

Protection of connectivity between large carnivores habitats in conditions of transportation infrastructure development in Poland

Sabina Nowak

Association for Nature "Wolf"-Twardorzeczka

Włodzimierz Jędrzejewski

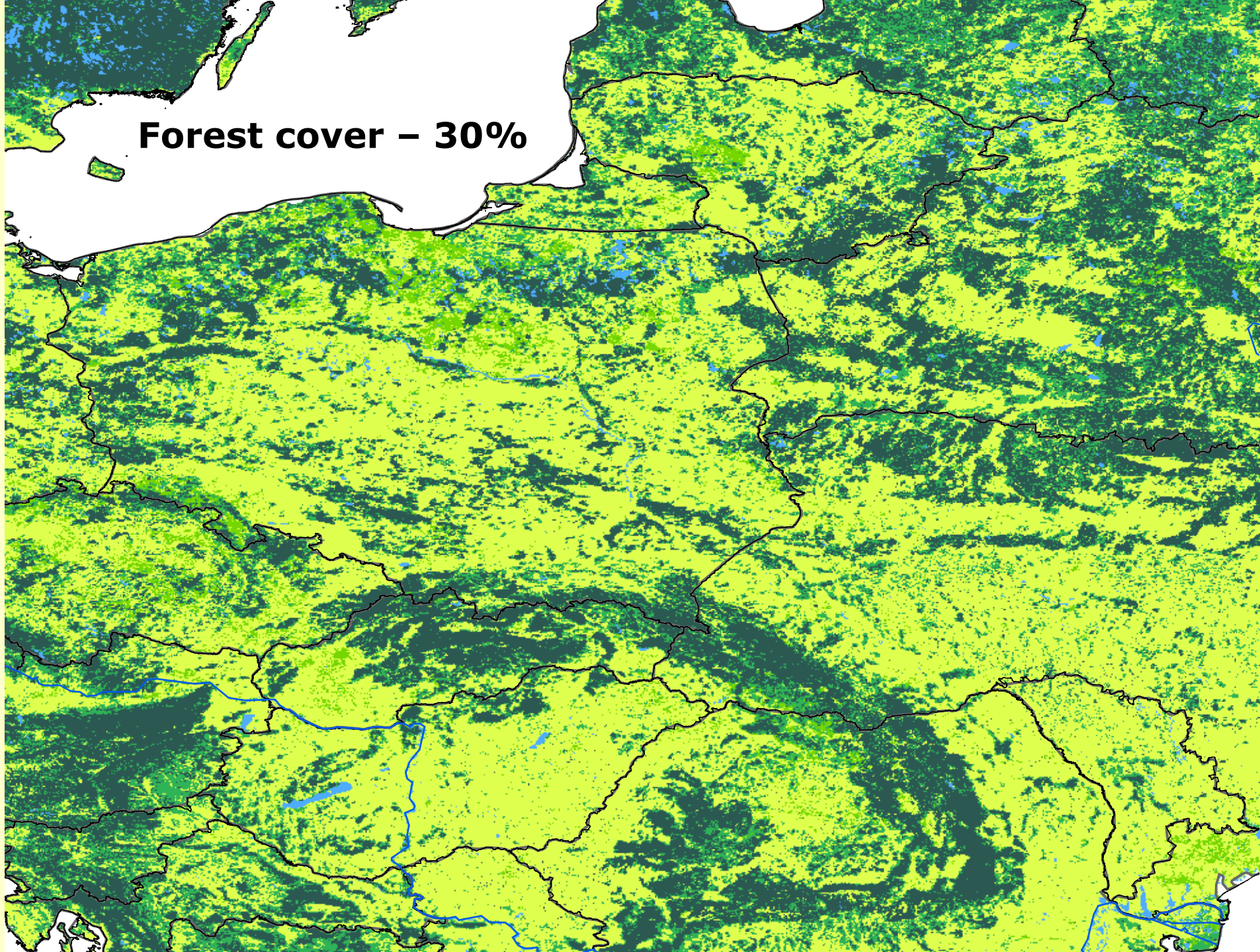
Mammal Research Institute - Białowieża



Projects are supported by:

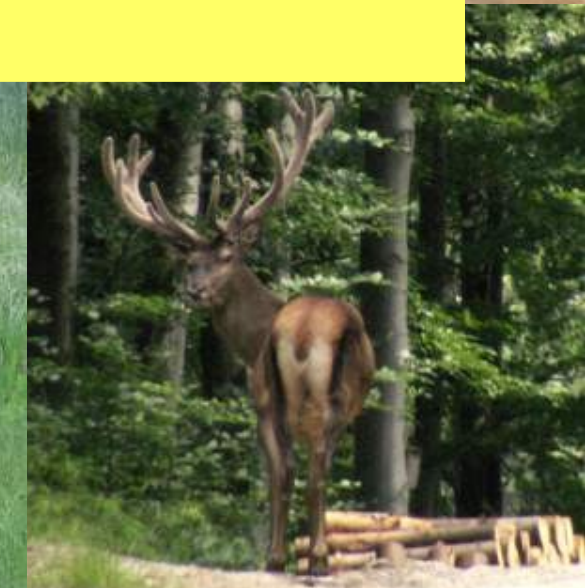


Forest cover – 30%



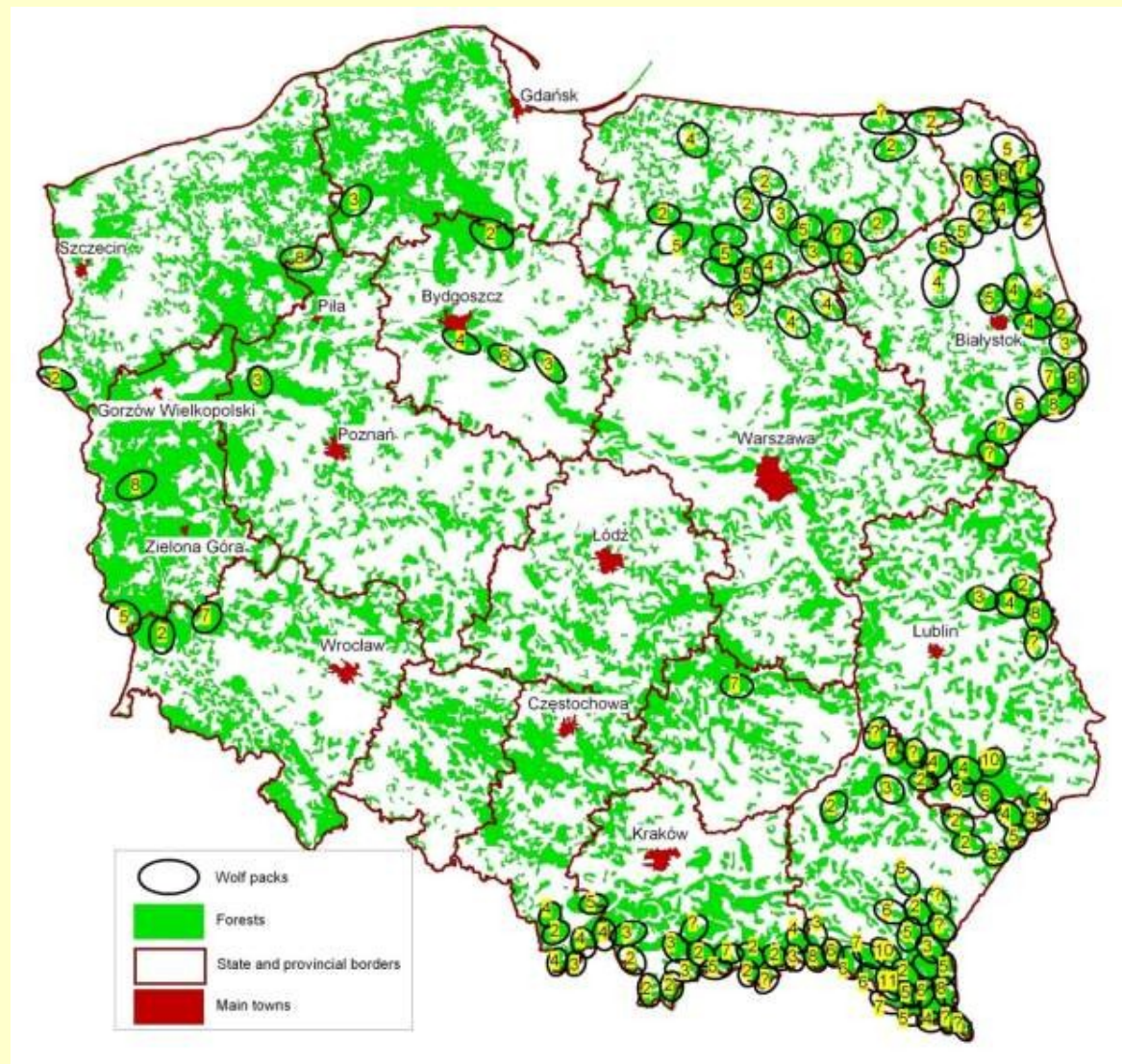


**All big predators are fully protected
in Poland**





Current wolf range in Poland



Source: Nowak et. al. unpubl.

