Institute of Terrestrial Ecology

JNCC Report No. 262

WILDLIFE AND POLLUTION: 1995/96 Annual Report

Centre for Ecology & Hydrology
Natural Environment Research Council

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This report should be cited as:
Newton, I., Dale, L., Freestone, P., French, M.C., Malcolm, H., Osborn, D., Wright, J., Wyatt, C., & Wyllie, I. 1996. Wildlife and Pollution: 1995/96. Annual Report. *JNCC Report* No.262.

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WILDLIFE AND POLLUTION: 1995/96 Annual Report

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Institute of Terrestrial Ecology
(Natural Environment Research Council)
JNCC Project 018 (Contract F71-12-153)
ITE Project T08054c5

Annual report to Joint Nature Conservation Committee

Monks Wood Experimental Station
Abbots Ripton
Huntingdon
Cambs
PE17 2LS

July 1996

Joint Nature Conservation Committee

Report distribution

Report number	262
Contract number/JNCC project number	F71-12-153, Project 018
Date received	July 1996
Report title	Wildlife and pollution: 1995/96 Annual Report
Contract title	Wildlife and pollution
Contractor	Institute of Terrestrial Ecology (Natural Environment Research Council)
Restrictions	None

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Wildlife and pollution

Part 1 Preface and Summary

2 Organochlorines and mercury in predatory birds, 1995

3 Organochlorines and mercury in peregrine eggs, 1995

4 Organochlorines and mercury in merlin eggs, 1995

5 Organochlorines and mercury in golden eagle eggs, 1995

6 Incidents investigated during 1995

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July 1996

1 Preface and summary

1.1 Introduction

The Wildlife and Pollution contract covers a long-term monitoring programme to examine the levels of pollutants in some wildlife in Britain. The programme was started more than 30 years ago, when there were serious concerns over the effects of organochlorine insecticides and organomercury fungicides on several birds and mammals. This early work demonstrated the effects of the organochlorines, and eventually contributed to the ban on their use in this country and abroad. The programme has measured levels of these compounds in predatory and fish-eating birds since then. Investigations have also been made into the levels of industrial polychlorinated biphenyls (PCBs), following their identification as pollutants in 1966. Mercury levels, derived from both agricultural and industrial sources, have also been tracked. In addition, the contract supports a wildlife incident investigation service, which can examine the causes of unexpected mortality incidents (that are not obviously related to oil pollution or to farm chemicals). In recent years, investigations have been made into the effects of the newest generation of rodenticides on barn owls. Due to the serious illness of the specialist analyst, the rodenticide analysis for 1995/96 has been delayed. These results will be presented in a later report. Gannet eggs are regularly collected biennially from four colonies and, when available, from other sites; 1995 was not a collection year. No gannet eggs were received during 1995.

Annual reports give an interim summary of results. Every three years these annual results are gathered together into a more substantial report in which they are integrated with previous findings. In addition, results are published periodically in the scientific literature. Recent key papers are listed in this report under sub-project summaries.

The Wildlife and Pollution contract was the subject of scientific assessment within JNCC's rolling programme of peer review in autumn 1993.

Each subproject within the Wildlife and Pollution contract is summarised below. Each is dependent on the provision of material from amateur naturalists and other interested parties, and it is not always possible to obtain desired material for analysis, especially from remote areas.

1.2 Organochlorines and mercury in predatory birds

The main objective of this work was to analyse the bodies of predatory and fish-eating birds, supplied by members of the public, in order to continue the monitoring of organochlorine and mercury residues in livers. This enables us to keep a watch on the effects of previous hard-won withdrawals of permitted uses of some of these chemicals, and to examine geographical variation in residues. For 1995, the livers from 147 birds were analysed, including those from 30 kestrels, 64 sparrowhawks, 5 herons, 6 kingfishers and 42 birds of various other species. These birds came from various localities in England, Scotland and Wales. Over the whole monitoring period (1963-95), the overall data for most species have revealed significant long-term downward trends in residues (except for PCBs in three species). Declines may be levelling off for DDE (the main metabolite of DDT) and HEOD (derived

from aldrin and dieldrin). Two significant changes in geometric mean levels between 1994 and 1995 were noted, involving decreases in mercury residues in kestrels and PCB residues in sparrowhawks. It is impossible to say whether these differences reflected real year-to-year changes in exposure.

1.3 Organochlorines and mercury in peregrine eggs

Eggs from 14 peregrine clutches were analysed in 1995, from various parts of England, Scotland and Wales. The organochlorine levels in British peregrines continue to decline, but occasional high PCB levels appear.

1.4 Organochlorines and mercury in merlin eggs

Eggs from 25 merlin clutches were analysed in 1995, from various parts of England and Scotland. The results confirm that the merlin remains the most contaminated of the British raptors, but residue levels are declining. Mercury in eggs from the Northern Isles continues to be at high levels.

