IUCN OTTER SPECIALIST GROUP BULLETIN
VOLUME 10 PAGES 14 – 20

Citation: **Körbel, O. (1994)** Hindering Otter *Lutra lutra* Road Kills Part 1. *IUCN Otter Spec. Group Bull*. **10:** 14 - 20

HINDERING OTTER *Lutra lutra* ROAD KILLS PART 1

Olaf Körbel

Aktion Fischotterschutz e.V., Otter-Zentrum, Sudendorfer Alle 1, D-29386 Hankensbüttel, Germany

Abstract: On commission from the Federal Ministry of Transportation, the Aktion Fischotterschutz e.V. began the research and development project "Otter on the Road". The intent was to collect and analyse data on otter deaths, the conditions under which the otters died as well as constellations of the death sites having an impact on the danger potential, for example, an increase. This paper presents the results of analysis of otter road deaths, road type and adjacent watercourses. A subsequent paper will cover mitigation measures.

INTRODUCTION

Even before the reunification of Germany it was evident that road kills have become the number one cause of otter deaths. Today, it is estimated that three-fourths of all discovered dead otters were killed on roads.

Road kills have increased of late so dramatically that KUBASCH (1992) has suggested that already 10% of the total otter population in Saxony has fallen victim to road kills.

In order to minimise further danger of road kills to the remaining otter population in Germany, there are a number of recommended measures to be undertaken for the future. On the one side, current accident hot spots need to be ameliorated in order to protect the local population from a total collapse due to death factor "roads". On the other side, otter protection requires a number of measures to be taken during road construction measures. Only in conjunction with other protective measures is it possible to save this species.

On 01.02.1993, and on commission from the Federal Ministry of Transportation, the Aktion Fischotterschutz e.V. began the research and development project "Otter on the Road". The intent of this research and development project was to collect and analyse data on otter deaths, the conditions under which the otters died as well as constellations of the death sites having an impact on the danger potential, for example, an increase.

Based on the knowledge gained on death sites to date, the first recommendations for conservation measures ought to be worked out which can be carried out when building or maintaining roads and applicable for various sites.

METHODS

The area under investigation was restricted to three Federal States that show a healthy otter presence: Brandenburg, Mecklenburg-Vorpommern and Saxony. Although there was documentation of road kills in Lower Saxony, Saxony-Anhalt and in Bavaria, due to the overall isolated and very low population numbers in these Federal States data on the death sites were not representative of typical individual death site points.

The time period researched ran from 01.01.1985 until 31.03.1993. Letters and questionnaires were used to collect and analyse data complete as possible on all otter road kills during this time period.

Inclusively, 92 death sites were mapped illustrating characteristics of the street, waters (to the extent given), as well as immediate surroundings.

RESULTS OF THE ANIMAL SPECIFIC DATA

A total of 303 otter road kills were reported during the time period between January, 1985 and March 1993.

An increase in road kills is apparent since the time of the German reunification (see Table 1). For the years 1985 to 1988, an average of 16 road kills were reported. In 1992 alone, there were 81. This is an increase of more than 500%.

Table 1: Numbers of deaths between 1985 and 1992

Year	Number
1985	9
1986	18
1987	15
1988	23
1989	39
1990	50
1991	57
1992	81
Total	**292**
1-3/1993	11

Looking at the monthly distribution of deaths, the possibility that an otter could fall victim to traffic is greatest between September and December (see Table 2). ZINKE (1991) has suggested that the increased mortality rate for these months, among other things, could correspond with fishery activities.

Table 2: Distribution of all road kills according to month

Month	Number	%
January	26	9.00
February	17	5.88
March	27	9.34
April	17	5.88
May	13	4.50
June	18	6.23
My	17	5.88

Month	Number	%
August	17	5.88
September	32	11.07
October	44	15.22
November	29	10.03
December	32	11.07
Total	**289**	**100.00**
?	14	

230 of the 303 otters could be sexed. 57% of these were male (see Table 3). The sex ratio is, therefore, 1.3 : 1.

