



ENVEROS

ENVIRONMENTAL EDUCATION THROUGH
ROADKILL OBSERVATION SYSTEMS

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<http://www.enveros.eu/>

Environmental Education through Roadkills Observation Systems - EnVeROS

04. Wildlife Vehicle Collisions (WVCs): Terms, Factors & Data



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LEARNING OBJECTIVES

At the end of this topic students should be able to:

- Define the terms related to WVCs; e.g. AVCs, DVCs.
- Categorize the factors contributing to WVC.
- Summarize how environmental and habitat characteristics could affect WVC.
- Identify traffic and driving characteristics that affect WVCs.



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Terminology

Roadkill refers to an animal or to animals that have been struck and killed by motor vehicles on highways. It has increasingly become the topic of academic research to understand the causes, and how it can be mitigated (van der Ree et al. 2015; *Introduction to road ecology*; Wiley Blackwell).



Photo: Antonín Krása; presentation in the EnVeROS joint training event in Brno. June 2019.

Fire Salamander (*Salamandra salamandra*) roadkilled in Czech Rep.



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Wildlife Vehicle Collisions - terms

Animal-vehicle collisions (AVC):

Collisions with wild and domestic animals.

Wildlife-vehicle collisions (WVC):

Collisions with all species of wild animals.

Deer-vehicle collisions (DVC): WVCs that involve only deer. A separate term is used for deer and no other specific type of animal because deer account for a majority of WVCs.



Hedgehog roadkill in Cyprus
(Photo: CyROS
<https://www.cyroadkills.org/gallery/>)



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WVCs as an issue in road ecology

- WVC are an important issue in road ecology because of their consequences on many species.
- WVC impact **species conservation and management, public safety, animal welfare, and the economy**
- Mortality resulting from roadkill can be very significant for species with small populations.



Owl roadkill in Cyprus

(Photo: CyROS)

<https://www.cyroadkills.org/gallery/>



Causes for WVCs increase during the last decades

- During the last 15 years, the sharp increase in WVCs observed globally has been attributed to causes such as (Rosell et al., 2013; *Int. Conf. on Ecol. and Transport.*):
- Demographic expansion of some species (e.g. ungulates in Europe)
 - Increase in velocity of cars.
 - Further increase of length of the road network.



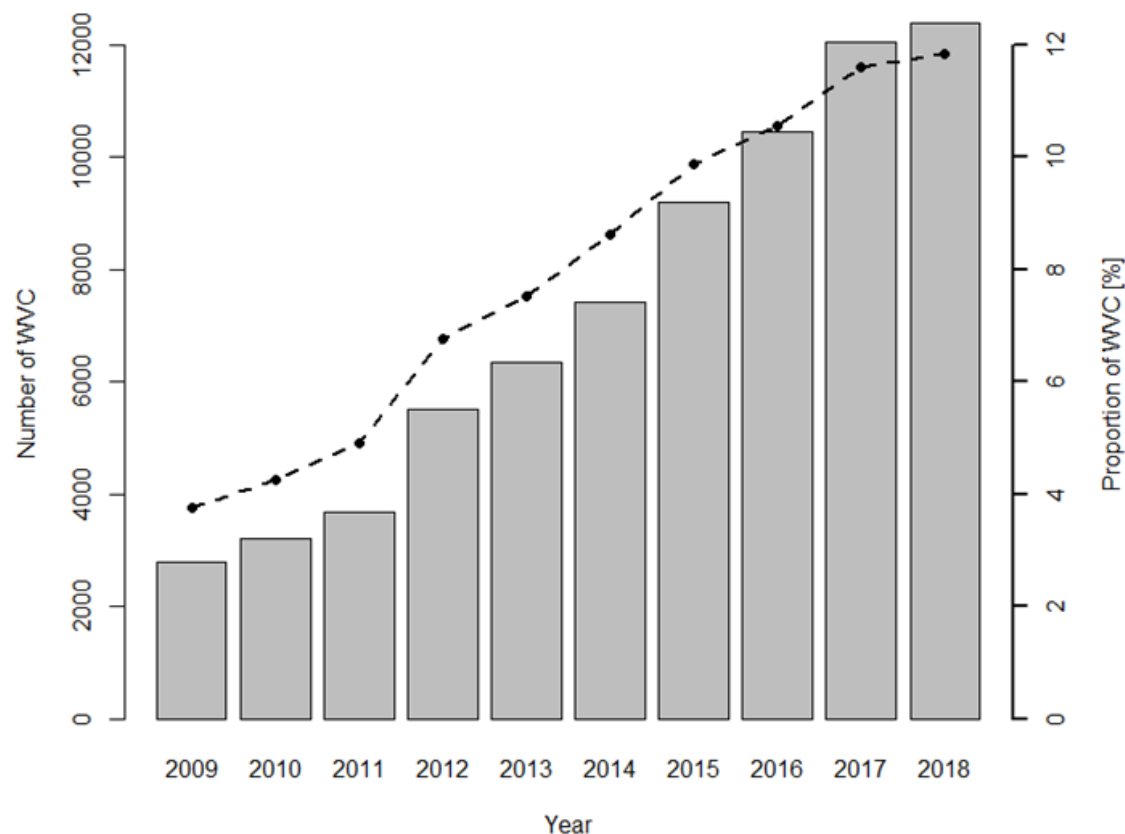
(Source: CHANJ Guidance Document)

