

Table 1: Relative contribution of different agents of mortality to total mortality recorded in national statistics collated from statutory returns from individual Hunting Districts in **Slovenia** [Source: Slovene Hunters' Association, via B.Pokorny]

<b>a) Roe Deer</b>		Average recorded mortality per year	%Cull	%Cull plus Poaching	%Natural Predators	%Predators and Dogs	%Traffic Accidents	%Other Accidents [eg.Mowers]	% Natural Loss (Found dead)	Overall Non-cull %
2001-2006	Bucks	14670	87.9	88.2	0.1	1.0	8.4	0.02	2.4	11.8
	Does	13290	63.0	63.4	0.6	4.5	24.2	0.06	7.9	26.6
	Kids	14450	79.8	79.9	0.3	2.4	9.4	5.6	2.7	20.1
	Total	42410	77.2	77.5	0.3	2.6	13.7	1.9	4.3	22.5

<b>b) Red Deer</b>		Average recorded mortality per year	%Cull	%Cull plus Poaching	%Natural Predators	%Predators and Dogs	%Traffic Accidents	%Other Accidents [eg.Mowers]	% Natural Loss (Found dead)	Overall Non-cull %
2001-2006	Stags	1270	91.8	92.5	1.8	1.9	2.5	0.03	3.1	8.2
	Hinds	1580	81.2	81.9	6.7	6.8	4.5	0	6.8	18.8
	Calves	2100	88.0	88.2	4.2	4.4	2.7	0.06	4.7	12.0
	Total	4950	86.8	87.3	4.4	4.5	3.2	0.03	5.0	13.2

Table 2: Relative contribution of different agents of mortality to total mortality recorded in national statistics collated from statutory returns from individual Hunting Districts in **Hungary** [Source: National Game Management Database (OVA); provided A.Nahlik ]

<b>a) Roe Deer</b>		Average recorded mortality per year	%Cull	%Traffic Accidents	%Other Non-cull	Total Non-cull %
2000-2005	Bucks	28650	93.1	2.9	4.0	6.9
	Does	26860	84.0	5.9	10.1	16.0
	Kids	28760	82.6	2.6	14.8	17.4
	Total	84270	86.6	3.7	9.6	13.3

Note <sup>1</sup>: the very low number of recorded traffic accidents for roe seems curious (see text para 2.2)

<b>b) Red Deer</b>		Average recorded mortality per year	%Cull	%Traffic Accidents	%Other Non-cull	Total Non-cull %
2000-2005	Stags	9260	93.5	1.6	4.9	6.5
	Hinds	14520	93.4	1.7	4.9	6.6
	Calves	14720	94.5	0.9	4.6	5.5
	Total	38500	93.8	1.4	4.8	6.2

Table 3: Relative contribution of different agents of mortality to total mortality recorded in national statistics collated from statutory returns from individual Hunting Districts in **Croatia** [Source: Statistical Department of Croatia; provided K.Krapinec]

		Estimated Spring Population	Average recorded mortality per year	% Mortality thru' Cull	% Cull plus Poaching	% Natural Predators	% Traffic Accidents	% Other Accidents [Flooding]	% Other Losses (includes Poaching)	Total Non-cull %
2002-2005	Roe Deer	43900	9490	78.9		2.3	9.7	2.7	6.4	21.1
	Red Deer	8190	1510	82.8		7.0	2.2	6.6	1.4	17.2

Notes: 1. Mortality agents are expressed in terms of individual contribution to %ages of total mortality, not as % of Spring Population  
 2. "Other Losses" includes poaching and natural loss so must be considered an overestimate for natural mortality

Table 4: Relative contribution of different agents of mortality to total mortality recorded in national statistics collated from statutory returns from individual Hunting Districts in **Austria** [Source: Official Austrian Hunting Statistics; provided F.Reimoser ]

		Average recorded mortality per year	%Cull	%Traffic Accidents	%Other Non-Cull Mortality	Total Non-cull %
2000-2006	Roe Deer	341370	79.8	11.6	8.6	20.2
	Red Deer	48760	95.6	1.1	3.3	4.4