650-700 wolves



Current lynx range in Poland



160-180 lynxes



Current brown bear range in Poland

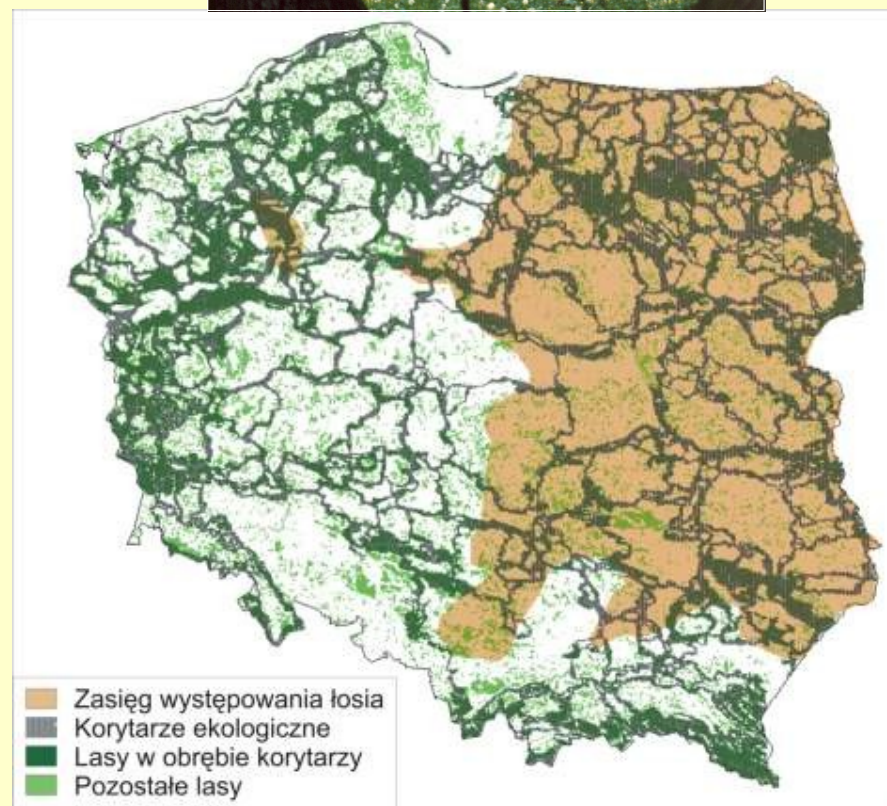


80-100 brown bears

Source: (Jakubiec 2001, modified)



