ENVEROS
ENVIRONMENTAL EDUCATION THROUGH ROADKILL OBSERVATION SYSTEMS

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Enviromental Education through Roadkills Observation Systems - EnVeROS

07. WVCs MITIGATION METHODS

Erasmus+ OPEN UNIVERSITY OF CYPRUS eurac research TRANSPORT RESEARCH CENTRE TERRA CYPRIA

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LEARNING OBJECTIVES

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

- Categorize the mitigation methods according to their target (influence driver or animal behavior).
- Summarize the most commonly applied mitigation methods.
- Plan mitigation methods implementation to their areas/ country.
- Write the benefits and drawbacks in implementing methods that physically separate animals from roads and suggest alternative approaches.

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Mitigation Measures encompass in two general categories:

- **Measures aiming to change the *driver's behavior*** (e.g. speed reduction, warning signs) including sophisticated devices as a part of automobiles.

- **Measures focusing on changing the *behavior of the species* in the proximity of roads** (e.g. fencing, vegetation clearance, dry ledges, overpasses and underpasses, olfactory repellents).

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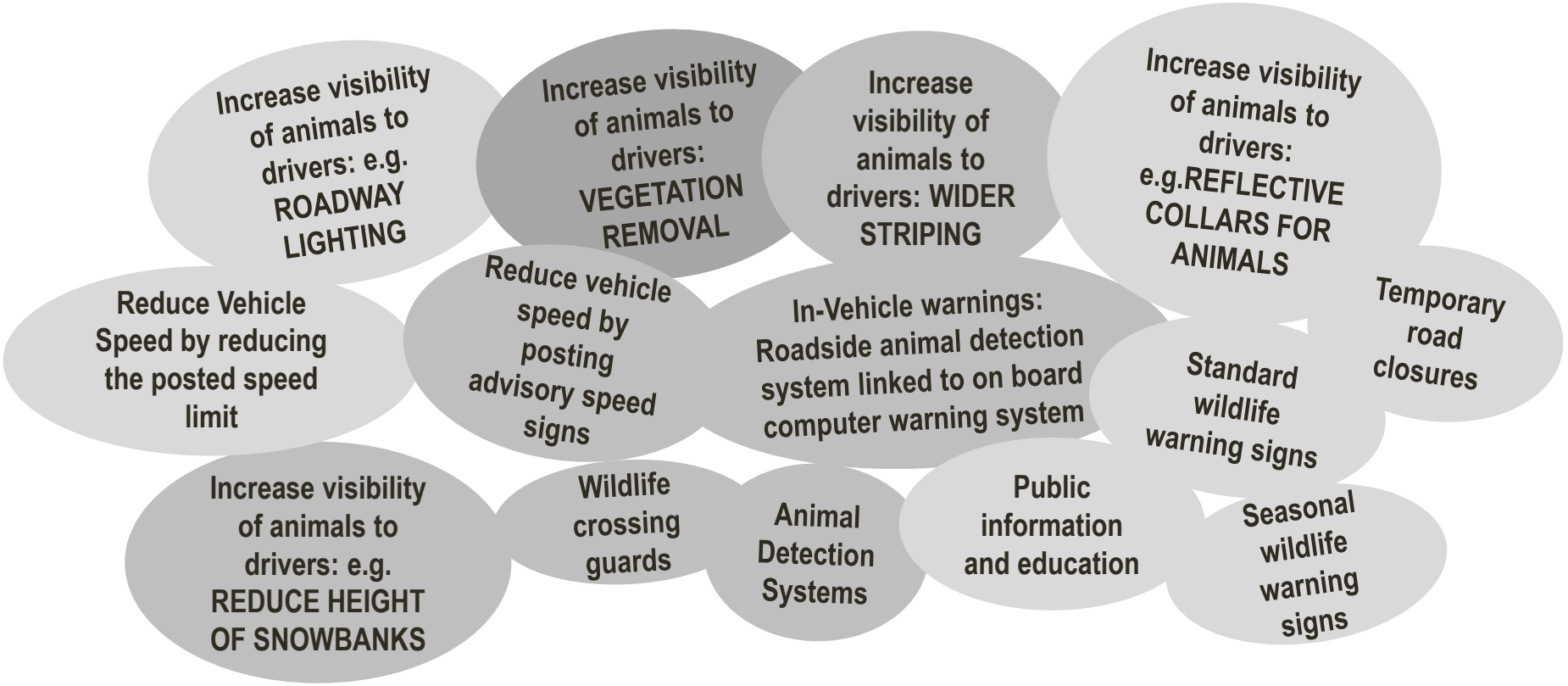
Mitigation Methods globally applied