Table 5: A summary of the data from Tables 1 -4 presents the relative proportion of cull vs non-cull mortality in populations of roe and red deer as revealed by overall national statistical returns for Slovenia, Hungary, Austria and Croatia.

a) **Roe**

Country	Years	Average recorded mortality per year	%Cull	%Traffic Accidents	% Predation	%Other Non-cull	Total Non-cull %
Slovenia	2001-06	42410	77.5	13.7	2.6	2.4	22.5
Hungary	2000-05	84270	86.6	3.7	-	9.6*	13.4
Austria	2000-06	341370	79.8	11.6	-	8.6*	20.2
Croatia	2002-05	9490	78.9	9.7	2.3	9.1**	21.1

\*includes Predation; \*\* includes poaching losses

b) **Red**

Country	Years	Average recorded mortality per year	%Cull	%Traffic Accidents	% Predation	%Other Non-cull	Total Non-cull %
Slovenia	2001-06	4950	87.3	3.2	4.4	5.0	12.7
Hungary	2000-05	38500	93.8	1.4	-	4.8*	6.2
Austria	2000-06	48760	95.6	1.1	-	3.3*	4.4
Croatia	2002-05	1510	82.8	2.2	7.0	8.0**	17.2

\*includes Predation; \*\* includes poaching losses

Table 6. Relative contribution of different agents of mortality to total recorded mortality of tagged roe deer in intensive study areas in

particular scientific studies. Note however, most were tagged as kids and thus results may be biased to some extent to mortality factors acting particularly on juveniles

Country	Years	Number of marked animals	%Cull	%Traffic Accidents	% Other Accidents	% Predation	% Disease/Starvation	% Other Non-cull [Unknown]	Source
Austria		634	51.1	20.3	9.3		-	19.3	Reimoser et al. (1999)
Norway <sup>1</sup>	1995-2004	51	-	?	17.6	64.7	5.9	11.8	Panzacchi 2007
Norway <sup>2</sup>	1995-2005	237	21.9	11.4	4.6	46.0	6.3	9.7	Melis et al. <i>in press</i>

Note 1: Panzacchi data Norway<sup>1</sup> are effectively %ages of non-cull mortality not total mortality, since no estimates are given of cull mortality

b) **Data from Norway<sup>2</sup>** (Melis *et al. in press*) are reanalysed to separate Males/Females, and eliminating deaths due to ‘unknown cause’ [14 male; 9 female] to recalculate %ages of known mortality

Died as	Years	Total Known cause	%Cull	%Traffic Accidents	% Other Accidents	% Predation	% Disease/Starvation	Total Non-cull %
Bucks	1995-2005	106	19.8	11.3	5.7	50.9	12.3	80.2
Does		108	28.7	13.9	4.6	50.9	1.8	71.3
Total		214	24.3	12.6	5.1	50.9	7.0	75.7

Table 7. Relative contribution of different agents of mortality in Bialowieza Forest in Poland; non-cull mortality identified from carcass searches. Results are presented for two subdivisions of the area, one where hunting is permitted (Bialowieza 1), the other where no hunting is allowed and thus all mortality is non-cull (Bialowieza 2). [Source: Okarma *et al.*, 1995]

a) **Roe**

Area	Years	%Cull	%Cull plus Poaching	%Traffic Accidents	% Natural Predation [wolf/lynx]	% Predation incl.dogs	% Disease/Starvation	% Other Non-cull [Unknown]
Bialowieza 1*	1984-1993	85.5	87.7	0.9	6.6	7.2	4.1	
Bialowieza 1*	1984-1993			7.4	54.1	58.9	33.6	
[Bialowieza 2]	1987-1993		[30.8]		[69.2]			
[Bialowieza 2]**	1987-1993				[100.0]			

\* Bialowieza 1: cull and non-cull mortality calculated as a percentage of total mortality

\* Bialowieza 1 : figures recalculated in this row to show non-cull mortality as a percentage non cull mortality only

