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SCIENTISTS' STATEMENT ON WILDLIFE MONITORING IN KRESNA GORGE, BULGARIA

1 August 2019

RE: Follow-up legal complaint on the Struma motorway project in Kresna Gorge [CHAP(2017)02186 – BULGARIA] - update to the complaint

Document[1] *prepared on a voluntary basis by:*

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[1] With translations by CEE Bankwatch Network and Za Zemiata/Friends of the Earth Bulgaria.

Dear Sir/Madam,

Below, we provide a summary scientific analysis of the methodology, results and conclusions of the monitoring of animals killed by traffic on the existing E-79 international road in Kresna Gorge. We would like to stress that a detailed comparative report prepared by us will be sent to the Commission in September 2019.

This document gives a brief comparative description of the monitoring methodology (Section 1), a comparative table for all vertebrate animals found during the monitoring (Section 2) and conclusions (Section 3).

The methodology of the two monitoring periods (2003-2004 versus 2013-2014) is found to be similar and the scientific data collected in each year are comparable.

During the first two monitoring years, that is 2003 and 2004, the study of animals killed by traffic in Kresna Gorge was initiated[2], planned and conducted on a voluntary basis by scientists from the National Museum of Natural History at the Bulgarian Academy of Sciences (hereafter referred as NMNH-BAS). The team included also experts from other institutions: Regional Natural Heritage Museums, and expert NGOs (BALKANI Wildlife Society, "Tetida" Society)[3].

Ten years later (2013-2014), the monitoring study was commissioned and paid by the National Company Strategic Infrastructure Projects (NCSIP)[4][5] which, at that time, was responsible for the construction of the Struma Motorway. A team of experts from the Bulgarian Academy of Sciences was also involved in this study. The document below is an Appendix 1 to the position paper[6] of the NMNH-BAS on the governmental 2017 AA report[7]. This appendix is based on and cites the monitoring data collected in 2003 related to conditions in the road shoulder, embankment and slopes. The data are used to assess the expected functionality of the proposed mitigation measures in 2017 AA report for the construction of the part of the Motorway in the Gorge (G10,5 alternative).

Volunteer/NMNH-BAS monitoring from 2003-2004 was also used and cited in the governmental Appropriate Assessment (AA) part of the EIA procedure for Struma Motorway conducted between

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2 Own unpublished scientific data. Monitoring was initiated and conducted by a famous Bulgarian scientist and mountaineer Boyan Petrov (see http://www.nmnhs.com/petrov-boyan-en.html and https://en.wikipedia.org/wiki/Boyan_Petrov)

3 Full database with initial field data is available at the NMNH-BAS or participating NGOs

4 March 2014, "Monitoring, analysis and assessment of the mortality of the species in the section of road E-79 (I-1), passing through theprotected zones" Kresna"and" Kresna - Ilindentsi – Final Report, Period March 2013 – February 2014", National Company strategic infrastructure projects, 86 Pp. + 7 Ap. (in electronic form, in Bulgarian, provided as Attachment 6 to the CHAP(2017)02186 – BULGARIA complaint)

5 March 2015, "Monitoring, analysis and assessment of the mortality of the species in the section of road E-79 (I-1), passing through the protected zones" Kresna"and" Kresna - Ilindentsi – Final Report, Period March 2014 – January 2015", National Company strategic infrastructure projects, 118 Pp. + 3 Ap. (in electronic form, in Bulgarian, provided as Attachment 4 to the CHAP(2017)02186 – BULGARIA complaint)

6 Position paper from 8 September 2017 of the National Museum of Natural History at the Bulgarian Academy of Sciences, Appropriate Assessment Report (AAr) on IP "Improvement of the route of Lot 3.2 of Struma Motorway on BG0000366 „Kresna–Ilindentsi" and BG0002003 „Kresna". 19 Pp. + 1 Appendix (in Bulgarian, English translation)

7 Appropriate Assessment Report on project "Improvement of the route of Lot 3.2 of Struma Motorway on BG0000366 „Kresna–Ilindentsi" and BG0002003 „Kresna", Road Executive Agency, July 2017. 562 P. + 8 Attachments (in Bulgarian)

2007 and 2008 (hereafter referred as '2007 AA Report') and its conclusions were used to assess the impact on protected species and mitigation measures suggested in the 2007 AA report.

