

Defragmentation in Belgium (Flanders)

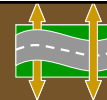
Connecting nature, connecting people

Johan Peymen



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Situation



Flanders

Brussels

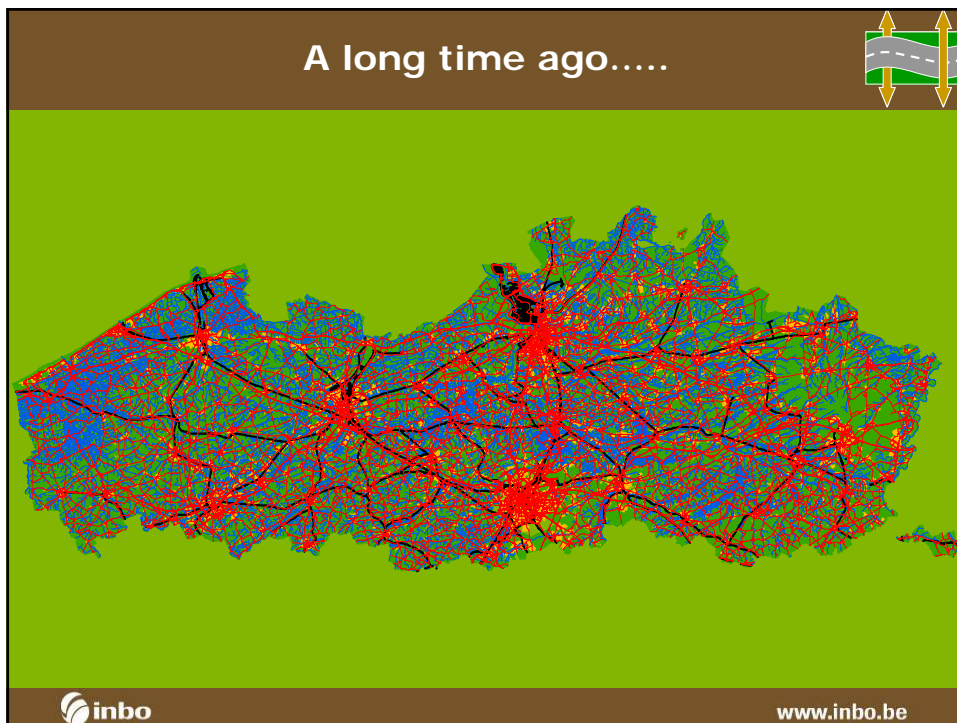
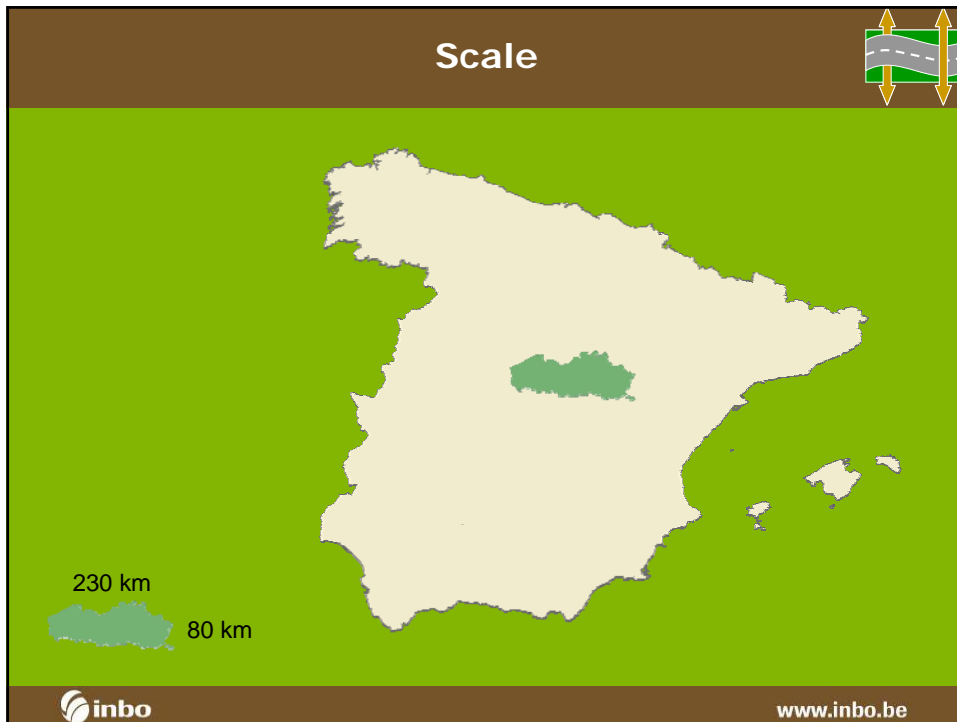
Wallonia