\*\* Bialowieza 2 recalculated without poaching losses; throughout Bialowieza 2 had v. small samples (13 roe carcasses found)

b) **Red**

Area	Years	%Cull	%Cull plus Poaching	%Traffic Accidents	% Natural Predation [wolf/lynx]	% Predation incl.dogs	% Disease/Starvation	% Other Non-cull [Unknown]
Bialowieza 1*		85.6	89.0	0.4	7.8	7.9	2.7	
Bialowieza 1*				3.5	70.9	71.9	24.5	
Bialowieza 2			15.9		74.3		9.8	
Bialowieza 2**					88.4		11.5	

\* Bialowieza 1: cull and non-cull mortality calculated as a percentage of total mortality

\* Bialowieza 1 : figures recalculated in this row to show non-cull mortality as a percentage non cull mortality only

\*\* Bialowieza 2 recalculated without poaching losses

Table 8. Estimates of the proportional mortality caused by human hunters, wolf predation and disease/starvation in populations of roe and red deer in the Italian Alps; data are re-calculated from original figures presented by Gazzola *et al.*, (2007)

Species	Years	% Hunted	% Predation	% Disease/ Starvation/RTAs ['Other Causes']	Source
<b>Roe</b>	2000-03	34.7 - 47.9	33.5 - 51.8	13.5 - 18.6	Gazzola <i>et al.</i> (2007)
<b>Red</b>	2000-03	51.5 - 67.8	27.4 - 44.8	3.7 - 4.8	

\* Predation in this study is primarily predation by wolves, estimated from proportion of red and roe deer found in wolf scats, corrected to actual numbers killed by considering

- i) the number of animals needing to be killed by wolves to supply estimated minimum daily intake of prey meat by weight (Nagy 1987) and/or
- ii) by using figures for numbers of roe or red deer killed by wolves per day in other study sites (Bialowieza)

Table 9. Relative contribution of different agents of non-cull mortality identified from carcass searches in intensive study areas

a) **Roe**

Area	Years	Number of Carcasses found	% Traffic Accidents	% Predation	% Disease/ Starvation	Source
Bialowieza 1	1984-1993	458	7.4	58.9	33.6	Okarma <i>et al.</i> , (1995)
Italian Alps	1999-2002	138	77.7	11.5	10.8	Gazzola <i>et al.</i> (2005)

b) **Red**

Country	Years	Number of Carcasses found	% Traffic Accidents	% Predation	% Disease/ Starvation	Source
Bialowieza 1	1984-1993	650	3.5	71.9	24.5	Okarma <i>et al.</i> , (1995)
Italian Alps	1999-2002	34	36.3	51.5	12.2	Gazzola <i>et al.</i> (2005)

Table 10 Number of traffic accidents causing death of red and roe deer in different European countries. Number of traffic kills is expressed as a percentage of total recorded mortality of the species and/or (where data are available) as percentage of estimated spring population.

**a) Roe**

Country	Years	Average Numbers killed per year	as percentage of total annual mortality	as percentage estimated spring population	Source
<a href="#">Austria</a>	<a href="#">1990-1994</a>	<a href="#">35,000</a>	<a href="#">13.3</a>	<a href="#">2.9</a>	<a href="#">Groot Bruinderink &amp; Hazebroek 1996</a>
Austria	2000-2006	39732	11.6		Austrian National Statistics
Slovenia	2001-2006	5798	13.7		Slovene Hunters' Association
Croatia	2002-2005	918	9.7	2.1	Official Croatian Statistics
Hungary	2000-2005	3130	[3.2]		OVA
Poland					
<a href="#">Denmark</a>	<a href="#">1990-1994</a>	<a href="#">10,000</a>		5.0	<a href="#">Groot Bruinderink &amp; Hazebroek 1996</a>
<a href="#">Norway</a>	<a href="#">1990-1994</a>	<a href="#">3,200</a>		1.6	<a href="#">Groot Bruinderink &amp; Hazebroek 1996</a>
Norway	2000-2005	6174			Andersen et al., 2007
<a href="#">Sweden</a>	<a href="#">1990-1994</a>	<a href="#">50,000</a>		4.1	<a href="#">Groot Bruinderink &amp; Hazebroek 1996</a>
Sweden	2005	>30,000		4.0	Liberg et al., 2007
<a href="#">Germany</a>	<a href="#">1990-1994</a>	<a href="#">120,000</a>	<a href="#">16.4</a>	<a href="#">6.0</a>	<a href="#">Groot Bruinderink &amp; Hazebroek 1996</a>
Germany	2005	180,000	10 -15		Kerzel 2005
Italy			77.7		Gazzola et al., 2005
<a href="#">Netherlands</a>	<a href="#">1990-1994</a>	<a href="#">2,500</a>	<a href="#">16.0</a>	<a href="#">5.0</a>	<a href="#">Groot Bruinderink &amp; Hazebroek 1996</a>
England/Wales	2000-2005	12,400- 18,500		8 - 12.5%	Langbein, 2007
Scotland	2000-2005	5,000- 7,000		1.4 - 2.0 %	Putman and Langbein, 2006