1. Methodology of the data collection on animals killed on the road in 2003, 2004, 2013, 2014 on the existing E-79 international road in Kresna Gorge.

	Volunteer/NMNH-BAS monitoring 2003	Volunteer/NMNH-BAS monitoring 2004	Road Agency monitoring 2013	Road Agency monitoring 2014
General methodology				
Type of data collected	Reporting of all detected dead specimens	Reporting of all detected dead specimens	Reporting of all detected dead specimens	Reporting of all detected dead specimens
Sampling method	Transect along the whole length of the road	Transect along the whole length of the road	Transect along the whole length of the road	Transect along the whole length of the road
Preventing re-counting errors	Yes - all animal corps removed from the shoulder after counting	Yes - all animal corps removed from the shoulder after counting	No	No
Collected information	Species or higher taxon, location (road section/coordinates), age/gender (where applicable), distance and direction from shoulder.	Species or higher taxon, location (road section/coordinates), age/gender (where applicable), distance and direction from shoulder.	Species or higher taxon, location (coordinates)	Species or higher taxon, location (coordinates)

Additional data collected	Yes. Road sections where described and assessed for suitability for construction of effective mitigation measures (underpasses) - with regard to the width of the shoulder, the slope and the nature of the road slopes and slopes	No	No	No
Duration, periodicity and research intensity				
Monitoring dates period	4.04.2003-26.10.2003	3.30.2004-21.11.2004	20.03.2013-15.01.2014	15.03.2014-31.01.2015
Total (months)	April-October, 7 months	(March) April-November, 8 months	March-January, 11 months	March-January, 11 months
Months with observations	7	8	9	9
Months with observations missing observations	No	No	half of March, November, half of January	August, October
Seasonality	Warm period without winter	Warm period without winter	All seasons	All seasons
Total number of field research days	30	27	36	48
Research intensity (as % of 2003 field days)	100	90	120	160
Number of field expeditions	30 - 1 day expeditions	27 - 1 day expeditions	36 - 1 day expeditions	36 - 1 day expeditions; 3 - 5 days expeditions

Periodicity of the expeditions	Regular, every week - mean number of expeditions 4 per month. After 5-7 days collecting of victims on road surface.	Irregular from 1 to 3, mean number 3, expeditions per month. Each expedition after at least 6 days collecting of victims on road surface.	Irregular from 2 to 5, mean number 4, expeditions per month.	Irregular from 2 to 6, mean number 4, expeditions per month.
Reporting and publishing				
Scientific publications	No	No	No	No
Other publications	Short report from November 2003 sent to Bern Convention Standing Committee. Statement of NMNH-BAS on the 2017 AA report on the Struma Motorway in Kresna Gorge, examines the effectiveness of the planned defragmentation facilities on the basis of the data from the monitoring.	No	Report published on the official webpage of the Road Agency	Report published on the official webpage of the Road Agency
Citation and use of information in other documents	Conclusions of AA report on Struma motorway from 2007 are citing and report is based on these data	Conclusions of AA report on Struma motorway from 2007 are citing and report is based on these data	Partially used in AA report on Struma motorway for Kresna Gorge section from 2017	Partially used in AA report on Struma motorway for Kresna Gorge section from 2017

2. Comparative table of 2003, 2004, 2013, 2014 monitoring of animal road kills on the existing E-79 road in Kresna Gorge – summarized road kill data.

"*" in the table indicates species and taxa from Annex 2 of the Habitats Directive (HD) and Annex 2 of the Birds Directive (BD) protected in the NATURA sites BG0000366 "Kresna Gorge" (habitats site) and BG0002003 "Kresna" (birds site). (The family of bats *Vespertilionidae* is

indicated in table, as it contains some taxa in HD protected in Kresna Gorge, but also some taxa found there are not protected by NATURA 2000).