FLANDERS

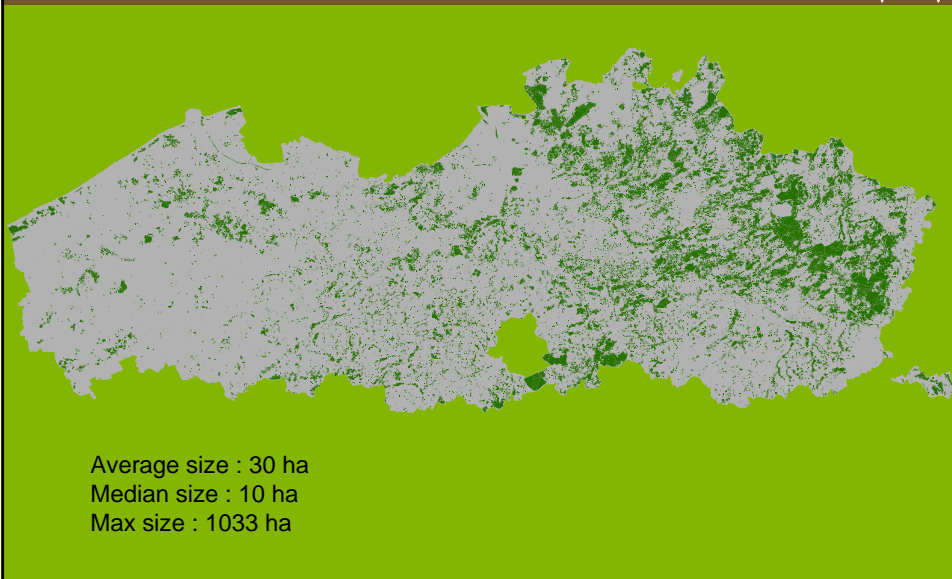
- 6 milj inhabitants (Wallonia : 3,4 milj)
- 13683 km² (Wallonia : 16844 km²)
- 522 inhabitants/km²



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Areas with high nature value

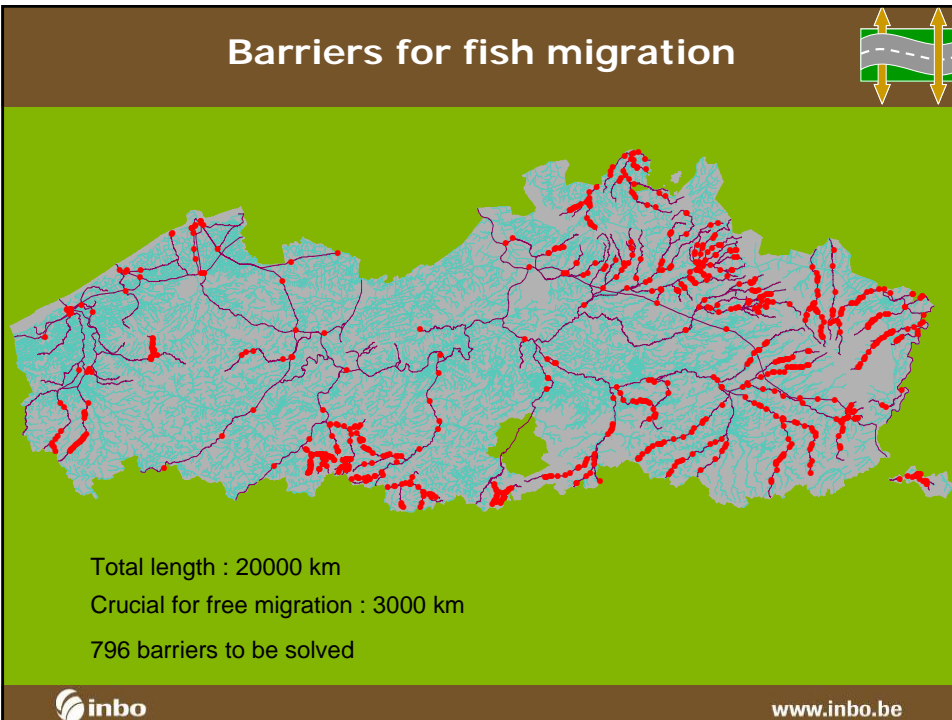
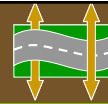


Average size : 30 ha
Median size : 10 ha
Max size : 1033 ha



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Barriers for fish migration



Total length : 20000 km
Crucial for free migration : 3000 km
796 barriers to be solved



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How to solve fragmentation?

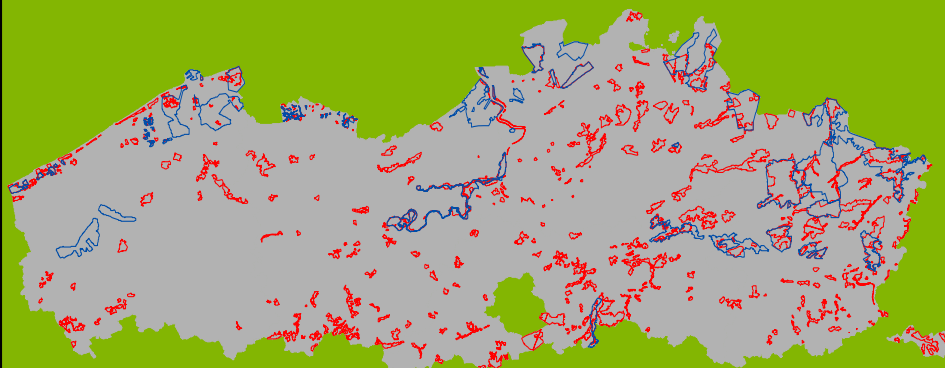
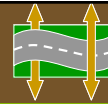


- **Ecological networks**
 - Natura 2000
 - Flemish Ecological Network
- **Technical mitigation**
 - Faunapassages (ecoducts, ecotunnels,...)
 - Solving bottlenecks for migration in rivers
- **Priority map for mitigation of barriers caused by transport infrastructure**