1.5 Organochlorines and mercury in golden eagle eggs

Eggs from seven clutches (six from Scotland and one from England) were analysed. These confirm the low levels of contamination in eggs from inland districts found in recent years.

1.6 Incidents investigated during 1995

Two small wildlife incidents were investigated during 1995. The first involved mute swans in Cambridgeshire, the second guillemots collected from the 1995 beached birds survey.

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Annual report to the Joint Nature Conservation Committee

Wildlife and pollution

Part 2 Organochlorines and mercury in predatory birds, 1995

I. Newton, L. Dale, P. Freestone, M. C. French,
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July 1996

2 Organochlorines and mercury in predatory birds

2.1 Introduction

The main objective of this work was to analyse the carcasses of predatory birds, supplied by members of the public, in order to continue the monitoring of organochlorine and metal residues in livers. The chemicals of interest included DDE (from the insecticide DDT), HEOD (from the insecticides aldrin and dieldrin), PCBs (polychlorinated biphenyls from industrial products) and Hg (mercury from agricultural and industrial sources). Throughout this section the levels of organochlorines are given as ppm in wet weight and of mercury as ppm in dry weight.

The main species involved included the sparrowhawk and kestrel, representing the terrestrial environment, and the fish-eating heron, kingfisher and great-crested grebe, representing the aquatic environment. The findings from various other species received during the year are also included.

2.2 Results from 1995

During the past year, the livers from 147 birds were analysed, including those from 30 kestrels, 64 sparrowhawks, 5 herons, 6 kingfishers, 3 great-crested grebes and 39 others. These totals included some birds which had died in earlier years, but which were analysed in the current year. The results from all these birds are listed in Table 1, and the geometric means for each chemical from the main species (1995 specimens only) are given in Table 2.

Several birds from 1995 had unexpectedly high levels of pollutants. They included one kestrel (from Kent) with 6 ppm DDE and one kestrel (from North Yorkshire) with 20 ppm PCBs; one sparrowhawk (from Kent) with 11 ppm DDE and 4 ppm HEOD, five sparrowhawks (from various counties) with 10-24 ppm PCBs and three sparrowhawks (from various counties) with 7-8 ppm Hg; one peregrine from the Isles of Scilly with 17 ppm HEOD, two peregrines (from Wales) with 35 and 80 ppm PCB, one of which also had 12 ppm Hg; one hobby (from Avon) with 43 ppm PCB; one short-eared owl (from Lincolnshire) with 31 ppm PCB, and one Bittern with 32 ppm Hg. Hence, although the levels of these various pollutants have generally declined since the 1970s (see below), occasional heavily contaminated birds continue to appear.

The high level of HEOD in the peregrine was at a level that could have been a contributory cause of death. The bird was autopsied by a vet prior to sending us various tissues for analysis. His report suggests that the bird was in a starvation condition and there were numerous bruises to the body consistent with a collision. There were also internal haemorrhages which he considers to be the ultimate cause of death. In the past, however, haemorrhages were associated with HEOD poisoning. One wonders whether dieldrin has been used recently in the bulb fields of the Isles of Scilly

Another major change of recent years has been the increasing relative importance of PCBs. In some species these chemicals have not declined since the 1970s (see below), so in many specimens they now predominate among organochlorine residues.

Out of 12 comparisons, two significant differences in geometric mean values were found between the 1994 and 1995 results. These were a highly significant decline in mercury residues in kestrels, and a decline in PCB residues in sparrowhawks (Table 3). It is impossible to say whether these differences reflected real changes in exposure, especially as levels were generally low. Because only one kingfisher was received in 1994, no comparisons between residues in 1994 and 1995 could be made for this species.

2.3 Reference

Newton, I, Wyllie, I. & Asher, A. 1993. Long term trends in organochlorine and mercury residues in some predatory birds in Britain. Environ. Pollut. 79: 143-151.

Table 1. Levels of organochlorines (ppm in wet weight) and mercury (ppm in dry weight) in the livers of predatory birds analysed between April 1995 and March 1996.

ND=none detected; J=juvenile in first year; A=adult other than first year; M=male; F=female; D & G=Dumfries & Galloway; H & W=Hereford & Worcester.