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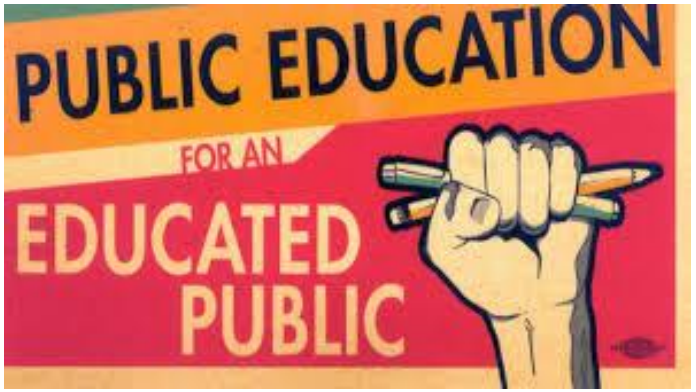
1. Methods that attempt to influence driver behavior: Public Information and Education

- Increase motorists' awareness of the **impacts**, **causes**, and **hotspots** of WVCs.
- Advise drivers on the **best actions** to take to avoid crashes with animals.
- Use **messages in the media**, **videos**, **brochures**, **posters**, and **bumper stickers**.
- **Roadside messages** at specific high-risk locations or in specific seasons of high wildlife migration or movement.



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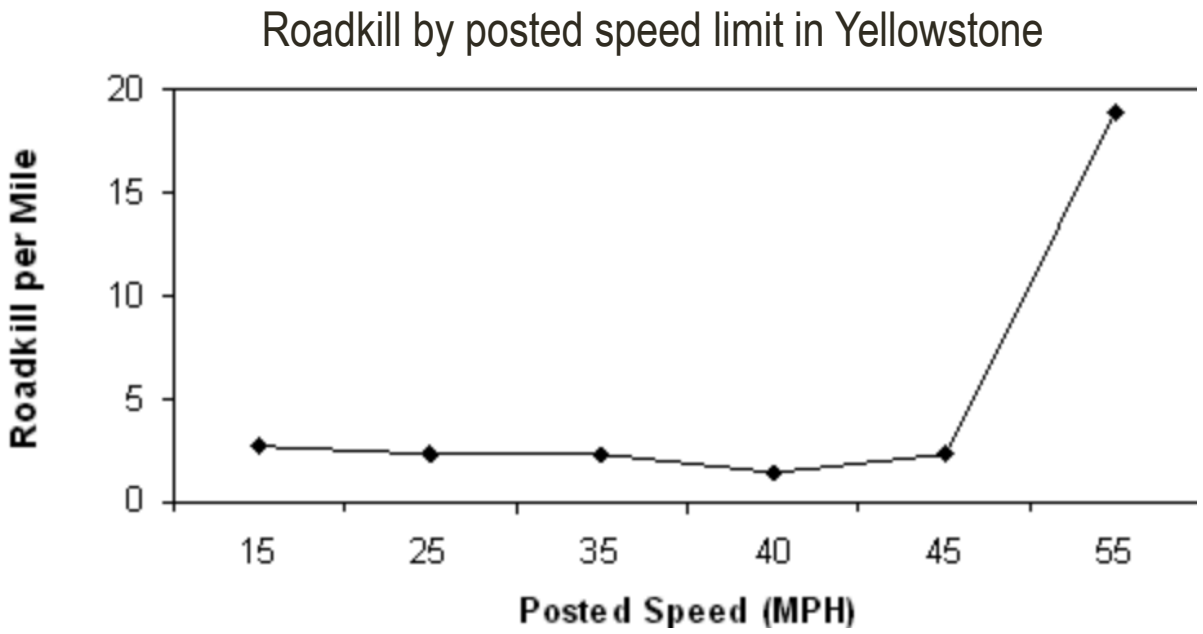
Speed Reduction