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Ecological networks : NATURA 2000

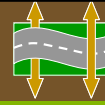


Natura 2000 network : 166.187 ha or 12,3% of Flanders



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Flemish Ecological Network

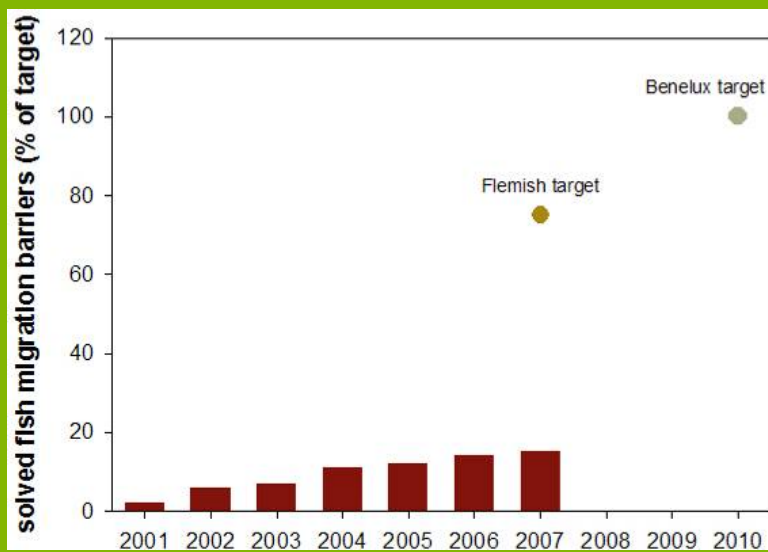
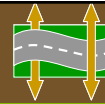


- Aim : merging fragmented nature and forest reserves into larger and interconnected units of nature (FEN), supported by : areas with mixed functions and nature corridors
- Target (till 2010) : 125000 ha FEN, 150000 mixed area, 433 nature corridors
- Realised : 70% FEN, 0,7% mixed areas, 3% nature corridors



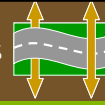
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Mitigation of fish migration barriers



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Priority map for mitigation of barriers

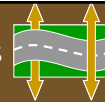


- **Flanders is one of the biggest 'cities' of Europe**
 - On every km² there is a place to defragment
 - Each 1m² has a lot of potential users (nature, infrastructure, agriculture, industry, recreation,...)
- **Defragmentation within a 'city' >< defragmentation in big open 'natural' areas**
- **Opportunistic approach :**
 - Where can nature be developed and what are the problems?
 - Look for the most efficient way to keep the existing biodiversity
 - Use species in a second phase
 - Use the existing policy opportunities
 - Keep it simple for policymakers

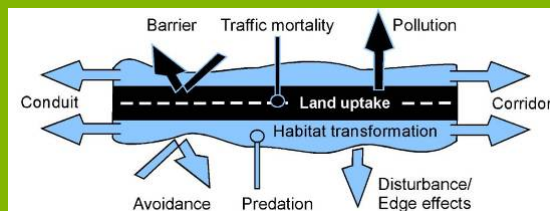


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Priority map for mitigation of barriers



- **Fragmentation by linear transportation infrastructure is complex**

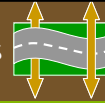


- **Difficult to make conclusions on a short period concerning the exact impact on nature**
- **Need for pragmatic instruments in the field of spatial planning for the possible impact and evaluation of effects**
 - Use of ecological information on the level of planning
 - Vulnerability-concept is such an instrument



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Priority map for mitigation of barriers

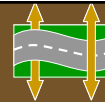


- **Areas important for nature policy**
 - Making priorities
 - Potential bottlenecks with nature
 - First areas, then species
- **Vulnerability map for barrier effects**
 - Species are used
 - Roads, canals, railways
- **Vulnerability map for ecotope loss**
 - Value of an area for nature conservation, based on vegetation
- **Distribution of species (fauna)**
 - Red list species



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Policy map

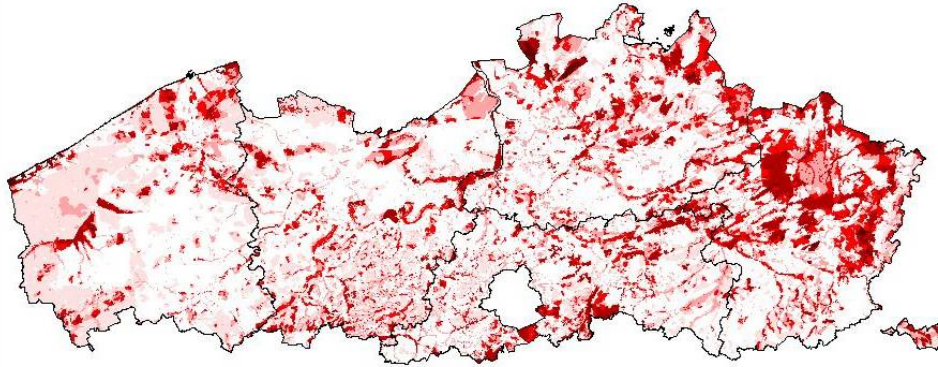
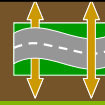