Table 3: Sex of traffic victim

Sex	Number	%
m	131	56.96
f	99	43.04
Total	**230**	**100.00**
?	73	

CHARACTERISTICS OF ROAD KILL SITES

Distinguishing characteristics of those sites where otters were run over comprised aspects on the road, waters, bridge(s) or ducts.

For all otter deaths reported, a categorisation of the road type was conducted. This was carried out independent of the mapping of the specific locations where dead otters were found. Given that nearly all sites were located in the new Federal States, Table 4 shows the respective percentages for the road types with respect to the total road network in East Germany, and Table 5 the road type where a death occurred with respect to the total road network of East Germany only.

[Translators note: in the first position are highways and the like, characteristically fast moving traffic on two or more lanes generally connecting highly frequented goals, for example, larger cities. The following categories given are not accurate names, rather, an attempt to describe that the road type is increasingly narrower, quieter and typically connecting less frequented goals.]

Table 4: Road type of the road network in East Germany

Road Type	km	%
"highway"	1,850	1.50
"regional road"	11,300	9.10
"county road"	34,000	27.30
"district road"	77,400	62.10
Total	**124,550**	**100.0**

Table 5: Road type at road kill site

Road type	Number	%
"highway"	7	4.40
"regional road"	96	60.70
"county road"	33	20.90
"district road"	17	10.80
other roads	5	3.20
Total	**158**	**100.0**

The tables show that "highways" are clearly over represented as road types on which road kills occurred. The reason is probably due to a heavier volume of traffic in combination with a higher speed limit. Regional roads were named as frequently as corresponds to their overall abundance in East Germany. County roads and other smaller roadways make up over 60% of the road network, however, only 25% of all road kills occurred on these road types. The reason for this is probably the poor conditions under which these roadways were maintained and an associated lower volume of traffic.

CHARACTERISTICS OF WATERS NEAR THE ROAD KILL SITE

It is important to keep in mind when considering the following mapping data that it was not an objective of the research and development project to determine comparative parameters for the road kill sites such as the general frequency of road kills within a particular biotope structure or specific road construction structure. It is, however, possible that the results mirror the frequency of such parameters. In the following tables the results of the above mentioned evaluation method are listed according to individual road kill sites (IRS, n = 53) and multiple road kills sites (MRS, n = 39) as well as total sites (n = 92). It is then possible to make a direct comparison between IRS and MRS as well as characteristics of the sites with respect to the numbers of otters killed there (n = 158) and the characteristics of the site as such (n = 92).

Within the framework of the mapping of road kill sites, particular effort was made to collect data on water sources nearby the site (Table 6).

Table 6: Number of road kills and the site according to water source type in the immediate vicinity

Water source	**Number**	**%**	**IRS**	**%**	**MRS**	**%**	**Total**	**%**
no crossing with water	74	46,84	25	47,17	17	43,59	42	45,65
river > 5 m in breadth	8	5,06	1	1,89	3	7,69	4	4,35
canal	2	1,27	0	0,00	1	2,56	1	1,09
stream	42	26,58	13	24,53	13	33,33	26	28,26
lake drainage	23	14,56	9	16,98	4	10,26	13	14,13
drainage ditch	9	5,70	5	9,43	1	2,56	6	6,52
Total	**158**	**100,0**	**53**	**100,0**	**39**	**100,0**	**92**	**100,0**

IRS = individual road kill site, MRS = multiple road kills site

It was surprising to see that 47% of the otter road kills occurred on roads crossing no water sources. Characteristic of these sites were that ponds, lakes or running water existed at a distance from the road on which an otter was killed. In addition, it became evident that road kill sites were not isolated to a single water source type. Even seemingly insignificant water sources such as drainage ditches, or dried up stream beds were sites of road kills.