Specimen no.	Date Found	County	Age	Sex	pp'-DDE	HEOD	PCB	Hg
Kestrel (*Falco tinnunculus*)								
11711	Nov 94	Wiltshire	J	F	0.021	0.028	0.982	0.590
11718	Jan 95	Sussex	J	F	0.247	0.108	1.574	0.870
11725	Jan 95	Cornwall	J	F	0.063	0.049	0.728	1.240
11742	Jan 95	H & W	J	F	0.001	0.037	0.121	0.240
11748	Feb 95	-	A	F	0.001	0.138	3.828	0.660
11749	Feb 95	Leicestershire	J	M	0.067	0.182	1.588	1.840
11778	Feb 95	Somerset	A	M	0.001	0.726	0.272	0.290
11783	Feb 95	Northants.	A	F	0.215	0.063	5.156	ND
11796	Mar 95	Essex	A	F	0.007	0.047	0.487	0.174
11817	Oct 93	Grampian	A	M	0.012	0.090	0.629	0.276
11818	Dec 92	Bedfordshire	A	M	0.207	0.541	0.184	0.136
11884	Jul 95	Norfolk	J	F	0.157	0.131	0.243	0.652
11893	Jun 95	N. Yorkshire	J	F	0.456	0.154	20.158	0.771
11907	Aug 95	Derbyshire	A	M	0.033	0.069	0.719	0.180
11914	Jun 95	N. Yorkshire	J	F	0.064	0.117	0.385	0.940
11919	Aug 95	Oxfordshire	J	F	0.024	0.111	1.436	0.323
11923	Sep 95	Cambs.	A	M	0.092	0.015	0.302	0.153
11947	Oct 95	E. Sussex	J	F	0.420	0.047	0.242	0.659
11949	Oct 95	Hampshire	J	F	0.035	0.077	2.012	0.551
11951	Oct 95	Fife	J	F	0.069	0.106	0.436	0.110
11953	May 95	D & G	A	M	2.677	0.105	4.803	2.307
11955	Oct 95	Grampian	J	F	0.025	0.023	0.300	1.356
11963	Aug 94	Highland	A	M	0.022	0.122	0.277	0.816
11973	Oct 95	Cambs.	J	F	0.103	0.535	0.030	0.223
11978	Nov 95	Norfolk	J	F	0.108	0.164	0.939	3.651
11980	Nov 95	G. London	J	M	0.044	0.019	5.329	0.131
11997	Dec 95	Hertfordshire	J	M	0.182	0.419	3.906	0.858
11999	Dec 95	Bedfordshire	A	M	1.563	0.541	4.361	1.055
12001	Dec 95	Sussex	J	F	0.066	0.269	2.499	0.735
12005	Dec 95	Kent	A	M	5.641	0.079	0.789	0.226

Specimen no.	Date Found	County	Age	Sex	pp'-DDE	HEOD	PCB	Hg
Sparrowhawk (*Accipiter nisus*)								
11720	Jan 95	Bucks.	J	F	5.608	0.167	9.238	4.031
11737	Jan 95	Tayside	J	M	2.612	0.057	0.246	1.828
11743	Jan 95	Grampian	A	F	4.949	0.293	8.752	5.639
11747	Feb 95	Central	A	F	1.114	0.055	1.006	2.590
11751	Feb 95	Suffolk	J	F	0.442	0.144	2.322	2.469
11752	Oct 92	Co Fermanagh	J	M	0.073	0.019	0.108	7.004
11756	Feb 95	Humberside	A	M	1.917	0.169	4.337	1.544
11758	Feb 95	Kent	A	F	11.241	3.539	17.950	3.606
11760	Feb 95	Northants.	J	M	1.274	0.051	3.065	3.214
11763	Feb 95	Notts.	A	F	0.471	0.048	2.284	1.831
11764	Feb 95	Glos.	A	F	2.903	1.078	16.697	3.886
11766	Feb 95	Cheshire	J	M	1.230	0.228	3.158	4.743
11772	Jan 95	Highland	J	F	2.334	0.166	3.253	5.547
11774	Feb 95	Bucks.	J	F	4.884	0.188	10.162	8.958
11775	Mar 95	Cambs.	A	F	8.896	0.203	1.223	2.429
11784	Feb 95	Northants.	J	F	3.693	0.200	7.132	5.635
11788	Mar 95	Hertfordshire	A	M	1.137	0.055	9.350	1.263
11792	Mar 95	Essex	J	M	1.938	0.026	0.220	0.522
11797	Apr 95	Devon	A	F	1.053	0.028	0.499	1.722
11803	Apr 95	Bedfordshire	A	M	3.131	0.582	1.048	2.186
11804	Apr 95	Wiltshire	A	F	1.531	0.055	2.132	2.616
11809	Apr 95	Northants.	A	F	3.675	1.026	24.390	6.205
11830	Apr 95	Strathclyde	J	F	1.335	0.048	0.754	5.917
11863	May 95	Bedfordshire	A	F	1.687	0.650	3.102	2.543
11864	Feb 95	Lincolnshire	A	F	2.827	0.753	0.340	2.589
11871	May 94	Devon	A	F	1.600	0.081	0.619	2.743
11872	May 94	Co. Down	A	M	1.502	0.031	3.191	0.906
11890	Jul 95	W. Midlands	J	F	0.813	0.037	1.350	1.220
11892	Jul 95	Norfolk	A	F	4.063	0.925	14.596	4.122
11896	Aug 95	Essex	J	M	0.203	0.013	0.245	0.362
11903	Aug 95	Norfolk	J	F	0.060	0.014	0.040	0.212
11905	Aug 95	Norfolk	J	M	1.780	0.017	0.027	1.296
11908	Aug 95	Northants.	J	M	0.572	0.027	0.350	1.048
11909	Aug 95	Strathclyde	J	M	2.172	0.068	4.149	0.901
11911	Aug 95	Bedfordshire	J	F	0.039	0.011	0.012	0.355
11912	Aug 95	Hampshire	J	F	0.079	0.006	0.023	0.304
11917	Aug 95	Oxfordshire	J	M	1.315	0.008	0.086	0.485
11921	Aug 95	Strathclyde	J	F	0.059	0.030	0.680	0.534
11924	Sep 95	Lincolnshire	J	F	0.101	0.018	0.190	0.101
11927	Aug 95	Suffolk	J	F	0.965	0.023	0.132	0.670

