

Start up SaveGREEN, 8 & 9 Septembre 2020, on line



Transport Ecology

Success based at cooperation

Hans Bekker, Netherlands



Transport

Ecology



Road building started with protection in natural circumstances
Transport helped developments in social and economic way

➔ Transport is essential

Ecology

Relation between all living organism and
with abiotic environment

➔ Ecology is essential



Civil engineering and Transport ecology



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- Applied science
- TE is a young discipline
- Use of existing knowledge in other disciplines
- Recently some first steps in (inter)national scientific research projects (universities, CEDR)

- Dealing with:
 - Roads
 - Waterways
 - Canals
 - Rail roads

 - Power lines
 - Airports



Essential background for Transport Ecology



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Knowledge of all kind of processes:

- decision making: in politics, in road authorities, in nature protection
- planning to design, contracting, building and maintenance
- scientific networks
- legacy and ownership
- (official) procedures and work schemes
- networking
- connected to other adjacent stakeholders / land users
- creating money



Cooperation between civil engineers and ecologists and many other disciplines

Both need each other

Impacts of infrastructure



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At physical environment

- fragmentation and destruction,
- running water and ground water
- soil and soil layers
- run off
- light, noise, climatically.
- spread of seeds



Impacts by infrastructure



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By Chemicals

- pollution
- carbon dioxide; NOx
- heavy metals
- oil beside the road by run off water
- impact at water quality in streams
- during construction and during use of linear infrastructure



Impact of Infrastructure



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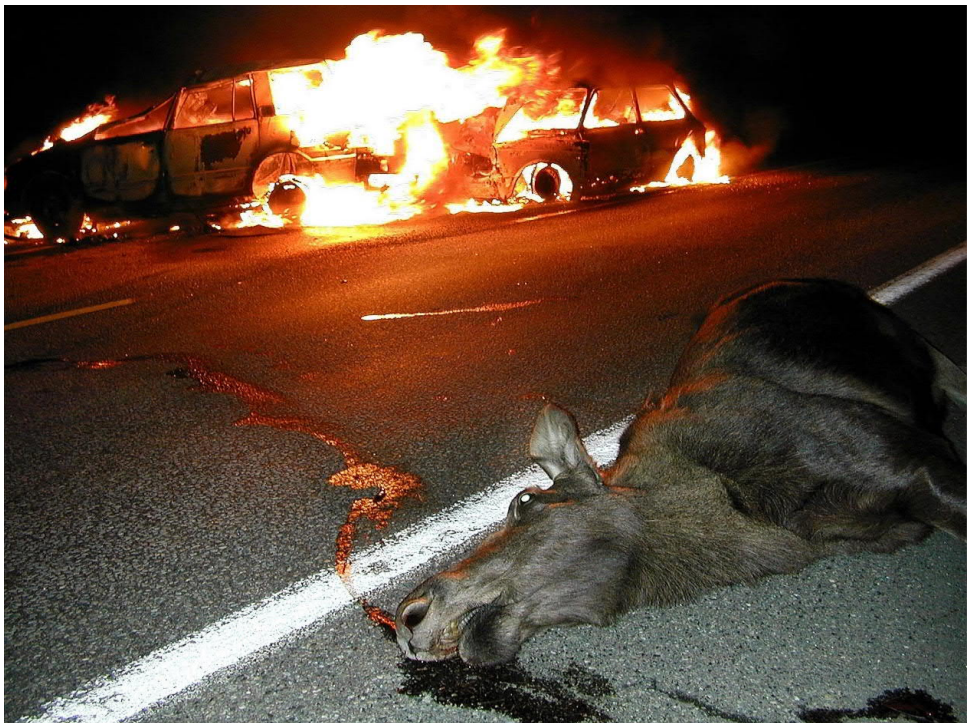
By road kills:

- impacts at people (safety)
- dead animals
- sometimes at whole local population of species
- a lot of information available
- need of analyzing data

