The Impact of Lost and Discarded Fishing Line and Tackle on Mute Swans

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Statement of Use
This technical report contains the results of a study into the impact of lost and discarded fishing line and tackle on Mute swans. The report will be released to Regions and into the public domain, resulting in simple guidelines for anglers and tackling issues at known "blackspots" to reduce the impact at these sites.

Key Words
Fishing line, fishing tackle, Mute swan, *Cygnus olor*, swan rescue, lead poisoning, anglers.

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EXECUTIVE SUMMARY

This report presents findings from a study to establish the extent and causes of the problem of tackle-related injuries to mute swans. The analyses are based on data collected during 1996 – 2000 by a number of swan rescue groups. Most data were collated by Peter Martin and Ellen Kershaw on behalf of the National Convention for the Welfare of Swans and Wildlife, while the RSPCA supplied other data from their extensive records. This project also examined fishing tackle retrieved from rescued birds and draws some conclusions about the causes of fishing tackle related incidents and the extent to which illegal lead continues to be used.

Other sources of information have been used to determine changes in the mute swan population and the incidence of lead poisoning.

There are significant uncertainties and assumptions in interpreting the available data. Nevertheless, the following broad conclusions are based on large samples and can be made with confidence:

- the mute swan population nationally has increased significantly since 1987;
- at 29.7% of all reported incidents, fishing tackle related injuries are the biggest single cause of swan rescues;
- the biggest proportion of angling related rescues occur between July and September, coincident with the school holidays and a surge in swan numbers due to the appearance of young, inexperienced cygnets;
- the survival rate of rescued swans is very high, underlining the effectiveness of swan rescue groups;
- nationally, it is estimated that there are about 3,000 tackle related swan rescues per year, including those carried out by the RSPCA. The annual cost to the voluntary swan rescue groups (an estimated 1148 of the rescues), excluding labour is estimated to be £94,940. This figure rises to an estimated £202,863 excluding labour if data for RSPCA rescues is taken into account;
- experimental voluntary segregation of anglers and swan-feeding areas at problem sites has been shown to be effective in reducing tackle related injuries;
- analysis of tackle removed from swans suggests that the majority of the problems occur with tackle used by anglers of average or low expertise.

Lead poisoning accounted for 3.6% of swan rescues over the period 1996-1999. In the national context lead poisoning in mute swans has declined since the restriction on lead weights was introduced in 1987. However, the data provide evidence of continued lead poisoning in some localised areas and further investigations to establish the source of the lead are needed.

Analysis of fishing tackle retrieved from 847 rescued birds revealed 34 sets (4%) of tackle that included a total of 97 illegal lead weights. This represents 13.7% of the fishing weights retrieved. (This should not be interpreted as being representative of all fishing tackle in use, since the sample is heavily biased towards inexperienced anglers and problem sites).

As a result of this project, a standard recording form has been developed and continues to be improved for more consistent recording of swan rescues. In addition, a computerised database of swan rescue incidents has now been established.

CONTENTS

1 INTRODUCTION

Recent changes in fisheries byelaws have raised concerns about possible increased impact of angling on aquatic wildlife. In particular the removal of the coarse fish close season on most stillwaters and the introduction of a maximum four rod limit for coarse fishing have given rise to concern that tackle related injuries among birds and mammals may increase. The purpose of this project was to establish the current extent of fishing tackle related injuries. The original intention was to examine tackle related incidents for all wildlife, but almost all of the available data relate to mute swans *Cygnus olor*, so this report concerns only the impact on them.

The project also examined fishing tackle retrieved from rescued birds and draws some conclusions about the causes of fishing tackle related incidents and the extent to which illegal lead continues to be used.

In the 1970s and 1980s lead poisoning was a major problem in mute swans, with the main source being the ingestion of lead fishing weights. As a result, byelaws restricting the use of certain sized lead fishing weights were introduced by Regional Water Authorities in England and Wales during 1987. Fishing tackle manufacturers and anglers responded well to these restrictions, but while the incidence rate has fallen, the number of reported cases of lead poisoning in mute swans remains high in some areas.

1.1 Context

Problems concerning swans and angling have been known for some time. Many mute swans are very tame and are accustomed to being fed bread by members of the public. As a result they frequently approach anglers and if the opportunity arises, may take the bait and become hooked; a significant number of incidents occur in this way. Other birds become entangled by swimming through the line or becoming caught up with lost or discarded tackle.

1.1.1 Changes in mute swan numbers

Two earlier surveys of swans numbers in England provided estimates as follows: 1978 (13,340), 1983 (14,800). The national census of mute swans carried out in summer 1990 has not been fully analysed, though the total count was 25,000 - 27,750 (Delany *et al*, 1992, Kirby *et al*, 1994); the differences arise from the interpolation of numbers in areas where there was no count. Hence the increase between 1983 and 1990 was around 35%. Since then, the only figures available are from the Wetland Bird Survey counts which do not aim for completeness, but cover all the major areas and the majority of the birds (e.g. Pollitt *et al* 2000). These provide an annual index of numbers, setting the most recent year (in this case 1998/99) to 100. Unfortunately the winter indexes around 1990 are not very stable (1989/90 = 75, 1990/91 = 84 and 1991/92 = 79). However, taking the average of these (79) as the index for 1990/91 and assuming a 25,000 - 25,750 base in 1990, the number of swans in the UK in 1999 is estimated to have been in the region 31,000 - 33,000.

Despite some uncertainties in these estimates, it is clear that *"the British population has increased dramatically since 1986/87"* (Kirby *et al*, 1994). At least three factors may have contributed to the change in fortunes: (i) the recent run of mild winters. Swans, especially cygnets, survive less well in cold than in mild winters (Perrins, 1991); (ii) an overall reduction

in lead poisoning; and (iii) an increase in the number of rescue groups which deal with sick and injured swans, though it should be emphasised that most of the major players in this field have now been operating for at least ten years. Floods outside the breeding season (e.g autumn 2000) have little affect on the swan populations though those in the breeding season (e.g. Easter 1998) may lead to the loss of nests and the reduction in that year's cohort of cygnets.

1.1.2 River water quality

Between 1990 and 2000 there was a net overall improvement in chemical water quality in 14010 km or 42.6% of the total length of rivers in England and Wales. During the same period the biological quality showed an overall improvement in 10490 km or 35.7% of the total length of rivers. Phosphate loads from sewage works have also declined due to better treatment and a reduction in its use in detergents.

It is difficult to assess the impact of these changes since swans are very mobile and able to avoid polluted areas. Nevertheless, improvement in water quality may also have been a factor contributing to the rising mute swan population.

1.1.3 River flows

Many rivers suffered from drought and over-abstraction in the mid-1990s. Low river flows may degrade riverine habitat, but are often associated with increased aquatic plant growth. The impact of low flows on swan populations is therefore difficult to assess.

1.1.4 River traffic

Boat traffic is known to impact on physical habitat and aquatic macrophytes (Staples, 1992). It is therefore likely that intensification of boat traffic may have an adverse impact on the swan population. Data for the River Thames shows that boat registrations and boat movements have declined in recent years. Lockages on the Thames fell from a peak of 456,000 in 1980 to 330,000 in 1999. Registrations of powered craft on the Thames declined from 11,521 in 1987 to 9,326 in 1999. This does not necessarily reflect boat traffic nationally, but given that most of the recorded tackle incidents involve swans in the Thames area, it is reasonable to view the increase in the swan population against a background of declining boat traffic.