Specimen no.	Date Found	County	Age	Sex	pp'-DDE	HEOD	PCB	Hg
Sparrowhawk (*Accipiter nisus*) cont.								
11928	Sep 95	Kent	J	M	2.657	0.027	0.039	0.519
11931	Sep 95	Norfolk	J	M	0.104	0.009	0.007	0.767
11933	Sep 95	Lincolnshire	J	F	0.625	0.175	0.022	0.331
11934	Sep 95	Strathclyde	J	F	0.595	0.022	0.668	1.805
11937	Sep 95	Avon	J	M	1.892	0.048	3.078	0.673
11938	Sep 95	Cambs.	J	F	0.606	0.016	0.581	0.377
11942	Sep 95	Suffolk	A	F	1.199	0.039	1.249	0.304
11950	Oct 95	Bedfordshire	J	M	0.553	0.000	0.024	1.110
11954	Sep 95	Gwent	J	F	0.061	0.013	0.451	1.596
11956	Aug 94	Highland	J	F	0.513	0.031	2.551	0.969
11957	Feb 95	Highland	J	F	7.552	0.732	5.083	3.842
11958	Mar 95	Highland	J	M	5.749	0.159	4.101	5.774
11959	Feb 95	Highland	J	F	0.405	0.032	0.058	3.086
11960	Aug 95	Highland	J	F	0.046	0.015	0.027	0.532
11961	Aug 95	Highland	J	F	0.111	0.036	0.026	0.463
11962	Aug 95	Highland	J	M	1.500	0.067	4.013	7.048
11971	Feb 95	Dyfed	J	M	0.011	0.006	0.034	0.204
11972	Aug 95	Warwickshire	J	M	0.078	0.010	0.035	1.997
11974	Oct 95	Hampshire	J	M	0.091	0.038	0.155	1.217
11979	Nov 95	Hampshire	J	F	3.404	0.412	6.826	0.414
11981	Nov 95	Clwyd	J	F	0.038	0.016	0.087	0.483
11984	Nov-95	Northants.	J	F	0.091	0.047	2.345	0.177
11988	Nov 95	Wiltshire	J	F	0.928	0.126	2.622	1.012
11993	Dec 95	Lincolnshire	J	F	8.612	0.687	1.323	0.635
Peregrine Falcon (*Falco peregrinus*)								
11785	Mar 95	Gwynedd	A	M	3.052	0.574	80.367	3.444
11857	May 95	Dyfed	A	F	1.547	0.284	35.283	12.094
11866	Nov 94	Isles of Scilly	-	-	2.622	17.221	17.351	8.065
11877	Jun 95	W. Sussex	J	F	0.926	0.097	1.550	0.446
11897	Jul 95	Dyfed	J	M	ND	0.043	ND	0.111
11948	Oct 95	Warwickshire	J	F	0.023	0.130	0.189	0.257
11964	Oct 95	Highland	J	M	0.131	0.137	0.272	0.691
Merlin (*Falco columbarius*)								
11878	Jun 95	N. Yorkshire	J	F	0.042	0.051	1.087	0.218
11885	Jul 95	N. Yorkshire	J	F	0.050	0.066	0.130	0.273
11886	Jul 95	N. Yorkshire	J	F	0.039	0.071	0.079	0.210
11887	Jul 95	N. Yorkshire	J	M	0.043	0.055	0.099	0.231