POLICY MAP	WEIGHT
Nature reserve	5
Forest reserve	5
Protected dune area	5
Flemish Ecological Network	5
Desired Nature and Forest Structure (Nature Core Area)	5
Ramsar convention	3
European Bird Directive	3
European Habitat Directive	3
Desired Nature and Forest Structure (Nature Interwoven Area)	3
Integral Supporting network	1
Regional Landscape	1
Area for grassland birds	1

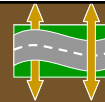


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Policy map

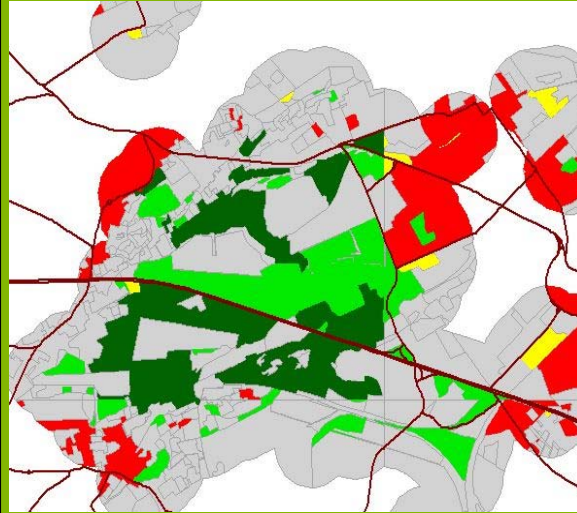
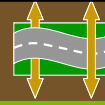


Vulnerability map for barrier effects



- **Barrier effects**
 - disturb migration of animals
 - effects on migration within home-range
 - effects on migration outside the direct habitat (dispersion)
 - fragmentation is not same as barrier (overall effect)
- **Maps for 20 species (mammals, amphibians, reptiles, birds)**
 - Relevant for barrier
 - Possible to make digital map with potential habitats in Flanders
 - Red list species, but also animals with high popularity index

Habitat map

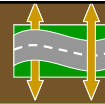


- Less suited
- Suited
- Very suited
- Not suited within home range
- Hard barrier
- Roads



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Barrier map

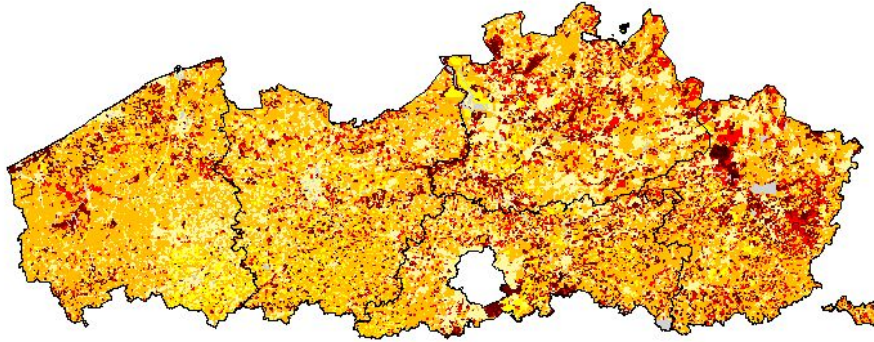
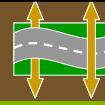


- No priority for barriers
- Small barrier
- Barrier
- Big barrier



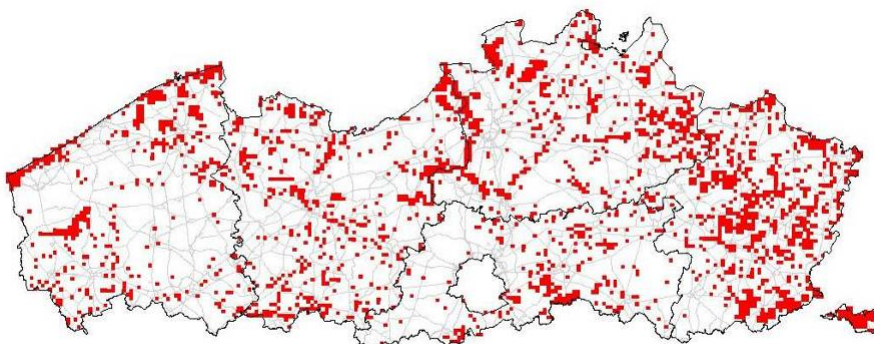
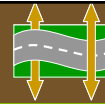
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Vulnerability map for ecotope loss



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Distribution map of red list species