Source: Krasińska & Krasiński 2004



Source: Bryliński et al. 2004

Wolf and Lynx Census in Poland

Since 2000, more than 30 000 records about wolves and lynx have been collected

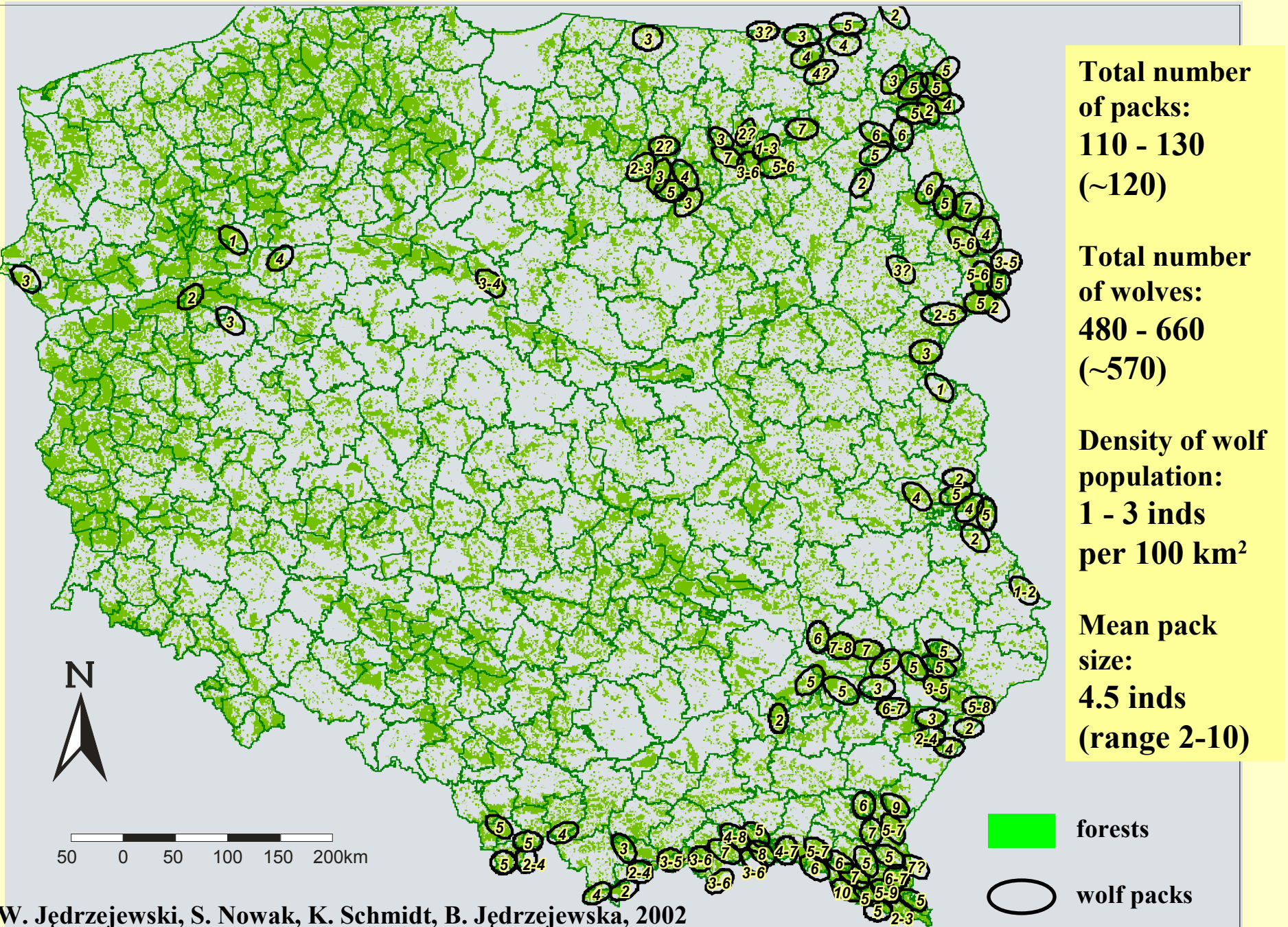
Co-ordinators

The Mammal Research Institute, PAS

The Association for Nature WOLF

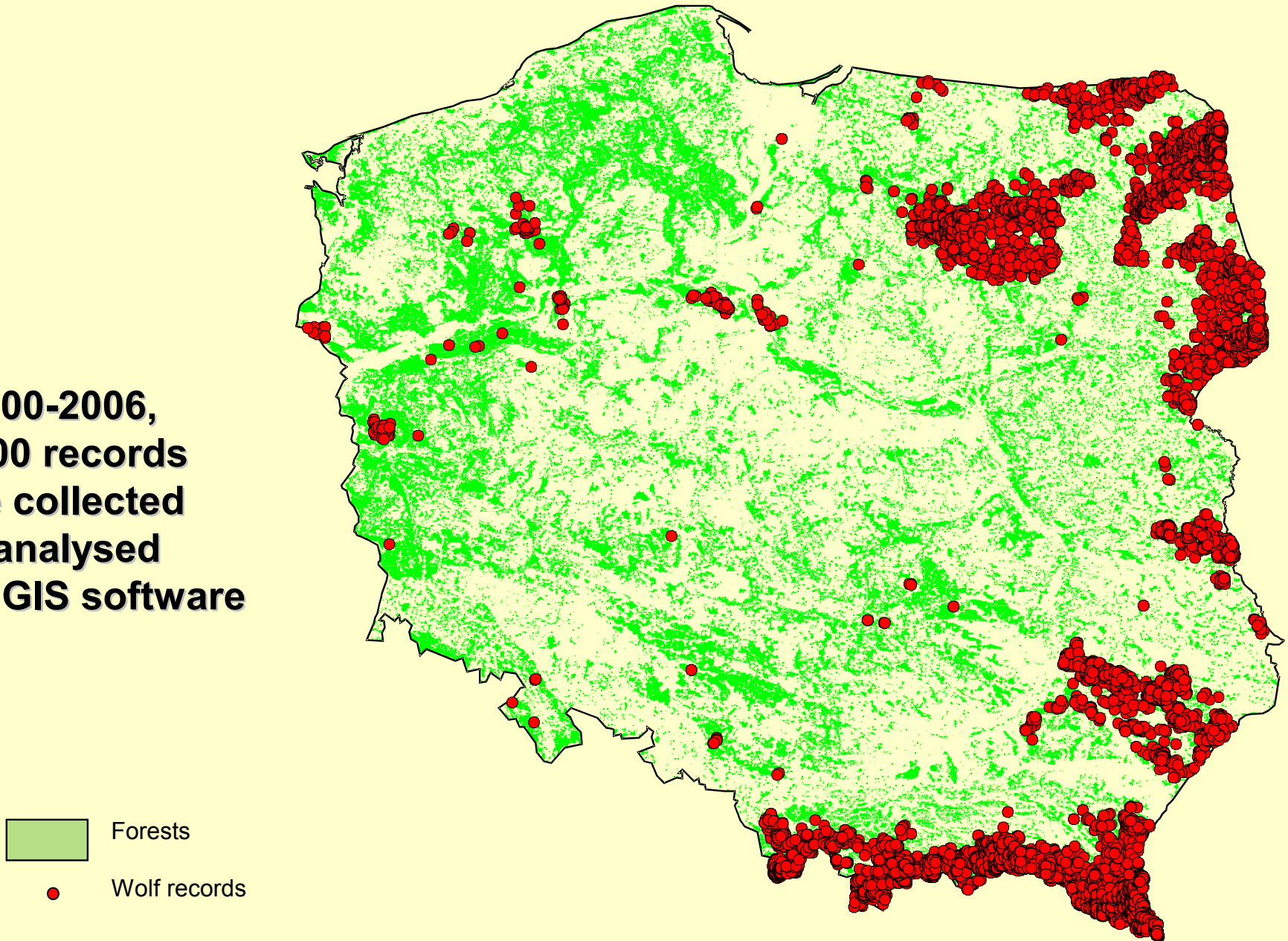


Distribution and number of wolf packs in Poland in 2000/2001



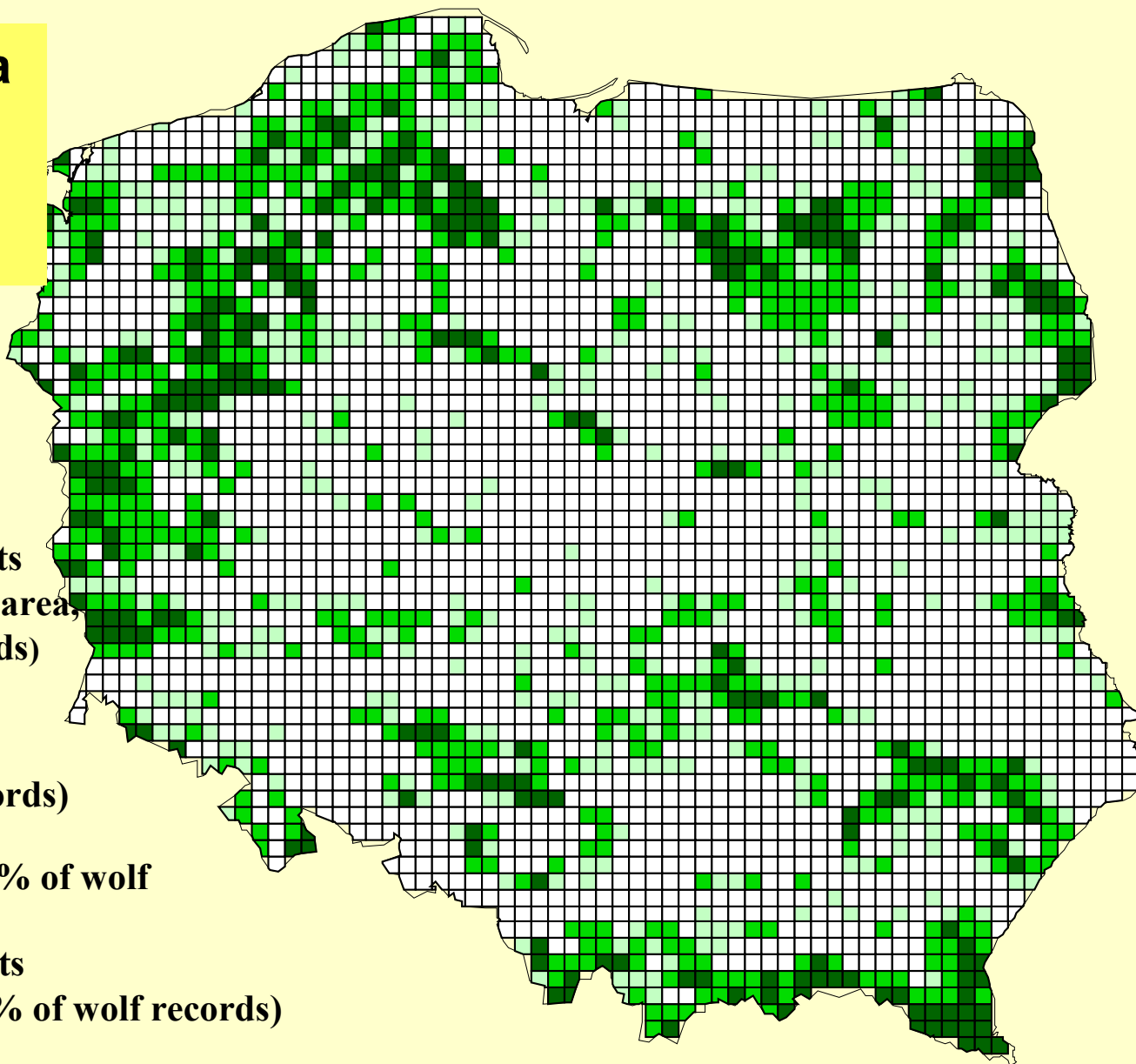
Analyses of habitat suitability for wolves in Poland