1.1.5 Angling

A national survey of anglers carried out in 1994 indicated that there were about 3 million anglers aged 12 or over in England and Wales (NRA, 1995). This represented a rise in coarse and game anglers compared with previous surveys in 1970 and 1980. However, since the data were collected in a different way the report could not draw firm conclusions about the changes in numbers.

The 1994 survey highlighted changes in anglers' habits, notably:

- an increased preference for stillwater fishing;
- a switch in the most popular target species among coarse anglers from roach to carp;

- an increase in “pole” fishing among coarse anglers.

On the lower Thames, Hampton Swan Rescue reports that in the late 1990s there was a noticeable trend for serious anglers to switch to pole fishing or legering. Both of these methods reduce the numbers of injuries to swans, because there is less line available on the surface for the swans to become entangled with and, in the case of legering, there are no baits close to the surface.

The most significant recent change has been the removal of the statutory coarse fish close season on most stillwaters since 1995 and more recently on canals (2000). Coarse angling activity on ponds, lakes and reservoirs has therefore increased during the swan breeding season (March - July) and this will have increased the potential for interaction between anglers and young, inexperienced cygnets, most notably towards the end of this period.

1.1.6 Habitat

While there has been a significant decline in the number of farm ponds in recent decades (Williams *et al.*, 1998), this is unlikely to have influenced the swan population because most are too small for breeding pairs to establish territories. In contrast, the increase in the number of gravel pits and purpose-built stillwater coarse and trout fisheries has probably contributed significant extra habitat which is suitable for swans.

A national river habitat survey in 1994-96 highlighted the degraded state of many lowland rivers (Environment Agency 1998b). Degraded river habitat has been of concern in recent years (Environment Agency 1998b), and there have been numerous projects carried out by the Agency and others towards restoring river habitat (River Restoration Centre, 1998). In some cases these will have benefited swans and other water birds, but there is currently no meaningful measure for assessing overall improvement of swan habitat.

2 METHODS

2.1 Scope, quality and availability of the data

This report is based largely on data made available by a number of swan rescue groups operating under the aegis of The National Convention for the Welfare of Swans and Wildlife. The bulk of the data analysed relates to rescues carried out in the years 1996-1999 inclusive, and involved essentially only mute swans. Some more local data have been analysed to highlight specific issues. A second major set of data was provided by the RSPCA; though their database does not usually record the reason for a rescue, they have good records of rescues throughout England and Wales and some of their main centres have been collecting blood lead levels routinely.

Most of the data from the rescue groups that support The National Convention were recorded on a form that had been drawn up specifically for this purpose. Two groups used their own style of reporting. One group (Hampton Swan Rescue) submitted a quantity of additional information relevant to that particular part of the River Thames to the west of London.

The data submitted were entered onto a Swan Rescue Incident database, at the Edward Grey Institute of Field Ornithology, Oxford University. Few of the reporters completed all the data fields on the report forms, so the totals in different tables do not always match.

The available data are biased geographically towards south-east England - exacerbated by the fact that almost two-thirds of the 1996 records come from Swan Lifeline, based at Windsor, while many others come from Hampton Swan Rescue whose rescues are almost exclusively from the River Thames. Latterly however, the countrywide records provided by the RSPCA have greatly reduced this imbalance.

2.2 Collection and analysis of tackle data-sets

In many cases when members of the National Convention rescued a swan entangled in fishing tackle, they retained the tackle (sometimes without the hook if this was deeply embedded in the bird's oesophagus or gizzard, it being deemed less dangerous to leave it there than to operate to remove it). A total of 847 sets or part sets of tackle removed from swans were inspected by Dr Bruno Broughton. 831 of these 847 were taken from swans and form the basis of this analysis. Each was stored in a separately numbered plastic bag and kept together with what data were supplied with it.

Split shot suspected of being lead were tested physically to determine whether it was predominately lead or a non-toxic alternative. An attempt was made to cut a groove in the shot with a blunt penknife, and the shot was rubbed on white photocopying paper. Lead shot is recognised because it cuts easily and leaves a grey streak when rubbed on paper; non-toxic shot is difficult to cut and does not mark paper.

However, as a definitive check on the substances found attached to retrieved fishing line, a total of 20 items from that part of the whole collection of tackle thought to comprise illegal lead shots was selected at random and submitted for chemical analysis at Ductile Steel Processors NAMAS approved laboratory at Willenhall in the West Midlands. This analysis confirmed conclusively the physical assessment of the lead as being very largely accurate. It should be noted that one sample thought to be non toxic turned out to be an illegal lead shot.

Four experienced anglers were asked to make assessments of each set of tackle to determine the probable use of the tackle (general coarse, pole, pike, carp, fly, other) and the likely ability of the user, based on the type of tackle and the way in which it had been assembled.

2.3 Collection of data on lead poisoning

This survey did not attempt to examine the problems of lead poisoning in detail. However, Wychbold and two RSPCA Hospitals (Stapeley Grange, Cheshire and Little Creech, West Hatch, Somerset) have been routinely measuring blood lead levels in birds rescued (for any reason) and have kindly made their data available. A new study was started in the summer of 2000 and is being written up separately (Perrins, Cousquer & Waine *in prep*.).

3 RESULTS

3.1 The data and its limitations

Table 1 summarises the main causes for call-outs made by the swan rescue groups (full data are in Appendix Tables 1a-1d), and the rescue groups who provided the data (Appendix Table 1e).

It is important to emphasise that these figures represent a sample of the national total; an attempt to estimate the total number of rescues is made in section 3.9. Also, most rescue groups rarely accept a call-out for a dead swan, so that the cause of death of most dead swans is not established.

Table 1. Summary of the main reasons for call-outs by Swan Rescue Groups 1996-1999

Reason for Call-out	No. of Call-outs	% of total
Tackle injury	2087	29.7
Illness/Poor Condition	783	11.1
Grounded	733	10.4
Territorial Dispute	674	9.6
Injury	531	7.6
Collision	442	6.3
Dead	341	4.9
Pollution	253	3.6
Lead Poisoning	256	3.6
Miscellaneous	927	13.2
TOTAL	**7027**	**100.0**

Note: none of the reasons under miscellaneous accounted for more than 2.0% of the call-outs.

3.2 Cause of injuries

The data need to be interpreted with care since it is important to realise that the apparent cause may not be the actual one. For example, a bird that crash-landed may have been the loser in a territorial dispute, or a bird that was attacked by a predator may only have been caught because it had been injured in a flying accident or had been sick.

In the case of the data considered here, it seems likely that, in most cases, tackle injuries have been correctly reported, although it is possible that some injuries classified in other categories may have been tackle-related. It is assumed that birds recorded simply as “injured” were not injured by tackle. Other sources of uncertainty include the probability that some “sick” swans may have been suffering from lead poisoning while some “dead” birds may have died as a result of fishing tackle or of lead poisoning.

Although some birds suffering from serious lead poisoning can be recognised as such, usually lead poisoning can only be confirmed by a diagnostic test and not all rescue services are equipped to do this. The incidence of lead poisoning is therefore likely to be underestimated in some areas (see section 3.8).

Angling related injuries are consistently by far the single most important category of all swan rescue call-outs (overall 29.7% tackle injuries). Lead poisoning accounts for 3.6% of rescues, although it is not clear whether all cases result from anglers' lead. Also, although there is some regional variation, the pattern seems to be largely true for all rescue group data; almost all the major rescue groups recorded that tackle-related incidents made up 25-40% of their call-outs. Outside the Swan Convention data, the Norfolk RSPCA Wildlife Hospital recorded a lower incidence of angling related injuries; in 1998 and 1999 91 out of 523 (17.4%) of the swans brought in had been rescued for angling-related incidents.