"sometime during the last three decades, roads with vehicles probably overtook hunting as the leading direct human cause of vertebrate mortality on land"
Forman & Alexander (1998).



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WVCs increase: evidence from Czech Rep.



An increase of both absolute number of WVC records and their proportion to all registered traffic crashes can be observed. Data from the Czech Police crash database and www.srazenazver.cz



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WVC current situation and data

European Countries – Wildlife Vehicle Collisions

- The number of WVCs is increasing in Europe, which has a major effect on road safety (Bartonička, T., et al. 2018; *Wildlife Management*).
- Large mammals (i.e. red deer, roe deer, fallow deer, wild boar) are the main group involved in most WVCs (Saéñz-de-Santa-María and Tellería, 2015; *European Journal of Wildlife Research*)

Wild boars in Greece
(Source: Kathimerini newspaper
www.eKathimerini.com)



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WVC current situation and data

European Countries – Wildlife Vehicle Collisions (Spain)

- Ungulates were reported in most collisions (85%), with **wild boars** and **roe deer** (*Capreolus capreolus*) involved in most cases (79%).
- A miscellaneous set of species was also recorded in police statements such as **hares** (Palomo et al. 2007; *Ministerio de Medio Ambiente*), **rabbits** (*Oryctolagus cuniculus*), **birds** and “**other non-domestic**” mammals.

Wild animals were involved in **74,600 vehicle collisions** in Spain from **2006 to 2012** which represents 8.9% of the 840.000 reported total road traffic accidents in Spain during the same period



WVC current situation and data

European Countries – Wildlife Vehicle Collisions (Cyprus)

Summary of existing roadkill records on CyROS database

(<https://www.cyroadkills.org/home/>)

Species Group		Incidents Per Road Type		Frequency of Road use	
Amphibians	1	Highway 4 lanes	44	Daily	37
Snakes	120	Non urban motorway	72	Few times per week	47
Lizards	25	Urban 4 lanes	0	Few times per month	242
Mammals	163	Urban 2 lanes	50		
Birds	17	Rural with asphalt	140		
		Dirt Road	20		

"Herpetofauna has been reported to have the highest levels of road mortality (Heigl et al. 2017; BMC ecology), since reptiles are usually unable to evade traffic and are not conspicuous to on-coming drivers (Andrews, K. M., 2015; JHU Press). A similar trend emerges for hedgehogs in the UK (Roos, S., et al. 2012; BTO Research Report)."

