

MORTALITY OF TOADS (*Bufo bufo*) ON ROADS NEAR A CAMBRIDGESHIRE BREEDING SITE

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During the Springs of 1987 and 1988, "toad-lifters" from the Beds and Hunts Wildlife Trust helped hundreds of toads safely across the roads of Ramsey, Cambridgeshire. There are three main breeding ponds in Ramsey with the largest population breeding in a pond beside Field Road in the north of the Town. In 1987, 136 toads were moved by the lifters across the roads near the pond, while in 1988 the total was 343.

Since 1974, I have counted the number of toads squashed on the roads in the vicinity of Field Road following peak migration (see Table 1). The aims of this exercise have been to determine migration routes and to indicate whether long term changes may have occurred in the population level. However, by utilising numbers of toads moved by the Trust Team and my own data it now becomes possible to derive an estimate both for the observed mortality rate of toads crossing the road and for the number making the crossing.

Central to the calculation is the question of how many toads would have been recorded as squashed had there been no intervention? This can be answered in two stages: first, by estimating, based on previous casualty totals and second, by refining the estimates by comparing calculated mortality rates for 1987 and 1988.

Between 1974 and 1986 numbers recorded killed ranged from 28 to 204. As 77 were killed in 1987 and 69 in 1988, these were not among the years with particularly low totals (despite the efforts of the Trust Team). In 1987 and 1988, casualties were low on the main St Mary's Road, although it was not patrolled by the Trust team, and it is reasonable to assume that total casualties without intervention would not have been excessively high. (Numbers on the St Mary's Road were particularly high in 1979 and 1985 and these coincided with high counts elsewhere in the Field Road area – see Table 1).

The overall mean number of casualties recorded for 1974-1986 was 93. However, numbers were rather lower in the early years, so it might be more appropriate to take as the "norm" the mean for the five year period 1982-1986 : 112. While it is appreciated that each of these means has a high variance let us at this stage assume that between 93 and 112 toads might have been recorded as squashed at peak migration during each of the last two years had there been no intervention.

For 1987 this means that the number of toads saved might have ranged from (93 minus 77) to (112 minus 66) = 16 to 35. As 136 were helped across the roads, the percentage that would have been recorded as being killed might have ranged from $(16/136)100$ to $(35/136)100 = 12-26\%$. For 1988, this observed mortality rate was 7-13%.

There is no reason to suppose that this statistic should vary markedly between 1987 and 1988. If there is no overlap in estimated mortality rate between the two years, it suggests that there was something wrong with the estimate for the numbers that would have been killed for one or both years. However, there is overlap between the two years : in the range 12-13%. The fact that there is overlap does not entirely preclude the possibility that estimates of numbers killed were wrong for both years and that the overlap was fortuitous.

In this context, it is relevant to compare these figures with those from road mortality observations elsewhere. They agree well with unpublished data of my own for St Neots Common, Cambridgeshire. Just after peak migration in 1980, I estimated by mark – recapture 730 toads to be present in the main breeding pool, while the cumulative mortality on the B road across the Common during the migration was 76 (9.4%). Moore (1954) studied a toad population breeding beside the A350 at Iwerne Minster in Dorset and considered that road mortality might have killed 40% of the toads attempting to cross. Van Gelder (1973), studying a Dutch

colony, estimated that 29% of female toads were killed by traffic during a single breeding season. On the other hand, Gittins (1983) and his co-workers systematically caught toads for marking as they crossed the road around a breeding lake in Llandrindod Wells, thereby reducing the estimated mortality to 4% per annum. Thus 12-13% for the Field Road site seems a reasonable figure for observed mortality on relatively quiet residential roads, several of which are cul de sacs; the St Mary's Road is a B road. It should be appreciated that this is the percentage recorded as killed; it probably underestimates the actual percentage killed as (many) casualties may be removed from roads by the action of traffic and by scavengers and therefore go unrecorded.

The figure of 12-13% suggests that for every eight toads helped at the Field Road site, one was saved from death (equivalent to 17 in 1987 and 43 in 1988). One can then use the final estimates of numbers that would have been killed without intervention (94 in 1987, 112 in 1988) to derive rough estimates of the overall numbers making the crossing (750 in 1987, 900 in 1988).

While this exercise is no substitute for a detailed scientific study, it is an example of how fairly superficial observations can indicate the size of a toad population and the danger it faces from road traffic.

My thanks are due to John Stott for the toad-lift data, and to Dr Rob Oldham and Tom Langton for helpful comments on a draft of the manuscript.

TABLE 1

Mortality of toads on roads around the Field Road pond, Ramsey. Casualties were counted on a single occasion after peak migration. (A daily check was made on the roads to determine the optimum time for counting).

Year	Field Road	Star Lane	St Marys Road	Other Roads	Total
1974	27	9	NC	9	45
1974	47	19	2	8	75
1976	19	20	NC	7	46
1977	15	17	NC	0	32
1978	24	26	NC	7	57
1979	93	43	45	8	189
1980	42	43	7	13	105
1981	45	34	9	14	102
1982	64	28	8	18	118
1983	44	73	9	10	136
1984	10	14	1	3	28
1985	84	58	28	34	204
1986	34	9	25	8	76
1987	44	11	8	14	77
1988	39	21	3	6	69

NC = Not counted

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