3.3 Seasonal pattern of tackle injuries

Table 2 shows the seasonal pattern of tackle injuries (the yearly details are given in Appendix Tables 2a-2d). The year is sub-divided so as to distinguish the coarse fish close season on rivers (15 March – 15 June inclusive).

Table 2. The frequency of tackle-related swan rescues by time of year: 1996-1999 inclusive

Season	Total Rescues	Number Tackled	% Tackled
1 January – 14 March	1525	282	18.5
15 March – 15 June	**1315**	**252**	**19.2**
16 June – 31 August	2000	965	48.3
1 September – 31 December	2187	588	26.9
TOTAL	**7027**	**2087**	**29.7**

Note: The period marked in bold type is the coarse fish close season for fishing on rivers.

The highest incidence of tackle-related injuries (as a percentage of the rescues) and the highest actual number of rescues due to tackle occur in the summer months. It is significant that July and August are in the school summer holidays when casual and inexperienced young anglers are most likely to be fishing. Late June is the time of year with longest evenings when many people go fishing after work hours. These factors, plus the upsurge in swan numbers caused by broods of inexperienced cygnets, mean that the opening of the fishing season on rivers is always a very busy time for the rescue groups. Numbers of incidents are lower at the end of the year and remain low until after the close season.

There is a statutory close season for coarse fishing on all rivers during the period March 15 to June 15 inclusive. It might be expected that a reduction in the number of tackle-related incidents would occur during that period. Although the numbers are lower, the percentage of injuries due to tackle is similar to that in the early part of the year. Since 1995 there has been no statutory coarse fish close season on most still waters, and this may explain the continuation of tackle-related incidents through the spring. To investigate this further, the data have been analysed further, dividing tackle-related incidents into river or lake-related habitats (Table 3; yearly details are given in Appendix Tables 3a-3d)). The sample is much smaller

because many records did not include information about the habitat. The data show an increased proportion of tackle injuries being recorded from lakes during the close season period on rivers.

Incidents on rivers during the close season may not be the result of illegal fishing, since birds may become entangled in discarded tackle that has been around for some time. Also, game fishing takes place during this period, but the evidence (Section 3.7) suggests that, by far, most injuries arise from coarse fishing. It may also be noteworthy that the proportion of rescues during the coarse fishing close season that have come from lakes has steadily risen during the study: 40.5% in 1996, 57.6% in 1997, 66.0% in 1998 and 79.4% in 1999 (Appendix Tables 3a-3d)

Table 3. The number of angling-related rescues by time of year and habitat in 1996 - 1999 inclusive

Season	Lake	River	% from Lakes
1 January – 14 March	83	139	37.4
15 March – 15 June	**117**	**67**	**63.6**
16 June – 31August	249	552	31.1
1 September – 31 December	175	308	36.2

Notes: 1) Lake includes ponds, gravel pits, etc. River includes broads, canals, etc.
2) The period marked in bold type is the coarse fish close season.

3.4 The fate of rescued birds

Table 4 summarises (yearly details are given in Appendix Tables 4a-4d) the fate of tackle-injured swans that have been rescued.

The results are encouraging, with only 31 of 2087 of these birds having died. This assumes that all bankside de-tackling is successful. Given that some of the birds would certainly have died had they not been rescued, this gives some indication of the effectiveness of the swan rescue groups.

Table 4. The fate of swans rescued because of tackle-related injuries 1996-1999

Outcome		**%**
Detackled on Site (bankside)	1142	54.7
Detackled at vets/hospital	357	17.1
False Alarm/Detackled Itself	171	8.2
Released Later	192	9.3
Not recorded	194	9.2
Died	31	1.5
TOTAL	**2087**	**100.0**

Note: Released later refers to swans that were detackled at vets/hospital; Not recorded mostly relate to birds which were still in care when the record was submitted.

3.5 Treatment of tackle injuries

Records show quite a high proportion of de-tackles are dealt with *in situ*; hooks attached to the "outside" of a bird can usually be removed relatively easily. Only in the case of more serious injury when veterinary expertise is needed is the bird removed. Table 5 and Appendix Tables 5a-5d show details of swans caught up in tackle at Hampton. If deemed fit, young birds - cygnets or juveniles - can be returned to their families within two days without undue fear of rejection by the parents.

In more difficult cases, there appears to be no consistency of approach. If the bird has tackle in its mouth or throat, only an X-ray investigation will resolve whether a hook has been swallowed and, if so, where it is. this. In some cases, this is the approach adopted, while in others, the line is simply cut, and the swan is released. The long-term effect of this latter course of action is not really known and may well differ with the details of the hook etc. that has been swallowed and where it is lodged. However, Hampton favour this approach as the least stressful and to date no ill effects have been reported by them in swans so treated.

3.6 Frequency of tackle injuries

Encounters between anglers and swans are seldom reported, but Hampton Swan Rescue data provides some broad indication of the frequencies of incidents for a heavily fished river with a large swan population (Table 6). The key message is that cygnets are the most vulnerable group and many of these need to be rescued more than once.

Table 5. Hampton Swan Rescue Group treatments 1996-1999

Number of swans rescued	297
Number with hook in mouth/bill etc.	159
Number taken to vet	28
Number from which all tackle removed	227
Number from which some tackle not removed	70

The stretch of the Thames between Teddington and Shepperton is a heavily populated and heavily fished part of the river. The figures indicate frequent interaction between swans and anglers in such places. Moreover, half of the rescues on this stretch of the river involve occasions when the swan has swallowed a hook and line (Table 5).

3.7 The source of the tackle

3.7.1 Evidence from the swans

It is unclear how most swans get entangled in fishing tackle, but Hampton Swan Rescue has made observations and collated eyewitness accounts of others. The location of the tackle on the bird, and main causes of entanglement appear in Table 7.

From the Hampton data, it appears that most events on this heavily fished river with a large swan population are associated with tackle currently in use. Some of the tackle reported as lost/discarded could be classified as unattended rods; on three occasions swans were rescued towing the complete tackle including the rod and reel. Birds which swallow line on which there is no hook (or bait) are thought to have been trying to free themselves of line caught round their legs or bodies. It should be noted that these conclusions relate only to the Hampton data and may not be representative of other areas.

Table 6. The rescue rate (rescues/bird/year) of mute swans on the Thames between Teddington and Shepperton, based on records of Hampton Swan Rescue

	Number of birds present	Numbers rescued for		Rescue Rate
		Tackle	Lead	
1994				
Non-breeders (average)	124	52	6	0.47
Breeders	30	9		0.30
Cygnets	45-25	25	3	1.12
1995				
Non-breeders (average)	118	51	14	0.55
Breeders	20	6		0.30
Cygnets	47-34	24	1	0.73
1996				
Non-breeders (average)	142	68	12	0.56
Breeders	26	15	2	0.65
Cygnets	52-26	34	1	1.35
Note: these figures are minima since other organisations also rescue birds on this stretch. The two numbers given for cygnets are for the numbers hatched and the numbers fledged; the rate is calculated on the number fledged.				