Monitoring period	4.04.2003-26.10.2003 (30 expedition days; basic research intensity)	5.04.2004-21.11.2004 (27 expedition days; 90% research intensity)	20.03.2013-15.01.2014 (36 expedition days; 120% research intensity)	15.03.2014-31.01.2015 (48 expedition days; 160% research intensity)
Vertebrates – total number of victims	**3171**	**1849**	**213**	**848**
Class AMPHIBIA total	375	193	14	77
**Bombina variegata*	2	0	0	1
Bufo bufo	30	37	0	24
Bufo viridis	184	17	0	5
Bufo sp.	0	1	1	1
Pelobates syriacus	2	2	0	0
Hyla arborea	13	6	0	0
Rana dalmatina	13	26	0	4
Rana graeca	1	3	0	0
Pelophylax (Rana) ridibundus	29	62	0	5
Rana sp.	98	38	2	9
Anura sp.	3	0	10	27
Salamandra salamandra	0	1	1	1
Class REPTILIA total	1865	835	76	480
Sub-order Sauria- lizards, total	875	378	9	125
Lacerta viridis	864	375	9	86
Lacerta trilineta	1	1	0	1
Lacerta sp.	2	0	0	33
Podarcis taurica	1	0	0	0
Podarcis erhardii	0	2	0	0
Podarcis sp.	2	0	0	0
Angius fragilis	5	0	0	5
Sub-order Serpentes- snakes, total	927	400	54	327
Typhlops vermicularis	152	124	0	17
**Elaphe quatuorlineata ssp.quatuorlineata*	5	1	0	0
**Zamenis situla (Elaphe situla)*	12	10	0	10

Zamenis longissimus (Elaphe longissima)	10	19	1	0
Dolichophis caspius (Coluber caspius)	58	27	3	4
Platyceps najadum (Coluber najadum)	32	44	1	14
Tellescopus fallax	51	35	2	2
Natrix tessellata	535	110	12	142
Natrix natrix	9	1	1	7
Natrix sp.	0	0	5	122
Malpolon monspessulanus	22	13	0	1
Colubridae sp.	1	1	0	0
Vipera ammodytes	30	13	4	7
Serpentes sp.	10	2	25	1
Order Testudines - turtles, total	63	57	13	28
**Testudo graeca/Eurotestudo hermanni*	42	21	9	16
**Testudo graeca*	17	30	2	4
**Eurotestudo (Testudo) hermanni*	2	5	1	4
**Emys orbicularis*	2	1	1	4
Class AVES, birds, total	216	143	38	94
Order Columbiformes - total	0	0	2	0
Columba livia f. domestica	0	0	2	0
Order Caprimulgiformes - total	1	1	0	0
**Caprimulgus europeus*	1	1	0	0
Order Galliformes - total	0	1	0	0
Alectoris graeca		1		
Order Passiriformes - total	203	141	31	76
Emberiza citrinella	0	0	1	0
Emberiza cia	0	1	0	0
Emberiza sp.	4	2	0	0
Gallus gallus domestica	0	0	1	0
Hirundo daurica	4	1	0	2
Hirundo rupestris	1	1	0	0
Hirundo rustica	2	1	1	0
Delichon urbicum	0	1	0	0
Ptyonoprogne rupestris	0	0	0	1
Sturnus vulgaris	0	0	2	1
Motacilla alba	2	0	7	14

