



ENVEROS

ENVIRONMENTAL EDUCATION THROUGH  
ROADKILL OBSERVATION SYSTEMS

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# Environmental Education through Roadkills Observation Systems - EnVeROS

## 05. ECONOMIC AND SOCIAL IMPACTS



eurac  
research



## LEARNING OBJECTIVES

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

- Identify the economic and social consequences of WVCs.
- Compare the related costs linked to WVCs on different areas of the world.
- Evaluate the current data availability regarding WVCs economic impact assessment.
- Write about the WVCs financial implications for public organizations.
- Identify the safety rules of animal vehicle collisions.



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## Economic and social impacts of WVCs

WVCs can have a broad range of **consequences** for both motorists and animals. These consequences can be divided into major categories according to their characteristics:

- **Vehicles** (damage to vehicles, infrastructure)
- **Health and safety** (injuries, hygiene – dead bodies in the roads, emotional trauma, delay in work/ schedule)
- **Species** (economic loss, e.g. game species and impact for the hunters)
- **Financial cost** for the **public sector**.

**Wildlife-vehicle collisions involving large mammal species, can cause substantial vehicle damage and human injuries, and consequently are a key public safety, economic and social concern**

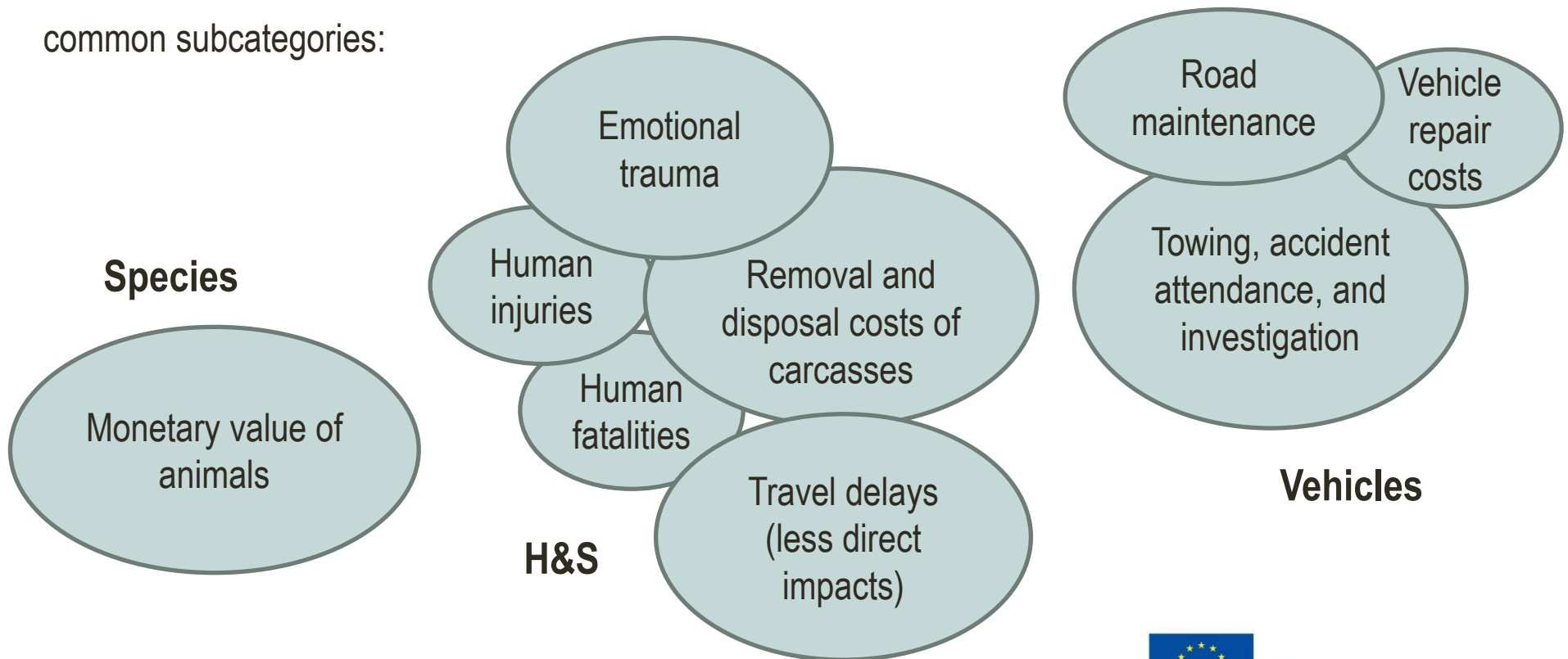


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## Economic and social impacts of WVCs