Most visible impact of transport

Awareness impacts starts with road victims





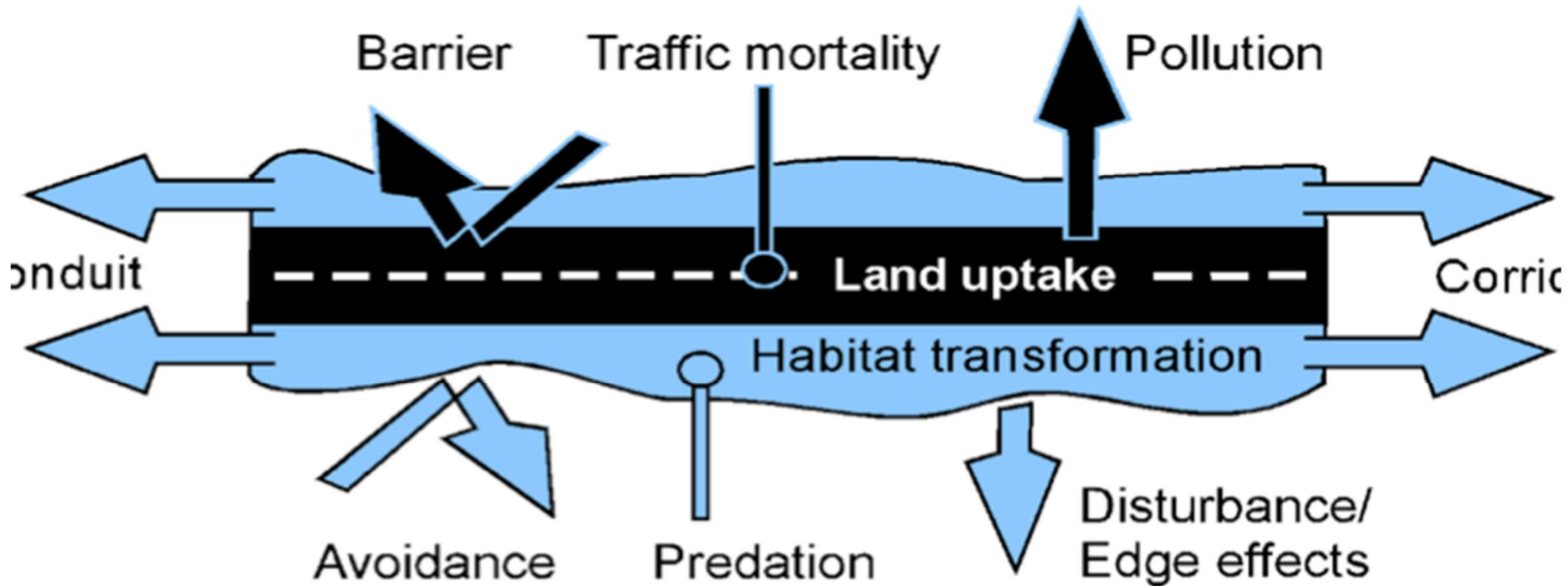
Impact by fragmentation



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Graphic to summarize impacts





How to attack these impacts?????

