations or be stimulated by data from core monitoring. Although co-ordinated through the Network they will be undertaken independently by partner organisations and so may involve members of the public as volunteer surveyors.

### **5.2 Characteristics of targeted surveys**

Targeted surveys will be designed in collaboration with partners in the NPMN to address specific questions of interest to the partner organisation.

Characteristics of the targeted surveys are as follows.

- Designed to co-ordinate with other NPMN surveys to maximise the value of data.
- Use standard NPMN methods.
- Are carried out by NPMN partner organisations.
- Use a statistically rigorous approach where appropriate.
- Include an element of quality control.
- Enable reporting on the state of the UK's ponds or on questions important to the NPMN.

### **5.3 Questions addressed by targeted surveys**

Targeted surveys will address questions of interest that may be complementary to, or independent from, the core monitoring programme, including the following examples.

- Are ponds in protected areas reaching the required standards e.g. are those designated as SSSIs meeting the statutory targets for "favourable condition"?
- How does the distribution and abundance of taxa of interest relate to pond quality or specific characteristics of the site?
- Are agri-environment schemes benefiting ponds?
- What is the impact of climate change?
- How widespread and damaging are invasive alien species?
- How can any adverse changes in pond quality be ameliorated?
- What characterises appropriate management of ponds for different purposes such as biodiversity, recreation, and pollution amelioration?
- Are taxa of interest (e.g. BAP species) using ponds increasing or declining?

### **5.4 Additional value from targeted surveys**

Co-ordination of planning of surveys by partner organisations can increase the value of the national pond data resource. This can be by addressing questions which are complementary to the core monitoring programme, by building on existing datasets, or by initiating new independent national survey layers as described in the following examples.

#### **5.4.1 Targeted surveys to be complementary to the core monitoring programme**

Targeted surveys will address issues which are not fully investigated by the national core monitoring programme, or which data from the core programme suggest need further study.

e.g. 1 If core monitoring showed certain pond species to be in decline this could stimulate intensive studies in the areas affected, or studies repeated at more frequent intervals than the core programme.

e.g. 2 To assess the impact of a single factor such as agri-environment schemes. The core programme will assess the combined impact of factors which affect pond quality, and will include sites affected by agri-environment schemes, so will give an indication of their impact. However, statistically rigorous assessment will need a targeted survey designed for that purpose, probably in a local area.

#### **5.4.2 Targeted surveys to build on existing datasets**

The value of data collected will be increased by co-ordinating surveys for different purposes at sites on which data are already held to create comprehensive data sets.

e.g. 1 This process has started with surveys for different taxon groups at c. 500 National Pond Survey (NPS) sites in England and Wales for which data layers are already held on wetland plants, aquatic invertebrates and physico-chemical data. Further survey layers are being collected from these sites for water shrews (by the Mammal Society), microcrustacea (Syngenta / Oxford Brookes University), and plans are underway to include amphibian data (possibly through the National Amphibian and Reptile Recording Scheme proposed by Froglife and the Herpetological Conservation Trust). These ponds are equally divided between minimally impaired sites and those more typical of the wider countryside, and so provide a basic classification of each site and a comprehensive dataset as tools for interpreting findings. Additional surveys at these sites will give a fuller picture of the biodiversity value of UK ponds.

e.g. 2 Co-ordination of plans for survey activity could result in large amounts of extra data being collected for minimal extra effort if surveyors collect more than one type of data at a site visit, e.g. if amphibian surveyors also surveyed for bats, or dragonfly surveyors sent charophytes for identification.

#### **5.4.3 Targeted survey layers of independent “national” surveys**

The value of data can be maximised if national datasets on different components of the pond habitat are collected in a consistent but independent way so they can be analysed together as a series of survey layers (see Figures 2, 3 and 4). The NPMN will promote a standard strategy for survey design to provide a consistent method of stratified random site selection.

e.g. 1 Figure 4 shows how survey layers, each with coverage of one country within GB can be built up to give full coverage of the UK mainland. This approach could also be taken for geographic areas such as counties, vice-counties or areas covered by different partners.

e.g. 2 Survey layers could include surveys of different groups of organisms, the physico-chemical variables, history, archaeology, or amenity value of ponds, to build up a broad dataset on the UK's ponds. Targeted surveys for different pond attributes can then be analysed as a series of survey layers, and used to make comparisons of the results of different types of pond surveys.

### **5.5 High quality data from targeted surveys**

A key objective of the NPMN is to increase the quality and reliability of pond data. The standard methods promoted through the Network will include quality assurance measures to be carried out by the partner organisations. Recommendations will include:

- training and accreditation of survey staff in methods used;
- repeat surveys by independent surveyors;
- quality control of laboratory procedures (e.g. checking of invertebrate samples);
- data quality checks such as having a certain proportion of data entered in duplicate.

## 6. The pond inventory

### 6.1 Overview

The National Pond Monitoring Network will bring together three complementary types of pond data, the core monitoring programme, targeted surveys and the pond inventory. This section describes plans for developing the pond inventory.

The core monitoring programme and targeted surveys will only cover a small proportion of the UK's pond resource, so the pond inventory dataset will give the National Ponds Database wider coverage. It will be built up from all available data, and will include information which is not part of the NPMN planned approach. By combining datasets from national surveys to one-off consultancy projects the pond inventory will provide information for a large number of ponds, and help identify ponds of biodiversity interest or conservation concern.

### 6.2 Characteristics of the pond inventory

The pond inventory will include a wide variety of data including surveys organised by individuals and organisations for their own purposes. These will range from the names and locations of pond sites to more detailed studies which address specific questions. Inventory data will identify sites for future targeted surveys and potentially for verifying Ordnance Survey maps. Regional surveys and surveys of specific pond types will contribute information on the distribution of high quality ponds, the occurrence of species of conservation concern and the quality of ponds in specific districts.

Datasets provided by partner and affiliated organisations will include:

surveys of particular types of ponds (e.g. SUDS ponds / non-degraded ponds / aggregate extraction sites / community ponds / ponds with archaeological, historical or amenity value);

regional or local surveys from a defined geographic area;

surveys for particular species or groups of interest (e.g. BAP species, dragonflies, water beetles).

Data sources could range from a single Environmental Impact Assessment (EIA) with no commitment to resample, to large scale existing datasets. For example Safeway and EXEL recently funded a survey by Warwickshire Wildlife Trust of 120 ponds for plants and amphibians stimulated by an EIA. Table 3 gives examples of existing survey datasets.

*Table 3. Examples of surveys which will contribute to the pond inventory dataset*

Area	Survey title	Year	Number of sites
Christleton, Cheshire	Christleton Pond Survey Phase I and II	1971 & 1998	150 & 80
Clywd	Clywd Pond Survey	1985	250
Hertfordshire	Hertfordshire Pond Survey	1986	150
Lancashire	Oldham Pond Survey	1995	200
Oxfordshire	Oxfordshire Pond Survey	1988-1990	100
Surrey	Tandridge Pond Survey	1985-1990	2000
National Amphibian Survey	England, Wales and Scotland	1990-1993	2000
Dorset	Dorset Ball Clay Ponds Research Study	1985	15
West Dorset	West Dorset Pond Survey	1992	15
Warwickshire	Safeway / EXEL funded plant and amphibian survey	2002	120

### **6.3 Questions which can be addressed by the pond inventory**

The pond inventory will be used to answer questions including the following.

- Where are ponds of high ecological quality / conservation interest located?
- Which ponds support taxa of interest, particularly species of high conservation concern?
- Which ponds have high archaeological, historical or amenity value?
- Are ponds shown on maps still there?

Answering these questions does not require a statistically rigorous approach, but does require similar data to be brought together from a wide variety of surveyors and sources. The availability of these data will also act as an impetus for repeat surveys on a local or taxon specific basis.

### **6.4 Maximising the value of the pond inventory**

The value to the National Pond Monitoring Network of inventory type survey work will be optimised by the following activities.

- Promoting the National Pond Monitoring Network widely and regularly to ensure that organisations and individuals carrying out surveys are aware of the Network and make contact.
- Arranging meetings with organisations planning pond surveys to encourage the use of standard NPMN survey methods and quality assurance.
- Ensuring that, where possible, surveys use standardised methods to gather data that can be readily incorporated into the NPMN database for comparative purposes.
- Providing training for survey staff to maximise data quality and compatibility.
- Where data are compatible and fit in with the stratified survey design, they may be included as part of survey layers.

## **7. Partners – a collaborative approach**

### **7.1 Overview**

The National Pond Monitoring Network aims to bring together as partners the organisations and individuals involved in carrying out pond survey work in order to make the most effective use of data collection. The partnership approach will allow surveys to be designed to give national and comprehensive coverage through the involvement of organisations with an interest in specific pond species, habitat types or geographic regions. It will involve the wealth of enthusiasm and expertise of volunteers and get the most value out of the effort, resources and funds spent on pond survey work.

### **7.2 Ways to become involved**

Interested parties can become a partner in the project by contributing data on ponds or pond species to the NPMN, and through optional involvement in other NPMN activities.

A range of partners will also be invited to join the project board which will enable them to influence the future direction of the programme and its reporting. This is the appropriate route for organisations that may be providing funding for the project or are likely to run major surveys, and for agencies with a responsibility for ponds and pond species in order for them to use the NPMN to meet their obligations.

### **7.3 Options for partnership**

The degree of involvement in the NPMN will be tailored to the needs of each partner organisation. The variety of options for partnership include the following:

- collaboration in pond survey work;
- application for joint funding for survey activity;
- consultation with the NPMN in survey design and planning;
- input into development of NPMN standard methodologies;
- adoption as standards of NPMN methodologies;
- contribution of existing survey data to the database;

conversion of data into a suitable format for the database.

### **7.4 Benefits of partnership**

The potential benefits for organisations of partnership with the NPMN include the following:

- association with the national focus for pond survey data;
- maximising value of data available by co-ordination with other NPMN surveys;
- access to training courses, obtaining technical support and increased access to resources;
- access to reports produced by NPMN staff;
- benefits for ponds and pond species of improved pond information and protection.

### **7.5 Partnerships underway and under discussion**

A full list of current and potential partners is given in Appendix 1, including details of organisations and projects involved either in partnerships that are underway or under discussion.

## **NPMN Strategy Appendix 1: Partners and potential partners**

Partnerships currently underway or under discussion

**The Mammal Society** is currently undertaking a national water shrew survey. As part of this project surveys of water shrews will be undertaken at National Pond Survey sites for which comprehensive datasets are held by PCT (c.500 ponds in England, Wales and Scotland) to provide baseline data on the occurrence of water shrews in UK ponds. Volunteers leave baited plastic tubes at a variety of habitat types and send tubes in which faeces have been left to a lab for identification. The plant, invertebrate and environmental data held by Ponds in Partnership on these sites will be useful in interpreting water shrew findings, while the water shrew data will feed into the NPMN database.

**The New Forest Ponds Project** is a pilot project for volunteer involvement in the NPMN. The project aims to identify high value ponds in the New Forest by locating sites supporting BAP species and other species of conservation concern. The project is being undertaken by Hampshire and Isle of Wight Wildlife Trust, the Natural History Museum, the Forestry Commission and others, with field survey work to be undertaken by volunteers. The project will produce a database of existing and new survey data for the New Forest and will act as a test-bed for inventory type surveys undertaken by volunteers in the NPMN. Surveys for species of interest will be carried out in 2003.

**Ponds for People**, The Ponds Conservation Trust's community action programme, which will eventually cover the whole of the UK, provides technical advice (including surveys) and funding to community groups working on ponds. In the course of Ponds for People a considerable amount of survey work on ponds is being undertaken. These data will be available to the NPMN and will use NPMN standard methods.

**The National Amphibian and Reptile Recording Scheme (NARRS)** is being proposed by Froglife, The Herpetological Conservation Trust, and the Herpetofauna Groups of Britain and Ireland. A draft Memorandum of Understanding has been prepared so that (i) NPMN and NARRS undertake joint work to design a national amphibian monitoring programme, (ii) NARRS amphibian data are available to the NPMN and (iii) other biological and physico-chemical data generated in the NPMN are available to NARRS.

**The British Dragonfly Society (BDS)** undertakes a wide range of survey work on Britain's dragonflies, the majority of which can be found in ponds. Initial discussions with BDS indicate that it is keen to participate in the NPMN, particularly through the development and implementation of standard methods for pond surveys of adult dragonflies and damselflies. Plans for collaboration in survey work are under discussion.

**The British Trust for Conservation Volunteers (BTCV)** run many volunteer-based practical pond conservation programmes, particularly Pond Warden schemes in southern England. Pond Wardens collect a wide variety of information about ponds and discussions are currently underway with BTCV about the ways in which these volunteers will be involved in the NPMN.

**The Bat Conservation Trust** has been involved in initial discussions about collaborating with the NPMN. Preliminary studies indicate that a high proportion of pond sites are used by bats, both as a source of water and as a source of invertebrates for food.



### **Organisations represented on the project board**

The Countryside Council for Wales / Cyngor Cefn Gwlad Cymru (CCW)  
The Department for Environment, Food and Rural Affairs  
English Nature  
Environment and Heritage Service, Northern Ireland  
The Environment Agency  
The National Amphibian and Reptile Recording Scheme (NARRS)  
The Ponds Conservation Trust  
The Scottish Environment Protection Agency

### **Organisations to be invited to become partners in the NPMN**

Academic research groups  
Balfour-Browne Club  
BAP groups for species associated with ponds  
Bat Conservation Trust  
Botanical Society of the British Isles  
British Dragonfly Society  
British Herpetological Society  
Buglife – The Invertebrate Conservation Trust  
British Trust for Conservation Volunteers  
Centre for Ecology and Hydrology  
The Centre for Environmental Data and Recording (Northern Ireland)  
Commercial consultants  
Commercial sponsors (e.g. Safeway and EXEL funded plant and amphibian surveys of 120 ponds by Warwickshire Wildlife Trust following Great Crested Newt mitigation at their logistics site.)  
Countryside Agency  
Educational Groups  
Farming and Wildlife Advisory Group  
Forestry Commission  
Freshwater Biological Association  
Froglife  
FreshwaterLife  
Herpetofauna Groups of Britain and Ireland  
Herpetological Conservation Trust  
Highways Agency  
Joint Nature Conservation Committee  
LBAP groups which recognise the UK broad habitat type “standing open water and canals”, or have local HAPS for ponds  
Local Authorities (County Councils & District Councils)  
Local Record Centres  
Ministry of Defence: Defence Estates  
National Biodiversity Network  
National Trust  
Plantlife  
Royal Society for the Protection of Birds  
Scottish Natural Heritage  
Water Authorities  
Wildfowl & Wetland Trust  
Wildlife Trusts, both nationally and through each local Trust  
Woodland Trust

## **NPMN Strategy Appendix 2: Ponds included in the Network**

### **Definition of a pond**

The Ponds Conservation Trust working definition of a pond is “a body of standing water between 1 m<sup>2</sup> and 2 ha in area which usually holds water for at least four months of the year”. (Ponds Conservation Group 1993). However the inclusion of ponds down to this small size has implications for effective resource management for surveys, and previous national surveys have used a lower size limit of 25 m<sup>2</sup> as recommended in the scoping study for the Lowland Pond Survey (Biggs *et al.* 1996).

### **Types of ponds to be included in the National Pond Monitoring Network**

Ponds in designated areas e.g. SSSIs, cSACs etc

Ponds in areas of semi-natural land use e.g. unimproved grassland, woodland, lowland heathland

Countryside / farm ponds including dew ponds

Urban ponds

SUDS ponds

Ponds created / managed through agri-environment schemes: Environmentally Sensitive Areas, Tir Gofal (Wales), Countryside Stewardship (England)

Fishing ponds

Aggregate extraction sites (e.g. gravel pits)

Special historical categories e.g. mill ponds, marl pits, moats

Road run-off ponds

Irrigation ponds

On-line ponds

Golf course ponds

Representatives of Water Framework Directive river basins

Community / school ponds

### **NPMN Strategy Appendix 3: Biodiversity Action Plan Species**

The UK Government's Biodiversity Action Plan defines species and habitats in need of protection. BAP species are a priority for action by statutory nature conservation organisations and other environmental bodies. Surveys of BAP species are important because they are rare or threatened plants and animals, and funding may be available to help with monitoring and protection.

A regularly updated list of BAP species is maintained on the UK Biodiversity website [www.ukbap.org.uk](http://www.ukbap.org.uk). The following BAP species are associated with ponds. Where there is no English species name the Latin name is given first, followed by the name of the group to which the species belongs (e.g. 'a diving beetle'). The list includes some species now living only in ditch systems and other pond-like habitats (e.g. in the Somerset Levels), though all were found in ponds in the past (e.g. the Little Whirlpool Ram's-horn Snail). Species associated with pond margins are also included.