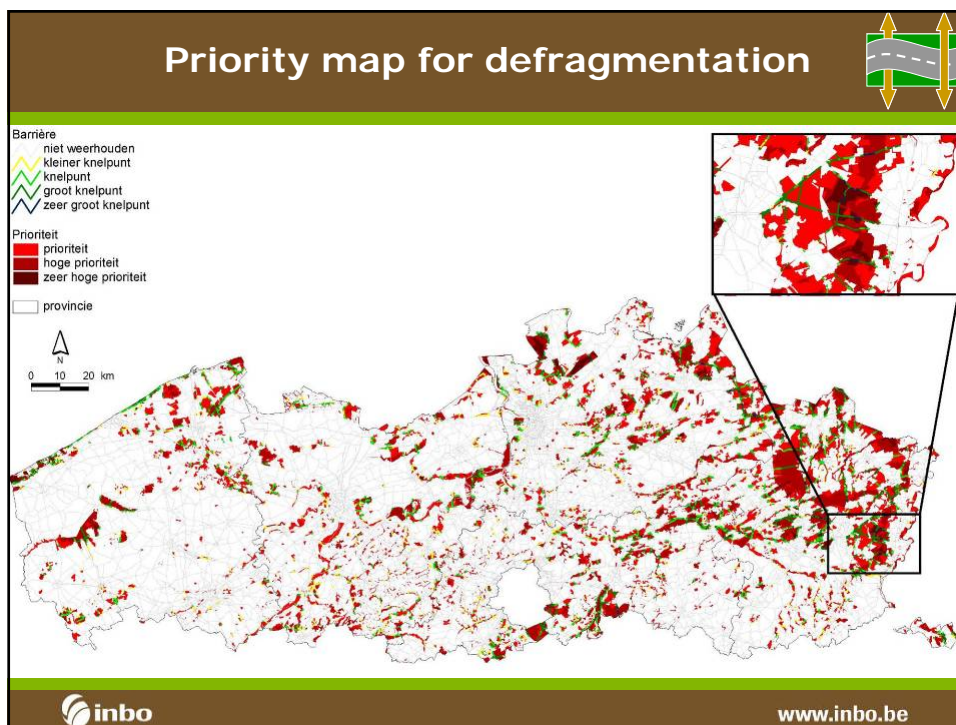


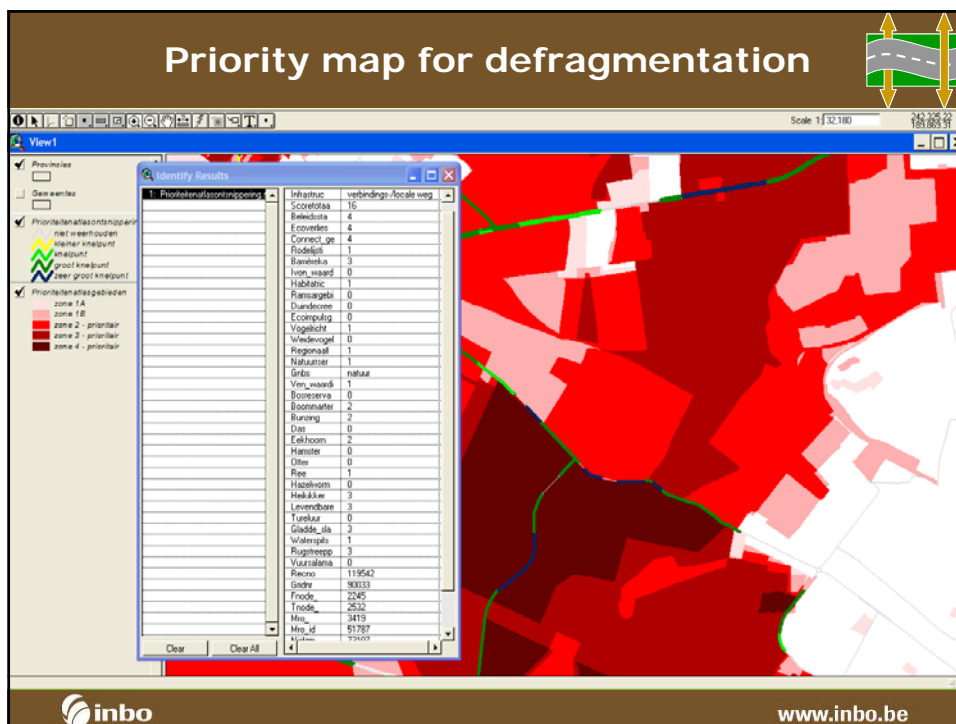
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Priority map for defragmentation

POLICY	/	prior	high priority	very high priority
score	/	2	3	4
BARRIER	not vulnerable	less vulnerable	vulnerable	very vulnerable
score	1	2	3	4
ECOTOPE LOSS	not vulnerable	less vulnerable	vulnerable	very vulnerable
score	1	2	3	4
AREA	> 50 ha	> 100 ha	> 500 ha	> 1000 ha
score	1	2	3	4
RED LIST	1 - 2	3 - 5	6 - 10	11 - 21
score	1	2	3	4
TOTAL	< 9	10 - 12	13 - 15	> 15
Priority	small priority	prior	high priority	very high priority

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Evolution of the Highway Network

- First highways in Belgium late '50
- '60 -'70 development of the Belgian Network
- Today : only "Missing links"

↓

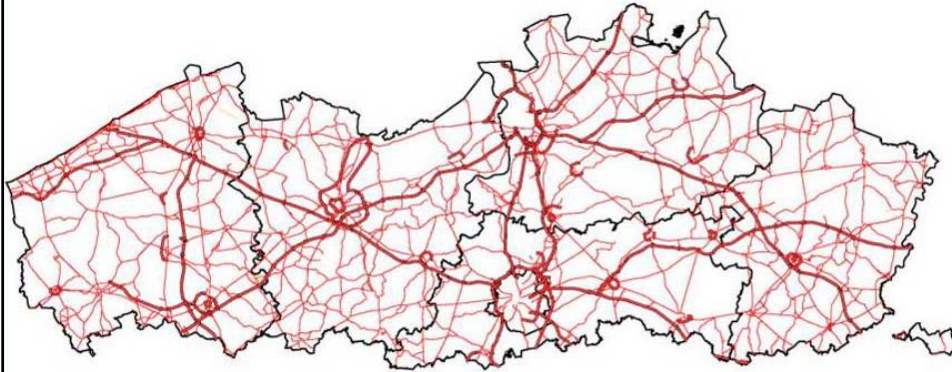
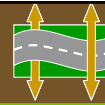
- Habitats were devided a long time ago.

