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CONFLICTS OF OTTER AND MAN IN SLOVAKIA: A REVIEW

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Abstract: The Eurasian otter (*Lutra lutra*) is a fully protected native animal species in Slovakia. At present the otter occurs in most parts of the country. Coexistence of otters and humans involves many conflicts. The most important negative factors affecting otters are road kills, destruction and fragmentation of habitats, illegal hunting and killing, water pollution, the use of hydrological resources etc. Despite the general prohibition of hunting protected animals in Slovakia, the cases of shooting, beating to death or capture of otters in traps or in fyke nets are considerable and indicate insufficient awareness of their protected status. Most of these threats are tending to increase.

Key words: *Lutra lutra*, hunting, road mortality, water pollution, protection

INTRODUCTION

The Eurasian otter (*Lutra lutra*) is native species in Slovakia. This species lives in all types of natural as well as artificial water ecosystems, including rivers, channels, reservoirs and mountain lakes, approximately 76 – 83 % of the Slovak area, with the exception of south-western and south-eastern lowlands (Urban, 2010; Urban et al., 2010, 2011, 2012; Černecký et al., 2014). It prefers rivers of central, northern and north-eastern Slovakia situated at the foot of mountains and their tributary streams. The citizens of Central and Eastern Europe can easily come into the direct or indirect contact with this animal (Urban et al., 2012).

The otter population has systematically decreased from the beginning of the 20th century up until the 1990s. During the last 25 years, it has recovered, and otters are currently re-colonizing their original territory. The increase in population size is promising for the conservation of the species. Limiting factors for otter occurrence include sufficient food supply, amount of water in streams, fluctuation of pollutants, periodic drying of clean streams and channels, and the availability of shelter (Urban et al., 2012).

The otter has been a fully protected species since 1947. Current valid legislation for otter protection in Slovakia was established by Act no. 543/2002 on Nature and

Landscape Protection, Decree no. 24/2003, and Hunting Law no. 274/2009, Decree no. 344/2009. Act no. 543/2002 and Decree no. 24/2003 also include legislation for compensation for damage caused by otters. This species is included in Annexes II and IV of the Council Directive on the Conservation of Natural Habitats and of Wild Fauna and Flora 92/43/EEC established in 1992 (May 21st), which has been adopted by Act no. 543/2002. Otter habitat is included in 91 Special Areas of Conservation (Sites of European Importance –according to National Law - Act no. 543/2002 on Nature and Landscape Protection) in both Alpine and Pannonian biogeographical regions of Slovakia. Otter population increase has been a long-term trend in both of these zones but some factors influencing the favorable status of otters are rated inadequate (unfavorable-inadequate) (Černecký et al., 2014) (Fig1, Tab. 1).