Table 7. The causes of swans becoming entangled with tackle (*n*=247)

Cause	**%**
Swimming “through” the line	31
Swallowing bait/hook	32
Entangled with lost/discarded tackle (round bill)	8
Entangled with lost/discarded tackle (round legs, body)	14
Swallowed without a hook	9
Miscellaneous	6

3.7.2 Evidence from the tackle

Detailed examination of the 847 sets or part sets of tackle removed from birds by the rescue groups sheds further light on the circumstances under which the birds become entangled or hooked. Of these, only 16 involved birds other than mute swans (black swan *Cygnus atratus*, Egyptian goose *Alopochen aegyptiacus*, mallard *Anas platyrhynchos*, coot *Fulica atra*, moorhen *Gallinula chloropus*, pigeon *Columba* sp., hybrid duck, and "young duck").

As might be expected since the tackle came from the swan rescues that have been reported on above, there was a summer peak. However, this was more marked than is apparent from Table 2; of the 697 items for which a month was given, 435 (62.4%) were collected during the three months July, August and September (Fig. 1).

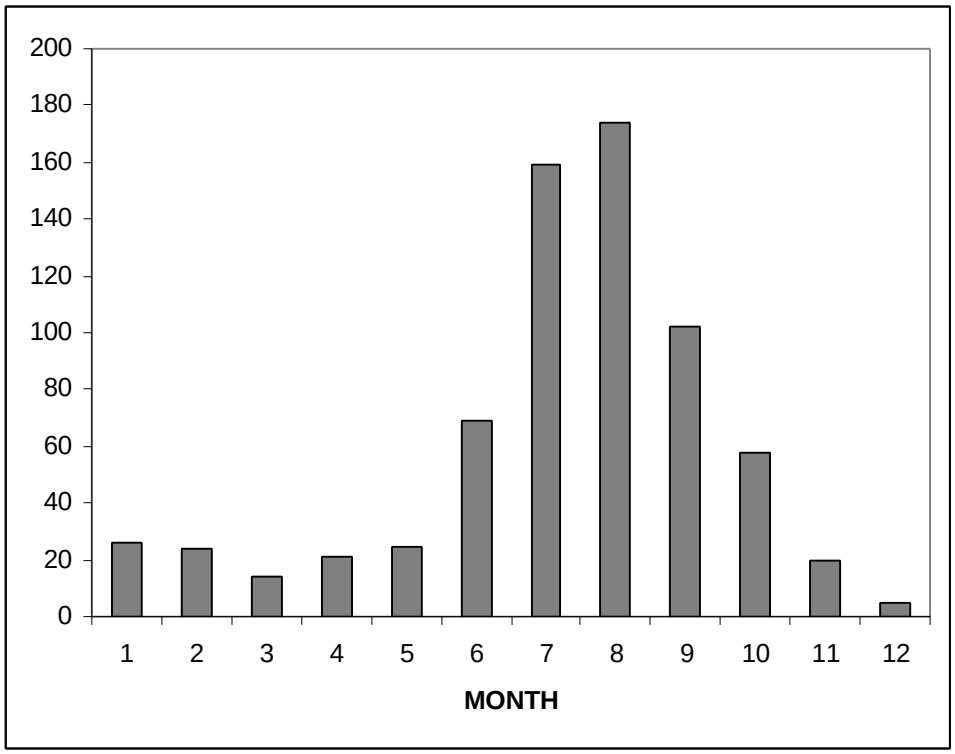

Figure 1: Number of tackles collected from rescued swans by month (1996-99)

The manner in which the bird was entangled was recorded in 586 cases; 330 were hooked internally or in the throat or bill and so had presumably become hooked while trying to take a bait. The remaining 256 were hooked or entangled elsewhere and so were more likely to have become entangled by swimming through the line.

On the evidence of the tackle retrieved, the very large majority (98%) was being used for coarse fishing. Of this, the large majority of the tackle (78%) was rigged for general coarse angling, with 11% for carp angling, and 6% for pike; 2% of the rigs were those used by pole anglers. Also on the basis of 583 of the sets of tackle it was thought possible to classify the level of expertise of the anglers who lost them; of these, 139 (24%) were classified as novice, 333 (54%) as average and 111 (19%) as experienced.

It has been suggested that swans are less likely to be hooked, or remain hooked, if they encounter a barbless hook rather than a barbed one. However, of the hooks retrieved, 390

were barbed and 102 barbless or reduced-barb hooks. This is thought to correspond broadly with retail sales, suggesting that swans may not be able to detach barbless hooks any better than barbed ones, though of course they are easier and less damaging to remove once the bird has been caught.

The split shot used was divided into size classes. The results for the 249 tackle sets that contained at least one split shot are summarised in Table 8. Of these 34 (13.7%) contained 96 illegal weights (lead shot of sizes No.8 and No.10, "dust shot", can be used legally). Of the other weights, there were 33 large weights, legers or weighted swim-feeders; of these only one was made of lead (this was of an illegal size).

Table 8. Shot size on tackle removed from swans

Size	No. legal	No. illegal	%
SSG	36	5	13.9
AAA	93	10	10.8
BB	168	26	15.5
N1	108	34	31.5
N4	140	17	12.1
N6	51	4	7.8
N8	118	-	-
N10	51	-	-
	596	**96**	**16.1**

3.8 Lead Poisoning

Despite some reduction in incidence, lead poisoning remains a problem in a number of places, though the extent and significance of it are not clear. When the restrictions on the use of lead fishing weights were introduced through Regional byelaws in 1987, it was not expected that this would result in an immediate cessation of lead poisoning incidents because of the likelihood of lost lead remaining in rivers and lakes. While much of the lead ingested seemed to be from recently lost leads, or even where baits were taken and line with lead attached broken by the swan, others seemed to be the result of ingestion of long-lost lead exposed after floods or during exceptionally low (drought) flows. The presumed link between lead poisoning and old angling weights re-exposed by erosion has yet to be confirmed, but if it is, an increase in the incidence of lead poisoning might be expected to follow large flood events, such as the 1998 Easter floods in the Midlands. On this basis, lead poisonings associated with re-exposure of lost lead would be expected to go on for some time.

In an earlier study on Thames swans the Edward Grey Institute (Sears & Hunt 1991, Lievesley 1997) used a blood lead level of 40µg/100 mls (roughly equivalent to 0.4 ppm) to indicate that birds had some degree of lead poisoning over and above background levels. This figure was derived from a detailed study of lead poisoning in Canada Geese in the United States (Buck *et al* 1976), but experience showed that it was a reasonable indicative level for swans. However, others have suggested that the figure should be lower; the Central Animal Pathology Laboratories, Keele, suggest that the normal range is 0.05 – 0.25 ppm/lead, Routh (2000) recommends treatment should be initiated at levels above 2 µmols/litre (roughly equivalent to 0.4 ppm) and Waine (2000) considers < 25 µg/100 mls to be the acceptable normal level.

Current information on the extent of lead poisoning is rather confusing. In Table 1, lead poisoning only accounted for 256 of the rescued birds, or 3.6% of the total. This is a much smaller proportion of casualties than some years ago (Table 9). However, in most cases, these recent diagnoses were not confirmed from blood lead analyses. Most swan rescue groups do not routinely test for lead by taking blood samples, but rely on recognising the symptoms. In the most obvious cases, such symptoms (eg. bent neck) are clear, but where the lead poisoning is less severe, it becomes progressively more difficult to diagnose. Routh (2000) emphasises that the correlation between disease symptoms and blood lead levels is not always consistent. Hence some sick birds assumed to be suffering from lead poisoning may not have been, but equally, some which were not recorded as having been lead-poisoned almost certainly will have been. O'Halloran *et al* (1988) showed that birds flying into wires may have higher than average lead levels, suggesting some reduction in response speed in lead poisoned birds. Perrins & Sears (1991) did not find such an effect, but speculated that the effect might be masked by birds with high lead levels being unwilling to fly.

