



# Romanian Bat Protection Association

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## Impact of Roads on Bat Species



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25<sup>th</sup> November 2009, Bucharest

- Bats are good indicators, sensible for the environmental changes
- All the bat species from Romania (31 species) are protected by domestic and international laws
- They use many landscapes as roosts, migration routs, hunting areas



# Bats as indicators?

- Represent a fifth of all mammalian biodiversity
- Occupy a wide range of niches
- Provide a number of ecosystem services
- Sensitive to climate change as depend on nocturnal flying insects (themselves sensitive to changes in temperature)
- Sensitive to pollution through poisoning of their insect prey base





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## International legislation:

- Bonn Convention
- Bern Convention
- EUROBATS Agreement
- Habitate Directive of the EC

## National Legislation:

- Law 90/2000 Romanian Ratification of EUROBATS Agreement



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# Bats protected by EU Legislation

- All the 31 species are strictly protected
- 13 species are included in the EU Habitat Directive Annex II – for these species is necessary the designation of the protected areas => Natura2000 sites





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# Bats of the World

## ....more than 1100 species

### Megachiropteras

- Distribution: tropical areas-active all year long
- Nutrition: fructivores, nectarivores, pollenivores and insectivores

### Microchiropteras

- Distribution: all of the world (except the poles)
- Nutrition: insectivores, fructivores, nectarivores, pollenivores, hematophages and carnivores





# The “Guinness Records” of bats

- The smallest bat in the world: (*Craseonycteris thonglongyai*): 1,5-2 g
- The biggest bats in the world (Megachiropteras) has 1, 5 kg



Common pipistrelle





common  
latin

Jamaican fruit-eating bat

*Artibeus jamaicensis*



Fruit bat

Association





Insectivorous bat

common  
latin Pallid bat  
*Antrozous pallidus*

# Bats of Romania

Horseshoe bats – 5 species



Vespertilionid bats – 26 species



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Greater horseshoe bat



Lesser horseshoe bat



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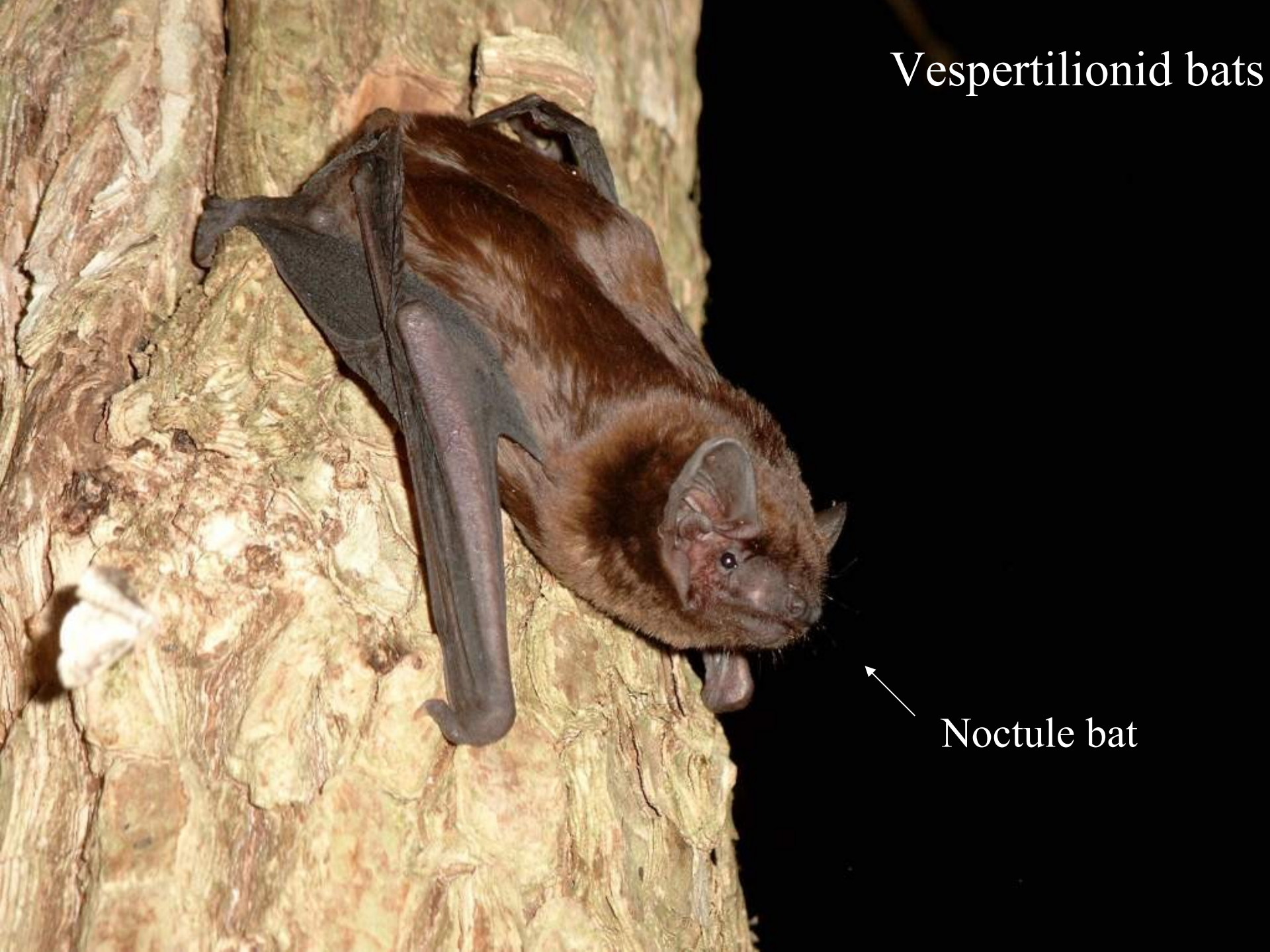
Vespertilionid bats