Motacilla flava	2	0	0	0
Motacilla cinerea	0	0	0	1
Erithacus rubecula	15	12	1	5
Phoenicurus ochruros	0	1	0	0
Luscinia (Erithacus) megarhynchos	23	12	0	4
**Hippolais olivetorum*	0	1	0	0
Carduelis carduelis	17	5	0	0
Carduelis chloris	1	0	0	1
Coccothraustes coccothraustes	5	5	0	2
Fringilla coelebs	7	3	0	4
Fringilla sp.	0	1	0	0
Muscicapidae sp.	5	0	0	0
Oenanthe sp.	1	0	0	0
Sylvia communis	0	0	2	0
Sylvia atricapilla	1	0	0	0
Sylvia sp.	0	1	0	0
Lanius collurio	0	1	0	0
Phylloscopus sp.	0	1	0	0
Acrocephalus sp.	0	1	0	0
Turdus merula	5	5	0	3
Turdus sp.	8	2	0	0
Aegithalos caudatus	0	0	0	2
Phoenicurus ochruros	0	0	0	0
Parus major	4	11	1	9
Parus montanus	1	0	0	0
Parus palustris	1	1	0	0
Parus sp.	0	2	0	0
Passer domesticus	9	13	0	0
Passer montanus	4	1	2	0
Passer sp.	5	10	1	0
**Alcedo atthis*	0	2	0	1
Garrulus glandarius	0	0	0	1
Pica pica	0	0	0	1
Passeriformes sp.	76	43	12	24
Order Accipitriformes - total	0	0	1	2
Accipiter nisus	0	0	1	0
Falco tinnunculus	0	0	0	0
Order Strigiformes - total	1	0	0	0
Aegolius funereus	1	0	0	0

Aves sp	11	0	4	16
Class MAMMALIA total	759	678	85	197
Order Insectivora- total	41	35	8	21
Crocidura leucodon	3	13	0	0
Crocidura suaveolens	0	1	0	0
Crocidura sp.	3	1	0	3
Soricidae sp.	5	1	0	0
Talpa europaea	1	0	0	1
Erinaceus concolor	29	19	8	17
Insectivora sp.	0	0	0	0
Order Chiroptera- bats, total	187	120	6	24
Pipistrellus pipistrellus	1	0	2	1
**Rhinolophus ferrumequinum*	1	0	0	0
**Rhinolophus hipposideros*	0	0	2	0
**Rhinolophus sp.*	10	2	0	0
Myotis mistacinus	0	0	0	2
**Myotis bechsteinii*	0	0	1	0
**Myotis sp.*	0	1	0	0
Hypsugo savii	0	0	0	2
**Vespertilionidae sp.*	56	0	0	1
Chiroptera sp.	119	117	1	18
Order Rodentia - total	499	499	49	109
Sciurus vulgaris	0	0	2	0
Glis glis	68	45	3	0
Dryomys nitedula	2	1	0	1
Sylvaemus (Apodemus) flavicolis/sylvaticus/mystacinos	374	319	41	104
Apodemus agrarius	0	0	1	0
Mus sp.	30	35	1	1
Rattus sp.	9	22	1	3
Arvicola amphibius	0	1	0	0
Rodentia sp.	16	76	0	0
Order Carnivora	23	16	20	18
Felix sylvestris catus	0	0	2	0
Felix sylvestris	2	2	3	0
Canis familiaris	0	1	4	3
Vulpes vulpes	3	4	5	7
Mustela nivalis	2	0	0	0
Mustela putorius	1	1	0	0
Martes foina	14	7	6	8

Mustela sp.	1	0	0	0
Carnivora sp.	0	1	0	0
Order Artiodactyla	1	0	0	0
Sus scrofa	1	0	0	0
Mammalia indetified	8	8	2	25