Table 9. Percentage of mute swans rescued on the River Thames 1983-1992 which were diagnosed as having lead poisoning

	Rescued	Lead	%		Rescued	Lead	%
1983	141	80	56	1988	173	25	15
1984	183	107	59	1989	304	75	25
1985	152	67	44	1990	337	76	23
1986	137	55	40	1991	351	55	16
1987	131	28	21	1992	377	44	12

Notes: i) these data are for live rescues only; ii) also excluded are some very high incidences of lead poisoning at Hampton in 1987 and 1988. Table based on data from Sears & Hunt (1991) and Lievesley (1997).

Despite the improvement in the situation suggested by some data such as that in Table 9, it is clear that lead poisoning remains a serious problem in some places. (The current situation is being reviewed by Perrins, Cousquer & Waine *in prep*.). Three rescue groups have been routinely analysing for blood lead and their results are summarised in Table 10. One difficulty with such results is that they are all taken from birds which are brought in for some reason or an other (including lead poisoning) and are therefore unlikely to be representative of the swan population at large. However, a survey during summer of 2000 of swans in a range of flocks revealed elevated lead levels in the flocks sampled on the Thames, Avon, Severn and Trent (Perrins, Cousquer & Wain *in prep*.)

Table 10. Blood lead levels in swans examined by RSPCA and Wychbold Swan Rescue ***(Wychbold data from Waine, 2000)***

Centre	**Period**	**N**	**Blood Lead Levels (µ mol/l)**		**% ³ 1.21µ mol/l**
			Mean	Median	
RSPCA Stapeley Grange	**Sept 1998 – Dec 1999**	341	5.66	2.00	75.7
RSPCA West Hatch	June 1994 – Sept 2000	477	4.32	1.37	43.8
Wychbold Swan Rescue	Dec 1997-June 2000	323	-	-	75.2

3.9 Numbers of swans rescued

It remains difficult to make an accurate national estimate of the numbers of birds that are rescued annually. Over the period 1996-1999 there were 2087 angling related rescues (Table 1) made by those rescue groups that contributed data to this study – an average of 522 angling related rescues per year.

Although the rescue groups covered here include most of the main groups, there are two major (RSPCA and Egham Swan Rescue) and quite a number of small to medium rescue groups whose figures are not known. The RSPCA records were not available when the interim report was written, but they have now been collated and are shown in Table 11. However these relate to all rescues and cannot be sub-divided by cause. Egham Swan Rescue reported 626 angling related rescues in 1996.

At present, the number of angling-related rescues undertaken by all these other bodies cannot be more than an educated guess. RSPCA swan rescues average 4394 over the period 1996-1999 – if it is assumed that the percentage due to tackle is similar to that reported by other rescue groups (29.7%) this represents 1305 tackle related incidents per year. If the Egham figure for 1996 is taken as representative the annual total, including the RSPCA is 2453 tackle related rescues per year. Taking account of the remaining minor rescue bodies, the annual total is estimated to be in the order of 3000. This excludes birds rescued due to lead poisoning, although some at least will be angling related.

Table 11. The number of Mute Swans rescued by the RSPCA by region and year

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
South West	320	300	500	311	410	448	472	495	421	462
South Central	328	289	283	224	221	232	245	304	341	347
South East	237	201	228	248	243	293	293	349	296	516
East Midlands	408	427	370	512	580	403	403	634	614	594
Central Midlands	337	322	535	443	544	580	580	738	749	917
West Midlands	660	623	556	511	669	729	729	791	777	882
Wales	133	165	246	265	441	486	486	556	466	150
North-west	81	438	209	142	169	140	140	224	215	672
North-east	56	48	110	104	119	136	136	128	125	218
Greater London	34	28	46	42	72	65	65	199	108	103
TOTAL	**2594**	**2841**	**3083**	**2802**	**3468**	**3512**	**4182**	**4418**	**4112**	**4863**

Note: the regions are those used by the RSPCA for administrative purposes. The RSPCA occasionally take swans from or place swans with the swan rescue services so there may be a small amount of double-counting with Table 1.

3.10 The cost of swan rescues

Costs are difficult to estimate objectively because they vary greatly according to the type of rescue involved. Basically, there are three components.

i **Travel.** Using Wychbold figures, the average trip to rescue a swan is about 64 kms each way. Since around half the birds are returned to the place of rescue, the average distance travelled is about 190 kms. The average travel costs, based on 21p per km, are therefore about £40 per bird.

ii **Treatment.** Many birds are treated on site at negligible cost, but others require veterinary care and this may be very expensive. Egham Swan Rescue has provided estimates of annual costs for angling-related rescues and the subsequent treatment of those that have to be taken into care. In 1996 the cost of 626 rescues was put at £14,288. This figure is mainly for the veterinary bills, though some vehicle running costs are included. Swan Life-Line produced a similar figure. The average treatment cost was therefore £22.80 per bird. Allowing for inflation at 3% per annum compound, by 2000 this has become £25.70

iii **Care.** For those birds which need to be kept for a considerable time (e.g. after an operation or after treatment for lead poisoning), the costs of care may be considerable. Wychbold estimates an expenditure of £8,000 on maintaining swans in care; this covers some 500 swans which are taken in during the year, an average care cost of £17 per bird.

The average costs of rescue (£40), treatment (£25.70) and care (£17) for a bird are about £82.70. If it is assumed that the tackle and lead weight related birds are “average” in terms of requirements, The cost to the voluntary sector of 1148 (522 plus Egham figure - see 3.9) angling related rescues per year is £94,940. Clearly, if the RSPCA effort is added, taking the total to 2453 such rescues per year, the cost rises to something of the order of £202,863. To make this figure more meaningful, an element reflecting RSPCA labour costs should be added. No attempt is made to estimate what this might be. Also these estimates do not include lead poisoned birds; at least some of the birds treated for lead poisoning will be angling related.

4 DISCUSSION

4.1 Data collection

One of the most difficult aspects of this entire project has been associated with communicating the need for a disciplined approach to data collection to small groups of individuals who carry out the rescues. In almost all cases these individuals are volunteers performing this important work on a part time basis, and with little experience of, or exposure to scientific and systematic data gathering. For the most part, the emphasis is on securing a speedy and efficient rescue, and then ensuring the appropriate treatment is provided. A key lesson from this project is that if the underlying problems – the root causes – are to be identified, so enabling the most effective solutions to be found, then the provision of robust and comprehensive data is essential. Progress has been made through the course of the project, but further work of this kind, if it is to be effective must be supported by greater and sustained improvements.

4.2 Management options

If the figures in Table 7 are representative, two thirds of swans (approximately 2,000 per year) involved in tackle related rescues become entangled while the tackle is in use. No anglers intentionally entangle swans, but many incidents could be avoided. Unattended rods is one particular area of concern.

Swans can be attracted simply by the presence of anglers. The use of groundbait or loose feed by the angler will often encourage swans to investigate a potential source of food, increasing the risk of then becoming entangled in the line or taking the baited hook. Segregation of swans from anglers will therefore work only up to a point and will only be suitable for certain situations.

