FROM PROVIDING SINGLE FAUNA PASSAGES TO RECONCILING GREEN AND TRANSPORT INFRASTRUCTURE IN EUROPE

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Anciently

Roads

1970

Roads and animals
Fauna passages to decrease road kill
And some threaten species

Roads and ecology
Transport network adapted to minimize negative impact on ecological connections, the green network

today

What, Why and what's in future?

IENE

Jornadas técnicas del Grupo de Trabajo de Fragmentación de hábitats causada por infraestructuras de transporte ‘Conectividad ecológica y vías de transporte’. Cáceres, 13-14 de noviembre de 2013.
Contents

- Biodiversity, Green infrastructure, Background
- The IENE network
- Single fauna passages
- Connectivity across a single infrastructure: Egnatia / Carpathian examples
- The consideration of ecological connectivity in a country/ region: Czech republic
- Defragmentation Programs in The Netherlands and Germany
- Some general conclusions

Increasing roadkill

Rapidly growing traffic since second world war with increasing numbers of road killed animals as a consequence started an debate in England and Netherlands. The viewpoint was mainly ethical.
Nature Conservation in 1970:th

• Focused on protection of areas.

• Red List, Threatened species
  Red list system was first concieved in 1963 and set standard for species listing and conservation assessment efforts
  *The International Union for Conservation of Nature (IUCN).*

First actions in Europe: fauna passages

- Fauna passages for Badgers Decade 1970s
- United Kingdom and The Netherlands
- Providing safe passages to reduce road casualties for a single species.
- Badgers often used, the mortality was reduced and the population increased.

Not only casualties
Road E4 Sweden, impact on some butterflies.

Obviously also barrier effects


And connectivity…

The Netherlands

...And Traffic noise in natural environments is a considerable problem for nature conservation

Negative effects of roads on birdlife are well documented:

Sources: Reijnen & Foppen 2006, Parris & Schneider 2009 and Barber et al 2010, Kociolek et al 2011


Developed view on ecological effects caused by infrastructure and traffic

Demands for
A new concept: Adapt new roads to wildlife.
New Knowledge – New Approach 
In road planning and construction

An example from Sweden. 1998

IENE – Infra Eco Network Europe

- Formalised network of experts working with various aspects of transportation, infrastructure and ecology (Since 1996)
- Mainly (but not exclusively) European authorities, institutes and individual experts
- Non-profit, non-governmental, non-political
- Providing an independent, international and interdisciplinary arena to encourage and enable cross-boundary cooperation in research, mitigation and planning
- Addressing decision makers, planners and researchers as well as the public
IENE – 1996 -2003

Wildlife and Traffic
Launched in Brussels 2003

State of the Art
Published by many countries during the 2000 decade

Wildlife and Traffic
Translated to many languages

IENE: From 2003 to 2009

Wildlife and Traffic
Launched in Brussels 2003

IENE hibernation

http://www.varangy.hu/category/image-galleries/restartiene
Egnatia Highway, Greece

At the late of 1990ies “Egnatia Motorway” was the first case in Greece discussing:

- natural fragmentation
- disruption of connectivity between important wildlife habitats in Pindos Mountain range
- creation of impermeable barriers in gene flow of wildlife species with the Brown Bear as a key case

Egnatia Motorway and its vertical branches

Intervention by ARCTUROS and other NGOs gave as basic results:

- The changing of the initial alignment of the Highway (AVOID)
- A considerable increased number of mitigation measures as tunnels and bridges (covering almost the 50% of the total length of Egnatia) (MITIGATE)

But:

- Without the construction of the appropriate fence
Egnatia Highway, Greece

Inappropriate fencing led to:

- road mortality of bears as a main human caused mortality factor in Greece
- more than 50 car–bear accidents with 30 dead bears recorded

New discussions lead to complementary measure as:

- special information signs
- construction of an appropriate fence (started in 2012 and will be completed in 2013)

THE FINAL CONCLUSION FROM GREECE:

THERE ARE NO SHORT CUTS IN PLANNING AND CONSTRUCTING GREEN – TRANSPORT INFRASTRUCTURE
So, We no what to do then! Problem solved, all good?