Bechstein's bat





Vespertilionid bats



Noctule bat



Vespertilionid  
bats

Brown long-eared bat





Vespertilionid bats

Barbastelle





# Hibernation



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A photograph showing a dense colony of common pipistrelle bats hibernating in a cave. The bats are clustered together, hanging from the ceiling, with their wings and bodies visible. The background is a deep blue, suggesting a cave environment.

- the biggest hibernating colony of common pipistrelle

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# Hibernation

Inactive period  
vital functions  
decreased

Very sensible to  
the disturbance



# Nursery



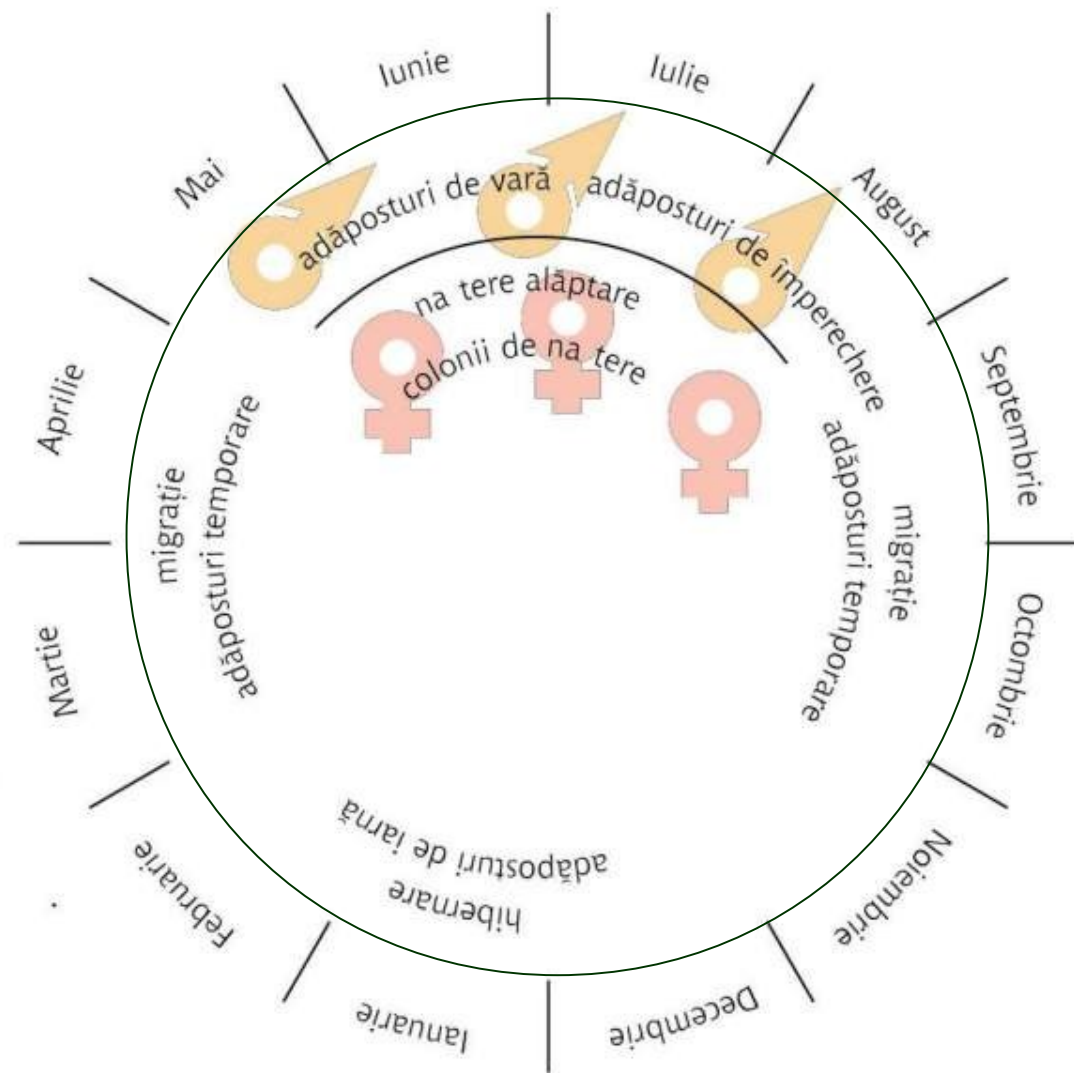
summer – their breeding period, sensibility level is high