In 2000-2006,
22 000 records
were collected
and analysed
with GIS software



Wolf habitat suitability model

**26% of Poland's area
is covered by good
and very good
habitats for wolves**




Actual and potential number of wolves in suitable habitats in Poland


**Actual number
700 wolves**

Potencial number 1586 wolves

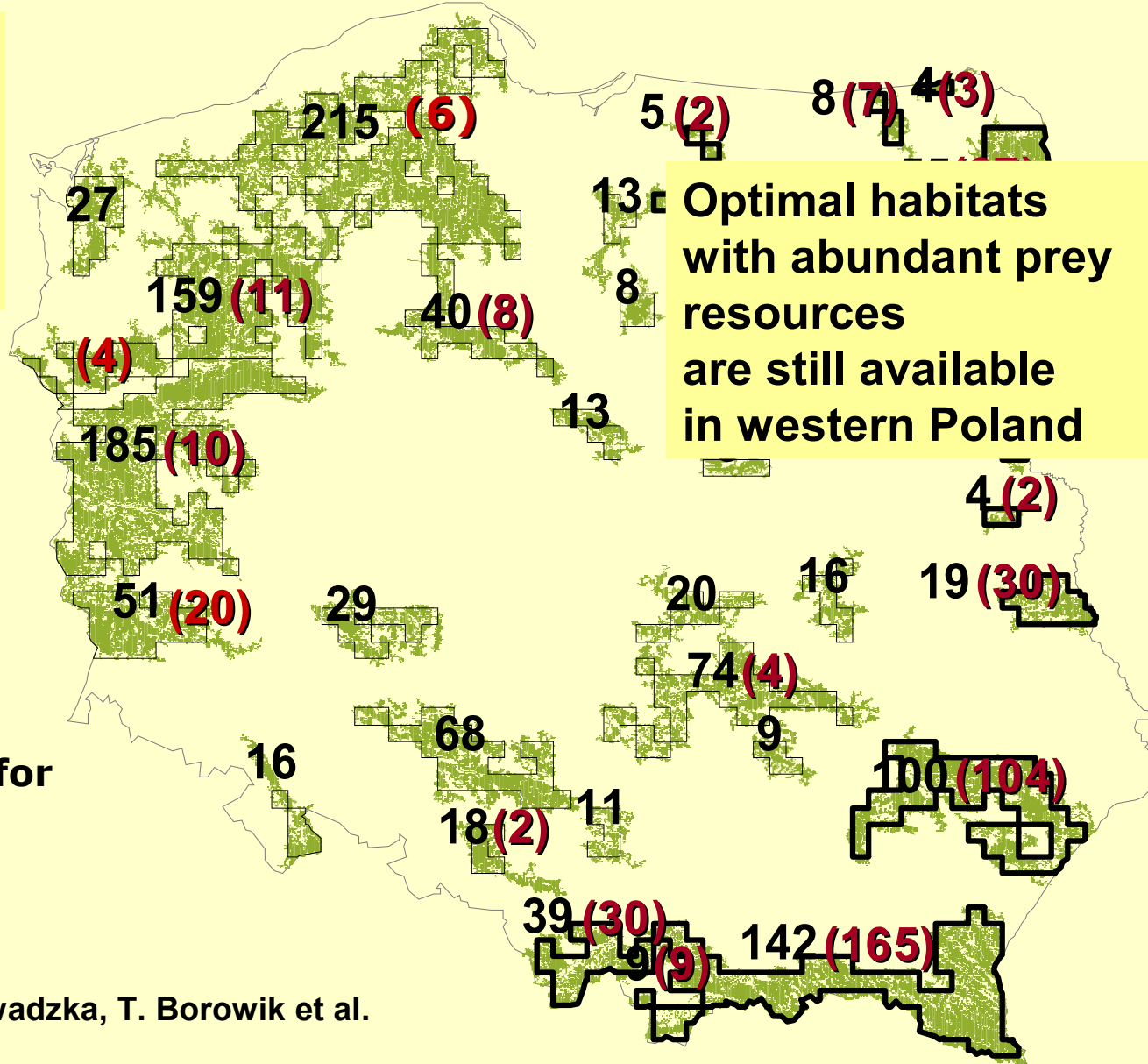
 **Areas saturated by wolves**

 **Areas less occupied**

Wolves number:
70 **Estimated**
(74) **Actual**

 Habitats suitable for wolves

**Optimal habitats
with abundant prey
resources
are still available
in western Poland**



Source: W. Jędrzejewski, B. Zawadzka, T. Borowik et al. 2008.

Wolf DNA analyses in Poland, 2004 - 2009

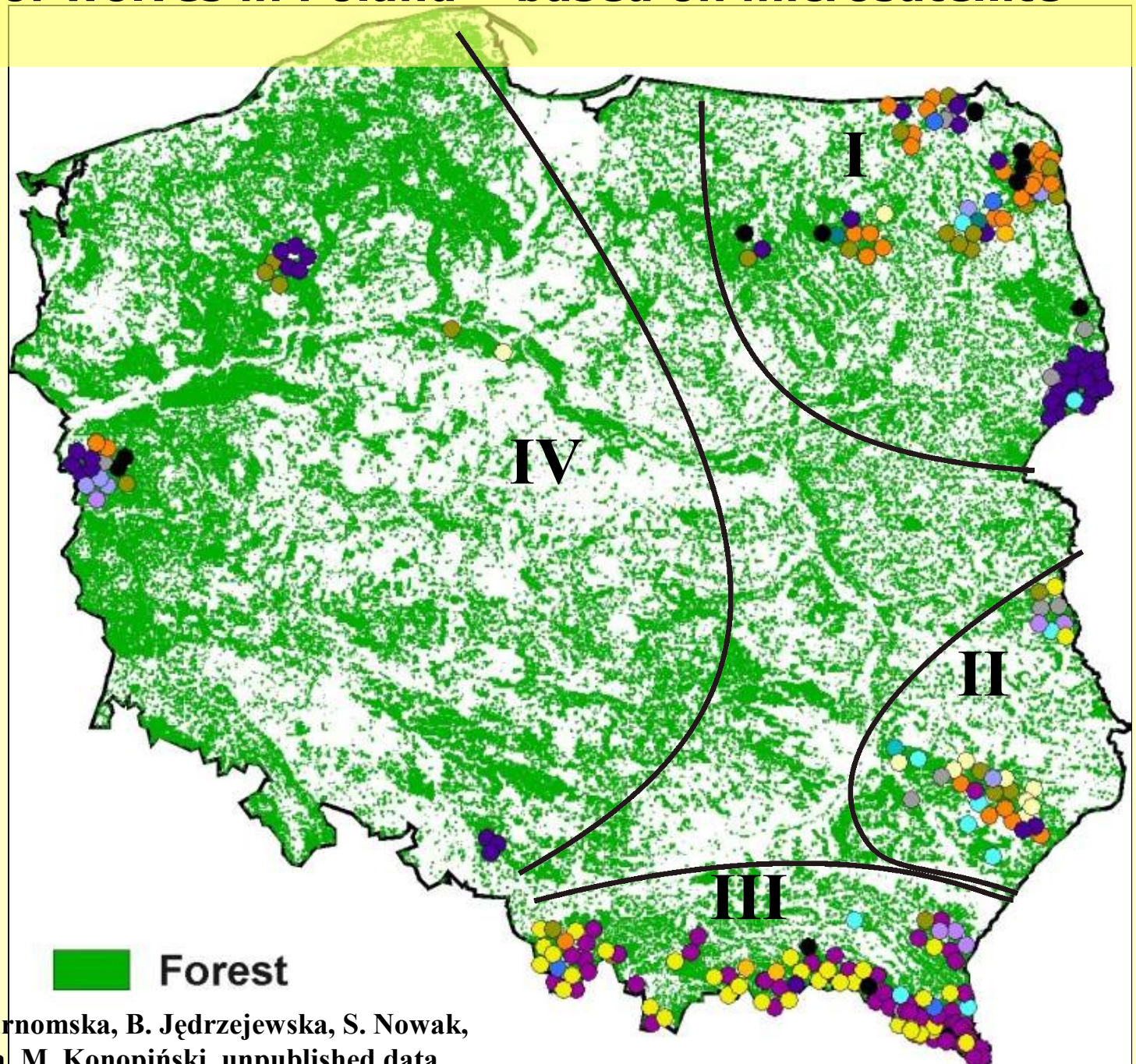
The Mammal Research Institute PAS
The Association for Nature WOLF
The Nature Conservation Institute