There are a number of factors which, combined, produce “black-spots” for interactions between swans and anglers. Flocks, comprising mainly immature birds, usually occur in or near urban areas, often in places where local, young and inexperienced anglers tend to fish, especially in the school summer holidays. Not only are there a high number of tackle-related injuries to swans in these areas, but the incident-rate is generally higher than elsewhere. It should be possible to reduce the number of incidents in these places by prohibiting angling in the areas frequented by these flocks. However, this will only be effective if the swan-feeding public also co-operate by feeding the birds only within the angling-free zone.

For many years there has been a flock of non-breeding swans at Hurst Park, East Molesey, Surrey. This flock has had a high incidence of lead poisoning and a high rate of tackle-related injuries. In June 1993, a stretch of 350 m of riverbank was designated as a no-fishing zone and six notices were erected. The public was asked to concentrate their swan-feeding efforts only in this zone. Most anglers co-operated with this initiative and the area was also wardened by local volunteers. The results were encouraging and the zone was extended in 1997. During the two years before the ban, there was an average of 80 injuries per year in a flock of some 125 swans. In the years following the restriction, the number of incidents have been as follows: *93/94* 32, *94/95* 31, *95/96* 28, *96/97* 47, *97/98* 31, *98/99* 14 and *99/00* 9. The increased numbers rescued in 1996/97 were largely due to the fact that the flock moved down to a more heavily-fished area around Tagg’s Island. That rescues still had to take place can be explained by the fact that there is still a considerable amount of fishing both upstream and

downstream of the no-fishing zone, and on the opposite bank. Nevertheless, these results suggest that keeping swans and anglers apart, even on quite a small scale, can have considerable advantages.

4.3 Lead Poisoning

Despite the restrictions on the use of lead weights, it is clear that lead poisoning remains a significant factor affecting the health of many swans in a number of areas (Perrins, Cousquer & Wain *in prep*). It is not wholly clear where the birds are getting this lead from, but there seem to be four possible routes (or combinations of some of these):

- the swans are obtaining long-lost leads in the mud in the river in their search for grit.
- the swans are picking up illegal leads being used currently.
- the swans are becoming poisoned by picking up legal "dust shot" (size 8 and smaller)
- the swans are obtaining particulate lead from some unidentified source.

The first three of these are angling related and although the first (long-lost lead) would not be easy to deal with, the other two could be if it was shown that they are a significant part of the problem. It is urgent to discover the way in which these birds become poisoned.

5 CONCLUSIONS AND FORWARD LOOK

This project has highlighted the magnitude of the danger which angling tackle poses for mute swans. Rescue groups and the RSPCA attend over 8,000 swans in trouble each year and it is estimated that approximately 3,000 are due to angling-related incidents, either directly hooked or entangled with fishing tackle. Additionally at least some of the birds (1996-1999 average 64 per year reported) suffering from lead poisoning will have resulted from ingestion of fishing weights. Over and above this, a much higher proportion of the swans suffer from some level of lead poisoning and the likelihood is that these too have resulted from ingestion of fishing leads, though this remains unproven and the exact route of the poisoning remains unclear.

While this project was conceived originally as one focusing on the impact of lost and discarded fishing tackle on wildlife in general, data collection for species other than swans proved too difficult. Nevertheless there exists a good body of evidence from a few locations which illustrate graphically the problem is much greater than is apparent from just the findings of this report. The casualties include geese, ducks and a variety of other waterfowl, as well as a wide range of passerine species, especially pigeons. There are reports of bats becoming snared in hooks with line attached.

In order to reduce the frequency of angling-related incidents we recommend that:

- Anglers be appraised of the problem on a regular basis and to be especially on their guard when swans, particularly those with young cygnets are near to their lines. Baited hooks should never be put into the water close to swans.

- Young anglers in particular be taught good angling habits through coaching schemes such as the Scouts Angling Badge.

- Angling be restricted around the major town flocks and other known black-spots for angling related incidents. Those who wish to feed the birds be encouraged to do so only within the restricted area.

- Increased enforcement of the restriction on the use of illegal lead weights.

- Urgent efforts be made to try to establish the source from which swans acquire lead poisoning and, where possible to prevent them from obtaining the lead.

- Keep the frequency of angling-related incidents under review.

References

Buck, W.B. Osweiler, G.D. & van Gelder, G.A. (1976). Clinical and diagnostic veterinary toxicology. 2nd Ed. Pp 319-332. Kendal/Hunt, Iowa.

Delany, S., Greenwood, J.J.D. & Kirby, J. (1992). The National Mute Swan Survey 1990. Report to the Joint Nature Conservancy Council, Peterborough (26pp.)

Environment Agency (1998a). The State of the Environment of England and Wales: Fresh Waters. The Stationery Office, London.

Environment Agency (1998b). River Habitat Quality: the physical character of rivers and streams in the UK and the Island of Man. Bristol.

Kirby, J., Delany, S. and Quinn, J. (1994). Mute Swans in Britain: a review, current status and long-term trends. *Hydrobiologia*, 279/280: 467-482.

Lievesley, P. (1997). Factors affecting the survival and reproductive success of Mute Swans in the Thames Valley. D. Phil. thesis, University of Oxford.

National Rivers Authority (1995). National Angling Survey 1994. HMSO, London.

O'Halloran, J., Myers, A.A. & Duggan, P.F. (1988). Lead poisoning in swans and sources of contamination in Ireland. *J. Zool*. 216: 211-223.

Perrins, C.M. (1991). Survival rates in young Mute Swans *Cygnus olor*. In: J. Sears & P.J. Bacon (Eds.) Proc. 3rd. Int. Swan Symposium, Oxford, 1989. Wildfowl, Special Supplement No. 1, pp. 95-103

Perrins, C.M. & Sears, E.J. (1991). Collisions with overhead wires as a cause of mortality in Mute Swans *Cygnus olor. Wildfowl* 42: 5-11.

Pollitt, M., Cranswick, P., Musgrove, A. Hall, C., Hearn, R., Robinson, J. & Holloway, S. 2000. The Wetland Bird Survey 1998-99: Wildfowl and Wader Counts. BTO/WWT/RSPB/JNCC, Slimbridge.

River Restoration Centre (1998). River Cole: restored 1995/96. RRC, Huntingdon, Cambs.

Routh, A. 2000. Veterinary Care of the mute swan. Veterinary Record/In Practice, September 2000: 426 - 443

Sears, E. J. & Hunt (1991). Lead Poisoning in Mute Swans, *Cygnus olor*, in England. Wildfowl, Suppl. No. 1. 383-388.

Staples, J. (1992). Ecosystem management in navigated waters. PhD thesis University of Liverpool.

Waine, J. 2000. Lead poisoning in swans. Veterinary Record, October 2000: 460.

Williams, P. J., *et al* (1998). Lowland Pond Survey 1996. DETR, London.

Glossary of acronyms

DETR	Department of the Environment, Transport and the Regions
NRA	National Rivers Authority
RSPCA	Royal Society for the Prevention of Cruelty to Animals
ppm	parts per million
µg/100mls	micrograms per 100 millilitres
µ mol/l	micromols per litre

[0.4 ppm = 40 µg/100mls and also = approximately 2µ mol/l]

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List of Swan Rescue Groups

Cuan House	Much Wenlock
Water Bird Rescue	Wroxham, Norfolk
Swan Care	Hemel Hempstead, Hertfordshire
Wychbold Swan Rescue	Droitwich, Worcestershire
Evesham and Cheltenham (now Cheltenham Swan Protection Society)	Cheltenham, Gloucestershire
Gwent and Barry	Barry, South Glamorgan
Cotswold Swan and Wildbird Rescue	Cirencester, Gloucestershire
St Ives and District Swan Rescue	St Ives, Huntingdon, Cambridgeshire
Swan Aid	Fairford, Gloucestershire
Swan Lifeline	Eton, Buckinghamshire
Hampton Swan Rescue	Hampton, Middlesex
Swan Rescue – South Wales* (formerly Gwent Swan Rescue)	Newport, Bridgend, etc. South Wales
Swan Study	Worcester

***** *Authors of an original small-scale pilot study, now acting as swan rescue group co-ordinators for the project.*

Also RSPCA, especially Tim Thomas, Andy Cousquer, Andrea Smith.