**b) Red**

Country	Years	Average Numbers killed per year	as percentage of total annual mortality	as percentage estimated spring population	Source
<a href="#">Austria</a>	1990-1994	400	0.9	0.4	<a href="#">Groot Bruinderink &amp; Hazebroek 1996</a>
Austria	2000-2006	545	1.1		Austrian National Statistics
Slovenia	2001-2006	160	3.7		Slovene Hunters' Association
Croatia	2002-2005	34	2.25	0.42	Official Croatian Statistics
Hungary	2000-2005	536	1.4		OVA
Poland					
<a href="#">Denmark</a>	1990-1994	90		1.9	<a href="#">Groot Bruinderink &amp; Hazebroek 1996</a>
<a href="#">Norway</a>	1990-1994	400		0.5	<a href="#">Groot Bruinderink &amp; Hazebroek 1996</a>
Norway	2000-2005	590		0.45	Andersen <i>et al.</i> 2007
<a href="#">Sweden</a>	1990-1994	30		0.5	<a href="#">Groot Bruinderink &amp; Hazebroek 1996</a>
Sweden	2005	580		5.5	Liberg <i>et al.</i> , 2007
<a href="#">Germany</a>	1990-1994	950	2.2	0.5	<a href="#">Groot Bruinderink &amp; Hazebroek 1996</a>
Germany	2005	c.2,000		1.3	Kerzel 2005
Italy			12.1		Gazzola <i>et al.</i> , 2005
<a href="#">Netherlands</a>	1990-1994	10	1.0		<a href="#">Groot Bruinderink &amp; Hazebroek 1996</a>
Netherlands	2001-2005	36		1.3	Van Wieren & Groot Bruinderink, 2007
England/Wales	2000-2005	550- 800		4.5- 6.5%	Langbein, 2006
Scotland	2000-2005	1,500- 2,500	??	0.5-0.6 %	Putman and Langbein, 2006

Table 11. Relative roles of cull and non-cull mortality in Scottish red deer populations. Figures are shown for average levels of overwinter mortality of stags, hinds and calves (animals found dead at the end of winter), alongside formal culls taken and estimated population numbers (counts) over the same period. Estates vary in population density from 6.4 - 21.0 deer per 100 ha.

## Red Deer

Estate	Years	Average Count				Density deerkm <sup>-2</sup>	Average Cull				Ave. Natural Mortality			
		Stags	Hinds	Calves	Total		Stags	Hinds	Calves	Total	Stags	Hinds	Calves	Total
Attadale	1998-2007	600	690	242	1532	12.7	73	94	40	207	18.3	11.7	13.7	43.7
Ardverikie	2000-2006	1082	1302	533	2917	19.7	144	225	43	412	7.3	9.3	11.9	28.5
Ben Alder	2000-2005	543	908	313	1764	15.4	72	155	51	278	16.4	17.4	32	65.8
Camusericht		587	293	110	990	20.5	66	57	22	145				
Camusrory	1996-1998	121	385	144	650	17.8	23	53	19	95	2.0	4.0	4.5	10.5
Corrour	2003-2007	1516	1097	347	2960	15.0	170	213	87	470	53.5	19.3	29.2	102
Coulin	2000-2007	253	320	90	663	6.4	31	25	14	70	1.6	1.6	1.1	4.3
Dunan	2001-2006	106	410	146	662	16.6	54	75	24	153				
Glendessary	1997-2001	267	486	157	910	15.4	40	64	17	121	12.0	10.8	12.8	35.5
Kilchoan	1996-2001	334	500	182	1016	18.6	40	105	46	191	14.7	5.7	5.0	25.4
Kingie	1997-2002	215	536	186	937	14.4	40	94	30	164	9.8	7.2	12.6	29.6
Knoydart	1997-2002	633	554	215	1402	21.0	80	106	48	234	7.7	3.3	3.3	14.3
Laudale	1999-2001	248	336	100	684	13.1	38	62	20	120	8.0	4.5	2.0	14.5
Scatwell	2000-2007	166	195	65	426	11.0	25	21	14	60	4.0	1.4	3.4	8.8
Scardroy	2000-2007	480	222	58	760	14.7	29	19	4.6	52.6	21.4	2.2	2.5	26.1
Struy	2001-2004	185	220	78	483	16.1	22	41	5	68	0.75	1.0	1.0	2.75