Specimen no.	Date Found	County	Age	Sex	pp'-DDE	HEOD	PCB	Hg
Merlin (*Falco columbarius*) cont.								
11888	Jul 95	N. Yorkshire	J	M	0.045	0.092	0.130	0.482
11889	Jul 95	N. Yorkshire	J	M	0.052	0.067	ND	0.207
11922	Aug 95	Durham	J	F	0.296	0.047	0.985	0.998
Hobby (*Falco subbuteo*)								
11874	Jun 95	Avon	J	F	5.115	0.105	43.649	3.510
Golden Eagle (*Aquila chrysaëtos*)								
11815	May 95	Highland	A	M	0.095	0.023	1.051	0.139
Buzzard (*Buteo buteo*)								
11869	Sep 95	Gwynedd	A	M	ND	0.027	1.087	0.383
11870	Jun 95	Glos.	J	M	0.025	1.855	16.263	1.977
11875	May 95	Dyfed	-	-	ND	0.020	0.639	0.639
11929	Sep 95	Dyfed	-	-	ND	0.050	0.834	0.800
11994	Oct 95	Highland	J	F	0.005	0.079	0.050	1.235
11995	Nov 95	Highland	J	M	ND	0.042	ND	0.514
12003	Dec 95	Glos.	A	M	0.013	0.108	1.844	1.392
12006	Dec 95	Devon	J	M	ND	0.089	0.030	0.201
Marsh Harrier (*Circus aeruginosus*)								
11910	Aug 95	Norfolk	J	M	0.087	0.024	6.643	0.038
11915	Aug 95	Suffolk	J	F	3.337	0.389	6.727	1.463
Hen Harrier (*Circus cyaneus*)								
11786	Mar 95	Norfolk	J	F	0.220	0.038	0.376	0.523
Long-eared Owl (*Asio otus*)								
11862	Apr 95	Shetland	A	F	0.009	0.003	0.453	0.098
11926	Feb 92	Surrey	J	F	0.014	0.007	0.074	0.032
Short-eared Owl (*Asio flammeus*)								
11812	Apr 95	Merseyside	J	F	0.063	0.017	6.470	0.184
11867	Nov 94	Lincolnshire	A	M	1.184	0.049	31.342	0.450

Specimen no.	Date Found	County	Age	Sex	pp'-DDE	HEOD	PCB	Hg
Little Owl (*Athene noctua*)								
11787	Mar 95	Gwynedd	A	F	0.836	0.030	0.672	1.390
11829	May 95	Cambs.	J	M	0.405	0.025	3.959	0.416
11856	May 95	Kent	J	M	0.876	0.020	1.357	0.198
11904	Aug 95	Oxfordshire	J	M	1.780	0.017	0.027	1.296
Heron (*Ardea cinerea*)								
11746	Jan 95	Essex	J	F	2.786	0.174	3.953	11.195
11801	Apr 95	Derbyshire	J	F	0.018	0.031	0.098	1.185
11820	Mar 94	Hertfordshire	J	F	0.216	0.035	0.502	3.716
11859	Jun 95	Kent	J	M	1.888	0.274	4.903	8.761
11873	May 94	Cambs.	J	M	1.313	0.078	5.957	6.309
Bittern (*Botaurus stellaris*)								
11823	Nov 93	Lancashire	A	M	1.127	0.051	0.808	32.404
11895	-	-	-	-	0.071	0.039	ND	1.132
11996	Nov 95	Humberside	A	M	0.028	0.038	0.142	10.032
12004	Dec-95	Glos.	A	F	0.021	0.018	ND	3.643
Kingfisher (*Alcedo atthis*)								
11726	Jan 95	Hampshire	J	F	ND	0.403	0.337	1.973
11767	Mar 95	Kent	A	F	3.712	0.255	8.689	7.532
11806	Apr 95	Middlesex	A	F	0.326	0.305	3.303	1.755
11901	Aug 95	Essex	J	F	ND	ND	1.520	0.614
11918	Aug 95	Worcestershire	J	M	3.607	0.680	0.626	0.777
11952	Aug 95	Cheshire	J	F	0.043	0.198	0.210	1.261
Great-crested Grebe (*Podiceps cristatus*)								
11807	May 95	G. London	A	M	0.316	0.023	4.016	4.869
11891	Jul 95	G. London	J	M	0.020	ND	0.177	0.278
11945	Sep 95	G. London	A	M	0.083	0.010	2.398	2.014

Table 2. Geometric mean levels of pollutants in the various species in Table 1, for 1995 specimens only.

	HEOD	pp'- DDE	PCB	Hg
Kestrel				
Mean	0.103	0.072	0.975	0.499
N	26	26	26	26
Range within 1 SE	0.085-0.125	0.047-0.110	0.734-1.296	0.411-0.606
Sparrowhawk				
Mean	0.067	0.800	0.660	1.299
N	60	60	60	60
Range within 1 SE	0.055-0.081	0.645-0.993	0.498-0.876	1.128-1.496
Heron				
Mean	0.114	0.456	1.388	4.880
N	3	3	3	3
Range within 1 SE	0.059-0.221	0.090-2.302	0.365-5.275	2.396-9.939
Kingfisher				
Mean	0.091	0.035	1.281	1.824
N	6	6	6	6
Range within 1 SE	0.029-0.282	0.007-0.175	0.647-2.539	1.212-2.745
Great-crested Grebe				
Mean	0.006	0.088	1.198	1.397
N	3	3	3	3
Range within 1 SE	0.002-0.016	0.043-0.181	0.455-3.152	0.599-3.257