Appendix A. The number of swan rescue incidents and their causes

Table 1a: Number of swan rescue incidents (1996)

Problem	January to March 14	March 15 to June 15	June 16 to August	September to December	TOTAL
Tackle	65	62	341	232	**700**
Grounded	50	30	29	133	**242**
Territorial Dispute	44	43	60	85	**232**
Illness/Poor Condition	45	20	27	67	**159**
Dead	34	29	38	55	**156**
Injury	40	25	40	47	**152**
Lead Poisoning	34	14	39	30	**117**
Pollution	19	17	14	25	**75**
Collision	14	9	13	34	**70**
Wandering	3	15	15	18	**51**
Frozen in Ice	28			12	**40**
Botulism	2	2	20	11	**35**
Abandoned	1	2	24	6	**33**
Swept over Weir		14	14	3	**31**
Trapped	5	5	9	14	**33**
Self-Admitted	5	2		13	**20**
Re-Location	1	6	6	6	**19**
Vandalism	2	4	6	3	**15**
Predator Attack	3	2	3	4	**12**
Shot	1	4	4	2	**11**
Road Traffic Accident	4	2		5	**11**
Leg Ring Problem	1	3	1	1	**6**
Miscellaneous	6	5	25	6	**42**
TOTAL	**407**	**315**	**728**	**812**	**2262**

Table 1b: Number of swan rescue incidents (1997)

Problem	January to March 14	March 15 to June 15	June 16 to August	September to December	TOTAL
Tackled	62	71	108	33	**274**
Illness/Poor Condition	66	55	20	22	**163**
Territorial Dispute	61	49	33	10	**153**
Grounded	55	31	9	24	**119**
Dead	60	30	9	6	**105**
Collision	35	39	3	4	**81**
Injured	22	28	8	8	**66**
Pollution	26	13	1	15	**55**
Lead Poisoning	7	14	13	3	**37**
Frozen in Ice	32				**32**
Abandoned		24	6		**30**
Predator Attack	6	8	1		**15**
Self-Admitted	12	1			**13**
Re-Location	2	5	2	2	**11**
Road Traffic Accident	8	1			**9**
Wandering	6	1	2		**9**
Vandalism	2	2	1		**5**
Leg Ring Problem	3	2			**5**
Trapped	2	3		3	**8**
Botulism		1	2	1	**4**
Shot			1		**1**
Miscellaneous	8	24	11	3	**46**
TOTAL	**475**	**402**	**230**	**134**	**1241**

Table 1c: Number of swan rescue incidents (1998)

Problem	January to March 14	March 15 to June 15	June 16 to August	September to December	TOTAL
Tackled	103	52	184	157	**496**
Illness/Poor Condition	46	39	50	75	**210**
Territorial Dispute	19	22	30	39	**110**
Injured	13	20	33	45	**111**
Collision	17	15	10	60	**102**
Grounded	24	11	5	48	**88**
Pollution	5	5	10	15	**35**
Lead Poisoning	14	1	5	11	**31**
Trapped	2	11	8	4	**25**
Dead	6	8	1	5	**20**
Wandering	2	2	2	14	**20**
Abandoned		1	3	10	**14**
Road Traffic Accident		1	4	8	**13**
Shot	2	2	1	6	**11**
Predator Attack	2	4		4	**10**
Vandalism		4	4	2	**10**
Frozen in Ice				6	**6**
Leg Ring Problem		1	2	1	**4**
Miscellaneous	2	9	6	8	**25**
TOTAL	**257**	**208**	**358**	**518**	**1341**

Table 1d: Number of swan rescue incidents (1999)

Problem	January to March 14	March 15 to June 15	June 16 to August	September to December	TOTAL
Tackled	52	67	332	166	**617**
Grounded	68	60	30	126	**284**
Illness/Poor Condition	59	60	69	63	**251**
Injured	31	42	49	80	**202**
Collision	65	48	13	63	**189**
Territorial Dispute	45	28	45	61	**179**
Pollution	19	7	37	25	**88**
Lead Poisoning	6	19	15	31	**71**
Dead	15	12	17	16	**60**
Abandoned		16	21	6	**43**
Predator Attack	6	2	10	13	**31**
Road Traffic Accident	2	6	3	15	**26**
Trapped	4	5	8	6	**23**
Wandering			13	9	**22**
Shot	4	3	3	7	**17**
Vandalism	2	4	3	1	**10**
Re-Location				5	**5**
Leg Ring Problem	1			1	**2**
Frozen in Ice	2				**2**
Miscellaneous	5	11	16	29	**61**
TOTAL	**386**	**390**	**684**	**723**	**2183**

Table 1e. Number of swan returns by group for 1996

Swan Group	Number
Barry	30
Cheltenham	42
Cotswolds	5
Dudley	1
Evesham	78
Gwent	99
Hampton	339
Lifeline	1015
Norwich	25
RSPCA	1
St Ives	160
Swan Aid	68
Swan Aid - Cirencester	5
Swan Care	156
Swan Rescue	19
Swan Study	71
Water Bird Rescue	133
Wychbold	13
TOTAL	**2262**

Table 1f. Number of swan returns by group for 1997

Swan Group	Number
Cheltenham	51
Cotswolds	6
Evesham	1
Gwent	30
Hampton	101
Lifeline	551
South Wales	20
St Ives	94
Staffordshire	2
Swan Aid – Cirencester	13
Swan Aid – Fairford	51
Swan Care	75
Swan Rescue	5
Swan Study	8
Water Bird Rescue	67
Wychbold	160
TOTAL	**1241**

Table 1g. Number of swan returns by group for 1998

Swan Group	Number
Cheltenham	58
Cotswolds	132
Cuan House	50
Fens Pool	1
Friends of Bristol Swans	18
Hampton	117
Norwich	4
RSPCA	25
South Wales	118
St Ives	140
Staffordshire	6
Swan Aid - Fairford	2
Swan Care	118
Swan Rescue	2
Swan Sanctuary	44
Swan Study	35
Water Bird Rescue	153
Wychbold	318
TOTAL	**1341**

Table 1h. Number of swan returns by group for 1999

Swan Group	Number
ARK Wildlife Rescue	11
Cheltenham	49
Cotswolds	109
Cuan House	35
Friends of Bristol Swans	23
Fens Pool	1
Hampton	94
Hemel Hempstead	62
Lifeline	487
Norwich	6
Pembrokeshire	4
RSPCA	557
South Wales	108
St. Ives	30
St. Jones	1
Staffordshire	4
Swan Aid	34
Swan Sanctuary	33
Water Bird Rescue	122
Wigan	5
Wychbold	408
TOTAL	**2183**

Appendix B. The frequencies of tackle-related rescues by time of year

Table 2a: The frequency of tackle-related swan rescues by time of year in 1996

	Total Rescues	**Number Tackled**	**% Tackled**
January – March 14	392	58	14.8
March 15 – June 15	**311**	**62**	**20.0**
June 16 – August	718	335	46.6
September - December	803	227	28.3