I am in fact advised that DCS themselves, until comparatively recently used to send out request forms for information on natural mortality as well as cull figures from reporting Estates. If this is the case, perhaps you could yourselves expand upon or extend this table in due course.

Table 11 a. Figures (above) for non-cull mortality are expressed as percentages of actual censused population

**Red Deer**

Estate	Years	Average Count				Density	Ave. Natural Mortality				Mortality as % Estimated Spring Population			
		Stags	Hinds	Calves	Total	deerkm <sup>-2</sup>	Stags	Hinds	Calves	Total	Stags	Hinds	Calves	Total
Attadale	1998-2007	600	690	242	1532	12.7	18.3	11.7	13.7	43.7	3.05	1.70	5.66	<b>2.85</b>
Ardverikie	2000-2006	1082	1302	533	2917	19.7	7.3	9.3	11.9	28.5	0.67	0.71	2.23	<b>0.98</b>
Ben Alder	2000-2005	543	908	313	1764	15.4	16.4	17.4	32	65.8	3.02	1.92	10.2	<b>3.73</b>
Camusericht		587	293	110	990	20.5								
Camusrory	1996-1998	121	385	144	650	17.8	2.0	4.0	4.5	10.5	1.65	1.04	3.12	<b>1.60</b>
Corrour	2003-2007	1516	1097	347	2960	15.0	53.5	19.3	29.2	102	3.53	1.76	8.41	<b>3.44</b>
Coulin	2000-2007	253	320	90	663	6.4	1.6	1.6	1.1	4.3	0.63	0.50	1.22	<b>0.65</b>
Dunan	2001-2006	106	410	146	662	16.6								
Glendessary	1997-2001	267	486	157	910	15.4	12.0	10.8	12.8	35.5	4.49	2.22	8.77	<b>3.90</b>
Kilchoan	1996-2001	334	500	182	1016	18.6	14.7	5.7	5.0	25.4	4.40	1.14	2.75	<b>2.50</b>
Kingie	1997-2002	215	536	186	937	14.4	9.8	7.2	12.6	29.6	4.46	1.34	6.77	<b>3.16</b>
Knoydart	1997-2002	633	554	215	1402	21.0	7.7	3.3	3.3	14.3	1.22	0.60	1.53	<b>1.02</b>
Laudale	1999-2001	248	336	100	684	13.1	8.0	4.5	2.0	14.5	3.22	1.34	2.00	<b>2.12</b>
Scatwell	2000-2007	166	195	65	426	11.0	4.0	1.4	3.4	8.8	2.41	0.72	5.23	<b>2.07</b>
Scardroy	2000-2007	480	222	58	760	14.7	21.4	2.2	2.5	26.1	4.46	0.99	4.30	<b>3.43</b>
Struy	2001-2004	185	220	78	483	16.1	0.75	1.0	1.0	2.75	0.41	0.45	1.28	<b>0.57</b>

Table 12. Relative roles of cull and non-cull mortality in Scottish red deer populations. The table presents a summary of average levels of overwinter mortality and cull mortality as individual percentages of overall annual mortality.