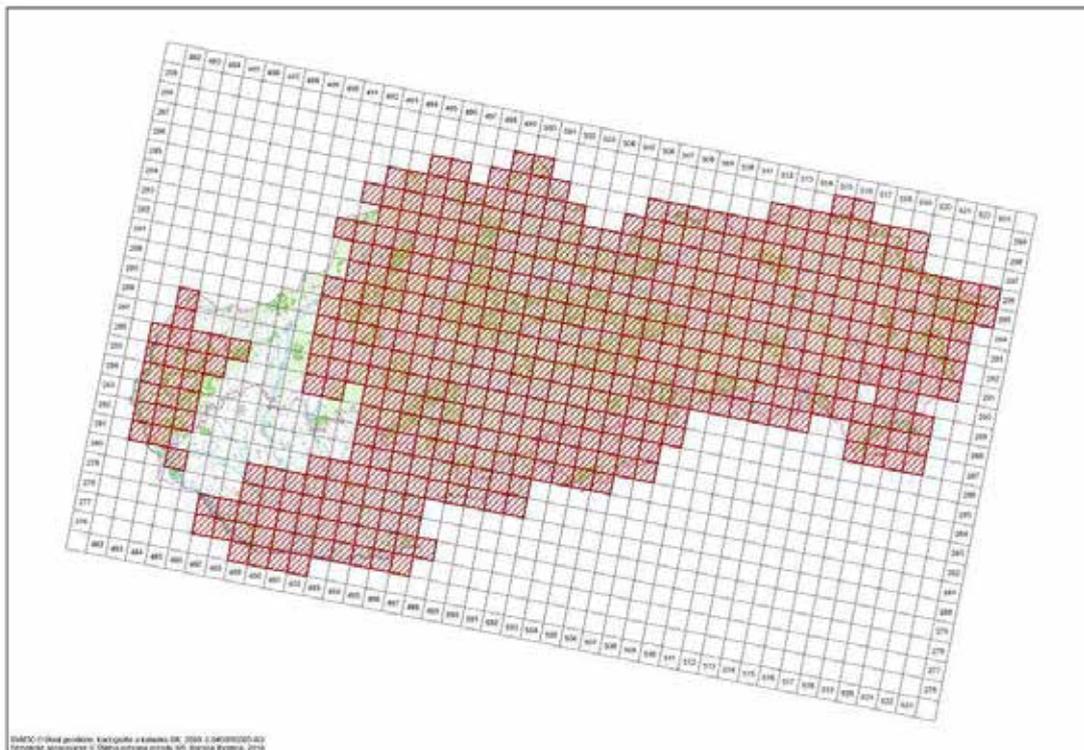


Figure 1. Distribution of the otter in Slovakia and close to its borders (shown in red). One square corresponds to 10 km² (10 × 10 km) (Černecký et al., 2014).

Table 1. Conservation status of Eurasian otter (*Lutra lutra*) in Slovakia (Černecký et al., 2014)

Conclusions for reporting	Biogeographical regions	
	Alpine	Pannonian
Range assessment	inadequate*	inadequate
Range trend	improving	improving
Population assessment	favourable	inadequate
Population trend		improving
Habitat for the species assessment	inadequate	inadequate
Habitat for the species trend	improving	stable
Future prospects assessment	favourable	inadequate
Future prospects trend		improving
Overall assessment of conservation status	inadequate	inadequate
Overall trend in conservation status	improving	stable

* Category “Unfavourable-Inadequate” Conservation Status is defined in the Habitats Directive and effectively describes the situations where a change in management or policy is required to return the habitat type or species to favourable status but there is no danger of extinction in the foreseeable future (Evans and Arvela, 2015).

Coexistence of otters and humans involves many conflicts. The otter has become a “conflict species”, since its presence is not always in accordance with human economic interests, and this has become a major concern in conservation biology.

The aim of this paper is to summarize knowledge about the major risk factors and threats to the otter population from humans in Slovakia before and after the year 2000.

MATERIAL AND METHODS

I have evaluated all the data about the otter from Slovakia found in the scientific literature, literature about hunting, the hunting database in the National Forest Centre (Institute for Forest Resources and Information) in Zvolen and from hunting statistical yearbooks (www.forestportal.sk) and the database of nature protection (KIMS – Complex Information and Monitoring System) (<http://www.biomonitoring.sk>) and from my research that was available at the end of 2015.

RESULTS AND DISCUSSION

Situation before 2000

The Eurasian otter population in Europe declined considerably during the 20th century and its population was thus considerably fragmented. Until 1947, when the hunting law ensuring otter protection was established, this species was frequently hunted. Thereafter, different threats have been pointed out as major threats in different otter habitats. Water pollution by environmental contaminants (i. e. organochlorines including PCBs and some heavy metals) in combination with habitat destruction, deterioration and fragmentation, human persecution (illegal killing), road traffic accidents and reduction in nutritional resources have caused a massive decrease in otter population and fragmentation or extinction of most European subpopulations during the second half of the 20th century (see e.g. Chanin, 1985; Mason, 1989, 1997; Foster-Turley et al., 1990; Olsson and Sandegren, 1991; Lodé, 1993; Körbel, 1994; Mason and Macdonald, 1986; Macdonald and Mason, 1983, 1994; Kauhala, 1996; Conroy and Chanin, 2000; Reuther et al., 2000; Robitaille and Laurence, 2002; Kruuk, 2006).