#### **Mosses**

Violet Crystalwort (*Riccia huebeneriana*)

Sea Bryum (*Bryum warneum*)

Long-leaved Threadmoss (*Bryum neodamense*)

#### **Vascular plants**

Pillwort (*Pilularia globulifera*)

Ribbon-leaved Water-plantain (*Alisma gramineum*)

True Fox-sedge (*Carex vulpina*)

Starfruit (*Damasonium alisma*)

Dune Gentian (*Gentianella uliginosa*)

Pygmy Rush (*Juncus pygmaeus*)

Cut-grass (*Leersia oryzoides*)

Fen Orchid (*Liparis loeselii*)

Floating Water-plantain (*Luronium natans*)

Pennyroyal (*Mentha pulegium*)

Slender Naiad (*Najas flexilis*)

Grass-wrack Pondweed (*Potamogeton compressus*)

Three-lobed Water-crowfoot (*Ranunculus tripartitus*)

Greater Water-parsnip (*Sium latifolium*)

#### **Stoneworts**

Convergent Stonewort (*Chara connivens*)

Lesser Bearded Stonewort (*Chara curta*)

Slender Stonewort (*Nitella gracilis*)

Dwarf Stonewort (*Nitella tenuissima*)

Starry Stonewort (*Nitellopsis obtusa*)

Tassel Stonewort (*Tolypella intricata*)

Great Tassel Stonewort (*Tolypella prolifera*)

#### **Invertebrates**

*Donacia aquatica* (a reed beetle)

*Donacia bicolora* (a reed beetle)

*Badister collaris* (a ground beetle)

*Badister peltatus* (a ground beetle)

*Dyschirius angustatus* (a ground beetle)

*Pterostichus aterrimus* (a ground beetle)

*Pterostichus kugelanni* (a ground beetle)

*Bidessus minutissimus* (a diving beetle)  
*Bidessus unistriatus* (a diving beetle)  
*Dromius sigma* (a ground beetle)  
Spangled Water Beetle (*Graphoderus zonatus*)  
*Helophorus laticollis* (a water scavenger beetle)  
Lesser Silver Water Beetle (*Hydrochara caraboides*)  
*Hydrochus nitidicollis* (a beetle)  
*Hydroporus cantabricus* (a diving beetle)  
*Hydroporus rufifrons* (a water beetle)  
*Laccophilus poecilus* (a diving beetle)  
*Paracymus aeneus* (a water scavenger beetle)  
Southern Damselfly (*Coenagrion mercuriale*)  
*Melanapion minimum* (a weevil)  
*Eristalis cryptarum* (a hoverfly)  
Little Whirlpool Ram's-horn snail (*Anisus vorticulus*)  
Sandbowl Snail (*Catinella arenaria*)  
Glutinous Snail (*Myxas glutinosa*)  
Fine-lined Pea Mussel (*Pisidium tenuilineatum*)  
Shining Ram's-horn (*Segmentina nitida*)  
Medicinal Leech (*Hirudo medicinalis*)  
White-clawed Crayfish (*Austropotamobius pallipes*)  
Freshwater Tadpole Shrimp (*Triops cancriformis*)  
*Lophopus crystallinus* (a freshwater bryozoan)  
Fen Raft Spider (*Dolomedes plantarius*)  
Lesser Water Measurer (*Hydrometra gracilentata*)  
*Prostoma jenningsi* (a freshwater nemertean)

### **Vertebrates**

Natterjack Toad (*Bufo calamita*)  
Pool Frog (*Rana lessonae*)  
Great Crested Newt (*Triturus cristatus*)  
Reed Bunting (*Emberiza schoeniclus*)  
Water Vole (*Arvicola terrestris*)  
Otter (*Lutra lutra*)  
Barbastelle Bat (*Barbastella barbastellus*)  
Bechstein's Bat (*Myotis bechsteinii*)  
Greater Mouse-eared Bat (*Myotis myotis*)  
Pipistrelle Bat (*Pipistrellus pipistrellus*)  
Greater Horseshoe Bat (*Rhinolophus ferrumequinum*)  
Lesser Horseshoe Bat (*Rhinolophus hipposideros*)

## **NPMN Strategy Appendix 4: PSYM, the Predictive SYstem for Multimetrics**

### **Overview**

Ponds in Partnership aims to establish the PSYM (Predictive SYstem for Multimetrics, pronounced “sim”) method as the standard pond survey method throughout England and Wales. PSYM is a reference based system which integrates macrophyte species and macroinvertebrate family information. It is compatible with Water Framework Directive requirements, and is suitable for other reporting purposes. PSYM is valuable for giving a national context to pond survey data, whether from a national survey or a single local BAP survey. The PSYM survey method is currently being proposed by PCT for adoption as a European Standard.

The PSYM model was developed by the Environment Agency and the Ponds Conservation Trust (PCT) to provide a standard indicator of quality for standing water bodies of up to 5 ha. PSYM methods have been developed for ponds and canals, but here only the pond method will be referred to. An assessment of pond quality can be made using either macrophytes or macroinvertebrates, though ideally both should be used.

### **Monitoring the quality of ponds using PSYM**

#### **Introduction**

PSYM has been developed to provide a method for assessing the biological quality of still waters in England and Wales.

The method uses a number of aquatic plant and invertebrate measures (known as metrics)<sup>1</sup>, which are combined to give a single value which represents the waterbody’s overall quality status.

Using the method involves the following steps.

1. Simple environmental data are gathered for each waterbody from map or field evidence (area, grid reference, geology etc).
2. Biological surveys of the plant and animal communities are undertaken and net samples are processed.
3. Biological and environmental data are entered into the PSYM computer programme which:
  - (i) uses the environmental data to predict which plants and animals should be present in the waterbody if it is undegraded;
  - (ii) takes the observed plant and animal lists and calculates a number of metrics<sup>1</sup>.

Finally the programme compares the predicted plant and animal metrics with the observed survey metrics to see how similar they are (i.e. how near the waterbody currently is to its ideal / undegraded state). The metric scores are then combined to provide a single value which summarises the overall ecological quality of the waterbody. Where appropriate, individual metric scores can also be examined to help diagnose the causes of any observed degradation (e.g. eutrophication, metal contamination).

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<sup>1</sup>Metrics are variables such as species richness or rarity which can be used to help identify how damaged a waterbody’s community is. These were selected as they have been shown to have a strong relationship with degradation.

## **Background**

### **Why was the method developed?**

Historically, the Environment Agency and other statutory bodies have undertaken relatively little monitoring of still waters (lakes, ponds, canals, ditches etc). The absence of a standardised method was a major barrier to the assessment of these waterbodies.

The PSYM methodology provides a standard assessment method for still waters which enables a variety of organisations involved in waterbody management to consider water quality in a broad national context. It provides the Environment Agency with a means to assess still water quality for General Quality Assessment (GQA) and other reporting purposes, and is also suitable for use for the type of ecological quality reporting required by others such as DEFRA or English Nature. The method also enables public or private sector NGOs (e.g. consultants, community groups) to improve general standards of assessment in waterbody management plans or environmental impact assessments, and provides a means of assessing management techniques.

### **About PSYM**

PSYM is a waterbody quality assessment methodology which essentially combines the predictive approach of RIVPACS<sup>2</sup> with multimetric-based methods used for ecological quality assessment in the United States.

In multimetric assessments, a range of variables (metrics) each related to degradation is used to assess water quality giving a broad-based assessment of quality. The values from individual metrics are combined to give a single measure which aims to represent the overall ecological quality of the waterbody. Combining this with predictive techniques gives a powerful method for comparing waterbodies of any type with their undegraded counterpart.

The PSYM method directly parallels the approach defined in the EC Water Framework Directive. This requires (i) comparisons with minimally impacted baseline conditions, and (ii) assessments to be based on multiple parameters related to degradation.

### **Which waterbodies can be monitored using the method?**

The PSYM approach is potentially applicable to all still waterbody types (e.g. lakes, ponds, temporary ponds, canals). However, to apply the method, specific data need to be collected from each waterbody type. These data are used both to (i) develop equations which can be used to predict the species which should occur at an undegraded site and (ii) to identify which biotic measures (e.g. species richness, ASPT) are the most effective at tracking degradation in that waterbody type.

So far, the method has been developed for use on two still waterbody types (i) canals (ii) ponds and small lakes (up to about 5 ha in area). An extension of the method for temporary ponds is currently being developed independently by PCT with support from the Freshwater Biological Association. Methods have not, so far, been developed for assessing the quality of large lakes, ditches or brackish waters.

The baseline dataset used to develop the metrics for ponds was based on survey data from sites with broad coverage of England and Wales from a wide range of altitudes (0-550m), and land types (representative coverage of ITE land classes), so the resulting model is suitable for sites across England and Wales.

### **Why assess water quality using both plants and invertebrates?**

Ideally, PSYM should use information from both the plant and animal communities present in a waterbody. This is because, together, plants and animal groups span a complementary range of sensitivities to potential degradation factors. Plants are, for example, particularly sensitive to waterbody nutrient status, whereas animals typically exhibit greater oxygen

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<sup>2</sup>RIVPACS. The River InVertebrate Prediction And Classification System, developed by the Institute of Freshwater Ecology and the Environment Agency (Wright *et al.* 1984, Wright 1995).

sensitivity. Combining a plant and animal group from these assemblages gives a range of taxa which span a number of trophic levels, occupy a variety of waterbody habitats (e.g. can be found in the littoral zone and open water) and are long-lived, so that they can provide a temporally and spatially integrated measure of the current ecosystem state.

Although PSYM pond quality assessments should be made using both plant and invertebrate assemblages, a partial assessment can be made using just one assemblage if necessary. If this is the case, macroinvertebrates are likely to be the best single choice of organisms for assessing overall waterbody quality. Macrophytes, however, have the advantage of being very quick to survey and can be used, if necessary, as a rapid bio-assessment method.

### **How are the plant and invertebrate metrics chosen?**

Metrics are biological measures (such as taxa richness) which vary with anthropogenic degradation and can, therefore, be used to measure the extent of ecosystem degradation. The concept underlying multimetric assessment is that by using a number of different measures and summing these together, an overall assessment of environmental degradation can be made.

Metrics are chosen by correlating known degradation gradients (nutrient levels, heavy metal levels, presence of road runoff etc) with a wide list of *possible* test metrics (e.g. family richness, number of exotic species, EPT (number of Ephemeroptera, Plecoptera and Trichoptera families)). The 'test' list is narrowed-down to a list of viable metrics by looking at the significance of relationships between each potential metric and anthropogenic degradation gradients.

For invertebrates, metrics were tested at both species and family level. In practice, there were generally at least equally strong correlations between family-level macroinvertebrate metrics and degradation as there were between species-level metrics and degradation, so the family-level data is used. Plant metrics are generally based on species level information.

Analyses have shown that the most effective metrics for assessing environmental degradation in ponds are (i) for invertebrates: average score per taxon (ASPT), the total number of dragonfly (Odonata) and alderfly (Megaloptera) families, and the total number of beetle (Coleoptera) families, (ii) for plants: number of submerged and emergent plant species, trophic ranking score for aquatic and emergent plants, and number of uncommon species.

### **Which physical and chemical variables are used in the predictions?**

As in RIVPACS, the PSYM method assesses quality by comparing actual and predicted quality scores for each waterbody. The predictions of unimpaired waterbody quality are made using physico-chemical data gathered from the waterbody.

In ponds the main predictors of unimpaired community type fall into nine major variable categories. Of these, three are relatively invariant (e.g. grid reference, altitude, base geology) which need only be assessed once. The remaining six categories of variables require on-site field measurement when each assessment is made. These are area, pH, shade, grazing, presence of an inflow and emergent plant cover.

### **How are metrics scored?**

When a waterbody is assessed, each individual metric is calculated and compared to the computer predicted score for that metric. The relationship between observed and expected is presented as a percentage of similarity, and then transformed to a 4 point scale e.g. 0, 1, 2 and 3 where 0 represents poor quality, and 3 represents good quality (i.e. no deviation from expected). All metric scores are then summed to give an overall quality index, which is presented as a percentage of the maximum score and, potentially, forms the basis of General Quality Assessment (GQA) categorisation of a site.

## What predictions are made?

In order to calculate predictions for these metrics the PSYM model predicts which taxa will be found at a site. An example of a predicted and observed taxa list is given below.

### Diagnosis

The main objective of the PSYM method is to assess the overall condition of freshwater ecosystems. The system does not, in itself, diagnose the cause, or causes, of degradation. Indeed it is considered inappropriate for a general quality assessment method to be biased towards the evaluation of a single impact. However, there is considerable potential for data to be re-interpreted to diagnose the causes of degradation. Individual metrics can indicate aspects of water quality and the raw data can be reanalysed to give pollution indices, such as trophic scores or acidification indices.

### Example results from PSYM use

#### Predicted (probability of occurrence) and observed taxa lists for pond plants and macroinvertebrates for Asham Meads field pond, Oxfordshire (survey in summer 1991).

Species	Predicted	Observed	Species	Predicted	Observed
<b>Plants</b>			<b>Macroinvertebrates</b>		
<b>Emergent and submerged</b>			<i>Lymnaeidae</i>	1.00	✓
<i>Agrostis stolonifera</i>	0.50	✓	<i>Hydrobiidae</i>	1.00	
<i>Juncus effusus</i>	0.49	✓	<i>Planorbidae</i>	1.00	✓
<i>Epilobium hirsutum</i>	0.42	✓	<i>Glossiphoniidae</i>	1.00	✓
<i>Solanum dulcamara</i>	0.41	✓	<i>Coenagriidae</i>	1.00	
<i>Juncus articulatus</i>	0.39	✓	<i>Corixidae</i>	1.00	✓
<i>Alisma plantago-aquatica</i>	0.37	✓	<i>Haliplidae</i>	1.00	✓
<i>Glyceria fluitans</i>	0.35	✓	<i>Dytiscidae</i>	1.00	✓
<i>Lycopus europaeus</i>	0.33		<i>Hydrophilidae</i>	1.00	✓
<i>Typha latifolia</i>	0.33		<i>Asellidae</i>	1.00	✓
<i>Mentha aquatica</i>	0.32	✓	<i>Notonectidae</i>	1.00	✓
<i>Juncus inflexus</i>	0.30	✓	<i>Crangonyctidae</i>	0.93	✓
<i>Galium palustre</i>	0.29	✓	<i>Leptoceridae</i>	0.92	
<i>Sparganium erectum</i>	0.28		<i>Limnephilidae</i>	0.89	✓
<i>Eleocharis palustris</i>	0.26	✓	<i>Gerridae</i>	0.85	✓
<i>Ranunculus sp.</i>	0.24	✓	<i>Baetidae</i>	0.80	✓
<i>Deschampsia caespitosa</i>	0.24	✓	<i>Sialidae</i>	0.77	
<i>Callitriche sp.</i>	0.20	✓	<i>Aeshnidae</i>	0.76	
			<i>Planariidae</i>	0.71	
<b>Floating-leaved</b>			<i>Erpobdellidae</i>	0.63	
<i>Lemna minor</i>	0.43	✓	<i>Libellulidae</i>	0.58	
<i>Potamogeton natans</i>	0.21	✓	<i>Caenidae</i>	0.55	
			<i>Physidae</i>	0.47	
			<i>Ancylidae</i>	0.46	✓
			<i>Gyrinidae</i>	0.37	✓
			<i>Nepidae</i>	0.37	
			<i>Sphaeriidae</i>	0.30	

Only taxa with a probability of occurrence of greater than 20% (plants) or 30% (invertebrates) are shown



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**Asham Meads: results summary**

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<b>Metric</b>	<b>Observed (1)</b>	<b>Predicted (2)</b>	<b>Ecological Quality Index (1 ÷ 2)</b>	<b>Index (0-3 scale)</b>
<b>Plants</b>				
No of emergent and submerged species	24	14.27	1.68	3
Number of uncommon species	2	2.39	0.84	3
Trophic Ranking Score	9.2	8.68	1.06	3
<b>Invertebrates</b>				
Average Score Per Taxon	4.82	5.08	0.95	3
Odonata & Megaloptera families	0	3.22	0.00	0
Coleoptera families	2	3.72	0.54	2
Sum of metrics (maximum possible)				14 (18)
<b>Index of Biotic Integrity</b>				<b>78%</b>

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**Further information**

The full PSYM manual including fieldsheets can be downloaded from The Ponds Conservation Trust website at [www.pondstrust.org.uk](http://www.pondstrust.org.uk). More detailed information describing the development of the PSYM methodology is given in the following reports: Williams *et al.* (1996), Williams *et al.* (1998a), Biggs *et al.* (2000b).