Estate	Years	Deer density deer km <sup>2</sup>	Stag Mortality		Hind Mortality		Calf Mortality		Total Mortality	
			%Cull	%Non-cull	%Cull	%Non-cull	%Cull	%Non-cull	%Cull	%Non-cull
Attadale	1998-2007	12.7	80.0	20.0	88.9	11.1	74.5	25.5	<b>82.6</b>	<b>17.4</b>
Ardverikie	2000-2006	19.7	97.1	3.9	96.0	4.0	78.3	21.7	<b>93.5</b>	<b>6.5</b>
Ben Alder	2000-2005	15.4	81.4	18.6	89.9	10.1	61.4	38.6	<b>80.9</b>	<b>19.1</b>
Camusericht		20.5								
Camusrory	1996-1998	17.8	92.0	8.0	93.0	7.0	80.9	19.1	<b>90.0</b>	<b>10.0</b>
Corrour	2003-2007	15.0	76.1	23.9	91.3	8.7	74.9	25.1	<b>82.2</b>	<b>17.8</b>
Coulin	2000-2007	6.4	95.0	5.0	93.9	6.1	92.7	7.3	<b>94.2</b>	<b>5.8</b>
Dunan	2001-2006	16.6								
Glendessary	1997-2001	15.4	76.9	23.1	85.6	14.4	57.1	42.9	<b>77.3</b>	<b>22.7</b>
Kilchoan	1996-2001	18.6	73.1	26.9	94.8	5.2	90.2	9.8	<b>88.3</b>	<b>11.7</b>
Kingie	1997-2002	14.4	80.3	19.7	92.9	7.1	70.4	29.6	<b>84.7</b>	<b>15.3</b>
Knoydart	1997-2002	21.0	91.2	8.8	97.0	3.0	93.6	6.4	<b>94.2</b>	<b>5.8</b>
Laudale	1999-2001	13.1	82.6	17.4	93.2	6.8	90.9	9.1	<b>89.2</b>	<b>10.8</b>
Scatwell	2000-2007	11.0	86.2	13.8	93.4	6.6	80.5	19.5	<b>87.2</b>	<b>12.8</b>
Scardroy	2000-2007	14.7	57.5	42.5	89.6	10.4	64.8	35.2	<b>66.8</b>	<b>33.2</b>
Struy	2001-2004	16.1	96.7	3.3	97.6	2.4	83.3	16.7	<b>96.5</b>	<b>3.5</b>

I am in fact advised that DCS themselves, until comparatively recently used to send out request forms for information on natural mortality as well as cull figures from reporting Estates. If this is the case, perhaps you could yourselves expand upon or extend this table in due course.

Table 13. Relative roles of cull and non-cull mortality in Scottish roe deer populations.

Data are presented for 14 Forest Districts (Forest Enterprise) and averaged over the years 2001-2006.

Forest District	Bucks				Does				Kids				Total			
	Total mortality	% Cull	% RTA	% Disease/S tarvation	Total mortality	% Cull	% RTA	% Disease/S tarvation	Total mortality	% Cull	% RTA	% Disease/S tarvation	Total mortality	% Cull	% RTA	% Disease/S tarvation
Ae	281	99.8	0.1	0.06	319	99.9	0	0.05	310	99.9	0.05	0	909	99.9	0.05	0.04
Tay	365	99.7	0.1	0.18	280	99.1	0.2	0.71	101	98.8	0.5	0.66	745	99.4	0.2	0.45
Lorne	92	98.2	1.8	0	82	97.1	2.6	0.20	49	97.6	1.4	1.01	223	97.7	2.0	0.30
Moray	368	98.7	1.1	0.14	337	98.5	1.4	0.15	210	98.4	1.3	0.32	914	98.6	1.3	0.18
Dornoch	390	98.5	0.8	0.68	372	98.6	1.0	0.40	203	98.8	0.7	0.57	965	98.6	0.8	0.55
Galloway	587	99.4	0.6	0	673	99.0	0.8	0.17	563	99.4	0.6	0.06	1823	99.3	0.7	0.08
Lochaber	92	99.3	0.7	0	102	98.0	1.3	0.65	36	99.1	0.9	0	230	98.7	1.0	0.29
Inverness	418	97.9	1.3	0.76	405	97.4	1.9	0.62	217	97.9	0.8	1.30	6235	97.7	1.4	0.82
West Argyll	340	98.8	0.9	0.29	280	98.7	1.1	0.24	184	98.7	0.5	0.72	4824	98.7	0.9	0.37
Aberdeenshire	699	99.1	0.4	0.50	590	98.8	0.7	0.42	416	99.0	0.3	0.68	10234	99.0	0.5	0.52
Fort Augustus	158	99.4	0.4	0.21	163	99.6	0.2	0.20	66	98.5	0	1.51	2320	99.3	0.3	0.43
Scottish Borders	272	99.9	0.1	0	289	99.9	0.05	0	342	99.8	0.1	0.05	5418	99.9	0.1	0.02
Cowal & Trossachs	288	99.4	0.5	0.12	305	98.9	1.0	0.16	135	99.4	0.6	0	4366	99.1	0.7	0.11
Lowlands	246	99.9	0	0.07	201	99.9	0	0.08	142	99.9	0.1	0	3538	99.9	0.02	0.06
TOTAL	4611	99.1	0.61	0.27	4463	98.9	0.82	0.29	3016	99.1	0.48	0.38	12090	99.0	0.65	0.30