CHARACTERISTICS OF BRIDGES AND DUCTS AT ROAD KILL SITES

Not all construction measures allowing water to flow underneath roadways appears suitable for the passage of otters. Tunnel passages reduce the width for water flow and, as a rule, and result in an increased water velocity. The same holds true for box shaped tunnels depending on their height and width. Bridges or very wide (rectangular) tunnels where there exists a natural strip of bank extending the length of the tunnel appears to enable the passage of otters. Table 7 shows the percentages of the various construction types with respect to numbers of road kills.

Table 7: Number of road kills according to construction type of the bridge or duct at the site

Construction type	**Number**	**%**	**IRS**	**%**	**MRS**	**%**	**Total**	**%**
raised bridges	4	4.76	2	7.14	1	4.55	3	6.00
rectangular ducts	33	39.29	10	35.71	8	36.36	18	36.00
tunnel shaped ducts	47	55.95	16	57.14	13	59.09	29	58.00
Total:	**84**	**100.0**	**28**	**100,0**	**22**	**100.0**	**50**	**100.0**

IRS = individual road kill site, MRS = multiple road kills site

In addition to the bridge or duct construction type, there are other structures such as dams that hinder the passage of otters and force them to leave the water and cross the road. This is also the case for road maintenance measures when a new bridge is built alongside the old one. Even if the new bridge has a wide enough span to ensure a strip of bank underneath, if the span of the remaining old bridge is restrictive, then it is most likely that the otter will leave the water and cross the road. This was the case in two of three raised bridge sites.

ROAD KILL SITES NOT CROSSING WATER

It was already mentioned above that about 47% of the otter fell victim at sites not in the immediate vicinity of water.

An important factor for the development of preventative measures at potential road kills sites of this sort is the distance to the nearest water source (Table 8). The mapping results clearly show, as expected, that the risk of an otter road kill decreases with the increasing distance between road and water source. The data is especially supportive of this trend for MRS. Over one-half of MRS were sites where the nearest water source was not more than 100 m away. This is similar when looking at the number of road kills, too. Close to one-half of all road kills occurred within less than 100 m from a source of water.

Table 8: Number of road kills and the site type according to distance from water source

Distance	Number	%	IRS	%	MRS	%	Total	%
up to 100m	35	47.30	8	32.00	9	52.94	17	40.48
up to 250m	19	25.68	6	24.00	5	29 .41	11	26.19
up to 500m	7	9.46	7	28.00	0	0.00	7	16.67
up to 1000m	8	10.81	2	8.00	2	11.76	4	9.52
> 1000m	5	6.76	2	8.00	1	5.88	3	7.14
Total	74	100.0	25	100.0	17	100.0	42	100.0

IRS = individual road kill site, MRS = multiple road kills site

EVIDENCE FOR OTTERS

Simultaneous to the mapping of road kill sites, evidence for otters was searched for. Due to time restrictions it was not possible to conduct the search following the IUCN standards. Only the immediate vicinity of the road kill sites were searched for evidence of otters. The results are shown in Table 9.

Table 9: Number of sites according to the type of evidence found for otters

Evidence type	DEIS	%	MRS	%	Total	%
none	32	60.38	11	28.21	43	46.74
scat or foot print	21	39.62	28	71.79	49	53.26
Total	53	100.0	39	100.0	92	100.0

IRS = individual road kill site, MRS = multiple road kills site

At more than 50% of the road kill sites actual evidence for otters was found. Noteworthy here is the marked distinction between IRS, for which evidence was found in only 40% of the cases, and MRS, for which scat or a foot print was found in 70% of the cases. These numbers impressively underline the emergency in implementing preventative measures at the existing road kill sites as well as for potential risk sites during road construction.

Descriptions of the preventative measures follow in part 2 of the report appearing in the next OSG Bulletin

REFERENCES

Kubasch, H. (1992). Otterschutz in Sachsen. In Reuther, C. (Ed.) (1992): Otterschutz in Deutschland, Habitat Nr. 7, Hankensbüttel

Zinke, O. (1991). Die Todesursachen der im Museum der Westlausitz Kamenz von 1985-1991 eingelieferten Fischotter *Lutra lutra (*L., 1758). Veröffentlichungen d. Museums d. Westlausitz **15,** 57-63