↓

- Defragmentation
= reconnection to 'new' territories
= re-enlarging fragments to more sustainable habitats

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Regional road network (2008)

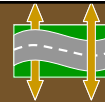


- Regional roads, highways and motorways (6300 km)
- Responsibility of Flemish Road Administration
- Defragmentation Strategy (2004)



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Small infrastructures



- Ecotubes, ecoculverts, amphibian tunnels
- Construction during maintenance and reconstruction of existing roads
- Implementation of a “defragmentation reflex” in all road projects in the early planning stage.
 - directive : ask the project team ecological engineering for advice
 - = Adaptation to a different way of working.



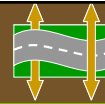
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Ecotube : A2 – E314 – Mechelse heide



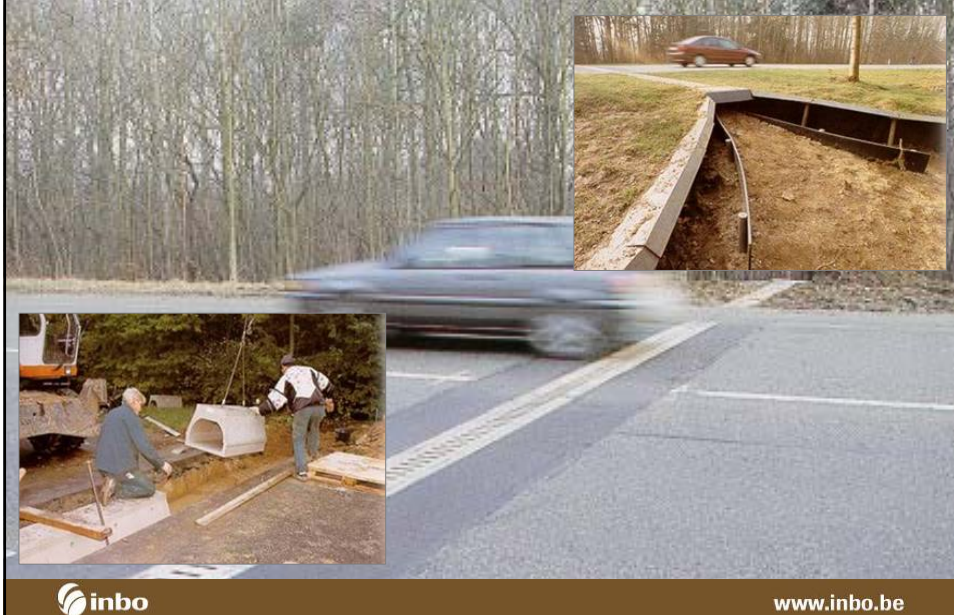
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Ecoculvert : N 79 - Borgloon



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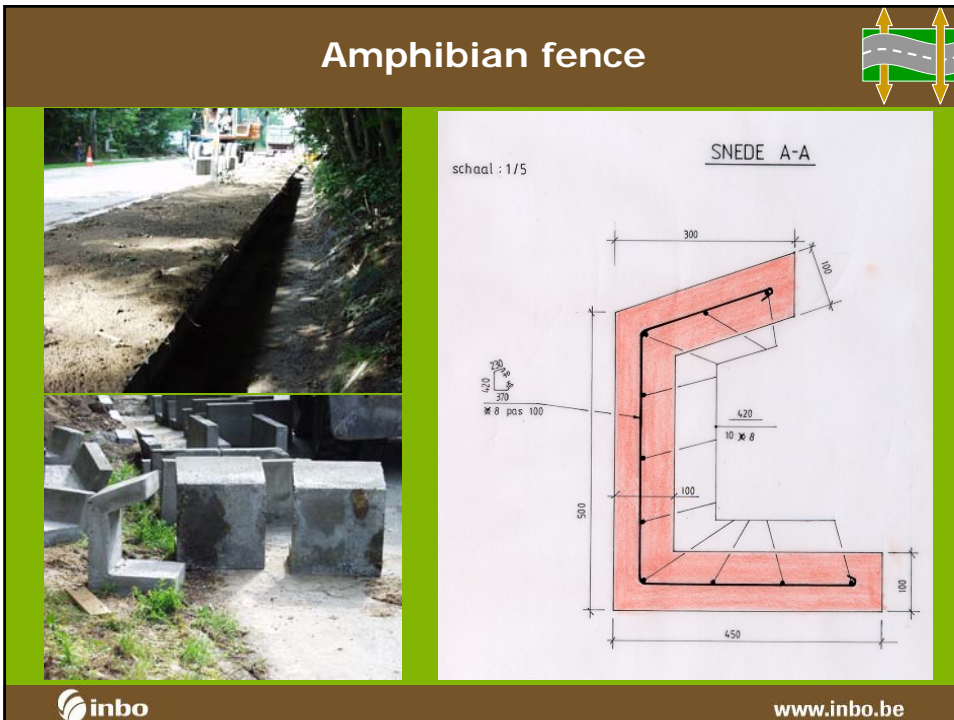
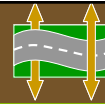
Amphibian tunnel :