## **NPMN Strategy Appendix 5: Glossary of terms**

BAP	Biodiversity Action Plan
BCT	Bat Conservation Trust
BDS	British Dragonfly Society
BSI	British Standards Institute
BTCV	British Trust for Conservation Volunteers
CEN	European Committee for Standardization ( <i>Comité Européen de Normalisation</i> )
DEFRA	Department for Environment Food and Rural Affairs
DETR	Department of the Environment ,Transport and the Regions (now part of DEFRA)
EBS	England Biodiversity Strategy, published October 2002
EIA	Environmental Impact Assessment
EHS(NI)	Environment and Heritage Service, Northern Ireland
HAP	Habitat Action Plan
LPS	Lowland Pond Survey – carried out by PCT in 1996 for DEFRA (then DETR)
NARRS	The proposed National Amphibian and Reptile Recording Scheme
NGO	Non Governmental Organisation
NPMN	National Pond Monitoring Network – to be established through Ponds in Partnership
NPS	National Pond Survey carried out by PCT
PCT	Ponds Conservation Trust
PCTPR	Ponds Conservation Trust: Policy & Research (formally Pond Action)
PIP	Ponds in Partnership
PSYM	Predictive SYstem for Multimetrics (pronounced “sim”): standardised method for survey and quality assessment of standing water bodies, developed by PCT & the Environment Agency
SAC	Special Area of Conservation (also cSAC: candidate SAC)
SEPA	Scottish Environment Protection Agency
SNCO	Statutory Nature Conservation Organisation
SNH	Scottish Natural Heritage
SPA	Special Protected Area (also cSPA: candidate SPA)
SUDS	Sustainable Urban Drainage Systems
SSSI	Site of Special Scientific Interest
WFD	Water Framework Directive

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## Appendix 4: Publicity leaflet

The image below was used as a colour A4 leaflet to publicise the Network.

# The National Pond Monitoring Network

The framework for the National Pond Monitoring Network has been created through Ponds in Partnership, funded by the Environment Agency and the Ponds Conservation Trust, and supported by Defra, English Nature, the Countryside Council for Wales, the Scottish Environment Protection Agency, the Environment and Heritage Service (Northern Ireland) and numerous non-governmental organisations.

### Why do we need for a National Pond Monitoring Network?

#### 1. Ponds are an important and neglected part of the ecological landscape.

Nationally, ponds are as rich as lakes and rivers in invertebrate and plant species, and support many rare species<sup>1</sup>. They have been shown to contribute more to regional biodiversity than rivers, streams or ditches<sup>2</sup>. Two thirds of Britain's freshwater macrophytes and macroinvertebrates are found in ponds and at least 65 BAP priority species use them for habitat<sup>3</sup>.

#### 2. Ponds are a threatened habitat.

Pond numbers in the UK are estimated to have declined by over a third from the 1940s to the 1980s<sup>4</sup>. The turnover rate is now c. 1% per year<sup>5</sup> and new ponds created may not be of high ecological quality. Many sites are affected by pollution, overstocking of fish or wildfowl and invasion by non-native plant species<sup>5</sup>.

#### 3. Until now there has been no way for the UK to assess the national picture and monitor trends.

Although around 2000 ponds have been surveyed in the last 5 years, a variety of survey methods have been used and until now data have not been collated, so national trends in pond quality are unknown.



### The National Pond Monitoring Network strategy<sup>3</sup> describes how partners will work together to:

#### 1. Establish a monitoring programme for the UK's ponds.

Develop proposals to enable assessment of the status of ponds in the UK, particularly their ecological quality and biodiversity value, and identify trends through time.

#### 2. Promote new survey activity.

Stimulate and co-ordinate partner activity in carrying out targeted surveys and developing an inventory of ponds and associated biodiversity data.

#### 3. Create a UK focus for pond survey data.

Collate new and old datasets to develop the web-accessible National Ponds Database.

#### 4. Report on the state of the UK's ponds.

Create reports using the National Ponds Database to feed into policy development to protect the habitat.

#### 5. Create a UK centre of ponds survey expertise.

Promote standard survey methods (particularly PSYM, the Predictive SYstem for Multimetrics<sup>6</sup> (see below) and provide technical support, training and quality assurance.

#### 6. Promote awareness of and public involvement in pond conservation.

Network activities will involve volunteers and members of the public will be able to submit and find information about ponds via the project website.



### The National Ponds Database will contain data from three sources:

**Core monitoring programme:** stratified random sites across the UK repeated at regular intervals

**Targeted surveys:** to address specific questions (e.g. status of BAP species, impact of pollutant)

**Pond inventory:** name, location and biodiversity information from as many sites as possible



### The Predictive SYstem for Multimetrics PSYM (pronounced "sim")

The PSYM<sup>6</sup> method for assessing the ecological quality of still waters involves identifying plant species and/or invertebrate families from a site sampled using a standard method. These and basic environmental and location data are entered into a computer model which compares survey results with predicted values for a minimally impaired site to give an indication of pond quality.

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### Contact details:

For more details, and to access the database, see

[www.pondnetwork.org.uk](http://www.pondnetwork.org.uk).

If you have pond data, are planning pond survey work, or would like to know more about the project contact:

Anita Weatherby

The Ponds Conservation Trust

c/o BMS Oxford Brookes University

Gipsy Lane Oxford OX3 0BP

[ajweatherby@brookes.ac.uk](mailto:ajweatherby@brookes.ac.uk)

01865 483189



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## Appendix 5: Details of the Network launch event

### PRESS RELEASE

FOR IMMEDIATE RELEASE



10 May 2004

Page 1 of 2

### **Environment Agency Chief Executive launches partnership to help understand and protect ponds**

Barbara Young, Chief Executive of the Environment Agency, will launch the National Pond Monitoring Network and National Ponds Database in London on 14<sup>th</sup> May 2004. The Network has been established through the Ponds in Partnership project, with funding from the Ponds Conservation Trust and the Environment Agency, and support from UK government agencies and Non-Governmental Organisations.

For the first time this gives a national focus for information about the UK's ponds and their wildlife. Organisations and members of the public can now contribute their local knowledge to the National Ponds Database, which is accessible to everyone through the internet ([www.pondnetwork.org.uk](http://www.pondnetwork.org.uk)). By bringing together partners and information the Network will help understanding and protection of the UK's ponds.

Ponds are vitally important for wildlife. Two thirds of the UK's freshwater species use ponds, including 65 priority species listed in the UK's Biodiversity Action Plan. Two thirds of the ponds in the UK countryside have been lost in the last 100 years. Those that remain are threatened by pollution, invasion by alien species or overstocking with fish or wildfowl.

Jeremy Biggs, Research Director of the Ponds Conservation Trust, said: "Until now there has been no way to assess the ecological quality of ponds across the UK to ensure they receive the protection they deserve. The National Pond Monitoring Network will change this by collating data into the National Ponds Database, setting up a monitoring programme to report on national trends in pond quality and biodiversity, and providing advice and training in standard methods to people planning pond surveys."

Shelley Howard, Project Manager for the Environment Agency, said: "The National Pond Monitoring Network will help policy makers, land managers and local communities protect and manage a valuable part of our natural heritage."

Now established the Network will work to increase knowledge of pond biodiversity in the UK including plans for a national survey of alien invasive plant species in ponds carried out by members of the public.

- ends -

### **Contact**

For advance information or to attend the launch event contact Anita Weatherby, National Pond Monitoring Network Project Officer: 01865 483189, 07947 057997, [ajweatherby@brookes.ac.uk](mailto:ajweatherby@brookes.ac.uk)

**Notes to Editors**

Launch event: 10.30am to 3pm, 14 May 2004, Defra, 1 Page St, London, SW1P 4PQ.

The Ponds Conservation Trust is a national charity established in 1998 by a consortium of 23 organisations and individuals. Its aim is to promote the conservation of ponds and wetlands through research, education, policy change and practical projects with wide public participation.

Partners in the project

- The British Dragonfly Society
- The Countryside Council for Wales / Cyngor Cefn Gwlad Cymru (CCW)
- The Department for Environment, Food and Rural Affairs
- English Nature
- Environment and Heritage Service, Northern Ireland
- The Environment Agency
- The Herpetological Conservation Trust
- The Mammal Society
- The Ponds Conservation Trust
- The Scottish Environment Protection Agency

Pond research publication

Ponds support more species across an agricultural landscape than rivers, streams or ditches demonstrated in Williams P., Whitfield M., Biggs J., Bray S., Fox G., Nicolet P. and Sear D. (2003) *Comparative biodiversity of rivers, streams, ditches and ponds in an agricultural landscape in Southern England*. *Biological Conservation* **115**:329-341.

Definition of a pond

A pond is “a body of standing water between 1 metre square and 2 Hectares in area which usually holds water for at least four months of the year”. (Ponds Conservation Group 1993).

Photos

Electronic colour copies of these images are available from the Ponds Conservation Trust, details below.



Further information

A summary leaflet describing the National Ponds Monitoring Network and a copy of “The National Pond Monitoring Network: a strategy for pond monitoring, surveillance and inventory development” are available from The Ponds Conservation Trust, 01865 483249, info@pondstrust.org.uk.

# Launch of the National Pond Monitoring Network

14 May 2004

Defra 1A Page Street London SW1P 4PQ

**Chair: Chris Mills**

Head of Wildlife, Recreation and Marine, Environment Agency

- 10.30 Coffee
- 11.00 Welcome from Chris Mills
- 11.05 Introduction  
*Barbara Young, Chief Executive of the Environment Agency*
- 11.25 The importance of ponds: why do we need a National Pond Monitoring Network?  
*Steve Head, Director of the Ponds Conservation Trust*
- 11.45 The National Pond Monitoring Network  
*Jeremy Biggs, Research Director of the Ponds Conservation Trust*
- 12.30 Questions
- 12.40 Lunch
- 14.00 The National Ponds Database  
*Anita Weatherby, Project Officer for the National Pond Monitoring Network*
- 14.30 Question / discussion session
- 14.50 Round up  
*Chris Mills*
- 15.00 Finish and tea



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### Attendees of the launch of the National Pond Monitoring Network

First Name	Surname	Organisation
Richard	Barnes	Greater London Authority
Jenny	Barr	Ponds Conservation Trust
Jeremy	Biggs	Ponds Conservation Trust
Jonathan	Brickland	British Waterways
Mike	Briers	Environment Agency
Rob	Briers	Napier University
Sheila	Brooke	Aquatic Heteroptera Recording Scheme
Andy	Brown	Anglian Water
Daryl	Buck	Environment Agency
Phillippa	Burrell	Thames Valley Environmental Record Centre
Steve	Cham	British Dragonfly Society
Amy	Clark	Royal Society for the Protection of Birds
Philip	Clark	Cambridgeshire County Council
Esther	Collis	Bat Conservation Trust
Nicky	Court	Hampshire Biodiversity Information Centre
Bella	Davies	Oxford Brookes University
Ruth	Davies	Royal Society for the Protection of Birds
Naomi	Ewald	Hampshire WT
Tanya	Ferry	Environment Agency
Gwyneth	Fookes	Independent surveyor
Jim	Foster	English Nature
Ian	Fozzard	Scottish Environment Protection Agency
Olive	Gearing	Ponds Conservation Trust
Chris	Gleed-Owen	Herpetological Conservation Trust
Jane	Goodwin	Defra
Hannah	Graves	Berkshire, Buckinghamshire & Oxfordshire Wildlife Trust
Jim	Green	Independent surveyor
Nigel	Greenhalgh	Ponds Conservation Trust
Leila	Griffiths	British Waterways
Margaret	Grocock	Royal Society for the Protection of Birds
Guy	Hagg	Ministry of Defence: Defence Estates
Kevin	Hall	Environment Agency
Tim	Halliday	Open University
Andy	Harmer	Independent surveyor
Rocky	Harris	Defra
Tom	Hastings	East Ayrshire Ranger Service
Julie	Hayes	Environment Agency
Steve	Head	Ponds Conservation Trust
Anne	Heeley	Farming and Wildlife Advisory Group
Dan	Horsley	Environment Agency
Shelley	Howard	Environment Agency
Debbie	Jackson	Berkshire, Buckinghamshire & Oxfordshire Wildlife Trust



<b>First Name</b>	<b>Surname</b>	<b>Organisation</b>
Trevor	James	National Biodiversity Network
Ian	Johnson	Defra
Jenny	Jones	Hertfordshire Biological Records Centre
Partycja	Jozefowicz	Environment Agency
Ingrid	Juettner	National Museums and Galleries of Wales
Carolynn	Jureidini	Wiltshire Wildlife Trust
Klieo	Kalemzaki	Environment Agency
Samantha	Langdon	University College Chester
Terry	Langford	University of Southampton
John	Lee	Oxford Brookes University
Andy	McVeigh	Bucks County Council
Stuart	Manwaring	Environment Agency
Nick	Meade	Suffolk Wildlife Trust
Glen	Meadows	Environment Agency
Chris	Mills	Environment Agency
Janet	Moore	Environment Agency
William	Moreno	London Biodiversity Partnership
Jonathan	Newman	Centre for Aquatic Plant Management
Pascale	Nicolet	Ponds Conservation Trust
Jo	O'Leary Quinn	Defra
David	Orchard	Independent Surveyor
Margaret	Palmer	Freshwater Biological Association
Sue	Rees	Ponds Conservation Trust
Hugh	Roberts	Ponds Conservation Trust
Tony	Sangwine	Highways Agency
Jo	Sayers	Wiltshire Wildlife Trust
Matt	Shardlow	Buglife
Dave	Sheahan	Defra
Tom	Sherwood	Environment Agency
Steve	Smith	Kent and Medway Environmental Records Centre
Martin	Spray	Wildfowl & Wetlands Trust
Abigail	Stancliffe-Vaughan	Brecks Countryside Project
Julia	Stansfield	Environment Agency
Mark	Stevenson	Defra
Ed	Stocker	Norfolk County Council
Alastair	Taylor	Natural History Museum
Jeremy	Taylor	Environment Agency
Jamie	Townend	Ponds Conservation Trust
John	Tweddle	Natural History Museum
Anita	Weatherby	Ponds Conservation Trust
Jon	Webb	English Nature
Lejla	White	Defra
Mericia	Whitfield	Ponds Conservation Trust
Paul	Williams	Environment Agency

<b>First Name</b>	<b>Surname</b>	<b>Organisation</b>
Penny	Williams	Ponds Conservation Trust
Vicky	Wilkins	Ponds Conservation Trust
Marian	Yallop	University of Bristol
Barbara	Young	Environment Agency

## **Appendix 6: Publicity for the Network**

Presentations have been given at the following events.

- Ponds Conservation Trust Annual General Meeting, Oxford, June 2002
- Meeting of representatives of Wildlife Trusts from the North of England and Environment Agency managers from the North East and North West, Leeds, October 2002
- Herpetofauna Workers annual meeting, Edinburgh, February 2003
- British Dragonfly Society Dragonfly Conservation Group meeting, Milton Keynes, March 2003
- New Forest Ponds Project meeting, Hampshire, May 2003
- Ponds Conservation Trust: Policy & Research Board Meeting, Oxford, July 2003
- Thames Valley Environmental Records Centre Oxfordshire Recorders annual meeting as part of workshop on development of the pond inventory recording form for the NPMN, Oxford, March 2004
- Buckinghamshire Recorders Annual Meeting, Aston Clinton, April 2004
- National Pond Monitoring Network launch event London, May 2004
- Cumbria Tarns Project meeting, Windermere, May 2004
- Freshwater Biological Association annual meeting, Plymouth, July 2004
- British Birdwatching Fair, Rutland Water, August 2004
- Kent Wildlife Conference, Canterbury, October 2004

Posters have been displayed at the following events.

- National Federation of Biological Recorders conference on "sampling and sampling strategies", Winchester, March 2002
- Freshwater Biological Association annual meeting, Durham, September 2002
- National Biodiversity Network / Freshwater Biological Association meeting on "Future Recording in Freshwater", Windermere, September 2002
- Symposium for European Freshwater Sciences, Edinburgh, July 2003
- Environment Agency Biodiversity seminar, Birmingham November 2003

Stands have been run at the following events.

- England Biodiversity Exchange Fair, Sheffield, March 2004
- National Biodiversity Network Gateway Launch, London, June 2004
- Thames Valley Environmental Records Centre Oxfordshire Recorders annual meeting, Oxford, March 2004
- Kent Wildlife Conference, Canterbury, October 2004

Publications about the Network.