**over 1100 samples from wolf scats
over 100 samples from wolves in western
Poland**



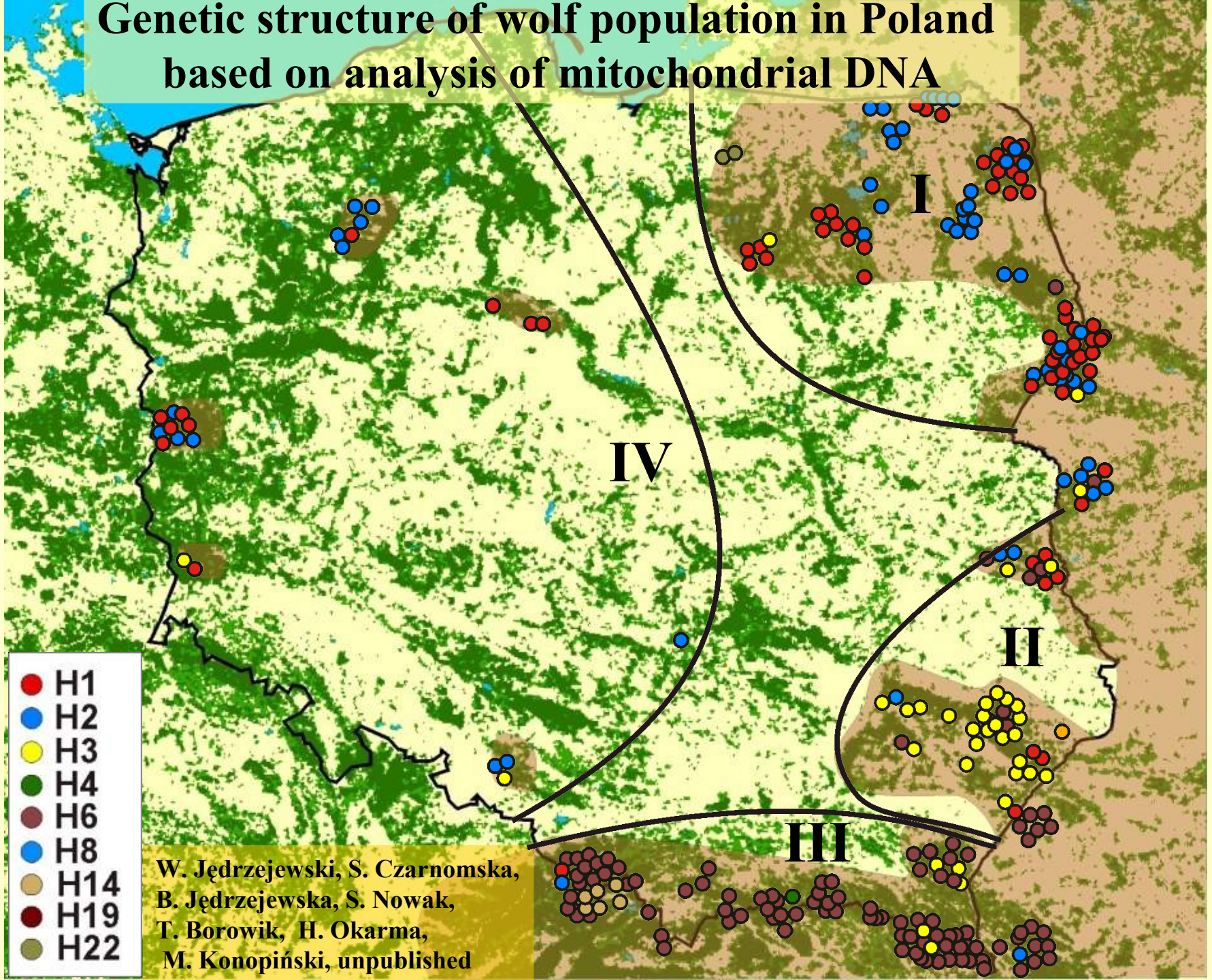
Relatedness of wolves in Poland – based on microsatellite analyses

Each point represents one wolf.
The same colour denotes individuals related at a level of at least cousins ($r \geq 0.125$).



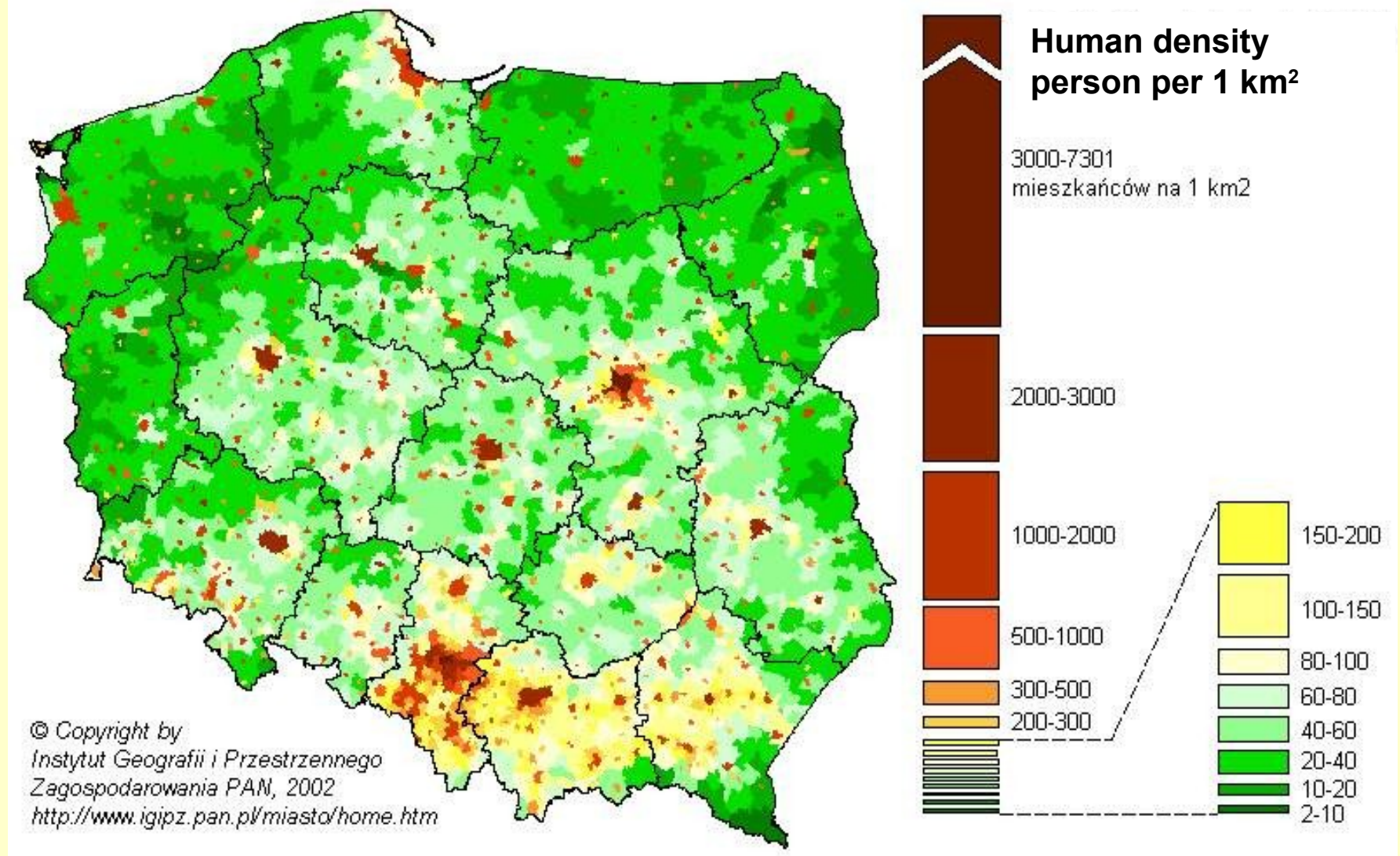
W. Jędrzejewski, S. Czarnomska, B. Jędrzejewska, S. Nowak,
T. Borowik, H. Okarma, M. Konopiński, unpublished data

Genetic structure of wolf population in Poland based on analysis of mitochondrial DNA