Table 14. Percentage of spring population of red deer in the 56 km<sup>2</sup> Oostvaardersplassen Nature Reserve in the Netherlands suffering overwinter mortality (found dead or humanely despatched *in extremis*)  
 [Red deer share the area with free-ranging populations of Polish ponies (konik) and Heck cattle, so effective densities are higher than might appear from simple consideration of red deer population number alone]

Year	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
approximate end of winter population	150	200	250	320	410	500	680	790	1000	1200	1540
% mortality	2	2	3	2	5	4	4	2	2	8	22

Table 15. Natural mortalities recorded over the years in the Kilmory study population of red deer on Rum  
 (Calculated as animals known to be in the population in year t-1, subsequently never seen again and thus assumed dead early in year t)

Year	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Total known population	208	229	236	273	303	283	285	263	250	258	267	329	277	309	313	280	316	334	320	245	263	287	341	365	385	358	286	312	280	317	321	261
<b>% known population lost</b>	<b>9.13</b>	<b>11.4</b>	<b>9.75</b>	<b>11.4</b>	<b>14.5</b>	<b>13.8</b>	<b>17.2</b>	<b>21.3</b>	<b>20.8</b>	<b>14.0</b>	<b>7.87</b>	<b>28.6</b>	<b>8.67</b>	<b>12.9</b>	<b>28.1</b>	<b>12.9</b>	<b>13.6</b>	<b>19.5</b>	<b>36.6</b>	<b>8.98</b>	<b>17.5</b>	<b>5.57</b>	<b>12.6</b>	<b>10.4</b>	<b>22.6</b>	<b>27.7</b>	<b>13.3</b>	<b>25.3</b>	<b>13.2</b>	<b>18.6</b>	<b>33.3</b>	<b>17.2</b>
% Population lost of Males older than calf	5.56	3.80	5.56	4.81	5.60	9.68	10.6	10.7	12.7	10.3	7.75	19.3	5.07	7.14	15.5	9.29	5.77	13.3	28.2	4.92	9.52	2.72	7.69	6.52	15.3	17.7	6.67	15.2	7.93	11.3	19.0	8.81
% Population lost of Females older than calf	7.69	13.39	9.26	17.0	18.7	15.7	18.5	25.3	19.5	9.21	8.14	26.1	9.80	17.7	30.2	8.75	12.6	10.7	24.8	11.7	12.2	10.4	20.8	17.9	21.9	28.8	20.3	24.7	17.7	28.8	37.1	34.6
% calf population lost	21.9	21.1	21.1	11.8	27.3	20.5	33.3	41.3	42.0	28.6	7.69	50.7	18.9	17.9	69.1	26.7	33.9	49.2	82.1	15.2	39.7	6.35	12.1	8.70	45.6	56.7	25.5	57.9	25.0	25.0	65.3	25.5