- Information about the NPMN was included in the updated version of the Scottish Environment Protection Agency's Ponds Pools & Lochans, February 2003
- Information about the NPMN was included in a Wildlife Trust publication for internal use on "Standing Open Water", September 2003
- Article published in National Biodiversity Network News, March 2004
- Article published in British Dragonfly Society's Dragonfly News, April 2004
- Article published in Freshwater Biological Association News, April 2004
- One page spread on the project and how it has been helped by the National Biodiversity Network (NBN) in the NBN Annual Report for 2003-2004, August 2004

# Appendix 7: PSYM fieldsheet

## Site and sample details

Site name \_\_\_\_\_

( )  
Recording format: (SU)345678 or (41)345 678

Location \_\_\_\_\_

Site access details \_\_\_\_\_

Survey date \_\_\_\_\_ Surveyor \_\_\_\_\_

Notes \_\_\_\_\_

### Environmental data

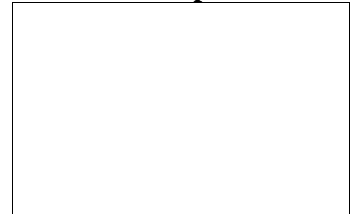
Altitude (m)  pH

Shade: % pond overhung  % emergent plant cover

Inflow (absent = 0, present = 1)  Pond area (m<sup>2</sup>)

% of pond margin grazed

### Sketch of pond



Pond base: categorise into one of three groups: 1=0%-32%, 2=33%-66%, 3=67%-100%

Clay/silt \_\_\_\_\_ Sand, gravel, cobbles \_\_\_\_\_ Bed rock \_\_\_\_\_  
Peat \_\_\_\_\_ Other \_\_\_\_\_

### MACROINVERTEBRATE LIST

#### Group 1 taxa (BMWP:10) ASPT

Siphonuridae			
Heptageniidae			
Leptophlebiidae			
Ephemerellidae			
Potamanthidae			
Ephemeridae			
Taeniopterygidae			
Leuctridae			
Capniidae			
Perlodidae			
Perlidae			
Chloroperlidae			
Aphelocheiridae			
Phryganeidae			
Molannidae			
Beraeidae			
Odontoceridae			
Leptoceridae			
Goeridae			
Lepidostomatidae			
Brachycentridae			
Sericostomatidae			
No. of taxa			

#### Group 2 taxa (BMWP:8)

Astacidae			
Lestidae			
Calopterygidae (Agriidae)			
Gomphidae			
Cordulegasteridae			
Aeshnidae			
Corduliidae			
Libellulidae			
Philopotamidae			
Psychomyiidae			
No. of taxa			

#### Group 3 taxa (BMWP:7)

Caenidae			
Nemouridae			
Rhyacophilidae (Glossomatidae)			
Polycentropodidae			
Limnephilidae			
No. of taxa			

#### Group 4 taxa (BMWP:6)

Neritidae			
Viviparidae			
Ancylidae (Acroloxidae)			
Hydroptilidae			
Unionidae			
Corophiidae			
Gammaridae (Crangonyctidae)			
Platycnemididae			
Coenagriidae			
No. of taxa			

#### Group 5 taxa (BMWP:5)

Planariidae (Dugesiiidae)			
Dendrocoelidae			
Mesoveliidae			
Hydrometridae			
Gerridae			
Nepidae			
Naucoridae			
Notonectidae			
Pleidae			
Corixidae			
Halplidae			
Hygrobiidae			
Dytiscidae (Noteridae)			
Gyrinidae			
Hydrophilidae (Hydraenidae)			
Dryopidae			
Elmidae			
Hydropsychidae			
Tipulidae			
Simuliidae			
No. of taxa			

#### ASPT

#### Group 6 taxa (BMWP:4)

Baetidae			
Sialidae			
Piscicolidae			
No. of taxa			
Group 7 taxa (BMWP:3)			
Valvatidae			
Hydrobiidae (Bithyniidae)			
Lymnaeidae			
Physidae			
Planorbidae			
Sphaeriidae			
Glossiphoniidae			
Hirudinidae			
Erpobdellidae			
Asellidae			
No. of taxa			
Group 8 taxa (BMWP:2)			
Chironomidae			
No. of taxa			
Group 9 taxa (BMWP:1)			
Oligochaeta			
No. of taxa			
TOTAL NO. OF TAXA			
TOTAL BMWP SCORE			
ASPT			
NO. OF OM TAXA			
NO. COLEOPT. TAXA			

Plant recording sheet (score through each species present) RS = Rarity Score, TRS = Trophic Ranking Score

RS	TRS	Emergent plants	RS	TRS		RS	TRS		RS	TRS	Submerged plants
1		Achillea ptarmica	1		Epilobium hirsutum	1	7.3	Phragmites australis	2	6.3	Apium inundatum
1		Acorus calamus	1		Epilobium obscurum	4	5.5	Pilularia globulifera	1		Aponogeton distachyos
1		Agrostis canina	1		Epilobium palustre	2		Pinguicula lusitanica	1		Cabomba caroliniana
1	LP	Agrostis stolonifera	1		Epilobium parviflorum	1		Pinguicula vulgaris	2		Callitriche brutia
32		Alisma gramineum	2		Epilobium tetragonum	1		Potentilla erecta	1	6.3	Callitriche hamulata
2		Alisma lanceolatum	2		Epipactis palustris	1	5.3	Potentilla palustris	2	8.5	Callitriche hermaphroditica
1	9	Alisma plantago-aquatica	1	LP	Equisetum fluviatile	1		Pulicaria dysenterica	2		Callitriche obtusangula
2		Alopecurus aequalis	1		Equisetum palustre	16		Pulicaria vulgaris	2		Callitriche platycarpa
4		Alopecurus borealis	1		Erica tetralix	1		Ranunculus ficaria	1	7.3	Callitriche stagnalis
1		Alopecurus geniculatus	1	2.5	Eriophorum angustifolium	1	LP	Ranunculus flammula	4		Callitriche truncata
2		Anagallis tenella	16		Eriophorum gracile	2	10	Ranunculus hederaceus	1		C. stagnalis/platycarpa agg.
2		Andromeda polifolia	2		Eriophorum latifolium	2*		Ranunculus lingua	1		C. hamulata/brutia agg.
1		Angelica archangelica	1		Eriophorum vaginatum	2		Ranunculus ophiophyllus	1		Callitriche sp. (undet.)
1		Angelica sylvestris	1		Eupatorium cannabinum	32		Ranunculus ophioglossifolius	2	10	Ceratophyllum demersum
2		Apium graveolens	1		Filipendula ulmaria	32		Ranunculus reptans	2		Ceratophyllum submersum
1	10	Apium nodiflorum	2		Galium boreale	1	10	Ranunculus sceleratus	2	7.3	Chara sp.
32		Apium repens	8		Galium constrictum	2		Rhynchospora alba	1		Egeria densa
2		Baldellia ranunculoides	1		Galium palustre	4		Rhynchospora fusca	4	7	Elatine hexandra
2	10	Berula erecta	2		Galium uliginosum	2		Rorippa amphibia	4		Elatine hydropiper
2		Bidens cernua	1		Geum rivale	8		Rorippa islandica	2		Eilegiton fluitans
1		Bidens connata	2		Glyceria declinata	2	10	Rorippa microphylla	1		Elodea callitricoides
1		Bidens frondosa	1	LP	Glyceria fluitans	1	10	Rorippa nasturtium-aquaticum	1	7.3	Elodea canadensis
2		Bidens tripartita	1	10	Glyceria maxima	1	10	Rorippa (undet.)	1	10	Elodea nuttallii
2		Blysnus compressus	2		Glyceria notata	1		Rorippa palustris	8		Eriocaulon aquaticum
2		Bolboschoenus maritimus	1		Gnaphalium uliginosum	2	10	Rumex hydrolapathum	1	6.3	Fontinalis antipyretica
2*		Butomus umbellatus	1	LP	Hydrocotyle vulgaris	2		Rumex maritimus	2		Groenlandia densa
2		Calamagrostis canescens	2		Hypericum elodes	2		Rumex palustris	2	7.7	Hippuris vulgaris
2		Calamagrostis epigejos	1		Hypericum tetrapterum	1		Sagina procumbens	2		Hottonia palustris
8		Calamagrostis purpurea	4		Hypericum undulatum	1		Sagittaria subulata	4		Isoetes echinospora
8		Calamagrostis stricta	2		Impatiens capensis	2		Samolus valerandi	2	5	Isoetes lacustris
16		Calamagrostis scotica	1		Impatiens glandulifera	2	7.7	Schoenoplectus lacustris	1		Lagarosiphon major
1		Calla palustris	4*		Impatiens noli-tangere	32		Schoenoplectus pungens	2	6.7	Littorella uniflora
1	7	Caltha palustris	1	LP	Iris pseudacorus	2		Schoenoplectus tabernaemontani	2	5	Lobelia dortmanna
1		Cardamine amara	1		Isolepis setacea	32		Schoenoplectus triquetrum	8		Ludwigia palustris
1		Cardamine pratensis	1		Juncus acutiflorus	16		Schoenus ferrugineus	1	6.7	Myriophyllum alterniflorum
2		Carex acuta	1		Juncus articulatus	2		Schoenus nigricans	1		Myriophyllum aquaticum
1	10	Carex acutiformis	1		Juncus bufonius agg.	16		Scorzonera humilis	2	9	Myriophyllum spicatum
4		Carex appropinquata	1	5.3	Juncus bulbosus	1		Scrophularia auriculata	4		Myriophyllum verticillatum
2		Carex aquatilis	2		Juncus compressus	1		Scutellaria galericulata	4		Najas flexilis
2		Carex curta	1		Juncus conglomeratus	1		Senecio aquaticus	2	6.7	Nitella sp.
2		Carex diandra	1	LP	Juncus effusus	1		Senecio fluviatilis	2		Oenanthe fluviatilis
1		Carex disticha	2		Juncus foliosus	32		Senecio paludosus	16		Potamogeton acutifolius
1		Carex echinata	1		Juncus inflexus	4		Sium latifolium	2	5.5	Potamogeton alpinus
2	10	Carex elata	32		Juncus pygmaeus	1	10	Solanum dulcamara	2	7.3	Potamogeton bertholdii
4		Carex elongata	2		Juncus subnodulosus	4		Sonchus palustris	4		Potamogeton coloratus
1		Carex flacca	4		Lathyrus palustris	1	8.5	Sparganium erectum	4		Potamogeton compressus
1		Carex hostiana	32		Leersia oryzoides	1		Stachys palustris	1	10	Potamogeton crispus
2		Carex laevigata	32		Liparis loeselii	2		Stellaria palustris	16		Potamogeton ephedrus
2	4	Carex lasiocarpa	1		Lotus pedunculatus	1		Stellaria uliginosa	4	10	Potamogeton filiformis
2	4	Carex limosa	1		Luzula luzuloides	1		Symphytum officinale	2	10	Potamogeton friesii
1	5	Carex nigra	2		Luzula sylvatica	16		Teucrium scordium	2	7	Potamogeton gramineum
1		Carex oedocarpa	1		Lychnis flos-cuculi	2		Thalictrum flavum	2	10	Potamogeton lucens
1		Carex otrubae	1		Lycopus europaeus	4		Thelypteris palustris	8		Potamogeton nodosus
1		Carex panicea	1		Lysimachia nummularia	2		Tofieldia pusilla	2	8	Potamogeton obtusifolius
2	10	Carex paniculata	1		Lysimachia terrestris	1		Trichophorum cespitosum	1	10	Potamogeton perfoliatus
1		Carex pendula	4		Lysimachia thysiflora	1		Triglochin palustre	2	7.3	Potamogeton pectinatus
2	10	Carex pseudocyperus	2		Lysimachia vulgaris	2	10	Typha angustifolia	2	8.5	Potamogeton praelongus
1		Carex pulicaris	16		Lythrum hyssopifolium	1	8.5	Typha latifolia	2	9	Potamogeton pusillus
1	10	Carex riparia	2		Lythrum portula	2		Valeriana dioica	8		Potamogeton rutilus
1	5.3	Carex rostrata	1		Lythrum salicaria	1		Vallisneria spiralis	4	10	Potamogeton trichoides
2		Carex spicata	1	7.3	Mentha aquatica	1		Veronica anagallis-aquatica	2	10	Ranunculus aquatilis
2		Carex vesicaria	16		Mentha pulegium	1	10	Veronica beccabunga	2	10	Ranunculus baudotii
1		Carex viridula	1	5.3	Menyanthes trifoliata	2		Veronica catenata	2	10	Ranunculus circinatus
16		Carex vulpina	1		Mimulus guttatus	1	5.5	Veronica scutellata	2		Ranunculus fluitans
1		Carex sp.	1		Mimulus luteus	1		Veronica sp. (undet.)	2	7	Ranunculus peltatus
2		Catabrosa aquatica	16		Minuartia stricta	1		Viola palustris	2	8.5	Ranunculus penicillatus
4		Cicuta virosa	1		Molinia caerulea	32		Viola persicifolia	2	8.5	Ranunculus trichophyllus
2		Cirsium dissectum	1		Montia fontana	1		Unknown exotic	16		Ranunculus tripartitus
1		Cirsium palustre	1	7.7	Myosotis laxa				1		Ranunculus sp. (undet.)
2		Cladium mariscus	1	9	Myosotis scorpioides				1		Sagittaria latifolia
1		Conium maculatum	1		Myosotis secunda				1		Sagittaria rigida
1		Crassula helmsii	4		Myosotis stolonifera				2		Sagittaria sagittifolia
1		Crepis paludosa	1		Myosotis sp. (undet.)				2	4	Sparganium angustifolium
16		Cyperus fuscus	2		Myosotis aquaticum				1	10	Sparganium emersum
4*		Cyperus longus	1		Myrica gale				2		Sparganium natans
2		Dactylorhiza sp (undet.)	1		Narthecium ossifragum				1	2.5	Sphagnum sp.
32		Damasonium alisma	2		Oenanthe aquatica				4*		Stratiotes aloides
1		Deschampsia cespitosa	1		Oenanthe crocata				2	4	Subularia aquatica
2		Drosera anglica	2		Oenanthe fistulosa				2		Tolypella sp.
1		Drosera binata	2		Oenanthe fluviatilis				2		Utricularia australis
1		Drosera capensis	2		Oenanthe lachenalii				2	4	Utricularia intermedia
2		Drosera intermedia	2		Oenanthe pimpinelloides				2	4	Utricularia minor
1		Drosera rotundifolia	4		Oenanthe silaifolia				2	5	Utricularia vulgaris
16		Dryopteris cristata	2		Osmunda regalis				1		Vallisneria spiralis
2		Eleocharis acicularis	2		Parnassia palustris				2	10	Zannichellia palustris
8		Eleocharis austriaca	1		Pedicularis palustris						
2		Eleocharis multicaulis	1	10	Persicaria hydropiper						
1	LP	Eleocharis palustris	1		Persicaria maculosa						
2		Eleocharis quinqueflora	2		Persicaria minor						
2		Eleocharis uniglumis	4		Persicaria mitis						
2		Epilobium alsinifolium	1		Petasites hybridus						
2		Epilobium anagallidifolium	1		Petasites japonicus						
1		Epilobium brunescens	4		Peucedanum palustre						
1		Epilobium ciliatum	1	8.5	Phalaris arundinacea						

Floating-leaved plants

1		Azolla filiculoides
2		Hydrocharis morsus-ranae
1		Hydrocotyle ranunculoides
2		Lemna gibba
1	9	Lemna minor
1		Lemna minuta
1	10	Lemna trisulca
4		Luronium natans
1		Menyanthes trifoliata
1		Nuphar advena
2	8.5	Nuphar lutea
4	7	Nuphar pumila
2*	6.7	Nymphaea alba
1		Nymphaea sp. (exotic)
4*		Nymphoides peltata
1	9	Persicaria amphibia
1	LP	Potamogeton natans
1	3.7	Potamogeton polygonifolius
2		Riccia fluitans
2		Ricciocarpus natans
2		Spirodela polyrrhiza
4		Wolffia arrhiza

\* = uncommon species often introduced to sites (details in Preston *et al.* 2002), if so score as 1

Number of emergent & submerged species
Number of uncommon species (with a rarity score of 2 or more)
Trophic Ranking Score

LP = species exhibiting little nutrient preference

## Appendix 8: Pond inventory survey form

<b>Surveyor Details</b>		Name:							
Address:									
Postcode:		Phone No:			Email:				
Are you willing:		(i) to be contacted about this dataset? Y / N							
		(ii) for this dataset (except contact details) to be made publicly available? Y / N							
<b>Landowner Details</b>		Name							
Address:									
Postcode:		Phone No:			Email:				
Is the landowner willing:		(i) to be contacted about this dataset? Y / N							
		(ii) for their contact details to be made publicly available? Y / N							
<b>Site Details</b>		Pond Name:							
Date of visit:		Grid Reference (e.g. SP123456 or more detail):							
Name of nearest town / village:				County:					
<b>Is the pond:</b>		(i) marked on an Ordnance Survey 1:25000 map? Y / N			(ii) in an area with free public access? Y / N				
iii) on a nature reserve or protected area? SSSI, SPA, SAC, NNR, LNR, ESA, other: - if so what is its name?									
(iv) any of these types of pond?		<input type="checkbox"/> garden		<input type="checkbox"/> school grounds		<input type="checkbox"/> farm pond			
<input type="checkbox"/> village pond		<input type="checkbox"/> urban pond		<input type="checkbox"/> created by mining / quarrying					
Pond area m <sup>2</sup>		Does the pond have an inflow e.g. from a river or stream? Y / N							
Does the pond dry up?		<input type="checkbox"/> 1=never, <input type="checkbox"/> 2=rarely (only in drought), <input type="checkbox"/> 3=sometimes (about 1 in every 3 years), <input type="checkbox"/> 4=annually							
How much of the pond is covered by vegetation?		<input type="checkbox"/> <1/4		<input type="checkbox"/> 1/4 to 1/2		<input type="checkbox"/> 1/2 to 3/4			
How much of the pond is shaded? (overhung at any height)		<input type="checkbox"/> <1/4		<input type="checkbox"/> 1/4 to 1/2		<input type="checkbox"/> 1/2 to 3/4			
Is the pond used by livestock at any time in the year?		<input type="checkbox"/> No		<input type="checkbox"/> cattle		<input type="checkbox"/> sheep			
				<input type="checkbox"/> horses		<input type="checkbox"/> other			
Tick if you have ever seen more than 20		<input type="checkbox"/> coots & moorhens or		<input type="checkbox"/> ducks at this pond					
Is there rubbish / pollution in the pond?		<input type="checkbox"/> None / little (e.g. some litter)		<input type="checkbox"/> Lots (e.g. covered in oil, shopping trolley)					
How old is the pond?		<input type="checkbox"/> 0 to 5 years		<input type="checkbox"/> 6 to 50 years		<input type="checkbox"/> over 50 years old			
Is there a shallow natural looking edge to any part of the pond? Y / N									
What types of plants are present in the pond?		<input type="checkbox"/> Grasses in water		<input type="checkbox"/> Floating-leaved plants					
		<input type="checkbox"/> Free-floating plants		<input type="checkbox"/> Submerged plants		<input type="checkbox"/> Emergent plants			
Please describe any pond management:									
<b>Land Use:</b> how much of the land around the pond is taken up by each of the land use types below? (tick which apply)									
		Up to 5m around the pond				From 5m to 100m from pond			
		<1/4		1/4 to 1/2		1/2 to 3/4		>3/4	
parks & gardens									
grassland									
arable									
woodland									
scrub or hedge									
marsh									
heath									
roads & tracks									
buildings									
ponds & lakes									
streams & ditches									
<b>Species observed:</b>									
<input type="checkbox"/> Fish		<input type="checkbox"/> Frog		<input type="checkbox"/> Toad		<input type="checkbox"/> Newt			
<input type="checkbox"/> Moorhen / Coot		<input type="checkbox"/> Duck		<input type="checkbox"/> Water vole		<input type="checkbox"/> Dragonfly or Damselfly			
<input type="checkbox"/> Smooth Newt		<input type="checkbox"/> Palmate Newt		<input type="checkbox"/> Great Crested Newt					
<b>Invasive alien plant species:</b> tick if present or mark with an A if abundant (i.e. approx a third or more of the pond covered)									
<input type="checkbox"/> New Zealand Stonecrop ( <i>Crassula helmsii</i> )				<input type="checkbox"/> Parrots feather ( <i>Myriophyllum aquaticum</i> )					
<input type="checkbox"/> Water fern ( <i>Azolla filiculoides</i> )				<input type="checkbox"/> Floating pennywort ( <i>Hydrocotyle ranunculoides</i> )					
<b>Notes:</b> (e.g. other species, observations)									