Obstacles for the large predators dispersal –

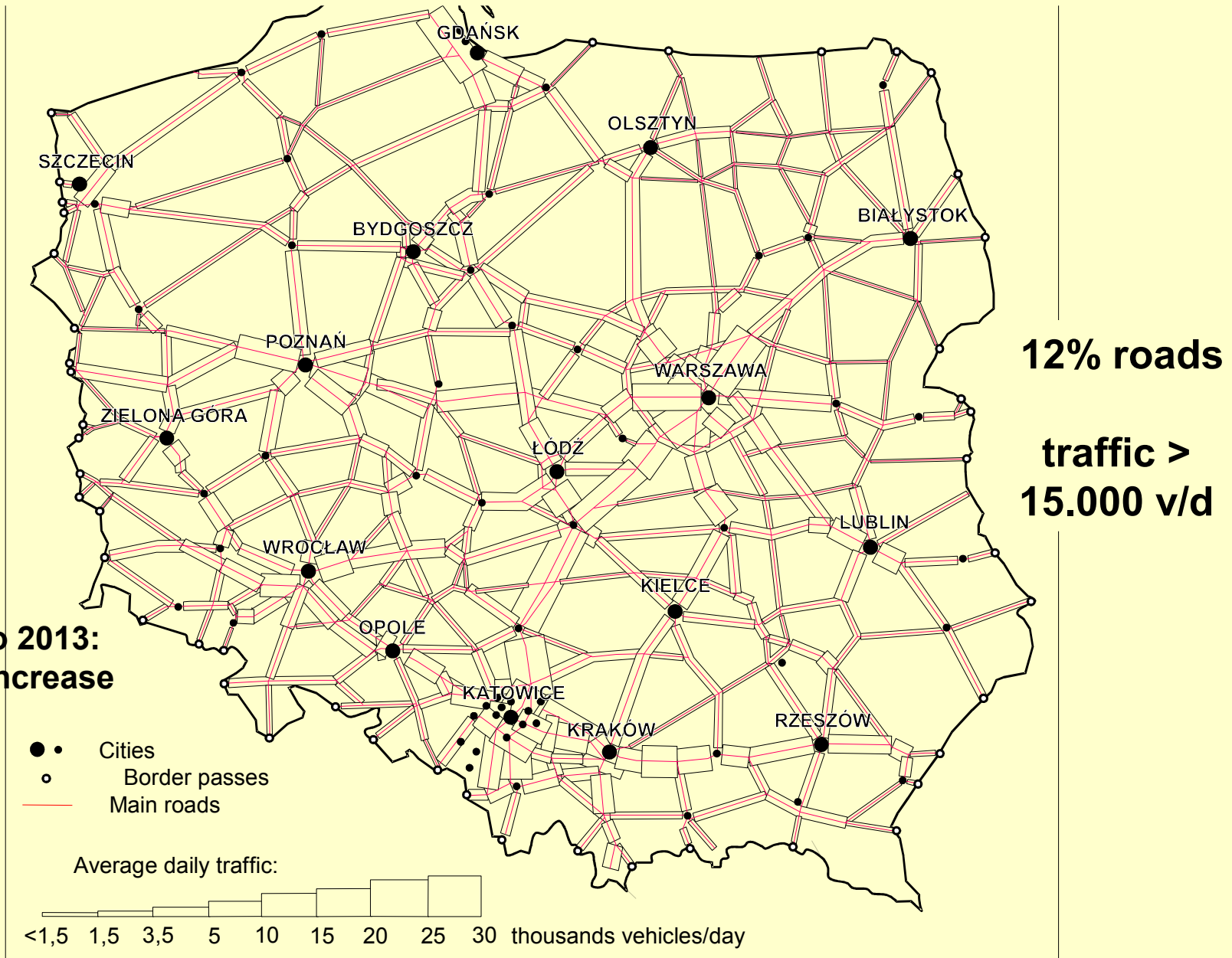
1. Densely urbanised central and southern part of Poland



Obstacles for large carnivores dispersal – 2. High traffic on roads

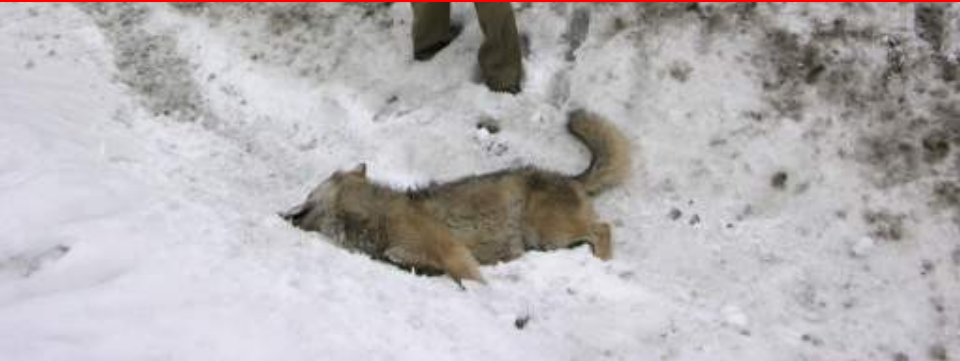


55% of existing roads deter animals from crossing (traffic > 6.000 vehicles/day)

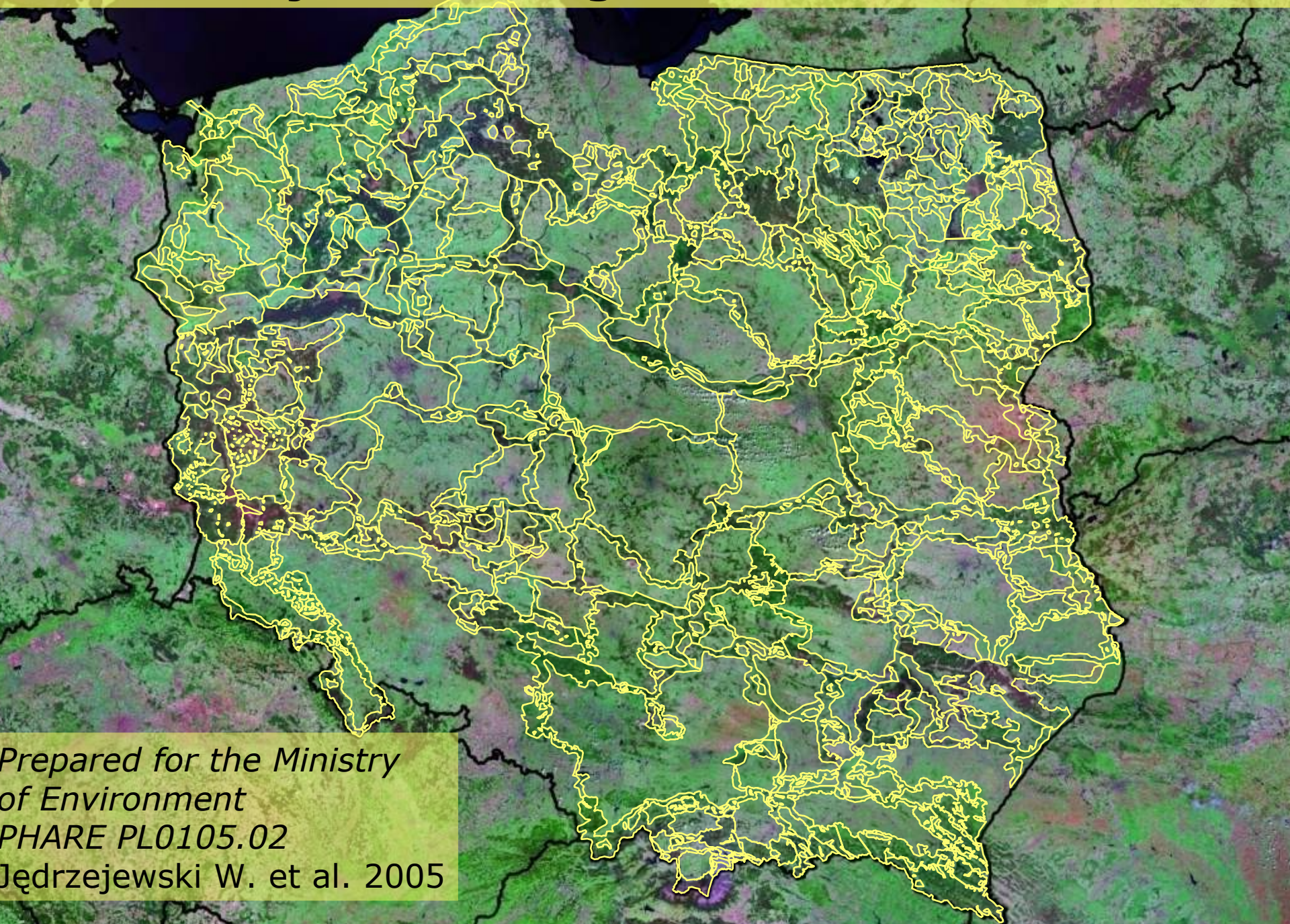




Habitat fragmentation is the main threat to large animal populations



Project of ecological corridors in Poland



*Prepared for the Ministry
of Environment
PHARE PL0105.02
Jędrzejewski W. et al. 2005*