Basic rule



1. Avoidance

2. Mitigation DE-FRAGMENTATION

3. Compensation

4. Maintenance of:
nature and nature area
ecological measures

How de-fragmentation starts in Netherlands



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Badger, *Meles meles*

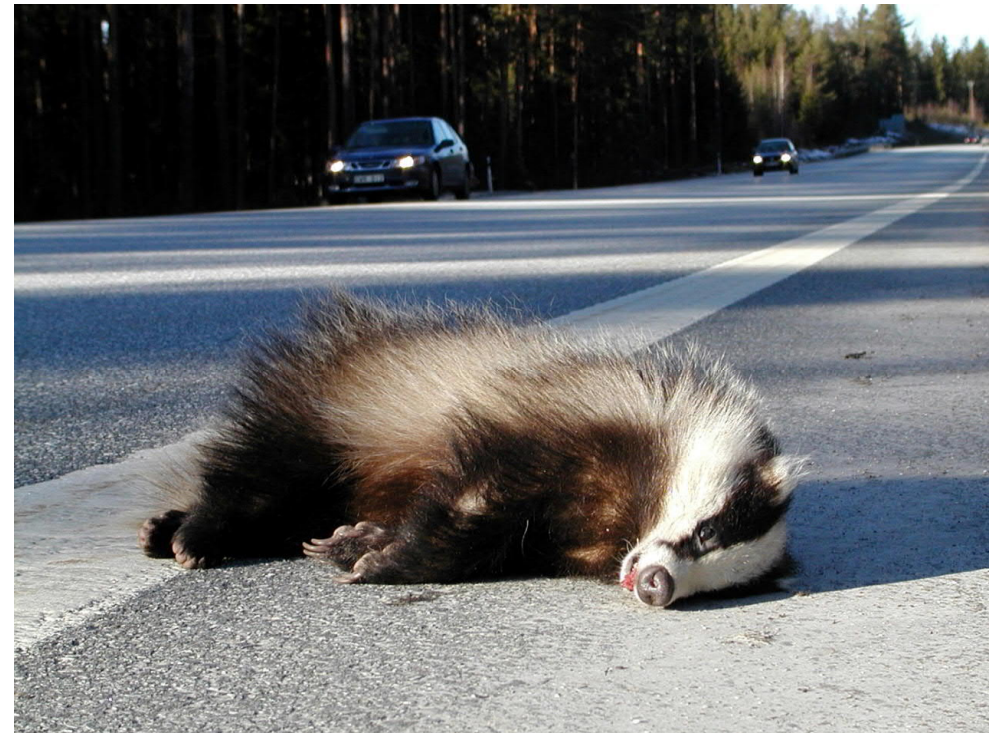


Dramatic decrease Dutch population badgers



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- 1960-1995: many badgers killed on the roads; most visible impact
Some years 20% - 25% of the total population
- Many good habitats were 'badger-empty'
 - Traffic victims
 - Degradation of badger biotope
 - Poisoning
- Number decreased between 1900 – 1980
from 5000 individuals till 1200



First action: Registration of dead badgers



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- Information from old datasets
- Action group did the registration of road victims via:
 - their network of members
 - road inspectors
 - volunteers
- ➔ This action group got a lot of attention
 - Newspapers
 - Politics
 - Procedures by court
 - Orphans





First measures 1974-1990 at motorways

- 1974: first badger tunnel (⊙ 0.80m) Milestone
- 1975 – 1979: 4 tunnels for badgers (□ 1.20 / 0.80)
- 1980 – 1984: 5 tunnels for badgers (⊙ 0.40, 0.30)
- 1985 – 1989: more tunnels were built

All these badger tunnels built by new roads

Milestone in 1989:

First badger tunnel realized under existing road



Special project by existing roads 1991 - 1994



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- 1990: Minister of Transport ordered to start a project for 40 badger tunnels by existing motorways
- This is a kind of win back method: restoring faults made in the past
- To identify problem points:
 - Knowing the distribution maps
 - Registered victims
 - Prioritized by the number of victims per spot
- One of the solved problem points was opened by the minister herself



monitoring



- Monitoring by:
 - track bed
 - photo camera
- Prove: badger tunnels well used by badgers andmany other species



One year camera trap at one small fauna tunnel



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| | | Badger | | Marten | | Polecat | | Fox | |
|---------------------|------------|---------------|-----------|---------------|-----------|----------------|-----------|------------|-----------|
| | | <i>out</i> | <i>in</i> | <i>out</i> | <i>in</i> | <i>out</i> | <i>in</i> | <i>out</i> | <i>in</i> |
| Juli | 27 | 9 | 6 | 2 | 3 | 2 | 1 | 0 | |
| Augustus | 29 | 17 | 11 | 5 | 1 | 2 | 1 | 0 | |
| September | 44 | 4 | 14 | 3 | 1 | 0 | 1 | 0 | |
| Oktober | 24 | 16 | 10 | 2 | 0 | 1 | 0 | 0 | |
| November | 5 | 4 | 2 | 0 | 0 | 0 | 0 | 0 | |
| December | 10 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Januari | 11 | 4 | 1 | 0 | 0 | 0 | 5 | 5 | |
| Februari | 52 | 36 | 0 | 0 | 2 | 6 | 2 | 8 | |
| Maart | 48 | 36 | 2 | 1 | 6 | 6 | 5 | 8 | |
| April | 63 | 46 | 1 | 2 | 5 | 3 | 1 | 7 | |
| Mei | 148 | 102 | 2 | 4 | 0 | 0 | 2 | 7 | |
| Juni | 43 | 21 | 0 | 4 | 0 | 0 | 0 | 3 | |
| Totaal (971) | 504 | 301 | 49 | 23 | 18 | 20 | 18 | 38 | 0 |

Ruud van den Akker (Zoogdier)



Badger in 2020



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- Badger tunnel now called small fauna tunnel
- By NRA standard procedure by new roads, reconstruction and under pressure during maintenance
- By local communities: pressure still necessary
- In Netherlands there are now over 4.000 small fauna tunnels
- Number of badgers around 7000 individuals
- Increase of distribution over suitable habitat