Please attach a sketch map and photo of the site if you can! Send completed forms to: Anita Weatherby, Ponds Conservation Trust, c/o BMS, Oxford Brookes University, Gipsy Lane, Headington, Oxford, OX3 0BP, or enter data via the National Pond Monitoring Network website: [www.pondnetwork.org.uk](http://www.pondnetwork.org.uk)

## Appendix 9: British Dragonfly Society Odonata recording sheet

**Essential information:-** Grid reference of pond \_\_\_\_\_ Date of visit \_\_\_\_\_  
 Name of site/pond \_\_\_\_\_  
 Nearest town/village \_\_\_\_\_

Please indicate any taxa or species recorded at the pond by putting a cross in the box in front of them

**Optional information:-** Record the number of males (♂) and/or females (♀) present for each species, and any breeding behaviour noted using the following codes:

Numbers present: **A** = 1 **B** = 2-5 **C** = 6-20 **D** = 21-100 **E** = 100-500 **F** = 500+

Breeding behaviour: **Co** = copulating pair **Ov** = ovipositing female **La** = larva **Ex** = exuvia

TAXA	SPECIES LIKELY AT PONDS	ADULTS	♂	♀	BREEDING
<input type="checkbox"/> <b>Calopterygidae</b>					
<input type="checkbox"/> Demoiselles	<input type="checkbox"/> <i>Calopteryx splendens</i> <b>Banded Demoiselle</b>				
	<input type="checkbox"/> <i>C. virgo</i> <b>Beautiful Demoiselle</b>				
<input type="checkbox"/> <b>Lestidae</b>					
<input type="checkbox"/> Emerald Damselflies	<input type="checkbox"/> <i>Lestes sponsa</i> <b>Common Emerald Damselfly</b>				
	<input type="checkbox"/> <i>L. dryas</i> <b>Scarce Emerald Damselfly</b>				
<input type="checkbox"/> <b>Coenagrionidae</b>					
<input type="checkbox"/> Red and Red-eyed Damselflies	<input type="checkbox"/> <i>Pyrrhosoma nymphula</i> <b>Large Red Damselfly</b>				
	<input type="checkbox"/> <i>Erythromma najas</i> <b>Red-eyed Damselfly</b>				
	<input type="checkbox"/> <i>E. viridulum</i> <b>Small Red-eyed Damselfly</b>				
	<input type="checkbox"/> <i>Ceriatrion tenellum</i> <b>Small Red Damselfly</b>				
<input type="checkbox"/> Blue and Blue-tailed Damselflies	<input type="checkbox"/> <i>Coenagrion mercuriale</i> <b>Southern Damselfly</b>				
	<input type="checkbox"/> <i>Coenagrion hastulatum</i> <b>Northern Damselfly</b>				
	<input type="checkbox"/> <i>C. lunulatum</i> <b>Irish Damselfly</b>				
	<input type="checkbox"/> <i>C. puella</i> <b>Azure Damselfly</b>				
	<input type="checkbox"/> <i>C. pulchellum</i> <b>Variable Damselfly</b>				
	<input type="checkbox"/> <i>Enallagma cyathigerum</i> <b>Common Blue Damselfly</b>				
	<input type="checkbox"/> <i>Ischnura elegans</i> <b>Blue-tailed Damselfly</b>				
	<input type="checkbox"/> <i>I. pumilio</i> <b>Scarce Blue-tailed Damselfly</b>				
<input type="checkbox"/> <b>Aeshnidae</b>					
<input type="checkbox"/> Hawkers etc	<input type="checkbox"/> <i>Aeshna caerulea</i> <b>Azure Hawker</b>				
	<input type="checkbox"/> <i>A. juncea</i> <b>Common Hawker</b>				
	<input type="checkbox"/> <i>A. mixta</i> <b>Migrant Hawker</b>				
	<input type="checkbox"/> <i>A. cyanea</i> <b>Southern Hawker</b>				
	<input type="checkbox"/> <i>A. grandis</i> <b>Brown Hawker</b>				
	<input type="checkbox"/> <i>A. isosceles</i> <b>Norfolk Hawker</b>				
	<input type="checkbox"/> <i>Anax imperator</i> <b>Emperor</b>				
	<input type="checkbox"/> <i>Brachytron pratense</i> <b>Hairy Dragonfly</b>				
<input type="checkbox"/> <b>Corduliidae</b>					
<input type="checkbox"/> Emerald Dragonflies	<input type="checkbox"/> <i>Cordulia aenea</i> <b>Downy Emerald</b>				
	<input type="checkbox"/> <i>Somatochlora metallica</i> <b>Brilliant Emerald</b>				
	<input type="checkbox"/> <i>S. arctica</i> <b>Northern Emerald</b>				
<input type="checkbox"/> <b>Libellulidae</b>					
<input type="checkbox"/> Skimmers / Darters and Chasers	<input type="checkbox"/> <i>Libellula quadrimaculata</i> <b>Four-spotted Chaser</b>				
	<input type="checkbox"/> <i>L. fulva</i> <b>Scarce Chaser</b>				
	<input type="checkbox"/> <i>L. depressa</i> <b>Broad-bodied Chaser</b>				
	<input type="checkbox"/> <i>Orthetrum cancellatum</i> <b>Black-tailed Skimmer</b>				
	<input type="checkbox"/> <i>O. coerulescens</i> <b>Keeled Skimmer</b>				
	<input type="checkbox"/> <i>Sympetrum striolatum</i> <b>Common Darter</b>				
	<input type="checkbox"/> <i>S. nigrescens</i> <b>Highland Darter</b>				
	<input type="checkbox"/> <i>S. fonscolombii</i> <b>Red-veined Darter</b>				
	<input type="checkbox"/> <i>S. flaveolum</i> <b>Yellow-winged Darter</b>				
	<input type="checkbox"/> <i>S. sanguineum</i> <b>Ruddy Darter</b>				
	<input type="checkbox"/> <i>S. danae</i> <b>Black Darter</b>				
	<input type="checkbox"/> <i>Leucorhina dubia</i> <b>White-faced Darter</b>				
<input type="checkbox"/> <b>Other Species</b>					
<input type="checkbox"/> Several species are less likely at ponds, but may be recorded occasionally					

Please send completed forms to: Anita Weatherby, Ponds Conservation Trust: Policy & Research, BMS, Oxford Brookes University, Gypsy Lane, Headington, Oxford, OX3 0BP, ajweatherby@brookes.ac.uk 01865 483189 www.pondstrust.org.uk

British Dragonfly Society: www.dragonflysoc.org.uk

National Pond Monitoring Network: www.pondnetwork.org.uk



### Appendix 10: Details of training courses

<b>Date</b>	<b>Content</b>	<b>Number of attendees</b>	<b>Location</b>	<b>Site visit</b>
22 July 2003	PSYM	15	Oxford Brookes University, Oxford	Lye Valley Pond and Rivermeads Pond, Oxfordshire
13 August 2003	PSYM	12	Northumberland Wildlife Trust Office, St Nicholas Park, Newcastle	Big Waters Nature Reserve, Northumberland
19 August 2003	PSYM	13	Environment Agency offices, Appleton House, Warrington	Risley, near Warrington
26 August 2003	PSYM	14	Hampshire and Isle of Wight's Blashford Lakes Study Centre, Hampshire	New Forest, Hampshire
12 September 2003	PSYM	14	Oxford Brookes University, Oxford	Pinkhill Meadow, Oxfordshire
17 September 2003	PSYM	14	Oxford Brookes University, Oxford	Pinkhill Meadow, Oxfordshire
20 May 2004	Pared down PSYM and invertebrate identification	12 staff from Buckinghamshire, Berkshire and Oxfordshire Wildlife Trust	Sandford Village Hall, Oxfordshire	Dry Sandford Pit, Oxfordshire
18 August 2004	PSYM	9	Oxford Brookes University, Oxford	Pinkhill Meadow, Oxfordshire
23 August 2004	PSYM	12	Oxford Brookes University, Oxford	Pinkhill Meadow, Oxfordshire
2 September 2004	Adapting PSYM for students	6	Rye Meads Nature Reserve, Hertfordshire	Rye Meads Nature Reserve, Hertfordshire

### Contents of Training Pack:

- a plan for day & list of attendees;
- the NPMN leaflet;
- the PSYM manual;
- extra copies of the PSYM fieldsheet;
- a mesohabitat record sheet;
- the National Pond Survey manual;
- two copies of the pond inventory recording sheet;
- a summary of conservation value scores;
- a list of invertebrate family names i) from scientific to English names, ii) from English to scientific names;
- a list of wetland plant species i) from scientific to English names, ii) from English to scientific names.

## Appendix 11: Data access agreement

**Agreement between** the National Pond Monitoring Network

c/o The Ponds Conservation Trust, Oxford Brookes University, Gipsy Lane, Oxford, OX3 0BP

**and**

Name of individual / organisation:

Email address:

Phone number:

Postal address:

**with respect to supply and use of the following pond survey dataset**

*(describe dataset e.g. date, number of sites, geographic area, survey method, species)*

### Statement

1. I give authorisation for this dataset to be included in:

the core National Pond Monitoring Network database to be used for general reporting purposes without making the site locations public;

the publicly accessible project website ([www.pondnetwork.org.uk](http://www.pondnetwork.org.uk)).  
*(tick as appropriate)*

2. I give authorisation for my contact details:

*To be retained and used by partners in the National Pond Monitoring Network*

*To be made publicly available*  
*(tick as appropriate)*

**List any special requirements here.**

This agreement replaces all written and spoken communication about data transfer. The agreement will remain in force unless cancelled in writing by either party. On termination the National Pond Monitoring Network database Manager will destroy or return all data and documentation transferred.

**For Data Contributor**

Signed: \_\_\_\_\_

Position: \_\_\_\_\_

Print name: \_\_\_\_\_

Date: \_\_\_\_\_

**For National Pond Monitoring Network**

Signed: \_\_\_\_\_

Position: \_\_\_\_\_

Print name: \_\_\_\_\_

Date: \_\_\_\_\_

## **Appendix 12: Summary of National Biodiversity Network report**

This is the summary of a report prepared for the National Biodiversity Network in March 2004 entitled *Developing and testing a targeted approach to biodiversity data management using ponds as a case study*.

### **SUMMARY**

#### **1. Background**

This report describes the results of a case study using ponds to develop and test a habitat-targeted approach to the management of biodiversity data for the NBN.

Overall, the project had three main objectives:

- to identify user requirements for pond data
- to assess the quality and availability of data relating to ponds, and the extent to which they meet user requirements
- to determine the extent to which the NBN could fulfil user requirements for access to pond data, using the recently developed National Pond Monitoring Network (NPMN) data management system as a potential NBN node.

Ponds provide a rigorous test of the habitat-led approach: they are numerous, important biologically, and many different types of environmental data are collected from them. Pond data are also of interest to many different user groups.

#### **2. User requirements**

Stakeholders (professional ecological data users) were interviewed using a structured questionnaire to assess their requirement for pond data. They identified five main needs:

- comprehensive locational information, collated into a single database, which 92% of respondents indicated would be useful
- information on the biotic assemblages occurring at sites, including information on the abundance of individual species where possible (92%-100% identified need)
- physical and chemical habitat quality information (required by 69-92% of users, depending on the type of data concerned)
- interpretation of the relative importance of sites (77% identified need).
- information on the past management, history and archaeology of ponds (69% of users) and amenity use (100% of users).

#### **3. Data available relating to ponds**

Biotic and environmental data relating to ponds are currently available from some 20,000 sites in Britain, approximately 5% of all ponds. In addition to this, Ordnance Survey inventories provide locational and basic size information for about 0.5 million individual pond locations.

Of the biotic and environmental data available, information relating to 35-40% of sites is derived from the NBN species databases. Information describing the remaining c.60% of sites is derived from multi-species or assemblage surveys (often with extensive associated environmental data) and other projects which are currently not accessible via the NBN. Note that although some species recording schemes have very large numbers of sites (e.g. the National Amphibian Survey) the number of sites which can be identified sufficiently accurately to be useful for habitat management purposes may be considerably lower.

#### **4. Types of pond-related data available in the NBN**

The NBN currently provides mainly locational data (grid references, vice counties etc) and species distribution data. The latter are available for a wide range of the species groups found in ponds, particularly dragonflies, water beetles, caddis flies, amphibians and vascular plants. Other relevant groups (e.g. aquatic molluscs, crustaceans, mammals) are likely to be available in due course.

These datasets can fulfil a variety of user requirements for biotic data including: establishing the status of species (and, therefore, their nature conservation significance), the initial identification of sites important for nature conservation, screening developments during Environmental Impact Assessments and undertaking BAP species protection projects.

With respect to habitat-based data management, the primary limitation of existing NBN data is the imprecision of locational information. For ponds, which are small and commonly lack well-defined site names, the proportion of available records which can be associated readily with particular sites rarely exceeds 30%. To increase this proportion requires considerable amounts of manual checking of datasets.

#### **5. Other pond-related datasets available**

Currently outside of the NBN are most of the larger national and regional pond survey datasets, including most datasets collected by the Ponds Conservation Trust, the Defra Lowland Pond Survey and the North-West England Pond*Life* project. Typically these datasets have been collected using standard survey methods, particularly those projects following National Pond Survey techniques. Together these datasets represent in the region of 1500 individual surveys providing high quality data from c. 700 ponds. They are particularly valuable in that they form a large and compatible dataset.

From the perspective of user groups these additional datasets are useful for: establishing the relative importance of sites for designation and assessment purposes, providing the basis for regional and national monitoring programmes, providing information about site impacts (e.g. pollution) and planning management solutions to specific problems. They also are valuable for developing understanding of small waterbodies generally and highlighting new concepts in freshwater management (e.g. the importance of small waterbodies in a catchment context).

#### **6. Benefits of a pond node for the NBN**

The major benefit of a pond or standing water node for the NBN is that it would considerably enhance the range of data needed by users which could be accessed through the NBN.

More specifically developing a pond node would:

- provide a blueprint for other habitats
- provide a wider variety of data to professionals, ‘amateur’ recorders and members of the public
- make datasets accessible to a much wider audience than currently
- encourage wider use of standard methods, increasing the usefulness of new data collected
- help to increase the effectiveness of the NBN more generally by enhancing its role as a key nature conservation resource.

#### **7. Challenges**

There are two main technical challenges to establishing a link between the NBN and the NPMN.

1. *Defining the precise mechanisms by which the two project databases are linked.* Should the NBN simply link to the NPMN or should there be live presentation of habitat related data drawn from the two databases?
2. *The need for better geographical identification of small water bodies.* A national inventory of ponds effectively already exists in Ordnance Survey datasets but closer links are needed with OS to maximise the use of this information for nature conservation.

## **8. Next steps in the NPMN**

The pilot version of the NPMN database will be launched in May 2004 at which point the datasets described in the present project will be accessible, a tool will be available to import new datasets, internet access for obtaining PSYM predictions, entering data and viewing site data will be available and basic site mapping will be completed.