Wolf and lynx as indicator species for defining ecological corridors

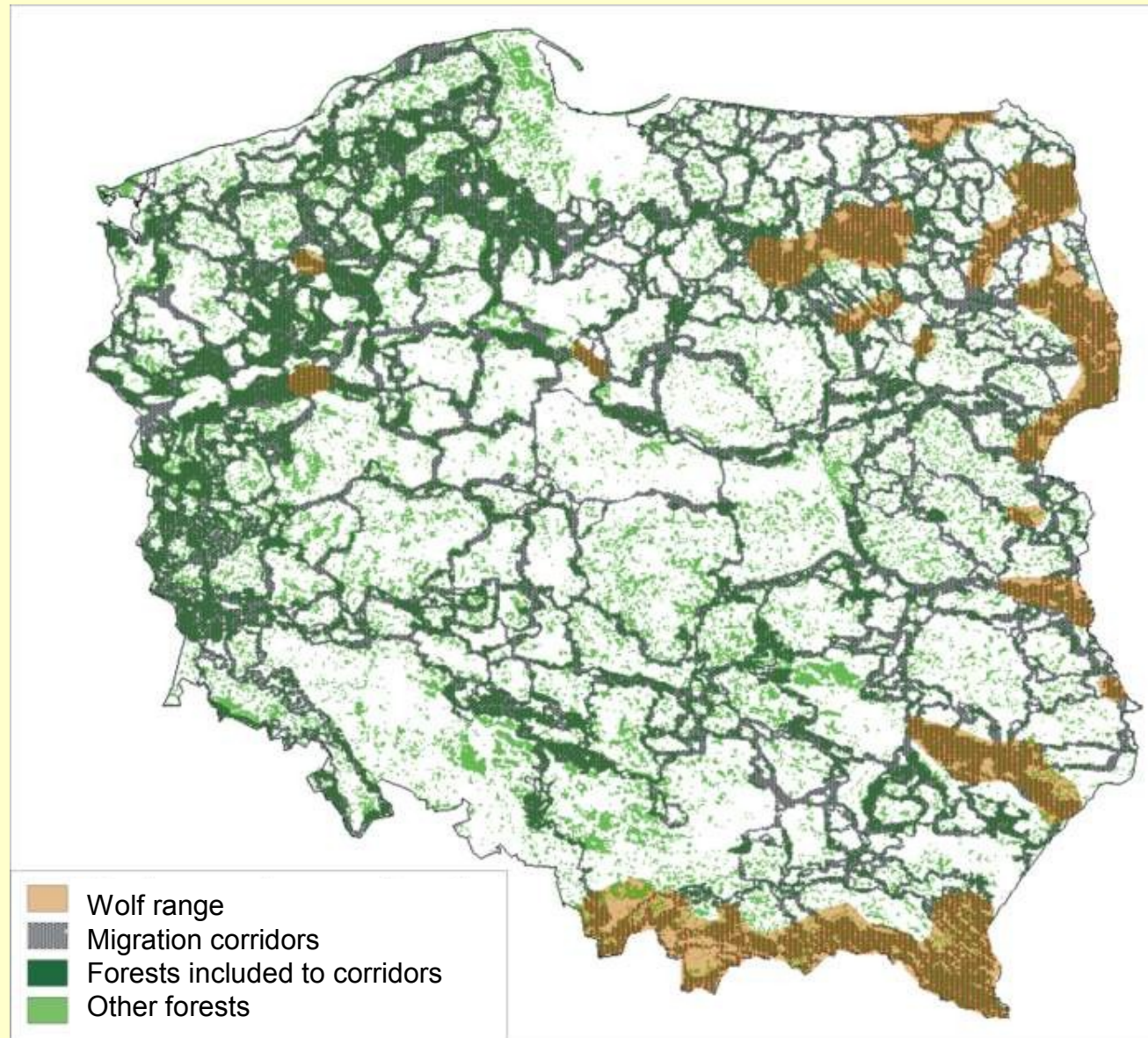
- priority species (Annex II Habitat Directive)
- big abilities for long distance movement and dispersal along forests
- corridors suitable for large carnivores are useful for other species



Population structure of wolves in Europe (according Guidelines for large carnivores management - LCIE)



Ecological corridors linking wolf populations and habitats in Poland



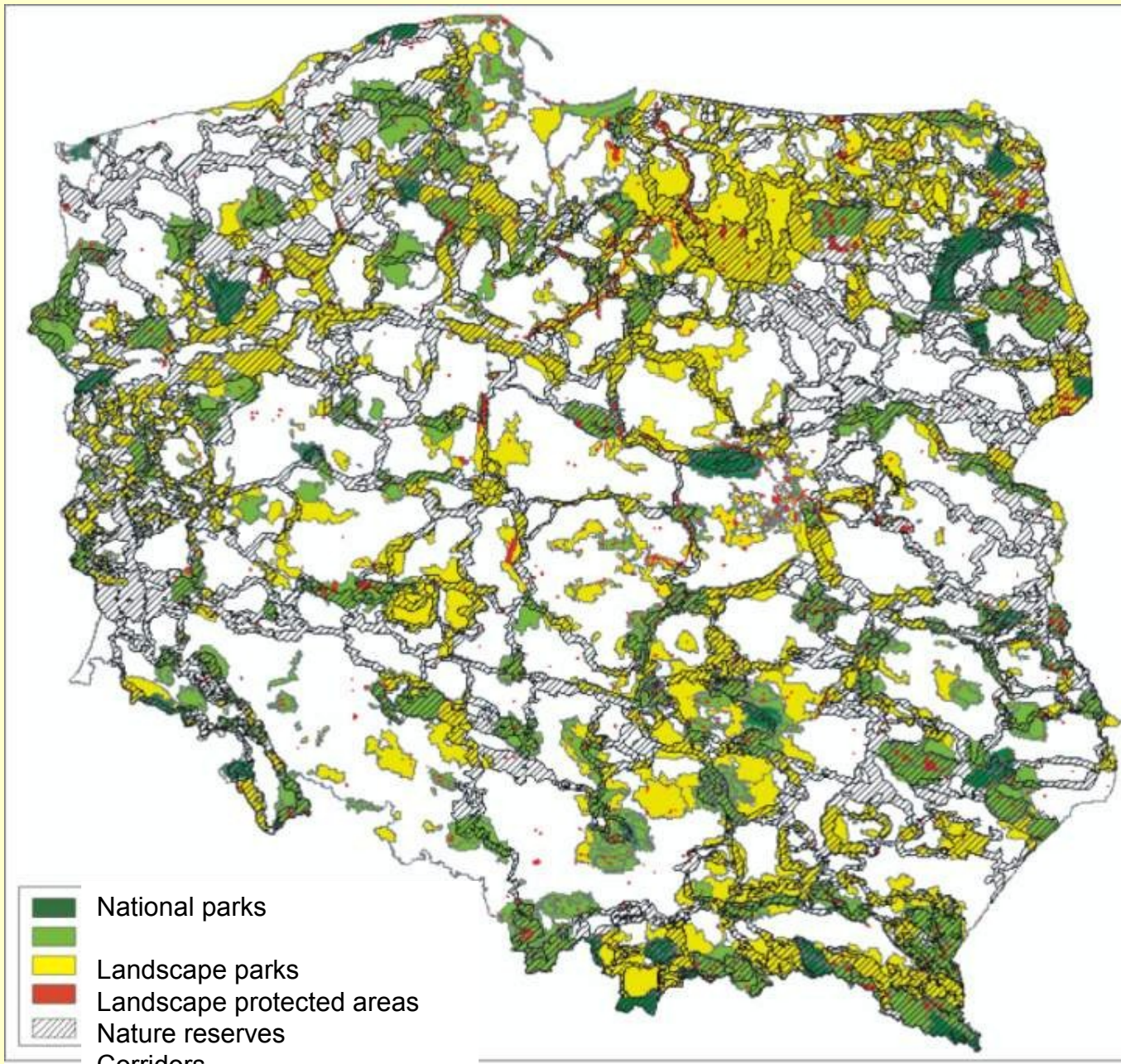
Source: Jędrzejewski i in. 2001, 2002, data from „Wolf and lynx census in Poland”)