Note: none detected values were taken as 0.001 for all residues

Table 3. **Comparison of geometric mean residue levels (log values) from bi collected in 1994 and 1995; t-values are shown. Minus values indi a decrease and plus values indicate an increase from 1994.**

	p.p'-DDE	HEOD	PCB	Hg
Kestrel	t_{53}=-0.789	t_{53}=-1.059	t_{53}=-0.712	t_{53}=-3.864***
Sparrowhawk	t_{134}=-1.709	t_{134}=-0.584	t_{134}=-3.588***	t_{134}=-1.536
Heron	t_{15}=+0.521	t_{15}=+1.342	t_{15}=-0.072	t_{15}=+0.173
Great-crested Grebe	t_{4}=-2.019	t_{4}=-0.326	t_{4}=-1.353	t_{4}=-1.783

Notes: None detected values taken as 0.001 for all residues
significance of difference *P<0.05; **P<0.01; ***P<0.001

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Annual report to the Joint Nature Conservation Committee

Wildlife and pollution

Part 3 Organochlorines and mercury in peregrine eggs, 1995

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July 1996

3 Organochlorines and mercury in peregrine eggs, 1995

3.1 Introduction

The findings from all peregrine eggs analysed between 1961 and 1986 were summarised in Newton *et al.* (1989); those from eggs analysed during 1987-94 are given in previous reports in this series, and those from 14 eggs (one per clutch) analysed in 1995 are given in Table 4. A single coastal egg was received from Swanage, Dorset.

3.2 Results

The findings confirm continuing widespread contamination of British peregrine eggs with organochlorines and mercury. However, most of the residues were present at relatively low level. The highest DDE and PCB levels in 1995 were 1.9 and 36.5 ppm wet weight, respectively (both in an egg from the Borders). The highest HEOD level was 0.42 ppm wet weight and the highest mercury level was 2.57 ppm dry weight (both in an egg from Strathclyde). The coastal egg had a PCB level of 3.72 ppm wet weight (Table 4).

There seems little doubt that organochlorine levels in British peregrines are continuing to decline. Over most of the country, the population recovered some years ago from its pesticide-induced decline.

3.3 Reference

Newton, I., Bogan, J.A. & Haas, M.B. 1989. Organochlorines and mercury in British Peregrine eggs. Ibis 131: 355-376.

Table 4. **Residue levels (organochlorine ppm wet weight (lipid weight); mercury ppm dry weight) and shell indices (SI) for Peregrine eggs received in 1995.**
ND=none detected.

Number	Year	County	SI	pp'-DDE	HEOD	PCB	Hg
SOUTHERN SCOTLAND							
E6605	95	S W Scotland	-	0.37 (6.93)	0.01 (0.13)	0.39 (7.26)	0.33
E6608	95	S W Scotland	-	0.03 (0.68)	0.01 (0.15)	0.05 (1.46)	0.37
E6611	95	S W Scotland	-	1.03 (17.60)	0.02 (0.28)	1.09 (18.63)	1.65
E6655	95	Strathclyde	1.93	0.47 (9.59)	0.01 (0.12)	1.28 (26.00)	0.44
E6659	95	Strathclyde	1.56	1.57 (48.36)	0.42 (12.88)	33.32 (1028.20)	2.57
E6661	95	Strathclyde	1.41	0.84 (14.11)	0.02 (0.28)	0.95 (16.01)	0.17
E6664	95	Borders	1.81	1.91 (48.23)	0.30 (7.67)	36.54 (920.29)	1.34
CENTRAL AND EASTERN HIGHLANDS							
E6495	95	Tayside	-	0.05 (0.85)	0.01 (0.08)	0.12 (2.00)	0.40
NORTHERN ENGLAND							
E6477	95	Durham	1.85	0.08 (1.33)	0.01 (0.20)	2.72 (6.08)	0.25
E6497	95	Cheshire	1.78	0.22 (4.60)	0.01 (0.15)	0.36 (7.55)	0.34
E6629	95	N'humberland	1.58	0.42 (8.62)	0.01 (0.27)	1.16 (23.84)	0.39
E6762	95	Cheshire	1.95	0.65 (11.43)	0.03 (0.52)	2.24 (39.33)	0.50
SOUTHERN ENGLAND							
E6505	95	Dorset	1.80	1.32 (29.78)	0.03 (0.73)	3.72 (83.66)	0.41
E6770	95	Devon	1.90	0.08 (2.59)	0.01 (0.26)	0.29 (10.06)	0.13

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Annual report to the Joint Nature Conservation Committee

Wildlife and pollution

Part 4 Organochlorines and mercury in merlin eggs, 1995

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4 Organochlorines and mercury in merlin eggs, 1995

4.1 Introduction

The findings from most previous analyses of merlin eggs were given in Newton & Haas (1988), those from 1987-1994 in previous reports in this series, while those from 25 eggs (one per clutch) analysed in 1995 are summarised in Table 5.