The genetic structure and demographic history of the otter population was studied in Czech Republic (n=132) and Slovakia (n=65) (Hájková, 2007; Hájková et al., 2007). Using microsatellite markers, a relatively high level of genetic diversity was found between the Czech and Slovak populations ($F_{ST}=0.154$, $P=0.0002$), which was also supported by Bayesian cluster analysis. Both the Czech and Slovak populations showed significant heterozygosity excess (assuming an infinite allele model) indicating recent population bottlenecks. A very recent population decline was also suggested by coalescent analysis, inferring a decline to approximately 25% of the past effective population size in both populations. The timing of the decline was in accordance with published data from otter surveys suggesting that the most dramatic decline probably occurred between the 1970s and the mid-1990s (Hájková, 2007; Hájková et al., 2007).

Hunting and persecution

Interesting information about otter hunting and fur processing, for example in the middle part of Hron River near Banská Bystrica (Central Slovakia), was published by Matej Bel (Bel, 1736). Otters were primarily hunted for their fur rather than meat, while large beavers were hunted mainly for meat (Bel, 1736; Maliniak, 2011).

From the literature about otter hunting in the whole of Slovakia or from various administration reports, it is possible to summarize the knowledge about otter distribution and population size in Slovakia during the 19th and the beginning of the 20th century (Matlekovits, 1897; Čech, 1935; Farský, 1935; Vodička, 1935; Lángoš, 1973; Žilinec, 1988; Jamnický, 1995). The most extensive and complex data about this topic were published by Jamnický (1995), presenting numbers of otters hunted in the present area of Slovakia (Slovakia was a part of the former Kingdom of Hungary until 1918, Fig. 2) by county (a type of administrative units from the 10th century to the 1918) at the turn of the 19th and 20th century (1892, 1894 – 1905, 1907 and 1909) - a total of 3 562 individuals for the years mentioned above and total of 10 038 in total historic Kingdom of Hungary (until the Treaty of Trianon covered present area of Hungary, Slovakia, part of Romania, Ukraine, Serbia, Austria and Croatia). Thus, during the period of these 15 years, approximately 237 animals were killed annually in the territory of present Slovakia and 669 in the total historic Kingdom of Hungary respectively (Fig. 3).