Table 2b: The frequency of tackle-related swan rescues by time of year in 1997

	Total Rescues	**Number Tackled**	**% Tackled**
January – March 14	471	62	13.2
March 15 – June 15	**402**	**71**	**17.7**
June 16 – August	225	104	46.2
September - December	134	33	24.6

Table 2c: The frequency of tackle-related swan rescues by time of year in 1998

	Total Rescues	**Number Tackled**	**% Tackled**
January – March 14	251	101	40.2
March 15 – June 15	**246**	**52**	**51.1**
June 16 – August	356	184	51.7
September - December	510	154	30.2

Table 2d: The frequency of tackle-related swan rescues by time of year in 1999

	Total Rescues	**Number Tackled**	**% Tackled**
January – March 14	396	51	12.9
March 15 – June 15	**417**	**67**	**16.1**
June 16 – August	695	332	47.8
September - December	774	166	21.4

Appendix C. The number of angling-related rescues by time of year and habitat

Table 3a: The number of angling-related rescues by time of year and habitat in 1996

	Lake	**River**	**% from Lakes**
January – March 14	18	25	41.9
March 15 – June 15	**15**	**22**	**40.5**
June 16 – August	67	201	25.0
September - December	49	133	26.9
Note: Lake includes ponds, gravel pits, etc. River includes broads, canals, etc.			

Table 3b: The number of angling-related rescues by time of year and habitat in 1997

	Lake	**River**	**% from Lakes**
January – March 14	10	28	26.3
March 15 – June 15	**19**	**14**	**57.6**
June 16 – August	16	66	19.5
September - December	3	16	15.8
Note: Lake includes ponds, gravel pits, etc. River includes broads, canals, etc.			

Table 3c: The number of angling-related rescues by time of year and habitat in 1998

	Lake	**River**	**% from Lakes**
January – March 14	26	66	28.3
March 15 – June 15	**33**	**17**	**66.0**
June 16 – August	60	99	37.7
September - December	58	82	41.4
Note: Lake includes ponds, gravel pits, etc. River includes broads, canals, etc.			

Table 3d: The number of angling-related rescues by time of year and habitat in 1999

	Lake	**River**	**% from Lakes**
January – March 14	29	20	72.5
March 15 – June 15	**50**	**13**	**79.4**
June 16 – August	106	186	36.3
September - December	65	77	45.8
Note: Lake includes ponds, gravel pits, etc. River includes broads, canals, etc.			

Appendix D. The fate of swans rescued because of tackle-related injuries

Table 4a: The fate of swans rescued because of tackle-related injuries in 1996

Outcome	***N***	**%**
Detackled on Site (bankside)	405	58.2
Detackled at vets/hospital	110	15.8
False Alarm/Detackled Itself	62	8.9
Released Later	92	13.2
Still in Care	10	1.4
Not Recorded (? Still in Care)	8	1.2
Died	9	1.3
TOTAL	**696**	**100**

N.B. Released later, Still in care, Not recorded, are taken from swans that were Detackled at vets/hospital.

Table 4b: The fate of swans rescued because of tackle-related injuries in 1997

Outcome	***N***	**%**
Detackled on Site (bankside)	133	42.9
Detackled at vets/hospital	83	26.8
False Alarm/Detackled Itself	11	3.5
Released Later	22	7.1
Still in Care	10	3.2
Not Recorded (? Still in Care)	51	16.5
Died	0	0
TOTAL	**310**	**100**

N.B. Released later, Still in care, Not recorded, are taken from swans that were Detackled at vets/hospital.

Table 4c: The fate of swans rescued because of tackle-related injuries in 1998

Outcome	***n***	**%**
Detackled on Site (bankside)	304	58.6
Detackled at vets/hospital	71	13.7
False Alarm/Detackled Itself	68	13.1
Released Later	32	6.2
Still in Care	11	2.1
Not Recorded (? Still in Care)	28	5.4
Died	5	0.9
TOTAL	**519**	**100**

N.B. Released later, Still in care, Not recorded, are taken from swans that were Detackled at vets/hospital.

Table 4d: The fate of swans rescued because of tackle-related injuries in 1999

Outcome	***n***	**%**
Detackled on Site (bankside)	300	56.3
Detackled at vets/hospital	93	17.4
False Alarm/Detackled Itself	30	5.6
Released Later	46	8.7
Still in Care	17	3.2
Not Recorded (? Still in Care)	30	5.6
Died	17	3.2
TOTAL	**533**	**100**

N.B. Released later, Still in care, Not recorded, are taken from swans that were Detackled at vets/hospital.

Appendix E. Treatment of swans caught up in angling tackle at Hampton

Table 5a:Treatment of Tackle Injuries (1996)

Number of swans rescued	118
Number with hook in mouth/bill, etc.	43
Number taken to vet	13
Number from which all tackle removed	93
Number from which some tackled not removed	25

Table 5b:Treatment of Tackle Injuries (1997)

Number of swans rescued	85
Number with hook in mouth/bill, etc.	58
Number taken to vet	5
Number from which all tackle removed	65
Number from which some tackled not removed	20

Table 5c:Treatment of Tackle Injuries (1998)

Number of swans rescued	58
Number with hook in mouth/bill, etc.	31
Number taken to vet	3
Number from which all tackle removed	46
Number from which some tackled not removed	13

Table 5d:Treatment of Tackle Injuries (1999)

Number of swans rescued	36
Number with hook in mouth/bill, etc.	27
Number taken to vet	7
Number from which all tackle removed	23
Number from which some tackled not removed	13

Appendix F. Swan rescue report form, version 9, 2001

SWAN RESCUE REPORT FORM

SWAN GROUP:			**SWAN IDENTITY**	
Tel. No.	**Date:**		BTO ring no.	
LOCATION	**PROBLEM**		Darvic - **Colour**	
Nearest town or village:	Tackle		**- Number**	
	Pollution		Hospital ring no.	
	Collision - Cable*		Male	
	- Other		Female	
INFORMANT	Vandalism - Shot		Adult (sex unknown)	
RSPCA - Log No.	- Other		Juvenile	
Police - Log No.	Predator (Dog)		Cygnet	
Public - Name	Grounded		Other	
Tel. No.	Injured		Species	
TACKLE DETAILS	Poorly			
Line: Light Heavy	Territorial dispute		**ENVIRONMENT**	
Hook: Barbed Barbless	Dead		River	
Weights: (Type)	False alarm		Estuary	
Toxic Non-toxic			Canal	
Floats etc.	**ACTION TAKEN**		Lake/Pond	
FISHING DETAILS	Not caught		Road	
Coastal	Resolved in situ		Field/Garden	
Coarse (free)	Into care			
Coarse (club)	To vet (**give name**)			
Game	To hospital (**give name**)			

Resources: **1. Rescue** - No. of people: Miles: Time taken (hrs.):

2. Release - Date: Location:
No. of people: Miles: Time taken (hrs):

COMMENTS / OBSERVATIONS. (Please use these sections to record as much relevant detail as possible; *this is important*).

***Cable details** (Required only when incident involves a cable strike):

National grid? Yes/No	**Local electricity company:** (e.g. GPU Power, Manweb etc.)
Nearest water: (river, canal, lake, etc.)	
Nearest town, village, etc.	
6 figure grid or map reference:	**This is very important**

The National Convention for the Welfare of Swans and Wildlife.

Version 9. May 2001.