3. Brief conclusions

- Data collected between 2003-2004 on animals killed by the traffic in Kresna Gorge demonstrate adverse impact on the protected and non-protected species and high mortality on the road. The combined transit and local traffic in the Gorge is around 4,500 vehicles a day[8]. Expert literature, including 'Wildlife and Traffic: A European Handbook for Identifying Conflicts and Designing Solutions'[9] (hereinafter referred as 'EU handbook'), point out that daily traffic of between 4,000 and 10,000 vehicles leads to high mortality of species.
- The data collected between 2013-2014 demonstrate a drastic decrease in the number of animals killed by the traffic for almost all protected and non-protected species. The impact could be explained by the systemic presure of road traffic from 2003 to 2014. An additional cumulative impact was caused by the significant increase of traffic intensity that doubled in the ten year period (official data shows 8-9,000 vechicles a day[10]). According to the EU handbook the decreased mortality while the traffic is increasing is caused by the prolonged adverse impact on habitats and species.
- For the species that could be scared away by traffic (including large mammals, bats, birds) the road mortality decrease is usually caused by road avoidance and serious negative impact on habitats.
- For the species that could avoid the site (including rodents and other small mammals, reptiles and amphibians) the mortality decrease is due to significant damage on the protected species population.
- The most impacted protected species are those that were key for designation of the Kresna Gorge as a Natura 2000 site. Amongst protected species most sensitive are those species which have habitats related to the river bottom and the narrow Kresna Gorge creates a concentrated bottleneck of their movements or migrations. They are thus most vulnerable to the adverse impact on the site:

    - For two of snake species (*Elaphe quatorlienata, Zamenis situla*) Kresna Gorge is a north border of distribution of their populations. The individual home range is

[8] Own monitoring of car traffic was done together with monitoring of the killed animals 2003-2004 as official statistics for the traffic in that section of E-79 international road did not exist until 2011.

[9] Page 5, table 3.1 and page 6, fig. 3.6 in the "Iuell, B., Bekker, G.J., Cuperus, R., Dufek, J., Fry, G., Hicks, C., Hlavac, V., Keller, V. B., Rosell, C., Sangwine, T., Torslov, N., Wandall, B. le Maire, (Eds.) 2003. Wildlife and Traffic: A European Handbook for Identifying Conflicts and Designing Solutions. COST 341, Habitat Fragmentation due to Transportation Infrastructure. Pp. 151 + 5 Annexes"

[10] Update traffic forecast and "cost - benefit" analysis for Lot 3 of "Struma". Report to update the forecast traffic. Version 01 29.12.2014g. OP Transport 2007-2013. National Company "Strategic Infrastructure Projects". 111 pp.

situated only along the Kresna Gorge and next to the river (and current road) are situated key habitats for their functioning (reproductive, feeding, drinking and wintering). The current road interupts daily and seasonal migration of those two species to the key habitat for their survival.

- For two of the tortoise species (*Eurotestudo hermanni, Testudo graeca*) the current road interrupts the daily and seasonal migration to key habitats in the Gorge: their summer habitats are situated at the bottom of the valley where food and water are accessible and their autumn-spring habitats are located on the slopes - functional for termoregualation, wintering and reproduction.
- Four bat species (*Rhinolophus ferrumequinum, Rhinolophus euryale, Rhinolophus hipposideros, Myotis emarginatus*) are sensitive to both: mortality along the road and road avoidance and disturbance. All four species rely on narrow habitats at the bottom of the Gorge for both reproduction and feeding (hunting habitat near the riparian habitats) and also migrate in the same habitat during their seasonal migrations. Some of them have winter refuges in the Gorge.

- The 2003-2004 monitoring data, cited in the NMNH-BAS position paper from 2017[11] and used in 2007 AA report for development of mitigation measures, shows that the specific characteristics of the Gorge do not allow for construction of appropriate mitigation measures for small animals (small mammals, reptiles and amphibians). The only feasible mitigation measure is the decrease of the traffic to a level that will allow regeneration of the affected habitats and populations of all impacted species. According to the EU handbook this could happen when traffic drops to 2,500 vehicles a day, which means allowing only primary local traffic at the existing road and replacing of the transit traffic outside the sensitive habitats in the Gorge.

- The alternative selected by the Bulgarian Government "G 10.5" will divide the current traffic, but the traffic in the Gorge will be still higher than the traffic in 2003-2004. This means continuation of the adverse impact on protected habitats and no oportunity for regeneration of the affected populations.

- For the four species of protected bats that probably have abandoned the habitats next to the road, the adverse impact could be mitigated and habits restored by decrease of the traffic and decrease of the speed on the current road through Kresna Gorge.

[11] Annex 2 to this up-date