Unfortunately not!

Protected Areas – Biodiversity decrease

Cumulated area of nationally designated areas over time in 39 European countries

Living Planet Index indicates steady Biodiversity decrease
Mammals and bird populations are severely affected by infrastructure

Mammal and bird populations are displaced from infrastructure, and displacement distance depends on the habitat type and on the species.

A decline in species abundance of up to 50-70 %
- for birds within 1 km
- for mammals within 5 km

From infrastructure

A decline in species abundance of
- 28-36 % for birds within 2 km and
- 25-38 % for mammals within 5 km

From infrastructure


Infrastructure have a crucial impact in future development of biodiversity

**Loss of mean species abundance if business as usual to 2050.**

Yellow: loss due to infrastructure, encroachment and fragmentation

1. Direct Infrastructure effects.
2. Indirect effects of infrastructure through new exploitation
3. Fragmentation by roads and land-use change.

Remaining Biodiversity expressed as Mean Species abundance (MSA)

From: OECD Environmental Outlook to 2050. The consequences of inaction.
New roads, railways, urban sprawl... make the situation worse, step by step

New infrastructure will have negative impact on biodiversity

Biodiversity at a certain time

The situation is steadily growing worth

Need to be compensated to avoid "net loss" in biodiversity

Mitigation measures and other adaptations to biodiversity

A stairway to hell!

The serious question asked is:
"Can the society survive the ongoing “arm-wrestling”?"
The Organisation for Economic Co-operation and Development

OECD concludes:
“Business as usual is not an option”

EU: Biodiversity strategy to 2020
"Towards implementation"

Recognises that infrastructure-building, urbanisation, industrialisation and physical intervention in the landscape in general are among the most significant drivers of the fragmentation of ecosystems and habitats.
Green infrastructure

By 2020, ecosystems and their services are maintained and enhanced by establishing green infrastructure and restoring at least 15% of degraded ecosystems.

Action 6b: The Commission will develop a Green Infrastructure strategy "as contribution to further integrating biodiversity considerations into other EU policies,"

Communication on "Green Infrastructure (GI) – Enhancing Europe's Natural Capital" adopted on 6 May 2013

*a strong signal towards decision makers, planners and promoters to invest in green infrastructure projects at local, regional, national and cross-boundary level.*

Green infrastructure is, for example

- Green bridges and eco-ducts re-connecting natural areas that have been artificially divided, by roads or railway lines
- An integral part of urban areas. Properly designed parks, walking paths, green roofs and walls
- Many things, inside and outside protected areas, where the latter are the core features and the former are the corridors that connect them up to form a functioning network.
- Different types of connecting elements as isolated elements or stepping stones, a group of trees, or corridors that physically connect habitats, like rivers or hedgerows, linking field and forest habitats.
Green Infrastructure guidance

The Commission will develop technical guidance setting out how Green Infrastructure will be integrated into the implementation of the main policies and their associated funding mechanisms from 2014 to 2020.

Already available:
- Better environmental options for flood risk management
- **Guidance on connectivity**
- Natural water retention measures (link to adaptation)
- Integration of biodiversity and climate change into SEA and EIA
- Connecting Smart and Sustainable Growth through Smart Specialisation
- Smart guide to multi-benefit investments
The Carpathian

A new Motorway crosses a wildlife corridor of European importance

Inadequate environmental assessment, and lack of mitigation measures caused the halt of building the building

*An* population of 250 brown bears north to the proposed route is at risk to be isolated from the population in south

*The* corridor is important also to all kins of animals from Lynxs to Amphibians
Ecological Landscape Analysis reveals wildlife corridors

Green bridges and other fauna passages are suggested
The aim is to promote a sustainable transport infrastructure by using the "avoidance – mitigation – compensation" principle

A new project aiming at identification of real migration and dispersal corridors for large mammals started in 2007

(The Czech Council for Research, Development and Innovations Project No. 2d4/36/08)
Sources and Results