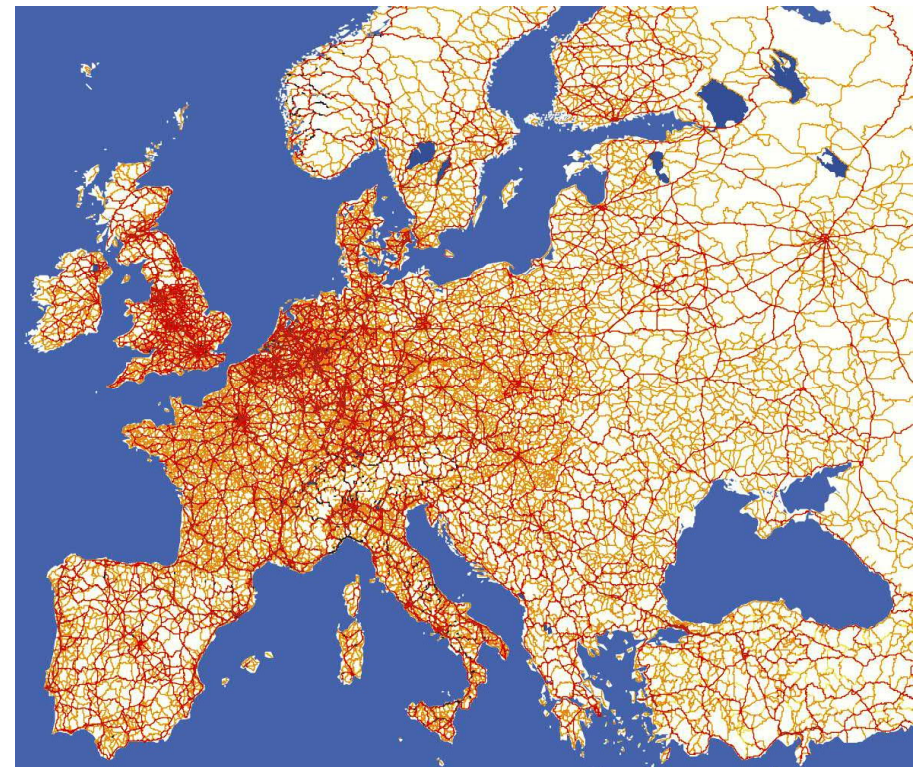


Dutch Multi-Years Program for Defragmentation (MJPO)



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- Success badger was one of the starting points
- Nature Transport policy:
 - National Nature Network
 - National Program for Traffic and Transport
- Most urgent situation
- MJPO:
 - 2004 -2018
 - 176 locations 165 solved
 - existing national infrastructure
 - signed by 3 ministers





Small fauna tunnel



Ongoing embankment

Adapted existing local viaduct





Use of gantry by tree dwelling species





Big underpass





Ecoduct Groene Woud



Matrix fauna passages and species (COST 341)



IFNE
d Ecology

| | Eco duct | Bridge on poles | Big Fauna Tunnel | Bridge with ongoing path | Culvert with ongoing path | Small fauna tunnel | Tree bridge | Viaduct with joint use | Tunnel with joint use |
|----------|----------|-----------------|------------------|--------------------------|---------------------------|--------------------|-------------|------------------------|-----------------------|
| | | | | | | | | | |
| deer | | | | | | | | | |
| fox | | | | | | | | | |
| leopard | | | | ??? | ??? | | | | ??? |
| squirrel | | | | | | | | | |
| elephant | | | | ??? | | | | | ??? |

IENE; 1995 -2020



- Network experts for transport ecology
- International meetings and symposia
(January 2021 in Portugal)
- Handbook: 2003 COST 341 (updated)
- Training (invitation by RA Myanmar)
- Initiator to research
- Connected to CEDR

COST 341

**Habitat Fragmentation due to
Transportation Infrastructure**

WILDLIFE AND TRAFFIC
A European Handbook for Identifying Conflicts
and Designing Solutions



European
Co-operation
In the Field of Scientific
and Technical Research



Attention / Learning points



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- Necessity to tell the story of impacts and de-fragmentation again and again
- Good registration of: goal, place and maintenance of defragmentation measures
- Maintenance is often a weak point
- Attention at paper \neq attention in work



Attention Learning Points



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recognized problem (facts)

proved solutions (examples)

willingness by all stakeholders

persons and organisations that dare to act

political acceptance helps a lot

start simple so you know there will be success

festivity by each mile stone



Ecoduct Kootwijk

4th ecoduct in Netherlands (1999)

Milestone: First ecoduct over an existing motorway



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Celebrate Milestones

- Festivity by official opening
- Queen Beatrix opens ecoduct
 - Officially
 - Status
 - Visible for public
- Nature needs Awareness:
Local school kids helping
Kids are the future





Thank you for attention