# Life cycle

Determinate by the seasons

- winter—hibernation
- summer – breeding
- autumn - mating
- migration between roosts



# Roosts of bats

Underground shelters:  
caves, mines, tunnels,  
cervices





# Artificial roosts

## Buildings



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# Forest roosts



*Letea*

*Forest*

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## Hollows:

- usage: in active periods; some species for hibernation also
- Frequently change of







*Pipistrellus pipistrellus*, *Myotis daubentonii*



*Uptesicus serotinus*, *Myotis mystacinus*



*Plecotus auritus*, *Myotis nattereri*



*M. daubentonii*, *M. dasycneme*, *Nyctalus noctula*

Hunting areas





Ex. Daubenton's bat is hunting above the water surface



# Habitat use

Network of  
different  
roost used  
by bats in  
different  
seasons





# Connections between roosts and feeding areas

*From the roosts, a network of flight paths that are used daily exists in the landscape.*

*Daubenton's bats (blue) fly from their tree along the lanes, hedges and close above water. From their roost in a house, the Common pipistrelle (yellow) disperses along all sorts of guiding structures to all corners of the landscape. Brown long-eared bats (green) from a church disperse by flying close to structures; they use a restricted area. Noctules (pink) fly from their tree high above the landscape to their feeding area high above the water.*