4.2 Results

The results from these additional 25 merlin eggs serve to confirm the continuing widespread contamination of British merlins with organochlorines and mercury. Levels of all contaminants were generally higher than those in peregrine eggs, but levels of all chemicals continue to decline slowly. The highest DDE levels were 9 ppm (two eggs from Co. Durham). The highest HEOD level was 1.8 ppm (two eggs from Tayside), the highest PCB level was 21 ppm (one egg from Northumberland). As in previous years the highest levels of mercury (3-7 ppm) were found in eggs from the Northern Isles.

Together with previous findings, these data indicate a continuing downward trend in organochlorine residues in merlins, but occasional high levels still occur, and mercury remains at high level in eggs from the Northern Isles. Decline in residues over the past 10-15 years has coincided with a substantial recovery in merlin numbers over much of the country.

4.3 Reference

Newton, I. & Haas, M.B. 1988. Pollutants in Merlin eggs and their effects on breeding. Brit. Birds 81: 258-269.

Table 5 **Residue levels (organochlorine ppm wet weight (lipid weight); mercury ppm dry weight) and shell indices (SI) for Merlin eggs received in 1995.**
ND=none detected.

Number	Year	County	SI	pp'-DDE	HEOD	PCB	Hg
CENTRAL AND EASTERN HIGHLANDS							
E6764	95	Tayside	0.96	3.62 (64.00)	1.82 (32.14)	13.79 (243.77)	1.27
E6765	95	Tayside	0.93	3.78 (62.44)	1.81 (29.93)	5.36 (88.50)	0.82
NORTHERN ENGLAND							
E6509	95	N Yorkshire	1.22	1.94 (25.08)	0.06 (0.84)	2.73 (35.28)	0.99
E6621	95	Durham	1.02	9.15 (74.80)	0.28 (2.33)	5.99 (48.99)	2.65
E6622	95	Durham	1.15	3.43 (46.87)	0.33 (4.55)	4.00 (54.63)	2.12
E6623	95	Durham	-	3.38 (50.99)	0.64 (9.64)	6.20 (93.48)	2.28
E6624	95	Durham	-	9.43 (87.66)	0.74 (6.89)	10.23 (95.14)	1.69
E6625	95	N'humberland	1.15	2.25 (36.80)	0.03 (0.54)	2.13 (34.74)	1.70
E6627	95	N'humberland	1.30	2.16 (27.95)	0.08 (1.08)	3.85 (49.77)	2.30
E6628	95	N'humberland	1.11	2.82 (33.70)	0.75 (8.90)	21.05 (251.24)	1.79
E6738	95	Durham	1.15	2.30 (35.25)	0.07 (1.10)	2.38 (36.55)	2.15
E6740	95	Durham	1.40	1.58 (24.44)	0.08 (1.16)	1.91 (29.53)	0.88
E6743	95	Durham	1.04	2.76 (33.09)	0.80 (9.54)	4.03 (48.24)	2.51
E6748	95	Durham	1.25	2.26 (35.85)	0.11 (1.73)	2.20 (34.78)	1.13
E6749	95	Durham	1.19	1.85 (36.04)	0.10 (2.04)	7.23 (141.13)	1.23
E6751	95	Durham	1.17	2.19 (36.07)	0.23 (3.75)	3.18 (52.41)	1.03
E6752	95	Durham	1.20	2.84 (41.02)	0.26 (3.80)	13.55 (195.41)	1.48
E6754	95	Durham	1.20	1.80 (27.45)	0.31 (4.80)	2.65 (40.47)	2.06
E6755	95	Durham	1.01	4.36 (56.22)	1.05 (13.38)	4.05 (52.20)	0.83
NORTHERN ISLES							
E6695	95	Shetland	1.19	3.60 (39.47)	0.11 (1.18)	3.28 (35.89)	3.83
E6696	95	Shetland	-	2.80 (45.75)	0.08 (1.25)	2.10 (34.38)	7.47
E6697	95	Shetland	1.21	1.49 (26.31)	0.01 (0.20)	3.08 (54.44)	7.44
E6698	95	Shetland	0.95	4.93 (108.13)	0.24 (5.27)	1.76 (38.53)	6.91
E6760	95	Orkney	-	1.70 (22.50)	0.03 (0.38)	3.12 (41.42)	2.73
E6761	95	Orkney	1.15	1.33 (30.90)	0.03 (0.78)	6.50 (150.74)	7.12

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Annual report to the Joint Nature Conservation Committee

Wildlife and pollution

Part 5 Organochlorines and mercury in golden eagle eggs, 1995

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5 Organochlorines and mercury in golden eagle eggs, 1995

5.1 Introduction

The findings from analyses of golden eagle eggs obtained during 1963-86 were given in Newton & Galbraith (1991), and from 1987-94 in previous reports in this series. Eggs from seven clutches were received in 1995, and the results are given in Table 6. Unfortunately, no coastal eggs were received.