Seiler (2005) observed that the reduction of speed from 90 to 50 km/h on roads with 8,000 vehicles/day/year traffic intensity can reduce the risk of accidents with moose by 50% (Seiler, A., 2005; Journal of Applied Ecology)



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Wildlife warning signs

- Commonly applied and widespread forms of mitigation measures aiming at reducing the number of roadkills.

- Lowering the number of WVC when the passive warning signs were installed during critical times (Grace et al., 2017; *Accident Analysis & Prevention*).

Traffic signs used in Italy do warn drivers before domestic (up) and wild (down) animals.

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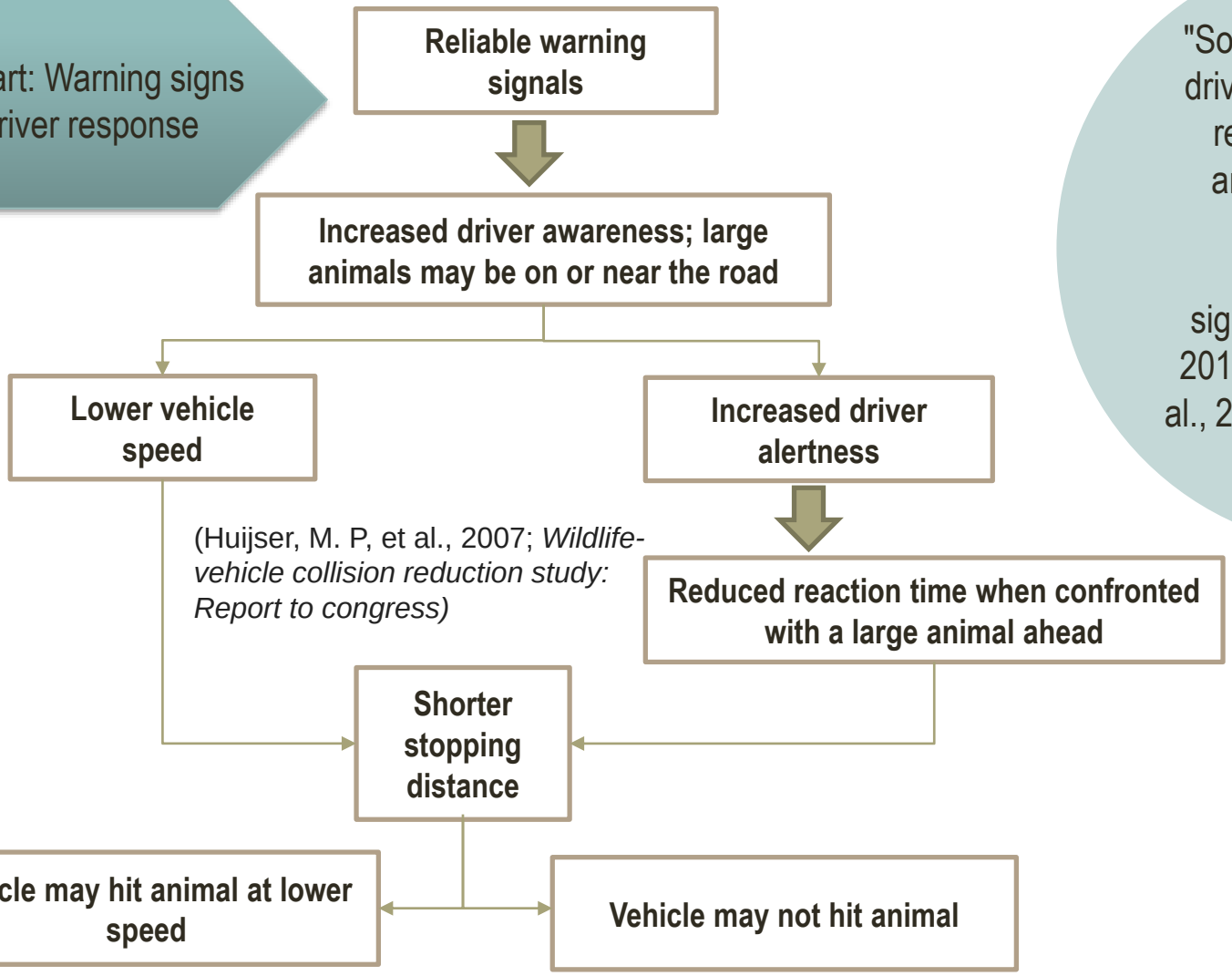
Improvement in driver attentiveness using warning signs by:

Flow chart: Warning signs and driver response



(Huijser, M. P, et al., 2007; *Wildlife-vehicle collision reduction study: Report to congress)*

"Some studies show that drivers are more likely to respond positively to animal-activated and vehicle speed-activated warning signs" (Bond and Jones 2013; *PloS one;* Grace et al., 2017; *Accident Analysis & Prevention*)

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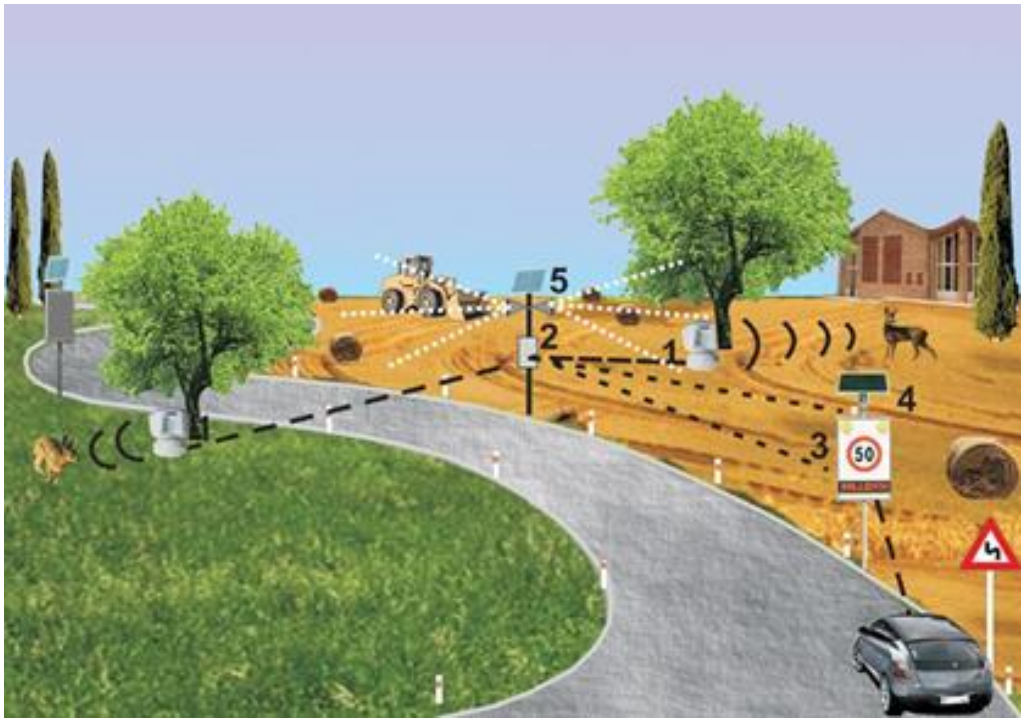
Warning Systems for both drivers and animals

The radar Doppler sensor (1) registers the presence of an approaching animal and sends the information to the electronic control unit (2).
The control unit activates an alert signal for the drivers (3), inviting them to slow down to an acceptable speed.
Another sensor (4) measures whether the car slows down to the desired speed.
If it does, the system stops to act. Otherwise the radar sends a signal back to the control unit (2), which activates the optical and/or acoustic scaring system (5), which shall drive the animal to escape.