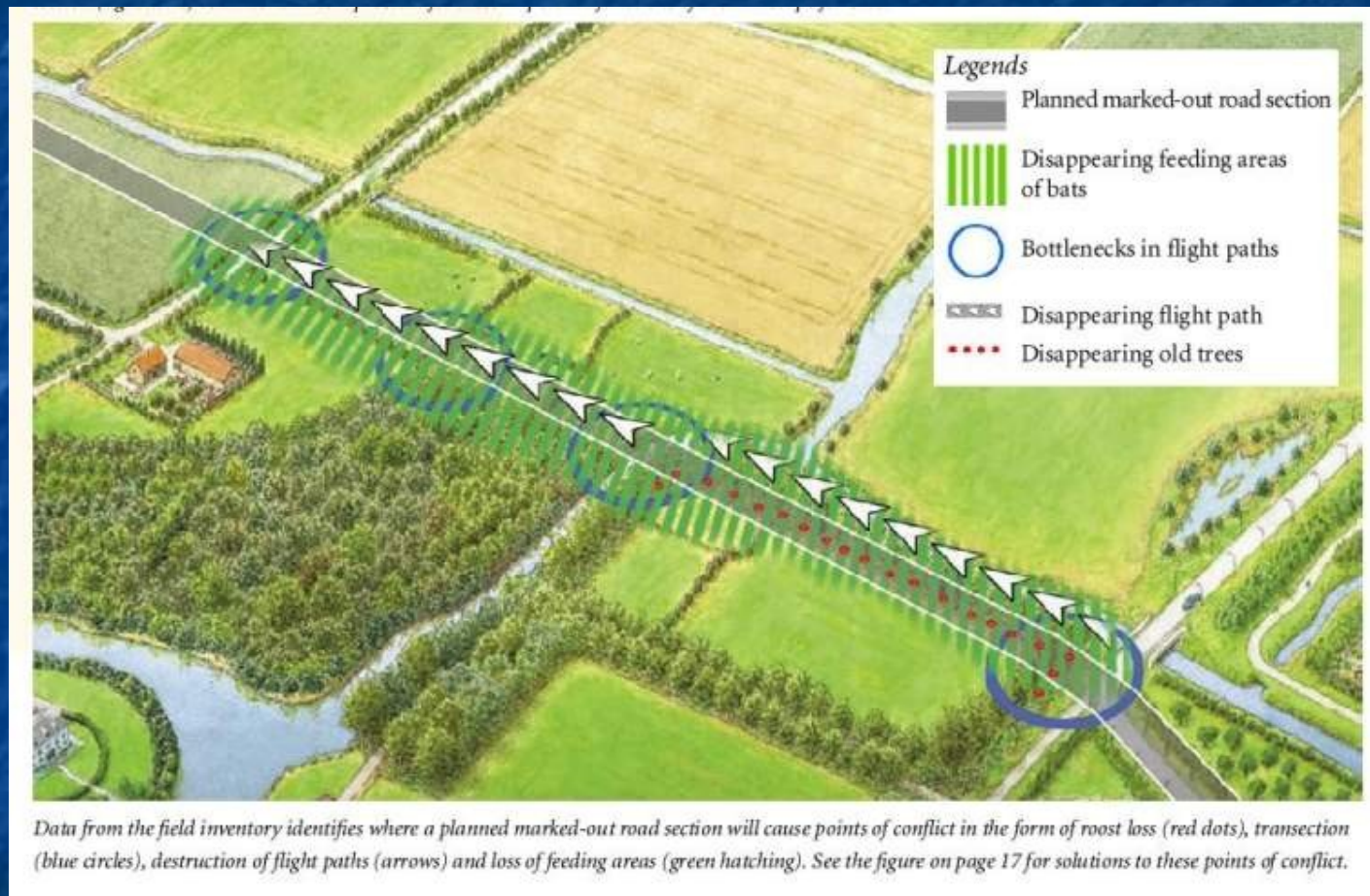
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# Bats and road construction

## Possible conflicts





	Status	Light feeding area	Light flight path	Summer roosts			Hibernation roosts			Home range	Flight path		Feeding area
<i>Greater horseshoe bat</i>	R									1-15 km ...			
<i>Lesser horseshoe bat</i>	R									1-10 km ..			
<i>Whiskered bat</i>	RC									1-10 km ..			
<i>Brandt's bat</i>	RC									1-10 km ..			
<i>Daubenton's bat</i>	C									1-20 km ....			
<i>Pond bat</i>	R									1-30 km .....			
<i>Capaccini's bat</i>	ER									1-30 km .....			
<i>Natterer's bat</i>	RC									1-10 km ..			
<i>Bechstein's bat</i>	R									0-5 km .			
<i>Geoffroy's bat</i>	R									1-10 km ..			
<i>Greater mouse-eared bat</i>	R									1-30 km .....			
<i>Common pipistrelle</i>	C									1-15 km ...			
<i>Soprano pipistrelle</i>	C									1-10 km ..			
<i>Nathusius' bat</i>	RC									1-20 km ....			
<i>Kuhl's bat</i>	RC									1-20 km ....			
<i>Noctule</i>	RC									1-40 km .....			
<i>Leisler's bat</i>	RC									1-30 km .....			
<i>Serotine</i>	C									1-20 km ....			
<i>Northern bat</i>	C									1-20 km ....			
<i>Parti-coloured bat</i>	R									1-30 km .....			
<i>Brown long-eared bat</i>	RC									0-5 km .			
<i>Grey long-eared bat</i>	R									0-5 km .			
<i>Barbastelle</i>	R									1-30 km .....			
<i>Schreiber's bat</i>	R									1-30 km .....			