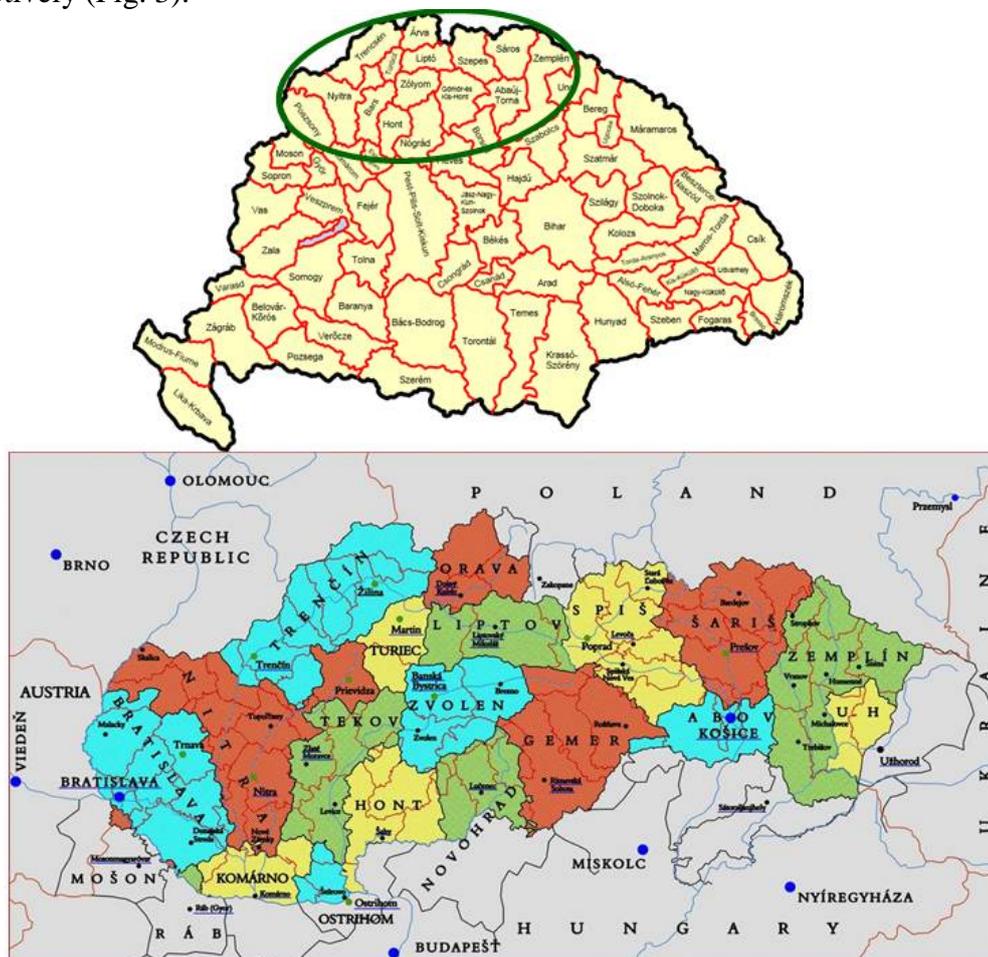


Figure 2. Map of historical counties of Kingdom of Hungary and present Slovakia.

During the first three decades of the 20th century, the trend for extensive otter hunting continued. Approximately 185 otters were killed annually in Slovakia in the period 1924 - 1929 (Farský, 1935). In comparison, only 74 individuals were killed in 1934 (Sekera, 1937).