Following this, a range of work is recommended to further develop the NBN/NPMN pond databases:

**Recommendation 1.** The NPMN database is fully integrated as a pond node for the NBN; assuming this proposal is accepted detailed work should be undertaken by relevant NBN/NPMN staff to define the technical requirements of this process.

**Recommendation 2.** It is recommended that the work originally proposed as Phase 2 of the present project is carried out with any revisions that are appropriate. This involves:

- evaluating the practical problems associated with gathering, managing and disseminating habitat targeted biodiversity data;
- in the light of this data, and the results of the present project, reviewing (i) generic issues relating to collection, management and dissemination of habitat targeted data (ii) specific pond-related data management issues.

The potential to develop a wider freshwater node, in conjunction with the Environment Agency, FreshwaterLife, the NPMN and other relevant groups, should be considered. This could be a particularly valuable resource for Water Framework Directive activities specifically and catchment management more generally.

**Recommendation 3.** Further developments of the NPMN are supported where these are relevant to developing the resource as an NBN node. Specifically:

- Discuss linking the NPMN database with the GB Lakes database
- Import other species datasets as these become available
- Develop interactive multi-species/environmental data reports for on-line users
- Refine mapping techniques with NBN, including working with Ordnance Survey to maximise use of existing mapping of ponds
- Work with species recorders to improve their identification of sites
- Continue to develop new pond survey activities, particularly (i) a co-ordinated pilot programme of pond surveys in conjunction with NBN Societies and Schemes activities, and (ii) development of national monitoring programme for ponds

## **9. Future funding**

We recommend the following areas be considered for further funding under the NBN:

- Development of a pond node for the NBN Gateway
- Phase 2 of the present project
- Establishing links between NPMN and GB Lakes database
- Refining mapping of ponds in collaboration with Ordnance Survey

Supporting work to help species recorders precisely specify the location of pond sites.

### Appendix 13: List of small waters of biodiversity significance

The following list was collated for English Nature in April 2004. It includes ponds and lakes in England of under 50 Hectares which met one or more of the following criteria:

- (i) the site is a known habitat for species of conservation concern (UK Biodiversity Action Plan priority species, Red Data Book 1 or 2, or a species for which the UK has international obligations);
- (ii) “high quality” - the site is defined as high quality under criteria developed from the National Pond Survey (plant survey identifies 40 or more plant species, standard 3 minute invertebrate survey identifies 50 or more species, 3 or more nationally scarce or Red Data Book species, or a Species Rarity Index of 1.5 or more);
- (iii) “habitat” - the site is designated under the Habitats Directive, is a UK Biodiversity Action Plan priority habitat or the waterbody is a central reason for SSSI designation.

Site Name	County	Grid Reference
Weston Moor	Avon	ST441736
Brogborough Pit	Bedfordshire	SP971394
Maulden Meadow	Bedfordshire	TL059383
Rookery North Pit	Bedfordshire	TL016418
Sandy	Bedfordshire	TL190478
Sandy	Bedfordshire	TL190478
Sandy	Bedfordshire	TL193478
Sandy	Bedfordshire	TL193476
Sandy, Path	Bedfordshire	TL190478
Cock Marsh SSSI	Berkshire	SU880867
Decoy Heath	Berkshire	SU613634
Dorney Common	Berkshire	SU933788
Moor Copse SSSI	Berkshire	SU636740
Ruscombe Pond	Berkshire	SU798765
Scarlett's Farm Pond	Berkshire	SU812779
Black Park	Buckinghamshire	TQ011843
Burnham Beeches Upper Pond	Buckinghamshire	SU949845
Cadmore End Common	Buckinghamshire	SU794927
Coleshill	Buckinghamshire	SU947950
Daisy Pond	Buckinghamshire	SU847965
Jeremy Pond, Stoke Common	Buckinghamshire	SU987854
Latchmoor Pond	Buckinghamshire	SU997887
Littleworth	Buckinghamshire	SU936863
Mannings Pond	Buckinghamshire	SU847962
New Pond	Buckinghamshire	SU999883
Penny Pond, Stoke Common	Buckinghamshire	SU987854
Beebys West Pit A	Cambridgeshire	TL180932
Beeby's West Pit B	Cambridgeshire	TL180936
Castor Hanglands Main Pond	Cambridgeshire	TF119016
Crown Lakes Ponds	Cambridgeshire	TF193942
Eye Green	Cambridgeshire	TF231034
Fletton Lake Ponds	Cambridgeshire	TL200965

<b>Site Name</b>	<b>County</b>	<b>Grid Reference</b>
Gault Hole A	Cambridgeshire	TL435804
Norman Cross Pit	Cambridgeshire	TL162907
Orton Pit	Cambridgeshire	TL165945
Upwood Meadow	Cambridgeshire	TL250830
Wicken Fen	Cambridgeshire	TL55 to TL69
Wicken Fen Boardwalk Pond 77B	Cambridgeshire	TL561706
Wicken Fen Brick Pit 76A	Cambridgeshire	TL560707
Wicken Fen Ditch Pond 78E	Cambridgeshire	TL560707
Woodwalton Fen Experimental Pond	Cambridgeshire	TL225837
Yaxley Brick Pit	Cambridgeshire	TL1894
Abbots Moss (2 pools)	Cheshire	SJ597690
Bosley Reservoir	Cheshire	SJ920665
Brookhouse Farm Hydrochara Pond	Cheshire	SJ61026638
Rease Heath 4	Cheshire	SJ634542
Sound Common North Pond	Cheshire	SJ624482
Sound Common South Pond	Cheshire	SJ624482
Water Vole Pond Christleton	Cheshire	SJ43206480
Orton Pit	City of Peterborough	TL163944
Lovell Hill Pools	Cleveland	NZ596189
Arrowan Common	Cornwall	SW750175
Black Head	Cornwall	SW7716
Bodkiddick Downs	Cornwall	SX04956185
Bray's Cot	Cornwall	SW7318
Brays Cott	Cornwall	SW726182
Breney Common	Cornwall	SX056611
Brew Moor	Cornwall	SW3625
Chyenhal Moor	Cornwall	SW4427
Clodgy Moor	Cornwall	SW455266
Countybridge Quarry	Cornwall	SW721220
Croft Pasco/Traboe Cross	Cornwall	SW7220 to SW7319
Croft Pascoe Pool	Cornwall	SW731198
Crousa Downs	Cornwall	SW759191
Dozmary Pool	Cornwall	SX1974
Garah Track	Cornwall	SW683176
Goonhilly Downs	Cornwall	SW731198
Goonhilly Downs	Cornwall	SW7018
Goonhilly Downs	Cornwall	SW7119
Goonhilly Downs	Cornwall	SW7317
Goonhilly Downs	Cornwall	SW7318
Goonhilly Downs	Cornwall	SW712195
Goonhilly Downs	Cornwall	SW7121
Goss Moor 1998	Cornwall	SW9358 to SW9459
Grochall Farm Track	Cornwall	SW6914



<b>Site Name</b>	<b>County</b>	<b>Grid Reference</b>
Hayle Kimbro Pool	Cornwall	SW694169
Hayle Kimbro Pool	Cornwall	SW690160
Jollytown Enclosure Track	Cornwall	SW676152 to SW675153
Kynance	Cornwall	SW6813 to SW6814
Kynance Cliff	Cornwall	SW682138
Kynance Downs	Cornwall	SW685136
Kynance Farm	Cornwall	SW681137
Kynance Farm	Cornwall	SW681139
Kynance Farm	Cornwall	SW6813
Kynance Farm	Cornwall	SW6814
Little Pednavounder	Cornwall	SW765180
Little Trelevar	Cornwall	SW762180
Lizard Downs	Cornwall	SW690138
Lizard Downs	Cornwall	SW689137
Mullion	Cornwall	SW692181
Mullion Cliffs	Cornwall	SW666172
Mullion Cliffs	Cornwall	SW666171
Penhale	Cornwall	SW700193
Penhallick Track	Cornwall	SW763180
Penhallock (Little Pednavounder)	Cornwall	SW764179
Pond between Helston & Guinear Rd Stn	Cornwall	SW62
Pond near Grampond Road	Cornwall	SW95
Ponsongarth	Cornwall	SW777179
Predannack	Cornwall	SW6916
Predannack	Cornwall	SW6715
Predannack Airfield	Cornwall	SW690164
Predannack Airfield	Cornwall	SW680174
Predannack Airfield (North)	Cornwall	SW684171
Predannack Airfield (South)	Cornwall	SW685154
Predannack Downs	Cornwall	SW6814
Redmoor	Cornwall	SX072622
Ruan Pool	Cornwall	SW696158
Ruan Pool	Cornwall	SW696158
S.W. Of Croft Pascoe Pool Plantation	Cornwall	SW700100
Skewjack Common	Cornwall	SW3624
The Lizard	Cornwall	SW690174
Traboe	Cornwall	SW738212
Traboe	Cornwall	SW738211
Traboe Downs	Cornwall	c.SW735206
Traboe Downs	Cornwall	SW7321
Trelow Downs	Cornwall	SW9368
Treskilling Pit	Cornwall	SX0357

<b>Site Name</b>	<b>County</b>	<b>Grid Reference</b>
Treskillig Pit	Cornwall	SX035570
Trevorian Common	Cornwall	SW3726
Tuckers Grave	Cornwall	SW701145
Tucker's Grave	Cornwall	SW702145
Tucker's Grave	Cornwall	SW702145
Two Pools South Of Croft Pascoe Plantation	Cornwall	SW700100
Ventongimps Moor	Cornwall	SW781513
Anthorn Farm	Cumbria	NY195586
Birk Rigg Dubs	Cumbria	SD5099
Boaterby Quarry	Cumbria	NY475495
Drigg Dunes	Cumbria	SD055985
Flass Tarn	Cumbria	NY129034
Ghyll Head Reservoir	Cumbria	SD397922
Haverigg Haws	Cumbria	SD155780
High Gateside Farm	Cumbria	SD3681
Hodbarrow Point	Cumbria	SD1778
Kemp Tarn, Staveley	Cumbria	SD463983
Knipe Tarn	Cumbria	SD426943
Lake District High Fells	Cumbria	NY303318
Mawbray Banks	Cumbria	NY079464
Millom Iron Works	Cumbria	SD185800
Rough Mire	Cumbria	NY2325
Sandscale 'Crag pond'	Cumbria	SD207764
Sandscale Haws	Cumbria	SD19787572 to SD19867571
Sandscale Haws	Cumbria	SD195755
Sandscale Haws, Obs pond	Cumbria	SD201757
Sellafield	Cumbria	NY026026
Sellafield Natterjack Reserve	Cumbria	NY025027
Subberthwaite Common	Cumbria	SD259878
Sunbiggin Tarn	Cumbria	NY676076
Ulswater Pool	Cumbria	NY397179
Bee's Nest and Green Clay Pits	Derbyshire	SK240545
Bondhay Golf Club	Derbyshire	SK516788
Braunton Burrows	Devon	SS460338
Braunton Burrows, Raven's Slack	Devon	SS449348
Bridge Moor	Devon	SS291032
Cadover Bridge NE Pond	Devon	SX552652
Gittisham Hill	Devon	SY1497
Great Moreton Pond	Devon	SS289070
Meddon Green	Devon	SS274177
Tinhay Quarry Lake	Devon	SX294852
Trenchford Reservoir	Devon	SX803828

<b>Site Name</b>	<b>County</b>	<b>Grid Reference</b>
Widdicombe Ley	Devon	SX820412
Wistlandpound Reservoir	Devon	SS645418
Alderholt Heath	Dorset	SU1012
Creech Heath	Dorset	SY927833
Furzebrook	Dorset	SY9283
Hartland Moor	Dorset	SY9484
Hengistbury Head	Dorset	SZ163914
Hethfelton	Dorset	SY857884
Kingcombe Meadows	Dorset	SY555988
Pool Pond	Dorset	SY886836
Pool Pond	Dorset	SY886836
Povington Heath	Dorset	SY8882
Stanpit Marsh	Dorset	SZ169918
Vitower	Dorset	SY987865
Vitower	Dorset	SY987864
West Dorset Alder Woods	Dorset	SY538968
Brasside Pond	Durham	NZ292452
Newsham Field Pond (nr Darlington)	Durham	NZ384117
Tarn Dub	Durham	NY853287
Wingate Quarry	Durham	NZ374374
Ashdown Forest Pond A	East Sussex	TQ446328
Ashdown Forest Pond B	East Sussex	TQ447329
Bentley Farm Pond	East Sussex	TQ482163
Bullock Hill dew pond	East Sussex	TQ368061
Burwash Field Pond	East Sussex	TQ679247
North Chailey Common	East Sussex	TQ390190
Wilmington Wood	East Sussex	TQ567089
Epping Forest	Essex	TQ415967
Epping Forest	Essex	TQ415967
Deeside and Buckley Newt Sites	Flintshire	SJ291678
Badgeworth	Gloucestershire	SO910205
Cherryrock Farm	Gloucestershire	ST735895
Cotswold Water Park 114	Gloucestershire	SU185987
Cotswold Water Park 124	Gloucestershire	SU191995
Cotswold Water Park 31	Gloucestershire	SU028962
Cotswold Water Park 32	Gloucestershire	SU029956
Cotswold Water Park 34	Gloucestershire	SU026952
Cotswold Water Park 41	Gloucestershire	SU032937
Cotswold Water Park 50	Gloucestershire	SU017943
Cotswold Water Park 65	Gloucestershire	SU027946
Crickley Hill	Gloucestershire	SO950170
Dowdeswell Reservoir	Gloucestershire	SO990198
Frampton on Severn	Gloucestershire	SO753076

<b>Site Name</b>	<b>County</b>	<b>Grid Reference</b>
Frampton Pools	Gloucestershire	SO753076
Green Trench	Gloucestershire	ST748881
Hawksbury Common	Gloucestershire	ST760870
Horton Great Trench	Gloucestershire	ST743873
Lance Coppice	Gloucestershire	ST758884
Lower Woods Lodge	Gloucestershire	ST748883
Micheldean Fairplay Westbury Brook Res.	Gloucestershire	SO658165
Over North Pond	Gloucestershire	SO820193
Over North Pond (Azolla)	Gloucestershire	SO820193
Over South Pond (Azolla)	Gloucestershire	SO820193
Reddings Large	Gloucestershire	SO695138
Spoil Coppice	Gloucestershire	ST751884
Stoneybridge Wood	Gloucestershire	ST743864
Vinney's Lane	Gloucestershire	ST743851
Whelford Pools	Gloucestershire	SK298981
Wickwar	Gloucestershire	ST716889
Withymore Wood	Gloucestershire	ST759894
Northholt A40(T) Road pond (W London)	Greater London	TQ133835
Wimbledon Common	Greater London	TQ232718
Aldershot Site 41 (Proposal)	Hampshire	SU889514
Aldershot Site 48 Small Hottonia next to Proposal	Hampshire	SU885515
Ashurst Lawn	Hampshire	SU331089
Ashurst Lodge	Hampshire	SU331087
Ashurst Wood	Hampshire	SU332100
Bartley	Hampshire	SU318112
Beaulieu Heath	Hampshire	SU384076
Beaulieu Heath	Hampshire	SU413040
Beaulieu R Yew Tree Heath	Hampshire	SU368072
Beaulieu Road Station	Hampshire	SU354048
Blashford Pond 102	Hampshire	SU146026
Bolderwood Farm	Hampshire	SU233085
Bramshill Common	Hampshire	SU7462 to SU7571
Bratley Arch	Hampshire	SU231093
Bratley Water.	Hampshire	SU231086
Breamore Common Pond	Hampshire	SU156176
Brockenhurst	Hampshire	SU295027
Brockenhurst	Hampshire	SU2801
Brown Loaf	Hampshire	SU194019
Buck Hill	Hampshire	SU376055
Buck Hill Pond	Hampshire	SU380056
Burbush	Hampshire	SU202017
Burley Lawn	Hampshire	SU218036
Burley Moor East	Hampshire	SU211047