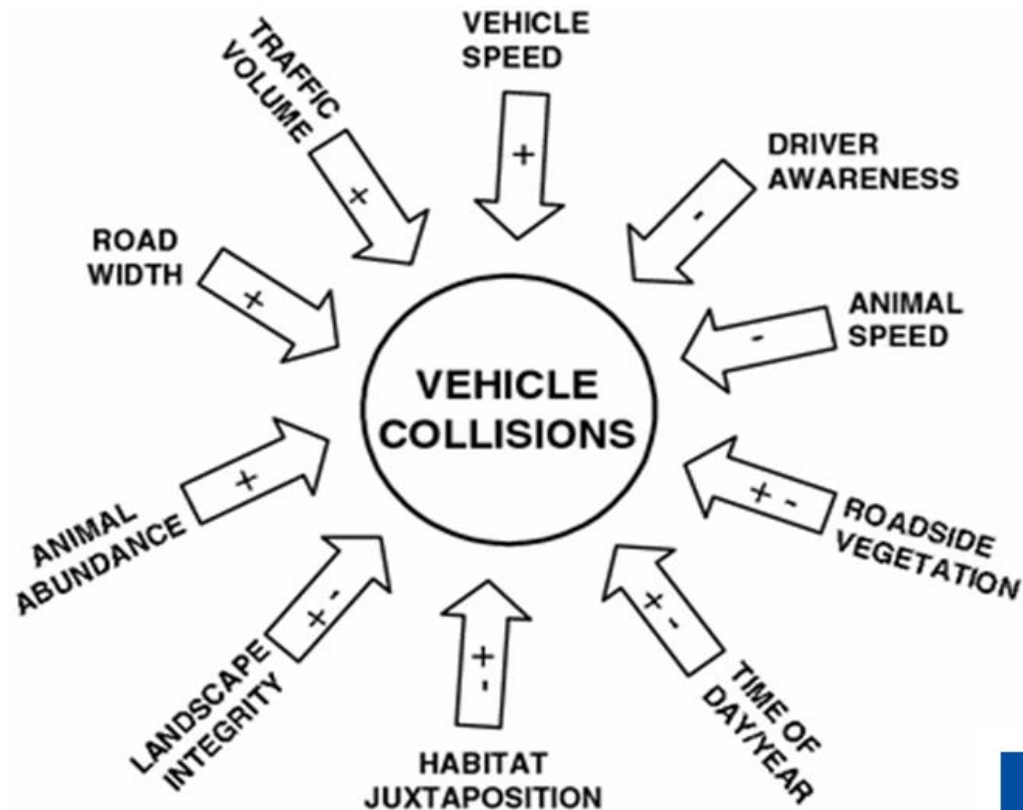


CyROS: towards a common methodological framework for roadkills recording in Cyprus (Zotos, S., & Voglatzakis, I. N., 2018; Ecologia Mediterranea)



Factors contributing to WVCs

Factors contributing to wildlife vehicle collisions incidents based on literature review: increasing incidents (+), decreasing incidents (-), not clear contribution (+-) (Litvaitis and Tash, 2008; *Environmental Management*)





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Traffic

- For many rare species worldwide, especially **amphibians and reptiles**, traffic is considered a threat to their survival.
- Traffic also imposes a problem to **many large and medium-sized mammals**, and even in common game species, road mortality can be of significance to the management of local populations.
- Increased traffic on a road is indicative of the number of WVCs, even though high volumes of traffic can also discourage species from crossing at all.

"Whether or not road mortality is significant to the conservation or management of a species, there is a growing economical, ethical and political concern, let alone reasons of traffic safety that demand mitigation against animal-vehicle collisions."
(Seiler, 2003; *PhD thesis, Un. Uppsala*).

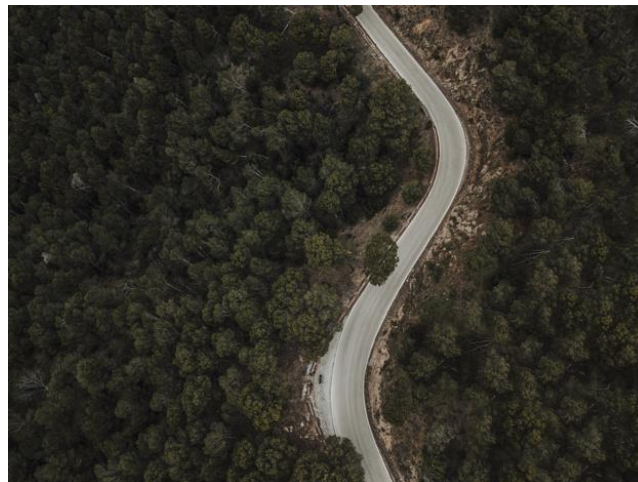


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Environmental Characteristics

- WVCs are common in areas where the roadside is **forested for protection**, and there are **large areas of natural habitat** or **species-specific habitats and migration routes** (Litvaitis and Tash, 2008; *Environmental Management*).
- WVCs are less likely to occur in urban areas, when there is agricultural land along the roadside, or where there are embankments along the roadside (Olson et al. 2014; *PloS one*).