5.2 Results

The new analyses serve to confirm the low levels of contamination found in recent years in golden eagle eggs (Table 6). All residue levels were low, and well within the range of previous values.

5.3 Reference

Newton, I. & Galbraith, A.E. 1991. Organochlorines and mercury in the eggs of Golden Eagles from Scotland. Ibis 133: 115-120.

Table 6. **Residue levels (organochlorine ppm wet weight (lipid weight); mercury ppm dry weight) and shell indices (SI) for Golden Eagle eggs received in 1995.** ND = none detected.

Number	Year	County	SI	pp'-DDE	HEOD	PCB	Hg
SOUTHERN SCOTLAND							
E6507	95	Argyll	-	0.24 (2.96)	0.05 (0.57)	3.41 (41.53)	1.16
E6646	95	Argyll	2.36	0.02 (0.46)	0.01 (0.11)	0.35 (6.66)	0.05
E6648	95	Argyll	3.43	0.02 (0.34)	0.01 (0.16)	0.36 (6.31)	0.05
E6649	95	Borders	3.13	0.03 (1.09)	0.01 (0.47)	0.31 (14.40)	0.07
E6650	95	Argyll	3.21	0.03 (0.60)	0.02 (0.39)	0.75 (14.11)	0.14
E6652	95	Argyll	3.20	0.09 (2.67)	0.01 (0.26)	0.09 (2.93)	0.09
NORTHERN ENGLAND							
E6511	95	Cumbria	2.93	0.04 (1.53)	0.01 (0.24)	0.19 (6.56)	0.19

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Annual report to the Joint Nature Conservation Committee

Wildlife and pollution

Part 6 Incidents investigated during 1995

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6 Incidents investigated during 1995

6.1 Introduction

Two small wildlife incidents were investigated during 1995. The first involved mute swans in Cambridgeshire, the second guillemots collected from the 1995 beached birds survey. Throughout this section HCH refers to hexachlorocyclohexane.

6.2 Somersham swan incident

During July 1995, four mute swan cygnets were found dead on a lake at Somersham, Cambridgeshire. Two were submitted for toxicological analysis. The NRA carried out analysis of water sampled from the area. Post mortem examination of the swans did not reveal any abnormalities, and no lead was reported in the gizzard. The birds were emaciated, although some sub-cutaneous fat was present. The lipid levels in the livers were similar to those reported in the livers of mute swans analysed previously.

The organochlorine and mercury concentrations in these swans were below those thought to induce any toxic effects. No toxicological cause of death was identified.

6.3 1995 beached bird survey

The livers from nine guillemots found dead during the 1995 RSPB beached bird survey were analysed. These birds were collected from Chesil Beach, Dorset, and were analysed to give an indication of organochlorines and mercury residues in guillemots from southwest Britain. Many carcasses of guillemots killed in previous incidents were analysed previously (e.g. Freestone *et al.* 1993). The aim of analysing these additional carcasses was to expand the dataset to include the southwest region.

The organochlorine and mercury residues in these guillemots were well below levels likely to have contributed to the deaths of these birds. The liver lipid content and the levels of all residues analysed were similar to those found in guillemots from the east coast killed by the 1994 Seabird Wreck.

6.4 Reference

Freestone, P., French, M.C., Malcolm, H.M., Osborn, D., Wright, J. & Wyatt, C. 1993. Incidents investigated during 1992-93. *In: Wildlife and pollution: 1992 Annual Report*, by I. Newton, A. Asher, P. Freestone, M.C. French, H.M. Malcolm., D. Osborn, J. Wright, C. Wyatt & I. Wyllie, 21-28. *JNCC Report*, No. 169.

Table 7. Levels of mercury and organochlorine compounds (mg/kg wet weight) in livers from birds received as part of wildlife incident investigations. Data for guillemots are expressed as geometric means and range within one geometric standard error, while those for swans are expressed as ranges. PCB-MAT is the total PCB expressed using only the peaks corresponding to those found in Aroclor 1254. PCB-TOT is the total PCB expressed using all the peaks found in the GC trace in the region in which PCB congeners normally occur.

Species	Area	Number examined	lipid %	Hg	HCB	α-HCH	γ-HCH	DDE	HEOD	TDE	DDT	PCB-MAT	PCB-TOT
Guillemot	Chesil Beach, Dorset	9	3.33 3.26-3.41	2.27 1.24-4.15	0.07 0.05-0.08	<0.001	<0.001	0.40 0.29-0.54	0.10 0.08-0.12	<0.003	<0.003	4.19 3.06-5.73	6.02 4.34-8.35
Mute swan	Somersham, Cambs	2	2.06-2.23	0.04-0.05	<0.001	<0.001	<0.001	<0.001	0.02-0.03	<0.003	<0.003	<0.001-0.08	<0.001-0.08

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