(Project: Life Strade)

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Mitigation Methods That Seek To Influence Animal Behavior

These WVC mitigation measures are designed to change **where**, **how**, and **when** wildlife cross roads by modifying the animals' behavior without the use of major structures on or along the roadway. Popular mitigation measures are:

- Deer reflectors and mirrors
- Audio signals in right of way or attached to vehicles
- Deicing alternatives
- Intercept feeding
- Influence species composition or minimize nutritional value of vegetation in the right of way
- Remove carcasses along transportation corridors

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Deer Reflectors and Mirrors

- Deer mirrors and reflectors are roadside installments intended to act as visual wildlife repellents. Mirrors directly reflect vehicle headlights off the roadway and into the surrounding right of way. (Brieger et al. 2016; *Accident analysis and prevention*).

(Source: ISTOCKPHOTO)

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Remove Carcasses Along Transportation Corridors

- The carcasses of road-killed animals that are not removed may **serve as food sources** for other wildlife, attracting them to roads and increasing their vulnerability to WVCs.

- Carcasses may be an attraction for scavengers, ungulates are not likely to be attracted or deterred by the presence of carcasses in the right of way (Beckmann and Shine 2015; *Wildlife Management*).

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Mitigation Methods that seek to physically separate animal from roadway

This broad category of WVC mitigation strategies includes those that attempt to **physically separate** animals from the roadway. The specific mitigation measures reported on in this chapter, by broad category based on their intent, consist of the following:

- Wildlife fencing
- Boulders in the right of way
- Dry ledges
- Long tunnels and bridges over landscape
- Wildlife underpasses and overpasses
- Olfactory repellents

(Source: CHANJ Guidance Document)

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Wildlife Fencing

- **Generally:** Several studies show that well-placed fencing can reduce significantly the ungulates mortality of more than **80%** (e.g. Clevenger et al., 2001; *Wildlife Society Bulletin;* Bissonette & Rosa, S. 2012; *Wildlife Biology)*

However, if species can find no alternative to reach the other side of the road, fencing can become an **unsurmountable barrier** and consequently **isolate the populations**, increasing the likelihood of extinction (Jakes et al 2018; *Biological conservation)*

Fencing along roads is capable to block movement of large mammals.
(Photo: Václav Šlauf, MAFRA, Czech Republic)

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Overpasses and underpasses for wildlife

Overpasses and underpasses: Provide safe road crossing opportunities for a wide array of species, allowing them to continue to move across the landscape and re-establish the habitat connectivity (Simpson et al. 2016; Wildlife Management).

However not all species can use these structures and tend to respond better to passages with specific design characteristics (McCollister and van Manen, 2010; *Wildlife Management*; Simpson et al., 2016; *Wildlife Management*).

Wildlife overpass in Belgium.
(Source: https://www.ecopedia.be/encyclopedie/ecoduct)

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Summary

1. For WVCs mitigation, there are:

- Measures aiming to change the driver's behavior (e.g. speed reduction, warning signs) including sophisticated devices as a part of automobiles.
- Measures focusing on changing the behavior of the species in the proximity of roads (e.g. fencing, vegetation clearance, dry ledges, overpasses and underpasses, olfactory repellents).

2. Some of the above work for both animals and drivers.

3. There are benefits and drawbacks in implementing all these methods and multidisciplinary expertise is required for their implementation and continuous monitoring for effectiveness evaluation.

(Source: CHANJ Guidance Document)

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Activities & Self Assessment Exercises:

- Give two examples of measures to change the **driver's behavior** and two examples of measures aimed at changing the **behavior of the species** in the proximity of roads and explain **how could be applied**.

- In a small paragraph explain which mitigation methods would you prefer to establish in your area and why (100 words).

- Be a photographer for a week and prepare a small PPT with problematic areas that you believe there is a need to develop mitigation measures.

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