**Sources**
- Distribution data
- Barrier analysis
- Habitat suitability models

**Results**
- Important Migration Areas
- Long Distance Migration Corridors
- Field verification of real permeability

**Parameters of migration corridors**
- Width of corridors - generally 500 meters (in critical places such as crossings with linear barriers minimally 50 meters)
- Total length - 10,000 km (6.5% of the whole territory of the Czech Republic)
- 85% of the total length of corridors is located in forests, 15% in agriculture landscape
- Currently, there are 28 points on the corridors net that are impermeable (especially crossings with the transportation infrastructure) – these points are proposed to be solved in the near future (building of new green bridges etc.)
- There are another 176 sections where passing through is very difficult. The spatial protection and restitution of the permeability in the long term horizon are the proposed solutions for this places
Defragmentation Programmes

Germany:
- Network of German Habitat Corridors
- German Defragmentation Programme
- Ratified in February 2012
- 93 priority areas for defragmentation measures

Netherlands:
- Dutch National Ecological Network
- Long Term Defragmentation Programme
- Ministry for Transportation and Ministry for Environment
- 2005 - 2018
- 215 conflict points, 602 measures

The German Defragmentation Program two main goals

To avoid fragmentation when planning new roads
To restore connectivity due to the existing road network

Adopted by the Federal Cabinet 29. February 2012
Concrete Actions to restore connectivity due to the existing road network

<table>
<thead>
<tr>
<th>Defragmentation concepts of the Federal states</th>
<th>Biological Diversity concept of the Federal states</th>
<th>Greenbridges built under the economic stimulus package II</th>
<th>Other measures</th>
<th>Monitoring</th>
<th>Balance between the national defragmentation concept and the concept of the Federal states</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 completed, 2 work in progress</td>
<td>9 completed, 2 work in progress</td>
<td>17 (+2) Greenbridges</td>
<td></td>
<td>5 (most of them by camera-systems)</td>
<td>8 Federal states</td>
</tr>
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Problem: to get money for the construction of Greenbridges and other measures

Further solutions: To publish the most important results of scientific investigations together with the concepts of the Federal states

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Restoration of Connectivity: next tasks

Hinterland-Connection: To plan, to get and safeguard the relevant areas

Monitoring: In which cases, with which questions?

Greening of the bridge itself: Function for whom and why?

Hunting: Where, how and when?

Luhacovice, 16. – 18. octubre 2013
Marita Böttcher, FG II 4.2, BfN
Some General Conclusions from Germany

**Wildlife passages** should be understood as an important element of Green Infrastructure but must be link to natural habitats and wildlife corridors.

**Wildlife passages must be better integrated with the surrounding landscape.** It is especially important for restoring and maintaining the populations of invertebrates and other small fauna.

In cases of wildlife corridors for larger mammals **it might be necessary to restore wildlife corridors in big areas**. Cooperation between different countries is needed.

**Monitoring of the measures must include habitat quality** and the presence of indicator species in the passages and their surroundings.

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We´re on the way but........

We have still a lot to achive!

So far strong focus is on barrier effects and connectivity but what about the rest?
The trend must be changed

From the concept of today: Minimize negative impact

To a new concept: Improve biodiversity

A new perspective is necessary

Ecological Performance Indicators

The problem
Transportation entails a number of qualitatively different impacts on nature and biodiversity

The Task
to develop a conceptual model of the impacts of transport infrastructure on biodiversity, that could help getting the required overview of the field.

[Diagram showing different ecological performance indicators such as species invasion, road mortality, disturbance, landtake of valuable habitats, etc.]

Vision
Target
Success!? | Well understood by planners and decisionmakers | Resources allocated for measures taken with respect to All this different aspects of ecological impact in

The Swedish National Infrastructure plan 2014 - 2025

For this purpose around 600 milion Euros is allocated

Far from finished but we have some results so far from this concept
Money for measures in existing roads and railroads (tSEK).

From from the Swedish National Infrastructure plan 2014-2025

Barrier effect | Road mortality | Disturbance | Landtake of valuable habitat | Verge management of valuable habitat | Invasive Alien species

Nature

Landscape

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On behalf of the IENE Steering Committee

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