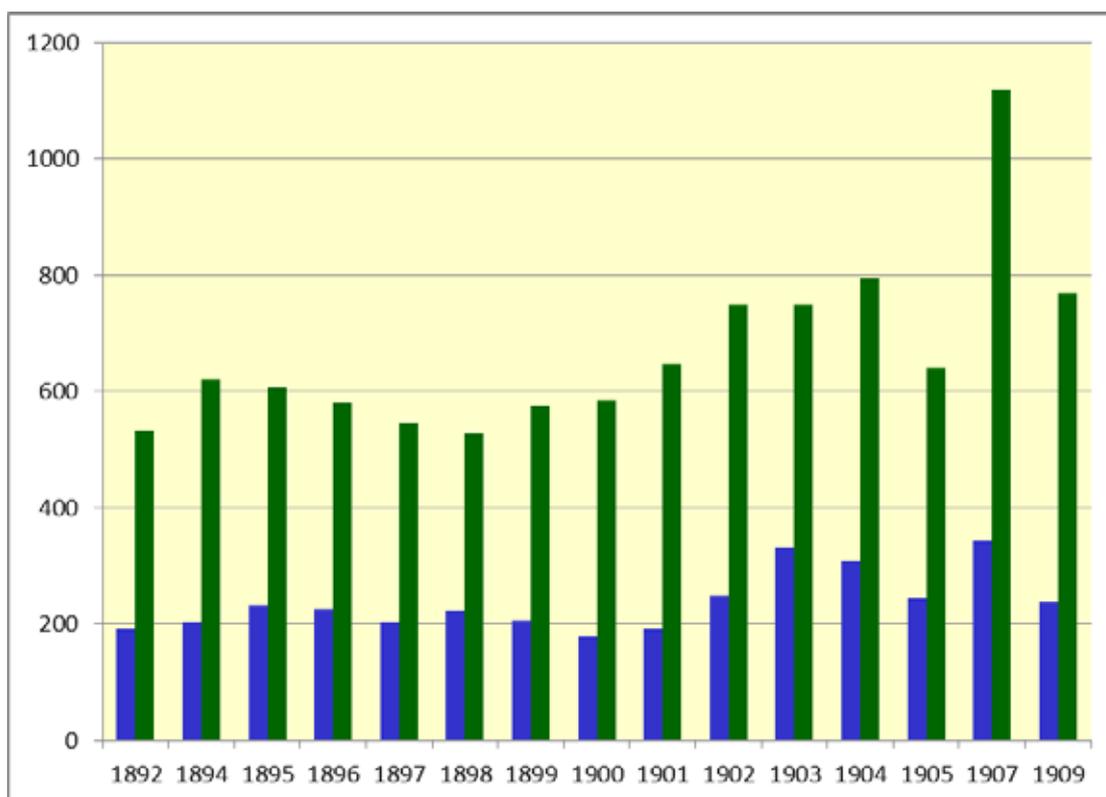


Figure 3. Hunting of otters in present territory of Slovakia and in total historic Hungary in 1892 - 1909 (according Jamnický, 1995). Legend: blue column: present territory of Slovakia, green column: total historic Hungary.

Changes in Water Regime and Land Utilization

In the first half of the 20th century, the most important causes of the decrease in otter numbers were river realignments, and watershed and stream management causing reduction in suitable habitats (Hell and Cimbal, 1972). In the second half of the century, wide-spread damage to and drainage of wetlands, and building of artificial channels also resulted in the decline of nutrition resources and in removal of the bank side vegetation which is important for otters for shelter. The devastation of wetland and river ecosystems was mainly inspired by the development of agriculture and flood prevention measures (Urban et al., 2010). According to several authors, otters disappeared from many rivers and their numbers continued to decline (Čellár, 1934; Dyk, 1956; Chudík, 1965). Some rivers in Slovakia have a naturally oscillating flow volume with a minimum water level in the summer, sometimes even drying up, and consequently otters are not found in them during this season (Urban and Tučeková, 1999;)

Water Pollution

Water pollution is one of the major factors influencing the otter distribution and abundance (see e. g. Chanin and Jefferies, 1978; Mason and Macdonald, 1986; Mason, 1989; Mason and O'Sullivan, 1992; Olsson et al., 1992; Gutleb, 2000; Roos et al. 2001; in Slovakia e. g. Voskár, 1982; Hell and Cimbal, 1978; Kadlečík, 1994). In the 1970s otters mainly occurred in clean mountain brooks and rivers (Hell and Cimbal, 1978). It affects food supply, trophic relationships, and the health and reproduction of otters. Systematic analysis of otter carcasses has not been carried out in Slovakia, but some sporadic data exists. The amount of metals found by analysis in otter carcasses from various parts of Slovakia were not very high (Budayová, 1992, 1994; Urban et al., 2010), but the concentrations of mercury in otter tissues from a

female found dead in Detva district (Central Slovakia) in 1998 was higher than the permissible limit for the Slovak Republic (i.e. muscles 0.05 mg.kg^{-1} ; liver 0.1 mg.kg^{-1} ; kidney 0.1 mg.kg^{-1}) (Urban and Hrivnák, 2000).

Traffic and Road Mortality

Fragmentation of habitats by traffic infrastructure is a problem in the whole of Europe including Slovakia. RTAs (Road Traffic Accidents) happen particularly on roads along water bodies, and the channels connecting water bodies or wetland habitats, mainly on first class roads, highways and motorways. Problematic places are bridges and culverts which otters consider “impassable”, forcing them to cross the road surface. As well as physical obstructions such as high water levels, grills and so on, vibrations caused by cars crossing the bridge are transmitted to the water and this can also deter otters from passing under the bridge (Urban et al, 2010).

The most frequent RTAs in the 1990s were happening on the D1 highway, in the section between Ivachnová and Važec (Northern Slovakia), which was not fenced. However, RTAs are quite frequent in much of the country along busy main roads as well as on regional roads (Kadlečík et al., 1996; Majko, 1997; Radúch, 1995; Urban et al., 1998).