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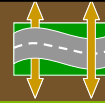
Amphibian fence



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Large infrastructures

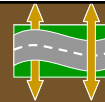




- **Studies of track sections crossing nature reserves**
 - Defragmentation with several measures built in corporation with the environmental administration
 - = Mechelse Heide, Meerdaalwoud
- **Studies of complete road tracks**
 - Highways in the province of Antwerp E19, E34/E313
 - E40/A10 from Brussels to Oostend

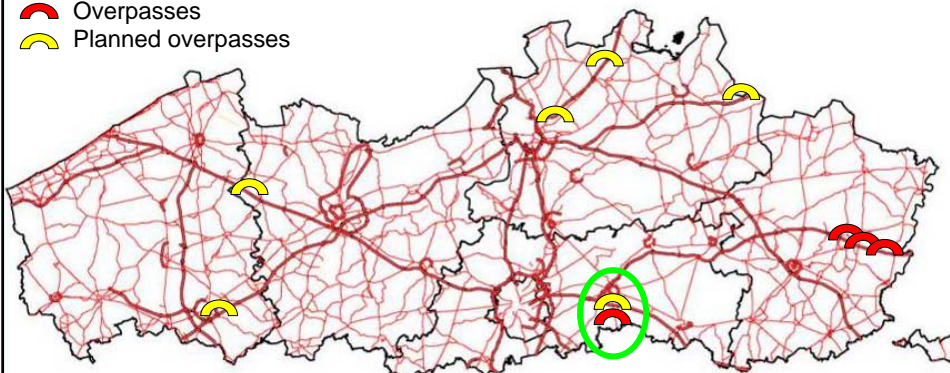


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Large infrastructures



-  Overpasses
-  Planned overpasses

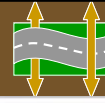


- **National road N25**
- **Connects 2 forest reserves**
- **1 ecoduct realised in 2004**



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Ecoduct : N25 - Meerdaalwoud

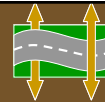


- Connects 2 forest reserves
- Bridge:
 - Width 65 m
 - Separate 'co-use' by horse riders



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Ecoduct : N25 - Meerdaalwoud



- horse track
- separated with tree trunks
- 'real' ecoduct
- wall : reduce impact of noise and light from traffic



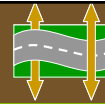
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Ecoduct : N25 - Meerdaalwoud

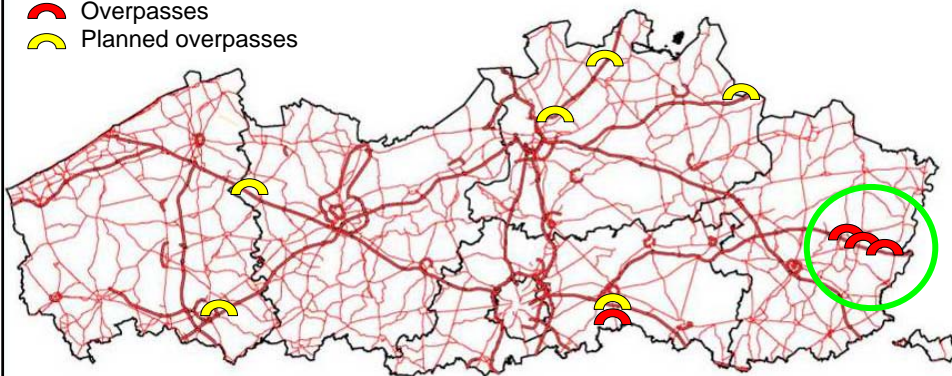


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Large infrastructures



- Overpasses
- Planned overpasses

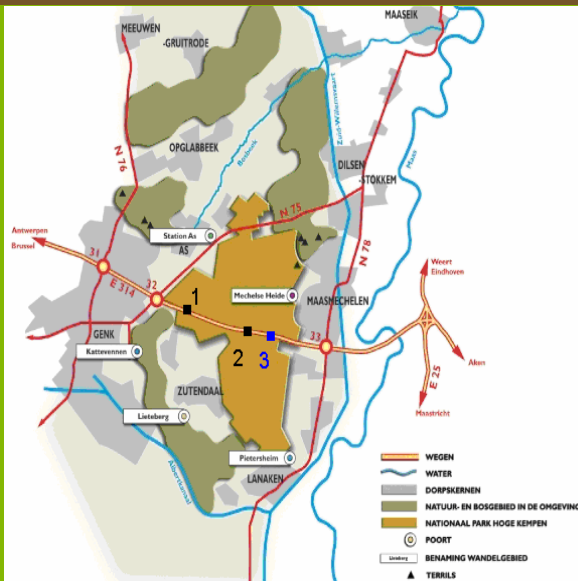
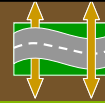


- Highway E 314
- Connects 2 biggest nature reserves
- 1 ecotunnel, 1 eco'velo'duct, 1 ecoduct



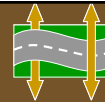
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Large infrastructures



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Ecotunnel – E 314

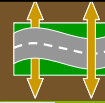


- Connects 2 heath reserves
- Tunnel:
 - Width : 5 m
 - High : 3 m
 - Length : 20 m
- Light at end of the tunnel?