According to 3 major categories of economic and social impacts of WVCs there are 9 most common subcategories:



## 1. Vehicle repair costs

- **In Spain:** Mean vehicle reparation **6.425,17 €** (Camps F., et al. 2012; *Govern. Of Catalunya*).
- **In the United States and Canada:** An estimate of at least **US\$ 1000** in vehicle repair costs, or a disabled vehicle that needs to be towed (Seiler, A., 2004; *Wildlife Biology*).
- **In Brazil:** The vehicle repair costs associated with capybara-vehicle collisions have been estimated at about **R\$ 2,885** (US \$ 1,418, in 2012) (Huijser et al. 2013; *Oecol Aust*).
- **In north central British Columbia:** Vehicle repair costs resulting from a collision with a moose can be as high as \$25,000, but they averaged **\$5,150** in 1999 (Federal Highway Administration).



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## Vehicle repair costs indicative data (Canada)

**Estimated costs for property damage, human injuries, and human fatalities for the average AVC.**

Maximum Severity	Cost (\$)	Distribution of Collisions (%)	Contribution to Cost of Average AVC (\$)
Property damage only	2,570	95.37	2,451
Possible human injury	24,418	2.34	572
Evident human injury	46,266	1.75	809
Incapacitating/severe human injury	231,332	0.47	1,083
Human fatality	3,341,468	0.04	1,210
Total		100	6,126

Federal Highway Administration Research and Technology

<https://www.fhwa.dot.gov/publications/research/safety/08034/03.cfm>



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## 2. Health and safety

### Human injuries due to WVCs

In Europe (Putman et al., 2011; *Cambridge Un. Press*):

- WVCs were estimated to result in **30,000** human injury accidents each year.
- **Germany** in the late 1980s/early 1990s were estimated at approximately **2500** injured per year.
- **Finland** in 2006 - **215** injuries.
- **Spain** in 2004, collisions resulted in **76** serious injuries and around **400** slight injuries.
- **France** in 2004, vehicle collisions with ungulates resulted in **340** injuries.
  
- **Czech Republic** (Bíl et al., AVC on Czech roads) in **1125** injuries (22 fatal) during 2007-2013.



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## Detailed data are scarce in many countries. - Data from Czech Rep.: Police crash database

Period: 2007 – 2013

– WVC

- Fatal 11 (12)
- Serious 51
- Light 453

– Crashes due to **avoiding collisions**  
with an animal

- Fatal 9 (10)
- Serious 51
- Light 550

**Higher risk of death or injury!**

Overall AVC: **29483**



All crashes of this kind: **2458**

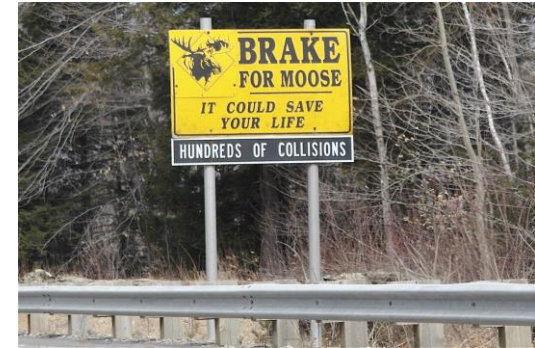


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## Tips to Avoid Animals or injury from WVC

- Do not panic.
- Swerving is not the best option.
- Slow down as much as possible as soon as you see the animal.
- Although no one wants to kill or injure an animal, drivers must realize that their own life and safety is more valuable than that of an animal. If a collision is unavoidable, slow down as much as possible and brace yourself for the impact.