<b>Site Name</b>	<b>County</b>	<b>Grid Reference</b>
Busketts Wood	Hampshire	SU318111
Butts Lawn	Hampshire	SU294027
Cattle pond near Finkley Manor Farm	Hampshire	SU390484
Chubbs Farm Pond	Hampshire	SU199021
Cobblers Corner, Setley	Hampshire	SZ304996
Cranmer Pond	Hampshire	SU787318
Crockford Bridge	Hampshire	SZ351990
Deep Moor, W Beaulieu Heath	Hampshire	SU348000
Dibden Bottom	Hampshire	SU385067
Dockens Water, N of Anses Wood, Fritham	Hampshire	SU225125
Dur Hill Down	Hampshire	SU192019
Dur Hill Down	Hampshire	SU200008
E Edge of New Forest	Hampshire	SU413040
East Boldre	Hampshire	SZ367992
East End	Hampshire	SZ362976
East End Pond, East Boldre	Hampshire	SU368012
Eversley Site 2	Hampshire	SU810617
Eversley Site 2a; Black Bag, Elodea	Hampshire	SU813617
Eyeworth Pond (site 98)	Hampshire	SU228147
Eyeworth Pond (site 98)	Hampshire	SU228147
Eyeworth Pond, Fritham	Hampshire	SU229147
Fletchers Green	Hampshire	SU281040
Fletcher's Green, Ober Heath	Hampshire	SU282041
Fletcher's Thorns	Hampshire	SU279042
Fritham Plain	Hampshire	SU222126
Fulliford Bog	Hampshire	SU341083
Furzey Pond	Hampshire	SU385067
Godshill Pond	Hampshire	SJ 974082
Golden Cross, Fordingbridge	Hampshire	SU212177
Greenford Bottom, Linford	Hampshire	SU192083
Greenmoor	Hampshire	SZ337989
Greenmoor (site 64/4)	Hampshire	SZ338991
Greenmoor Pond, Boldre	Hampshire	SZ334999
Greenmoor, Boldre	Hampshire	SU334001
Harepath, East Boldre	Hampshire	SZ365990
Harepath, East Boldre	Hampshire	SZ366991
Haskells Pond	Hampshire	SU146026
Hill Top Pond (site 89)	Hampshire	SU40190311
Hilland Lake	Hampshire	SU8852
Hilltop, Sway	Hampshire	SZ293984
Holmsley	Hampshire	SU222015
Holmsley Bog	Hampshire	SU222016
Holmsley Gravel Pit NR	Hampshire	SZ207989

<b>Site Name</b>	<b>County</b>	<b>Grid Reference</b>
Holmsley Inclosure	Hampshire	SZ213997
Ipley Bridge	Hampshire	SU380068
King's Hat	Hampshire	SU388052
Ladycross Lodge	Hampshire	SU338033
Latchmoor Pond	Hampshire	SU29250038
Latchmoor Pond, Brockenhurst	Hampshire	SU292003
Leecley Pond, Butts Lawn	Hampshire	SU300031
Little Hatchet Pond	Hampshire	SU368013
Long Slade Bottom	Hampshire	SU258008
Longcross Pond (site 122)	Hampshire	SU246152
Longcross Pond (site 122)	Hampshire	SU246152
Lucas Castle	Hampshire	SU243106
Lyndhurst Road Stn	Hampshire	SU334096
Markway Inclosure	Hampshire	SU249027
Marlborough Deep, Wooton	Hampshire	SZ224986
Marlpit Oak, Sway	Hampshire	SZ286997
Matley Bog Tree Pool	Hampshire	SU336075
Matley Heath	Hampshire	SU342082
Mead End	Hampshire	SZ263987
Mill Lawn	Hampshire	SU227035
Mill Lawn	Hampshire	SU231036
Mill Lawn, Burley	Hampshire	SU229035
N of Ocknell Pond	Hampshire	SU235119
New Copse Inclosure, Brockenhurst	Hampshire	SU327031
Norley Wood, Ponds	Hampshire	SZ368976
Nr Balmer Lawn Pond	Hampshire	SU304032
Nr Decoy Pond Fm, Marchwood CP	Hampshire	SU356076
Nr Longdown Inclosure	Hampshire	SU346079
NW of Row Hill, Lyndhurst	Hampshire	SU319085
NW of Slufers Pond	Hampshire	SU22220964
Ober Heath	Hampshire	SU280040
Ober Heath	Hampshire	SU281035
Ober Heath	Hampshire	SU281036
Ocknell Pond	Hampshire	SU234119
Ocknell Ponds	Hampshire	SU2311
Peel Hill	Hampshire	SU355079
Peel Hill	Hampshire	SU360080
Peel Hill, Longdown	Hampshire	SU359079
Pilley Small Pond	Hampshire	SZ335986
Plain Heath	Hampshire	SZ218987
Pond near Hawthorn Farm	Hampshire	SZ19
Rowbarrow Pond	Hampshire	SU357044
Roydon	Hampshire	SU314003

<b>Site Name</b>	<b>County</b>	<b>Grid Reference</b>
Rushy Flat	Hampshire	SU214176
Salisbury Plain	Hampshire	SU077497
Setley Plain	Hampshire	SU289000
Sheepwash Pond, East End	Hampshire	SZ365976
Sheepwash Pond, Norley Copse	Hampshire	SZ363976
Sherfield English	Hampshire	SU293221
Sherfield English	Hampshire	SU293221
Spreading Oak	Hampshire	SU239107
Stoney Cross Plain	Hampshire	SU254112
Stonyford Bottom	Hampshire	SU412040
Stubbs Wood	Hampshire	SU364037
The New Forest	Hampshire	SU310050
The Triangle Pond, East End	Hampshire	SZ368975
Thorney Hill	Hampshire	SZ206999
Thorney Hill Holms	Hampshire	SU200007
Toad Pond (site 64/3)	Hampshire	SZ337989
Unnamed ditch near Ashurst campsite (site 92)	Hampshire	SU331100
Upper Crockford Bottom	Hampshire	SZ349992
Vales Moor	Hampshire	SU190039
Warren Heath	Hampshire	SU7659
Warwickslade	Hampshire	SU272062
White Moor Bottom	Hampshire	SU211047
Whitten Bottom	Hampshire	SU200011
Whitten Pond nr Burley	Hampshire	SU203011
Widden Bottom, Sway	Hampshire	SZ287993
Woodfidley Ladycross	Hampshire	SU340037
Woodfidley railway pond (site 66/2)	Hampshire	SU341036
Woolmer	Hampshire	SU790329
Woolmer	Hampshire	SU790329
Woolmer Forest	Hampshire	SU805325
Woolmer Pond	Hampshire	SU790329
Woolmer Pond	Hampshire	SU788320
Woolmer Range No 2	Hampshire	SU790328
Wootton	Hampshire	SZ222987
Wormstall Wood	Hampshire	SZ358985
Yateley Site 24; Large Hottonia gravel pit	Hampshire	SU878570
Little Mountain	Herefordshire	SO2742 to SO2842
Ashridge	Hertfordshire	SP982127
Boundary Way Balancing Pond	Hertfordshire	TL085080
Tetley Gravel Pits	Humberside	SE782115
Newtown Harbour Pond 82	Isle of Wight	SZ442908
B2231 Arable Pond	Kent	TQ957719
Chiddingstone	Kent	TQ500450

<b>Site Name</b>	<b>County</b>	<b>Grid Reference</b>
Church Street Pond ROPA	Kent	TQ715741
Combwell Wood	Kent	TQ714343
Dungerness	Kent	TR0619, TR0645
Gold Lakes	Kent	TQ8851 to TQ8952
Great Bayhall	Kent	TQ623394
Hothfield Common	Kent	TQ96624555
Hothfield Common	Kent	TQ96694579
Hothfield Common	Kent	TQ96834530
Marden Meadow	Kent	TQ762445
Oreleston Forest	Kent	TQ979351
Peter`s Pit	Kent	TQ717628
Pond 146/8 DETR Lowland Pond Survey	Kent	TQ824429
Sandwich Bay	Kent	TR347161
Honley,Thirstin Rd	Kirklees	SE1311
Cockerham	Lancashire	SD445515
Great Bowden	Leicestershire	SP742897
Stoney Cove, Leics	Leicestershire	SP490940
Gibraltar Pt	Lincolnshire	TF5658
Messingham Sand Quarry	Lincolnshire	SE9003 to SE9102
Saltfleetby	Lincolnshire	TF470917
Saltfleetby Dunes NNR	Lincolnshire	TF482895
Saltfleetby–Theddlethorpe Dunes and Gibraltar Point	Lincolnshire	TF480906
Swanholme Lakes	Lincolnshire	SK9467 to SK9468
Swanholme Lakes Site 11	Lincolnshire	SK939685
Whisby Gravel Pits	Lincolnshire	SK9267
Ainsdale	Merseyside	SD2911
Ainsdale Dunes	Merseyside	SD286103
Altcar	Merseyside	SD285055
Birkdale	Merseyside	SD3013
Birkdale	Merseyside	na
Cabin Hill	Merseyside	SD285055
Formby	Merseyside	SD270075
Formby Hills,pond	Merseyside	SD270074
Formby Hills,pond nr Burell Av	Merseyside	SD279070
Formby Hills,wildfowl pond	Merseyside	SD279071
Hightown	Merseyside	SD296030
Hightown	Merseyside	SD296030
Queen's Jubilee NT	Merseyside	SD323164
Red Rocks	Merseyside	SJ204875
Sefton Coast	Merseyside	SD21, SD31
Sefton Coast	Merseyside	SD281099
Belton	Norfolk	TG471024
Belton Common	Norfolk	na



<b>Site Name</b>	<b>County</b>	<b>Grid Reference</b>
Blackfleet Broad	Norfolk	TG444213
Blakeney Point	Norfolk	TG0244
Cockshoot Broad	Norfolk	TG340150
Deep-Go Sound	Norfolk	TG429210
Fenmere	Norfolk	TL909881
Foulden Common	Norfolk	TF748001
Heigham Sound	Norfolk	TG436202
Heigham Sound	Norfolk	TG430200
Holkham	Norfolk	TF832455
Holkham NNR	Norfolk	TF832455
Holme	Norfolk	TF710449
Holme Dunes	Norfolk	TF710449
Hornwort Pond	Norfolk	TL993894
Horsey	Norfolk	TG464239
Horsey	Norfolk	TG464239
Langmere	Norfolk	TL906884
Langmere	Norfolk	TL906885
Lopham Little Fen	Norfolk	TM043794
Martham Broad	Norfolk	TG458204
Martham Broad	Norfolk	TG460201
Martham Broad	Norfolk	TG458201
Martham Broad	Norfolk	TG458204
Martham North Broad	Norfolk	TG458208
Martham South Broad	Norfolk	TG460201
Ranworth Broad	Norfolk	TG350150
Ringmere	Norfolk	TL909879
Rollesby	Norfolk	TG4415
Snetterton Arable Field Pond	Norfolk	TM010911
Sparham Pits	Norfolk	TG075175
Syderstone	Norfolk	TF836313
Syderstone	Norfolk	TF835331
Syderstone Common	Norfolk	TF826323
Syderstone Common	Norfolk	TF835315
Thompson Common Pingo 1	Norfolk	TL937964
Thompson Common Pingo 2	Norfolk	TL939966
Upton Broad	Norfolk	TG380130
Waxham Cut	Norfolk	TG448237
Winterton	Norfolk	TG486218
Winterton	Norfolk	TG484216
Winterton – Horsey Dunes	Norfolk	TG487196
Winterton Dunes	Norfolk	TG494203
Breckland	Norfolk/Suffolk	TL862948
The Broads	Norfolk/Suffolk	TG438209

<b>Site Name</b>	<b>County</b>	<b>Grid Reference</b>
Clay Bank	North Yorkshire	NZ571036
Ellers Spring	North Yorkshire	SE857848
Hilla Green Farm Bridge	North Yorkshire	SE947901
Little Hilla Green	North Yorkshire	SE947901
Lumley Moor Reservoir	North Yorkshire	SE2270
Lumley Moor Reservoir	North Yorkshire	SE220708
Skipwith Common	North Yorkshire	SE6437 to SE6637
Skipwith Pillwort Pond	North Yorkshire	SE647374
Skipwith Wash Dyke Pond	North Yorkshire	SE650390
Strensall Common	North Yorkshire	SE6559
Wykeham Lake	North Yorkshire	SE9882
New Hartley Ponds	Northumberland	NZ305764
Grove Farm	Norwich	TF555186
Daneshill	Nottinghamshire	SK668864
Daneshill Lakes A	Nottinghamshire	SK666868
Daneshill Lakes B	Nottinghamshire	SK667863
Lound Gravel Pits	Nottinghamshire	SK704855
Asham Meads	Oxfordshire	SP595135
Beckley Moat	Oxfordshire	SP577120
Beckley 'Raised Bog'	Oxfordshire	SP577120
Central Pond, Otmoor	Oxfordshire	SP569145
Fowl's Pill Otmoor	Oxfordshire	SP572141
Fringford Road Pond	Oxfordshire	SP598278
Holts Farm	Oxfordshire	SP557176
Kennington Pit	Oxfordshire	SP518033
Little Wittenham Lower Pond	Oxfordshire	SP571927
Little Wittenham Upper Pond	Oxfordshire	SP571927
Littleworth	Oxfordshire	SU3098
Otmoor: near Central Pond	Oxfordshire	SP568144
Otmoor: near Fowls Pill	Oxfordshire	SP573139
Otmoor: NW Fields 1	Oxfordshire	SP563149
Otmoor: NW Fields 2	Oxfordshire	SP561152
Otmoor: NW Fields 3	Oxfordshire	SP569152
Otmoor: RSPB1	Oxfordshire	SP564130
Otmoor: RSPB2	Oxfordshire	SP568133
Otmoor: RSPB3	Oxfordshire	SP568134
Otmoor: Willow Pond	Oxfordshire	SP576146
Pinkhill Groundwater Pond	Oxfordshire	SP439068
Pinkhill Main Pond	Oxfordshire	SP439068
Pinkhill Main Pond	Oxfordshire	SP439068
Pinkhill Scrape	Oxfordshire	SP439068
Pinkhill Surface Water Pond	Oxfordshire	SP439068
Wolvercote Green	Oxfordshire	SP494098

<b>Site Name</b>	<b>County</b>	<b>Grid Reference</b>
Woodcote Upper Pond	Oxfordshire	SU643816
Wychwood Forest New Hill 3	Oxfordshire	SP338169
Brown Moss	Shropshire	SJ562397
Brown Moss	Shropshire	SJ561393
Clarepool Moss	Shropshire	SJ435342
Long Pool Stiperstones	Shropshire	SO355977
Robin Hood's Butts (Wildmoor Pool)	Shropshire	SO425965
Clatworthy Reservoir	Somerset	ST041315
Pinkerley Pond	Somerset	SS722423
Priddy Pool 1	Somerset	ST545518
Priddy Pool 2	Somerset	ST545518
Tealham Moor	Somerset	ST407450
Cannock	Staffordshire	SJ976192
Hatherton Clay Pit, Bridgetown, Cannock, Stafford	Staffordshire	SJ974083
Knypersley Reservoir outlet,R Trent	Staffordshire	SJ896549
Milford Quarry	Staffordshire	SJ976192
Stowe Pool	Staffordshire	SK120100
Walk Mill Clay Pit	Staffordshire	SJ974082
Dew's Ponds	Suffolk	TM390719
Easton Broad,S side	Suffolk	TM517792
Lound Waterworks	Suffolk	TG5100 to TG5001
Minsmere	Suffolk	TM452692
Minsmere	Suffolk	TM452692
Minsmere (RSPB Reserve)	Suffolk	TM458694
Minsmere Lower Pool	Suffolk	TM452692
New-delight Walks	Suffolk	TM454732
New-delight Walks	Suffolk	TM453728
Redgrave Fen	Suffolk	TM049795
Walberswick	Suffolk	TM452729
Westleton Heath RSPB	Suffolk	TM452694
Westleton Pit	Suffolk	TM4469
Westleton Pits	Suffolk	TM452693
Westleton Pits	Suffolk	TM452691
Boldre Mere	Surrey	TQ0758
Bookham Common	Surrey	TQ124558
Brimmer Pond	Surrey	SU204531
Burgh Heath	Surrey	TQ241577
Chequers Pond	Surrey	TQ126636
Churt	Surrey	SU863398
Churt Common	Surrey	SU863398
Churt Flashes	Surrey	SU863398
Crooksbury	Surrey	SU890453
Frensham	Surrey	SU849403

<b>Site Name</b>	<b>County</b>	<b>Grid Reference</b>
Frensham Great Pond	Surrey	SU849403
Halfpenny Pond	Surrey	SU948612
Headley Heath (Heath End House)	Surrey	TQ204541
Heath House Pond	Surrey	TQ204541
Holmwood Common	Surrey	TQ1845
Horsell Birch	Surrey	SU9859
Mitcham Pond	Surrey	TQ289679
Pintmeer Pond	Surrey	TQ226553
Reigate	Surrey	TQ2649
Shortwood Pond	Surrey	TQ048719
Staines Moor Butts Pond	Surrey	TQ030736
Thursley	Surrey	SU902412
Thursley Common	Surrey	SU903406
Thursley, Ash, Pirbright and Chobham	Surrey	SU885399
Hailsham	Sussex	TQ5909
Hooe Common	Sussex	TQ6910
Milton Hide Common	Sussex	TQ562087
Powdermill Reservoir	Sussex	TQ799196
The Warren, Catsfield	Sussex	TQ720145
Wartling Wood	Sussex	TQ6510
Risley Urban	Warrington	SJ662927
Rixton Clay Pits	Warrington	SJ684901
Ensor's Pool	Warwickshire	SP348903
Ufton Fields	Warwickshire	SP382607
Himley landfill site	West Midlands	SO895903
Tilehurst Green	West Midlands	SP178768
Pondbrow	West Sussex	TQ272106
Trotton Bridge	West Sussex	SU837224
Denby Grange Colliery New Pond	West Yorkshire	SE270154
Denby Grange Colliery Pond 1	West Yorkshire	SE270153
Ireland Wood	West Yorkshire	SE256382
Pond (SSSI), St Ives, Bingley	West Yorkshire	SE088389
Cotswold Water Park 48	Wiltshire	SU019937
Cotswold Water Park 52	Wiltshire	SU012937
Emmett Hill	Wiltshire	SU009901
Pewsey Downs	Wiltshire	SU115631
Seasonal pond, Winterslow	Wiltshire	SU233326
Grafton Flyford	Worcestershire	SO967558
Lyppard Grange	Worcestershire	SO879556
Westwood Great Pool	Worcestershire	SO879635
Westwood Great Pool	Worcestershire	SO880633

#### Appendix 14: Funding applications made during Phase 1

<b>Date</b>	<b>Organisation</b>	<b>Activity</b>	<b>Result</b>
October 2002	Environment Agency Monitoring Group	Agency involvement in pond monitoring	Not funded due to Water Framework Directive
May 2003	Environment Agency Monitoring Group	Core NPMN activities and agency involvement in pond monitoring	Not funded due to Water Framework Directive
September 2003	Defra / National Biodiversity Network	Assess Habitat based biodiversity data management	Funded (summary in Appendix 11)
October 2003	Defra	Development of database accessibility and content	Included in Defra Wildlife and Countryside Research Requirements Document 2004 / 2005 as a possible project if funds are available
December 2003	English Nature	Core NPMN activities	Not funded
February 2004	Scottish Executive Environment and Rural Affairs Department	Core NPMN activities and collecting data to extend PSYM to Scotland	Appears in research programme for 2004 / 2005 as a possible project if funds are available
February 2004	English Nature	Prepare list of high quality ponds for Water Framework Directive process	Funded (sites listed in Appendix 12)
July 2004	Water UK	Core NPMN activities	Not yet responded
September 2004	Defra / National Biodiversity Network	Develop agreed monitoring plan with voluntary recorders and statutory bodies	Not yet responded

## **Appendix 15: Draft HAP for Ponds of High Ecological Quality**

This document was prepared by the Ponds Conservation Trust in 2002 as part of the proposal for Ponds of High Ecological Quality to be recognised as a priority habitat under the UK Biodiversity Action Plan. It is intended to be a basis for discussion and to make recommendations for the Habitat Action Plan for Ponds of High Ecological Quality.