Table 1: Schematic overview of some regionally abundant European bat species and their land habitat use.

Legends: C = common, RC = relatively common, R = rare, ER = extremely rare. It is also indicated per species whether or not they are sensitive to light, whether they choose to roost in trees or buildings or underground sites, what their home range is, whether their flight paths follow structures or move as well into open areas and which types of feeding areas (park-like, water, woods) they prefer.

# Bats and road construction - conflicts

## Effects of roads on bats

### Flight path

- Loss of flight paths
- Collision risk
- Landscape permeability

### Roosts

Loss or disruption of  
roosts, killing bats

### Feeding areas

Loss or disruption of  
feeding areas





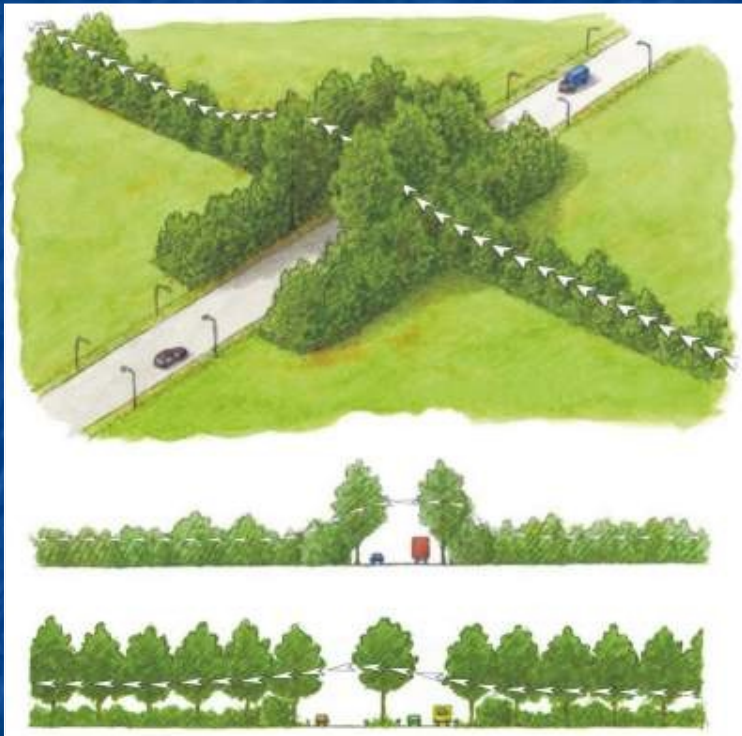
# Bats and road construction - techniques

Measures for avoid this conflicts:

- Planning
- Mitigation
- Compensation



Hop-over using crown of trees

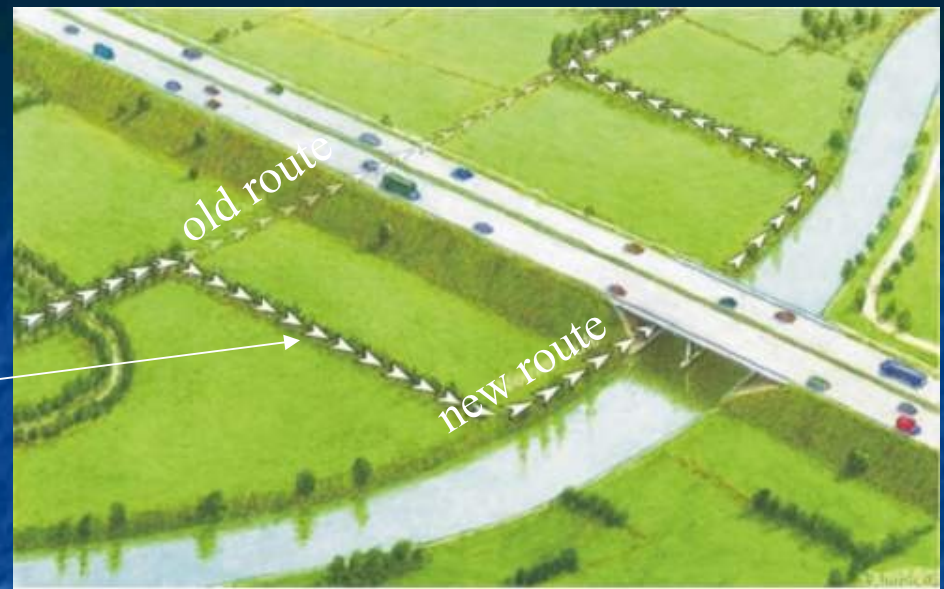


Using viaduct





Water route / Re routing  
of flight paths



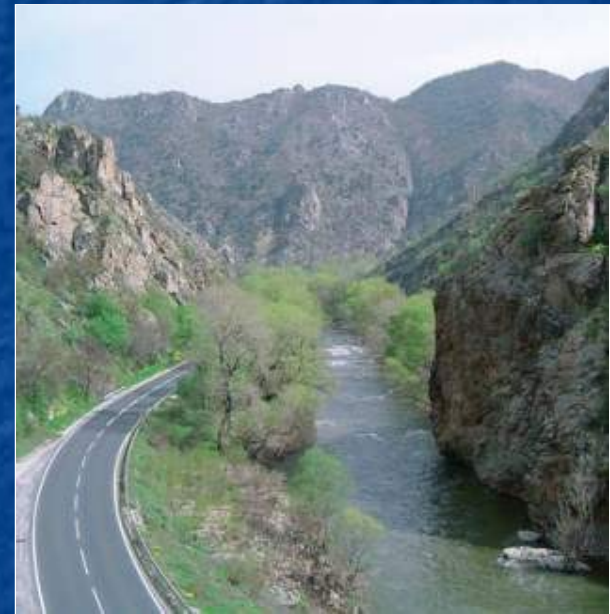
Ducking under: tunnels  
and bridges



# Study case:

KRESNA GORGE, SW BULGARIA –  
E79 international road - Peak traffic flow  
is 280 to 320 vehicles/hour  
Research 2004-2003, 187 killed  
bats were found, 25% of all mammals  
killed on the road

Solution: - tunnel option





# Indicator Bats (iBats RO)

- The RBPA established a national bat monitoring system in order to survey bats along roadside/ data stored in a national webdatabase
- Aim: follow in long term the population change of bats

[www.ibats.org.uk](http://www.ibats.org.uk)



# Global ultrasonic monitoring (iBats RO)

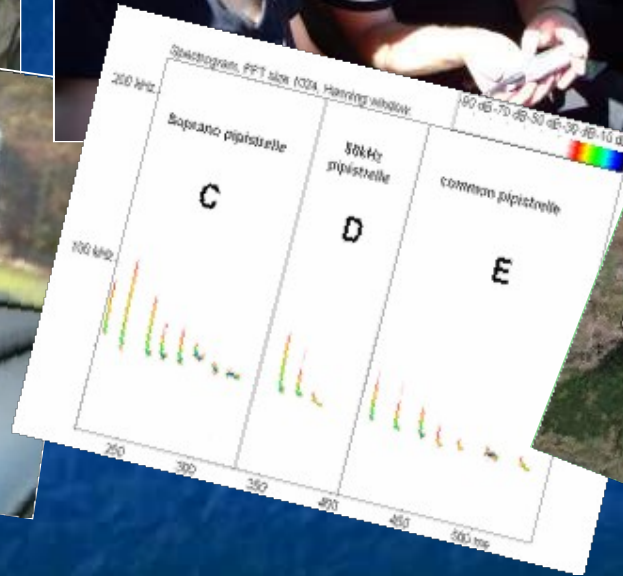
## Equipment



## Training



## Monitoring



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# The Romanian Bat Protection Association



- Preparation of a Guideline about bats and EIA
- International partnerships – EUROBATS
- Specialists in the country – EIA and researches



# Guideline – Bats and EIA

- Special chapters about bats and road construction
- Techniques
- Free downloadable:
- [www.aplr.ro](http://www.aplr.ro)





Thank you for  
your attention!



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