(Source: <https://driving-tests.org>)

## Tips to Avoid Animals or injury from WVC

- If the animal you are approaching on the road is a large animal such as a deer, moose, or elk, the impending impact may be more detrimental.
- After an impact with a large animal, try to regain control of your vehicle and pull off of the road in the first safe space. You and your vehicle may have suffered damage that requires assistance. You may need to call the police.
- After crashing into a large animal, stay inside your vehicle. An injured deer, moose, or elk could be very dangerous. Turn on your emergency flashers to warn other drivers of your accident.
- Contact your automobile insurance agent as soon as possible to file a claim for any damage to your vehicle.

# Safety Rules for drivers involved in WVC

(Source: <https://driving-tests.org>)



## If you hit a wild animal with your car...

- Make sure everyone is safe.
- Due to the risk of infection, a dead animal should only be touched with gloves and pulled to the side of the road.
- Do not touch injured animals, they could fight back. Instead, keep your distance so that the stress on the animal does not increase.
- Do not take the dead animal with you.
- Document the scene. When the scene is safe, it's a good idea to take pictures of the animal and any damage to your vehicle, in case you need to file an insurance claim. Also: write down names and addresses of accident vehicles.



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## Removal and disposal costs of carcasses (indicative data from US & Canada)

### In Canada (Federal Highway Administration Research and Technology):

1. The clean-up
  2. Removal
  3. Disposal costs for animal carcasses
- } \$100 for deer, \$350 for elk, and \$350 for moose

### In Pennsylvania (USA) (Pennsylvania Department of Transportation):

For deer carcass **removal** and **disposal** in a certified facility was **\$30.50 per deer** for contractors and **\$52.46 per deer** for the Pennsylvania Department of Transportation in 2003–2004.

An average cost for removal and disposal costs of animal carcasses were \$50 (deer), \$100 (elk), and \$100 (moose).



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### 3. Monetary value of animals (e.g. game species): Case study in British Columbia

The monetary value of wildlife has many different components including :

- License fees
- Costs associated with hunting (e.g., materials, transport, lodging, meals)
- Recreational wildlife viewing

#### In British Columbia (Federal Highway Administration Research and Technology):

- The net return to the economy of British Columbia from hunting was estimated at \$1,270–7,450 for deer, \$3,250–3,290 for elk, and \$1,250–1,680 for moose.
- The total net return to the economy of British Columbia from recreational wildlife viewing was estimated at \$174,000,000 per year.



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## Examples of costs that are not quantifiable

- Emotional distress of people involved in WVCs.
- The expenses involved with conservation efforts for threatened or endangered species.
- The costs of the distress of injured animals.
- The costs associated with the rehabilitation of injured animals.
- The cost of cultural values impacted by wounded animals (e.g. symbolic species).



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## 4. WVCs have financial implications for public agencies...

- **Law enforcement agencies** face direct costs of investigation and traffic control following a collision.
- Accidents involving large animals can lead to **travel delays** or **secondary accidents** for subsequent motorists if the vehicle or animal lies in the right of way.
- **Transportation agencies** typically are responsible for carcass removal and disposal costs and infrastructure repair costs, if necessary.
- **Public agencies** may incur some financial losses based on the monetary value of the animal itself, value associated with its hunting or license fees or recreational attraction for wildlife viewing.

(van der Ree et al. 2015; *Handbook of Road Ecology*)



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## Summary

- WVCs can have a broad range of consequences regarding repair costs, health and safety and natural capital.
- Despite the lack of data, vehicle damage data are the easier to find.
- Economic data on health and safety issues, although important, they are difficult to find and assess, with the exception of N. America.
- Losses of natural capital (e.g. game species and recreational value) due to WVC is even more difficult to assess.
- WVCs secondary effects with no monetary value (e.g. emotional trauma) are also difficult to assess





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## Activities & Self Assessment Exercises:

- Search in the web to find related material and prepare a response to the question: "How Wildlife Vehicle Collisions could affect health and public safety?" (300 words).
- Explain in a paragraph how WVCs have financial implications for public organizations (100 words).
- Develop a paragraph and explain which are the subsequences of the WVCs for species from the financial perspective. (50-100 words)
- Explain which socioeconomic impact is the most important according to you. Give 3-4 reasons.