Situation after 2000

In many European countries, the Eurasian otter population is currently recovering from the massive decline occurring during last decades of the 20th century (Mason and Macdonald, 2004; Elmeros et al., 2006; McDonald et al., 2007; Prigioni et al., 2007; Sulkava et al., 2007; Ruiz Olmo et al., 2008; Roos et al., 2015), due to legislation for protection of the species, the ban on PCBs (Roos et al., 2001, 2012), and conservation efforts (Cianfrani et al. 2011; Romanowski et al., 2013), including introductions. Currently, the otter population is increasing in most European countries including Central Europe (e. g. Foster-Turley et al., 1990; Chanin, 2003; Conroy and Chanin, 2000; Kranz, 2000; Kranz et al., 2001; Georgiev, 2005; Romanowski, 2006; Poledník et al., 2008; Loy et al., 2010; Romanowski et al., 2013).

A similar trend has also been observed in Slovakia. The recent recorded expansion and cross connection of fragmented otter populations is essential for future genetic flow and the health of the whole population, and it should be supported by environmental projects for planned habitat conservation (Urban et al., 2010, 2011; Urban, 2013; Černecký et al., 2014). The current most important negative factors affecting otters still include traffic and road accidents. Not surprisingly, since otter populations have begun to recover, increasing numbers of animals have been killed on roads. Other current dangers for the otter population include destruction and fragmentation of habitats, illegal hunting and killing, water pollution and consumptive usage of hydrological resources.

Table 2. Overview of the causes of threat to otters and their importance for the conservation of this species in Slovakia.

Cause of threat	Importance	Assumed development
road mortality	high	growing tendency
Illegal hunting, persecution	high	growing tendency
Changes in the water regime	moderate	growing tendency
Water quality	moderate	stable

Traffic and Road Mortality

Road traffic accidents (RTAs) are currently among the most frequent recorded causes of otter mortality in Slovakia (Urban et al., 2010, 2011). Systematic monitoring of otter road mortality (and carcass analysis) has not been carried out in Slovakia. There are some records of otters killed by traffic, but the collisions and their causes have been evaluated only in some areas. For example, on the roads in and around the Malá Fatra Mts. National Park (cca. 230 km², Northern Slovakia), 33 killed individuals were recorded during 2005 - 2015 (Kalaš 2011, and personal communication). In sections of the first class road between Banská Bystrica and Brezno along Hron River, and between Brezno and Pusté Pole following the Hnilec river (c. 100 km), in Central Slovakia, 23 mortalities were recorded during 2005 - 2010. In March 2013, we recorded 4 otters killed on the 32 km long section of the second class road between Šahy and Veľký Krtíš along the Ipeľ River (Southern Slovakia) (Urban et al., 2015). We have also recorded increasing numbers of otters killed on roads in cities. For example, during one year, from November 2014 to November 2015, we recorded 5 otters killed on roads in three nearby towns in Central Slovakia (Zvolen, Sliach and Banská Bystrica, c. 150 km²).



Figure 4. Killed otter found 10 August 2015 on the first class road between Zvolen and Lučenec (Central Slovakia) (photo P. Urban).

Changes in Water Regime and Land Utilization

Human impact on the flow volume of rivers is particularly related to the construction of water power plants, dams, water-supply reservoirs as well as building channels and other regulations of rivers. Water volume changes in rivers are also connected to irrigation, artificial snowing of ski slopes, pumping of ground water, but also to the overall river basin management. All these factors affect water retention in the landscape, especially the acceleration of water runoff (Urban, 2007; Kadlečík et al., 2009; Urban et al., 2010).

Water Pollution

Pollution is a major threat to otters in Western and Central Europe. In most EIA (Environmental Impact Assessment) projects, no solutions have been proposed for mitigating water pollution or eliminating pollutants, which is necessary for the conservation of otters (and other animals). Only a few studies exist that deal with the concentration of pollutants in otter tissue. In the future, the EIA process in Slovakia needs to be made more appropriate to otters and other animal species (Urban et al., 2011).