Highway through forest
(www.freepick.com)





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Environmental Characteristics

- Heterogeneous landscapes might create natural corridors for animal movements, while more homogeneous landscapes encourage a more random WVC distribution (Bissonette & Cramer, 2008; *Evaluation of the use and effectiveness of wildlife crossings; Report*)
- Roads that are close to wetlands, which typically host a variety of species populations, are in high risk of having many animals lingering by the roadside (Litvaitis and Tash, 2008; *Environmental Management*).

Road close to wetlands
(<http://theconversation.com>)





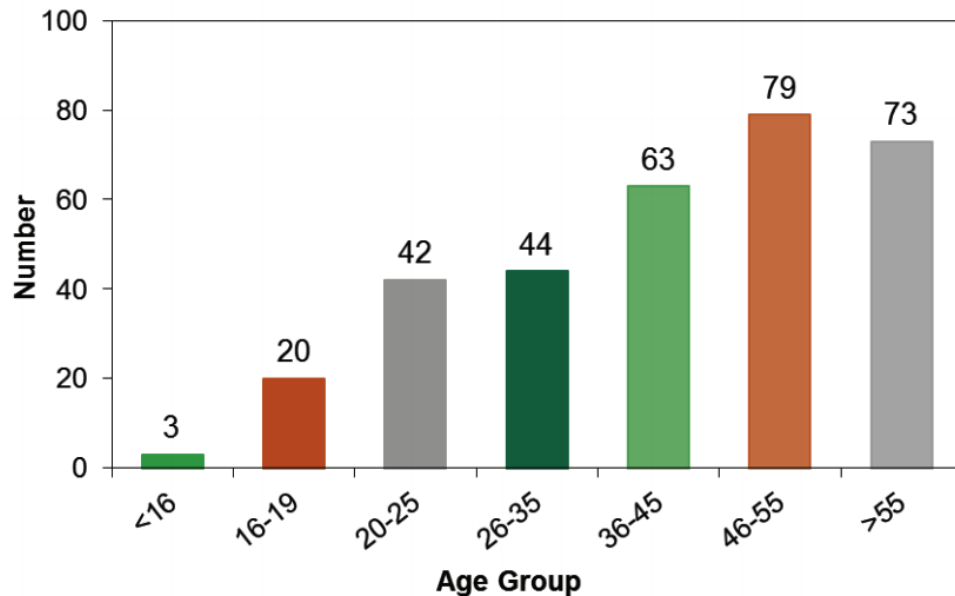
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Driver characteristics: driver experience

Drivers killed in wildlife-vehicle collisions by age group – Canada, 2000-2014

(Vanlaar, W. G., et al, 2019; *Journal of safety research*).



- The chance of being involved in a WVC does not decrease with experience (on the contrary), as this study from Canada suggested.
- Drivers aged 46-55 accounted for the largest number (79) of drivers who were killed in WVCs
- However, these data are location specific (Canada) and should be treated with caution.



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Summary

- The term Wildlife-Vehicle Collisions (WVCs) is defined as “Collisions with all species of wild animals” and is probably the most popular to study this phenomenon.
- Other related terms are also used depending on the animal category involved in collisions.
- WVCs are a growing problem in many countries and has impacts on species.
- Many factors are contributing to the problem (e.g. environmental, species and traffic related, drivers experience).



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Selected references

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- Huijser, M. P., McGowen, P. T., Fuller, J., Hardy, A., & Kociolek, A. (2007). *Wildlife-vehicle collision reduction study: Report to congress* (No. FHWA-HRT-08-034).
- Litvaitis, J. A., & Tash, J. P. (2008). An approach toward understanding wildlife-vehicle collisions. *Environmental Management*, 42(4), 688-697.
- Sáenz-de-Santa-María, A., & Tellería, J. L. (2015). Wildlife-vehicle collisions in Spain. *European Journal of Wildlife Research*, 61(3), 399-406.



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Activities & Self Assessment Exercises:

- Explain the terms related to WVCs; e.g. AVCs, DVCs in a small paragraph (50-100 words).
- Which are the main factors contributing to WVC? (Answer in 300 words)
- Prepare a small PPT (6 slides) to present the WVC problem and parameters affecting it in your country or the area of your interest.
- Identify habitat and landscape characteristics that could lead to WVC in your area. Present one area which could have high risk of WVC (Make 5 PPT slides for the presentation).



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