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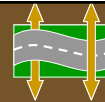
Ecotunnel – E 314



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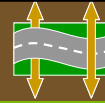
Ecotunnel – E 314



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Ecoveloduct – E 314

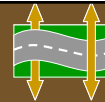


- Existing bridge transformed
- First road that is taken away
- Eco'velo'duct : co-use by fauna and bikers
- Water to attract fauna



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Ecoduct – Kikbeek - E 314

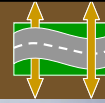


- Built in 2005
- Ecoduct:
 - width : 40 m
 - length : 75 m
- Cost: 4,6 milj euro
- 2 concrete tubes
- Soil on it from surrounding

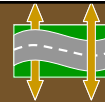


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Ecoduct – Kikbeek - E 314



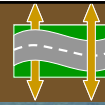
Ecoduct – Kikbeek - E 314



- **Monitoring plan**
 - 2 cameras
 - ink and sandbed
 - soiltrap
 - datalogger
 - 'snake' tiles

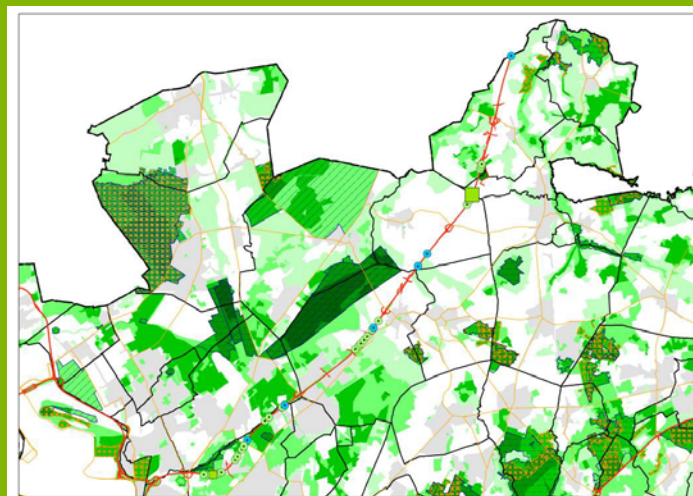
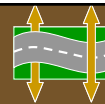
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Ecoduct – HST – E19



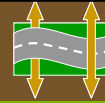
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Ecoduct – HST – E19

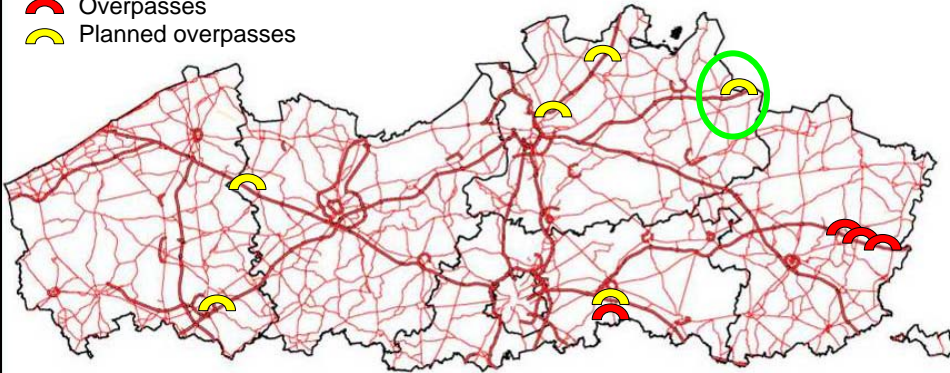


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Ecoduct – E34 / A67



- Overpasses
- Planned overpasses

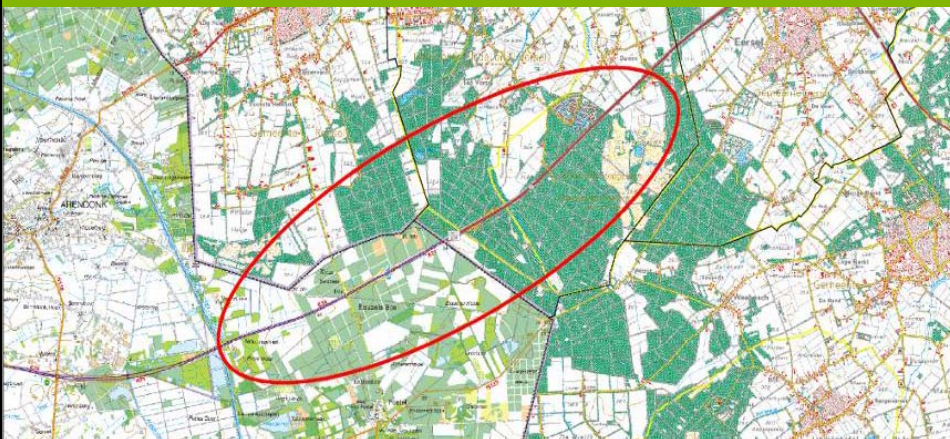
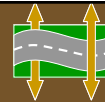


- Ecoduct planned on boarder ?
- International cooperation
- Looking for best solution
- Learning proces (connecting people, connecting nature)



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Ecoduct – Flanders / the Netherlands



- Different procedure
- Different timing / speed
- Communication



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