Hunting and Persecution

Despite the general prohibition of hunting of protected animals in Slovakia, cases of shooting, beating to death and drowning of otters in traps or fyke nets have been recorded and they indicate insufficient public awareness of the problem. These dead individuals are often dissected by taxidermists and illegally deposited in private collections or they are posted abroad. With the increased economic importance of waters, the otter has often been viewed as a human competitor and some have called for the control of the population. This encourages poaching, the extent of which is, however, difficult to assess (Kadlečík et al., 2009; Urban et al., 2010, 2011).

According to the Act on Nature and Landscape Protection, the state is responsible for damage caused by otters, whilst hunting for fish raised for commercial purposes in fishponds or in aquaculture facilities. Compensation is provided for the damage, if an otter was observed at the time and place of the recorded damage. If the damage was caused to fish raised in aquaculture facilities, the compensation is only given when the aquaculture facility was sufficiently fenced at the time of damage, and the inflow and outflow were equipped with grills, all protecting the facility against the otters entering. The extent of damage to the fish must be proven by expert assessment. The claimant declares the damage caused by writing to the nature conservation authority, in whose district the incident happened (Urban et al. 2010, 2011; Urban 2013).

CONCLUSION

The Eurasian otter is an often discussed “conflict species” in Slovakia. Despite full protection, many factors which threaten the otter population in this country, especially mortality on roads and illegal hunting, have been on the increase in recent times. Other negative factors include a decline in the number of suitable habitats and deterioration in water quality.

Communication between authorities and general public, and education of target groups such as fish farmers and fishermen is very important in order to improve their relationship with the otter.

Acknowledgements - I would like to thank to colleagues and students, Ján Kadlečík, Anton Krištín, Stanislav Ondruš, Jerguš Tesák, Ján Topercer, Erika Urbanová, Ivan Valach, for their assistance and / or help with the fieldwork. I also thank to Matej Vesteg for proofreading.

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RÉSUMÉ

CONFLITS ENTRE LOUTRE ET HUMAIN EN SLOVAQUIE : UN EXAMEN

la loutre européenne (*Lutra lutra*) est une espèce locale protégée en Slovaquie. Actuellement, les loutres sont présentes dans la plupart des régions du pays. La coexistence des loutres et des humains implique donc beaucoup de conflits. Les plus importants des facteurs négatifs affectant les loutres sont l'écrasement sur les routes, la destruction et la fragmentation de leurs habitats, la chasse illégale, la pollution de l'eau, l'usage des ressources hydrologiques, etc. En dépit de l'interdiction générale de chasse des animaux protégés en Slovaquie, les cas où les loutres de font tirer dessus, battre à mort ou capturer dans des pièges à loutre ou dans des filets à foin sont considérables et indiquent une prise de conscience de leur statut d'espèce protégée. La plupart de ces menaces ont tendance à augmenter.

RESUMEN

CONFLICTOS ENTRE NUTRIAS Y SERES HUMANOS EN ESLOVAQUIA: UNA REVISIÓN

La nutria Eurasiática (*Lutra lutra*) es una especie animal completamente protegida en Eslovaquia. Actualmente, la nutria ocurre en la mayor parte del país. La coexistencia de las nutrias y los seres humanos involucra muchos conflictos. Los factores negativos más importantes que afectan a las nutrias, son las muertes por atropellamiento en rutas, la destrucción y fragmentación de los hábitats, la caza ilegal, la contaminación del agua, el uso de recursos hidrológicos, etc. A pesar de la prohibición general de cazar animales protegidos en Eslovaquia, los casos de muerte por arma de fuego, apaleamiento o captura en trampas o redes, son considerables e indican una insuficiente conciencia de su estatus protegido. La mayoría de estas amenazas tienden a incrementarse.