This habitat is popular with the public and with biodiversity organisations. Suggested actions are largely based on co-ordinating activities currently being carried out by the variety of organisations involved with ponds. This means the new resources required to put the HAP in place are likely to be modest and largely focussed on providing much needed improvements to existing activities (e.g. co-ordination of resources for pond conservation based on sound management recommendations, ongoing co-ordination of pond survey activities, pollution control through targeted use of agri-environment schemes, creation of high quality ponds).

The Ponds Conservation Trust welcomes wider distribution of this document, and feedback on it. The Ponds Conservation Trust can be contacted via [pondstrust@brookes.ac.uk](mailto:pondstrust@brookes.ac.uk).

### **1. Current status**

1.1 "Ponds of high ecological quality" are defined as permanent and seasonal standing water bodies up to 1 ha in area which meet one or more of the following criteria:

- amphibians: ponds supporting exceptional amphibian populations or numbers of species (based on population sizes specified in guidelines for the selection of biological SSSIs);
- dragonflies: ponds supporting an exceptional number of dragonfly species (based on numbers of species specified in guidelines for the selection of biological SSSIs);
- wetland plants: ponds supporting an exceptionally rich plant assemblage (based on numbers of species, as used in the 1996 Lowland Pond Survey (LPS96), defined by the National Pond Survey);
- other invertebrates: ponds supporting an exceptionally rich invertebrate assemblage (based on the number of species as defined by the National Pond Survey);
- Red Data Book and BAP species: ponds supporting any Red Data Book or BAP species.
- A supplementary method, PSYM (Predictive System for Multimetrics, pronounced "sim"), could also be used. PSYM has been developed by the Environment Agency and the Ponds Conservation Trust as a method of assessing pond ecological quality. The method compares recorded physico-chemical values and invertebrate families and/or plant species with predictions from a baseline non-impacted dataset. Ponds of high ecological quality could be defined as those which have a PSYM index of biological integrity of 70% or above. For more information on PSYM see [www.pondstrust.org.uk](http://www.pondstrust.org.uk) and follow links for Ponds in Partnership.

1.2 Data from the Lowland Pond Survey suggest that about 2-5% of ponds would fall into the category of 'high ecological quality' based on these criteria. The most recent data suggest that there are in the order of 400,000 ponds in the British countryside (Countryside Survey 2000), (UPDATE WITH CS2000 data) so between 8000 and 20000 ponds are expected to meet these criteria. Seasonal ponds, which may be very important for their specialist flora and fauna, are included in the definition. Bog pools are, however, excluded because they more appropriately dealt with through the two bog HAPs.

1.3 Ponds of high ecological quality are important habitats for biodiversity including key species. Nationally, ponds are at least as rich as lakes and rivers in invertebrate and plant species, and support many scarce and rare species (Biggs et al. 2000). They are the main breeding sites of all amphibians and most dragonflies, and are used by about 20 species of native fish. A large number of wetland species are also associated with the damp ground of pond margins and these can be particularly valuable in areas of the countryside where wetlands are scarce. At least 40 BAP priority species are associated with small standing water bodies (e.g. water vole, tadpole shrimp, medicinal leech, lesser silver water beetle, spangled water beetles, starfruit, pennyroyal, three-lobed crowfoot), as are the Habitats Directive Annex II species great crested newt and atlantic stream crayfish.

1.4 Ponds are functionally critical habitats for species that do not spend all their life in water, e.g. bats for feeding. They form stepping stones and isolated patches of benign habitat for many species, especially where associated with wetland vegetation.

1.5 Corresponding habitats

BAP broad habitat: Standing open waters and canals.

Phase 1: G1 Standing water.

NVC: Various aquatic, swamp and fen communities; OV28-OV35; and others.

Habitats Directive Annex I: Oligotrophic waters containing very few minerals of sandy plains (part); oligotrophic to mesotrophic standing waters with vegetation of the Littorelletea uniflorae and/or of the Isoetes-Nanojuncetea (part); Hard oligo-mesotrophic waters with benthic vegetation of Chara species (part); Natural dystrophic lakes and ponds (part); Mediterranean temporary ponds; Natural eutrophic lakes (part).

Habitats Directive Article 10 recognises the importance of ponds as 'stepping stone' habitats

1.6 Ponds are widespread throughout the UK, but high-quality examples are localised, especially in the lowlands.

## **2. Current factors affecting the habitat**

2.1 Ponds are vulnerable to loss and damage through uncontrolled factors (e.g. nutrient enrichment, infilling) on a scale that is not possible to counter using existing mechanisms. The 1996 Lowland Pond Survey (LPS96) shows that at least 50% of the ponds in the wider countryside are significantly degraded and that there is widespread evidence of enrichment and other diffuse pollution impacts. Temporary ponds are, if anything, more degraded than permanent ponds. There is also growing concern that even ponds in semi-natural landscapes are at risk from air-borne pollution (e.g. acidification, nutrient-enriched rainfall) and climate change, to which small shallow waterbodies are recognised as being particularly vulnerable. Ponds in most parts of Britain are also seriously threatened by invasive alien aquatic plants

2.2 LPS96 and CS2000 show that although pond numbers are relatively stable, there is an exceptionally high turnover of ponds, with 1% of the total resource both destroyed and created each year. There is currently no direct assessment of the quality of ponds lost compared to those gained, but it is likely that new ponds created are of lower ecological quality than old ponds destroyed. LPS96 suggests that most new ponds are created (a) with stream inflows - a practice discouraged in many other European countries, since most inflows are polluted, and (b) as fishing lakes. Currently the long term potential for many new sites is, therefore, likely to be relatively low.

### **3. Current action**

#### **3.1 Legal status**

3.1.1 Ponds have little statutory protection with very few directly protected as SSSIs. High quality ponds are not mentioned in the SSSI Selection Guidelines. Pond species cannot be supported by surrounding terrestrial habitat and often are not found in larger water bodies (lakes, canals) that are given specific treatment in the SSSI series. Incidental protection for ponds is sometimes provided through their occurrence within protected sites, but this does not ensure their sympathetic management. Elsewhere, protection depends largely on the goodwill of the landowner.

3.1.2 The UK has international obligations for six Annex I habitat types included within this habitat (either entirely or in part), and several Annex II species (see Section 1.4 above). The importance of ponds as 'stepping stone' habitats is recognised in Article 10 of the Habitats Directive. However, although the conservation interest of some types of ponds and some pond species is recognised internationally by their inclusion in the annexes of the Habitats Directive, the majority of important ponds and associated species will not be covered by SACs.

3.1.4 Existing HAPs and SAPs currently protect only a small proportion of high-quality ponds. So, for example, the National Pond Survey shows that 89% of the ponds supporting a Red Data Book plant or animal species do not support BAP species and so are not covered by existing SAPs. Large numbers of high-quality ponds lie outside existing priority habitats. For example, most ponds in the high-density clusters in NW England are primarily in agricultural grassland; many ponds in the Weald in southern England are in semi-natural woodland with no conservation designation.

3.1.5 The existing HAP for eutrophic standing waters will cover some ponds, but most are not included in the HAP since it specifically excludes field ponds, small pools and brackish waters.

3.1.6 Ponds which support Great Crested Newts are protected by the Wildlife and Countryside Act 1981, Habitats Regulations 1994 and Countryside and Rights of Way Act 2000 which make it illegal to damage or destroy a breeding site or resting place.

3.1.7 Ponds are theoretically protected from water pollution by a range of UK and European legislation (e.g. the Environment Act 1995, the Control of Pollution Act 1989 (Scotland), the Nitrates Directive and the Water Framework Directive). In practice, however, pollution control efforts are primarily focussed on rivers and lakes, with few specific measures implemented on ponds.

3.1.8 The Environment Agency (EA) is responsible for controlling water pollution in England and Wales and has a statutory duty to promote the conservation of wetland wildlife. The Scottish Environment Protection Agency (SEPA) has a similar role in Scotland. Other organisations with statutory responsibilities include water companies, internal drainage boards, British Waterways, local authorities, the Environment and Heritage Service (Northern Ireland) and the Office of Water Services.

3.1.9 Agri-environment schemes which have potential to benefit ponds include: Environmentally Sensitive Areas schemes, Wildlife Enhancement Schemes, Countryside Stewardship, the Scottish Countryside Premium Scheme, Habitat Improvement Schemes in Northern Ireland and Tir Gofal in Wales. These schemes provide payments for pond management, pond creation and for the deintensification of land-use which can lead to reduce pollutant inputs to ponds.



## 3.2 Management, research and guidance

3.2.1 Large numbers of ponds are managed annually but at present this work is largely undertaken on an ad hoc basis with little co-ordination or integration. Thus although management of freshwaters is increasingly being organised at a catchment level most pond management still proceeds on a site by site basis with little reference to the management of adjacent terrestrial or aquatic habitats, both of which have a profound influence on pond quality.

3.2.2 In addition, despite a large amount of work undertaken assessing the value of ponds (e.g. National Pond Survey, DETR Lowland Pond Survey, many regional surveys) remarkably little is known about the effects of pond management. Thus, although some research on the effects of pond management has been carried out by the Ponds Conservation Trust, Plantlife, and others there remains a need for basic information on virtually all aspects of pond management including effects of desilting, vegetation removal and pollution control measures.

3.2.3 Particularly important is the need for more information about the role of networks of ponds: recent research has shown that ponds are a rich source of aquatic biodiversity in catchments but little is known of how this biodiversity can best be maintained.

3.2.4 There is a considerable amount of pond survey information currently available, with new surveys regularly commissioned by Local Authorities and NGOs. This provides the basis for a national assessment of pond quality, including methods compatible with the Water Framework Directive, which requires comparison with a minimally impaired baseline.

3.2.5 An increasing amount of research is also being undertaken on ponds with most work focussed on site assessment (e.g. the PSYM work by PCT and the Environment Agency) and the ecology of amphibians. Valuable work has also been undertaken by the PondLife project in north west England and in a number of universities (e.g. University of Plymouth work on Mediterranean temporary ponds).

3.2.6 The Environment Agency and the Ponds Conservation Trust are currently developing a National Pond Monitoring Network which will enable ongoing assessment of the ecological quality of small water bodies in the UK, and collate data from all the various surveys which are carried out nationally.

3.2.7 Recently there has been an increase in the availability of reliable information on the conservation of ponds but only a small proportion of the total audience has so far been reached. Generic publications giving guidance on management are available, but need to be more widely distributed (e.g. management leaflets produced jointly by the Environment Agency, English Nature and the Ponds Conservation Trust on "Good wildlife ponds", "Planting-up ponds" and "Problem pond plants". A comprehensive guide to pond management has been prepared by the PCT but, in the absence of information on the effects of management, is largely based on the precautionary principle of minimal intervention.

3.2.8 Existing grants are available to help conserve/create new high quality ponds e.g. agri-environment schemes However the effectiveness of these financial incentives is largely dependent on the quality of advice driving them and the take up of the most recent management advice, which remains patchy. Grants also need to be directly linked to conservation management advice to prevent damage during management of existing ponds and to create good quality new sites.

#### **4. Action plan objectives and targets**

4.1 Ensure that there is no deterioration in the biological or physico-chemical condition of existing ponds of high ecological value.

4.2 Encourage the creation of new high quality ponds (i.e. ponds with minimum pollution risk and with designs optimised for wildlife). The target for the creation of new high quality ponds should be 100 sites annually (approximately 1 per county).

#### **5. Proposed action with lead agencies**

##### **5.1 Policy and legislation**

5.1.1 Support development of initiatives and policy which will protect ponds of high ecological quality, including implementation of policies to control diffuse pollution from agricultural and urban environments, inclusion of high quality ponds in Water Framework Directive River Basin Management Plans, refinements to agri-environment schemes to promote high quality pond protection and creation, and measures to control the spread of invasive alien species.

5.1.2 Ensure that ponds of high ecological quality are consistently identified in structure plans, local plans, unitary development plans and Local Environment Agency Plans.

5.1.3 Encourage agri-environment schemes to promote the protection and creation of ponds of high ecological quality through targeted implementation of pollution control measures (e.g. buffer zones, arable to grass conversion, reduction of fertiliser inputs), strategic creation of new ponds and provision of appropriate pond management advice.

5.1.4 Encourage bodies funding pond conservation work (e.g. local authorities, English Nature, Heritage Lottery Fund) to focus on the protection and creation of ponds of high ecological quality.

5.1.5 Ensure that local HAPs for ponds include specific actions for the protection and creation of ponds of high ecological quality.

##### **5.2 Site safeguard and management**

5.2.1 Encourage local or national designation of ponds of high ecological quality sites of nature conservation importance (e.g. as SNCI, LNR, SSSI).

5.2.2 Encourage the preparation of specific management statements for all ponds of high ecological quality; plans may be prepared for individual sites or groups of sites. Where possible plans should be incorporated in existing site management plans.

##### **5.3 Advisory**

5.3.1 Develop, promote and disseminate good practice guidelines on the creation and management of ponds of high ecological quality, particularly for landowners and managers.

5.3.2 Contribute to the implementation and integration of relevant species and habitat action plans associated with ponds in conjunction with the relevant steering groups.

##### **5.4 International**

5.4.1 Liaise with relevant authorities in Europe to exchange information and ideas on conservation of ponds, and in particular to form partnerships to gain EU funding.

##### **5.5 Monitoring and research**

5.5.1 Continue to collect and collate pond survey data to produce an inventory of ponds of high ecological quality.

5.5.2 Continue to refine assessment methods for identifying high quality ponds.

5.5.3 Encourage pond surveys using techniques which will enable identification of ponds of high ecological quality.

5.5.4 Use the framework of the National Pond Monitoring Network (NPMN) to assess changes in the number and quality of ponds of high ecological quality. The NPMN is made up of partnerships between the various organisations carrying out pond survey work

## 5.6 Communications and publicity

5.6.1 Co-ordinate activities of the various organisations carrying out pond surveys and management.

5.6.2 Promote high quality pond creation schemes by publicising existing agri-environment schemes, grants etc which are favourable toward the creation and maintenance of ponds of high ecological quality.

5.6.3 Promote an awareness among the public and land managers that ponds are important for biodiversity and should be managed for this interest, and not just for fishing, wildfowl, amenity and landscape.

## 6. Costing

6.1 Resources for practical pond management (pond creation, pond management) are widely dispersed through many different organisations and the private sector. At present, no estimates are available of the current expenditure. However, there is an urgent need for funding for co-ordinating activities, ensuring that existing funds are spent more effectively (e.g. training of advisors, development and co-ordination of LBAPs which identify high quality ponds).

### 6.2 Estimated expenditure

Creation of new ponds. £250,000/year (average of £2500/site)

Advice on pond design and siting: £100,000/year (1 advisor England/Wales, 1 advisor Scotland).

Costs of monitoring / co-ordination: £100,000/year (1 advisor England/Wales, 1 advisor Scotland).

## 7. Lead partners

7.1 It is proposed that the Environment Agency and Ponds Conservation Trust take a joint lead role.

## 8. References

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