Ecological corridors linking lynx populations and habitats in Poland

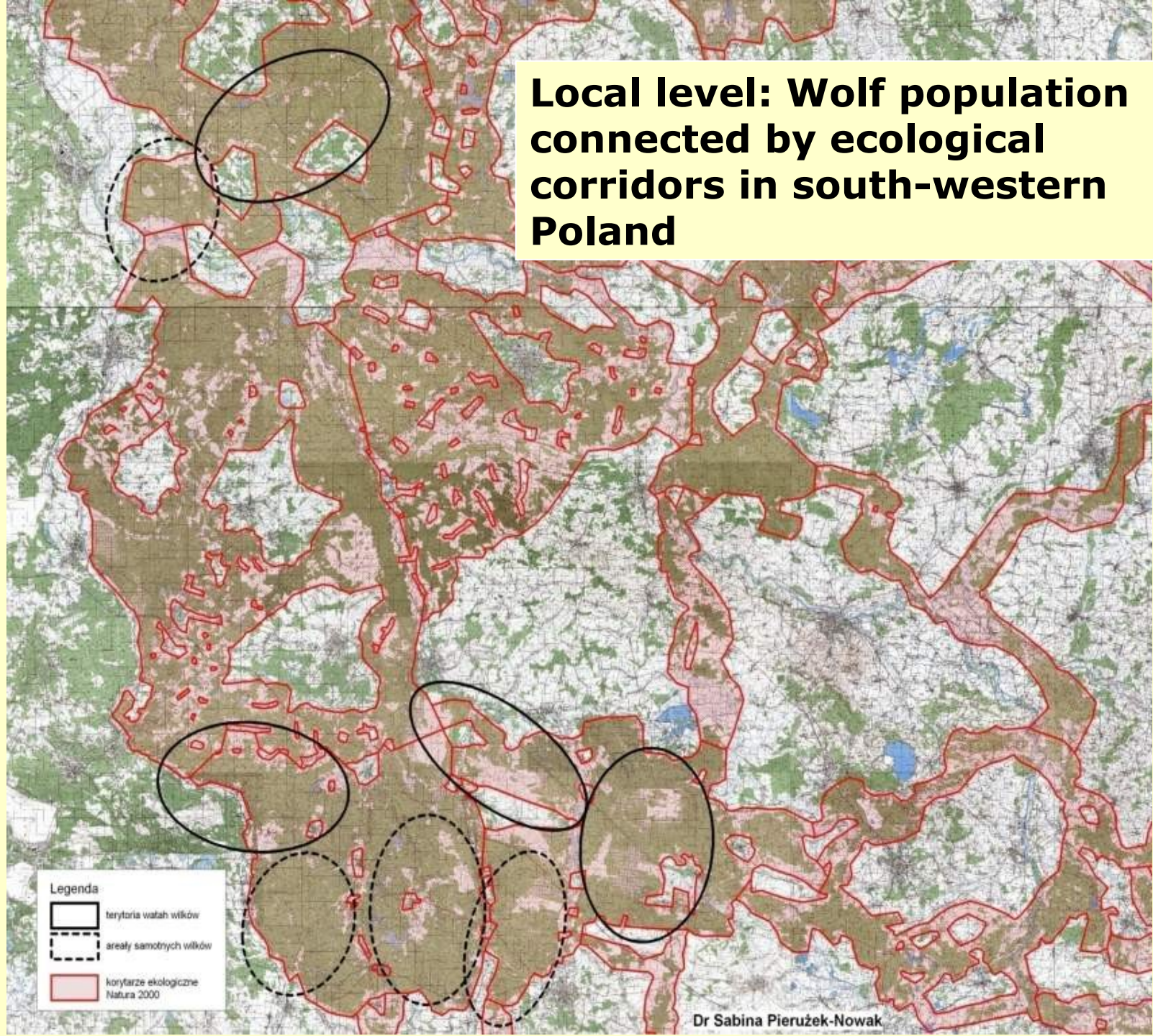


Źródło: (Jędrzejewski i in. 2001, 2002, dane z Ogólnopolskiej inwentaryzacji wilka i rysia, koordynowanej przez ZBS PAN)

Ecological corridors linking protected areas (including Natura 2000 sites) in Poland

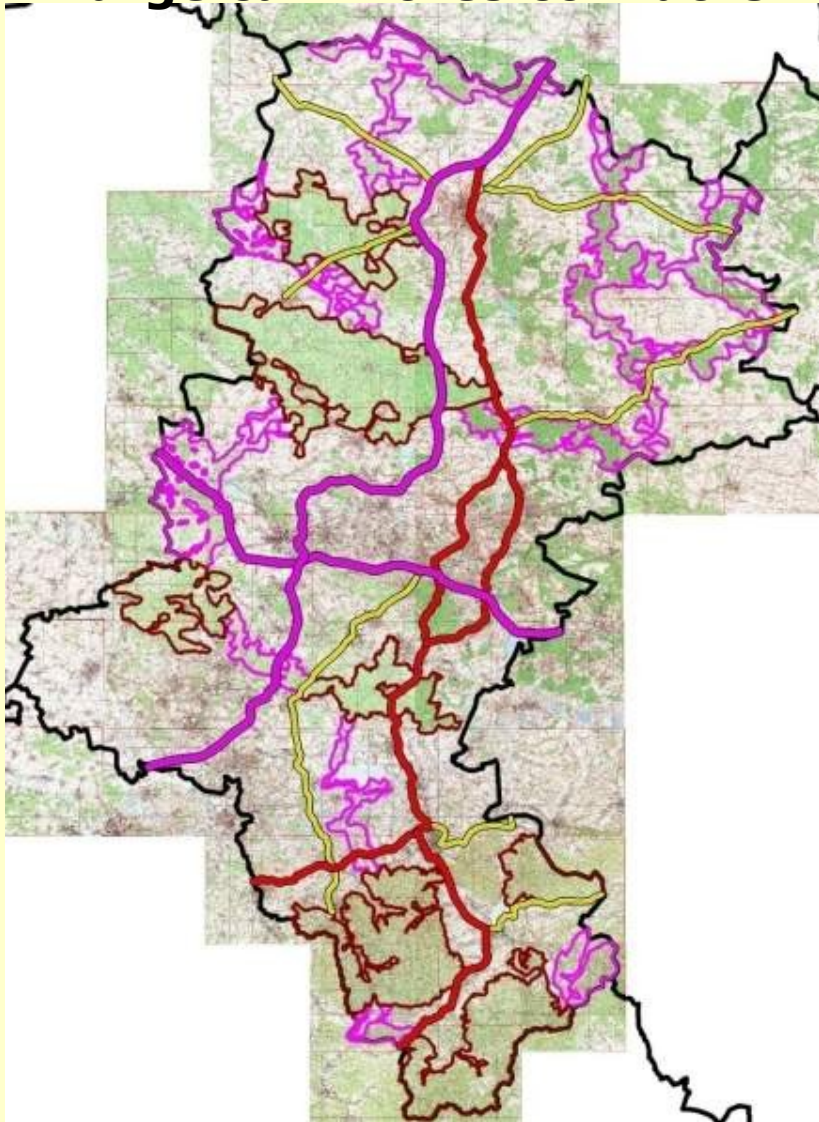


Local level: Wolf population connected by ecological corridors in south-western Poland

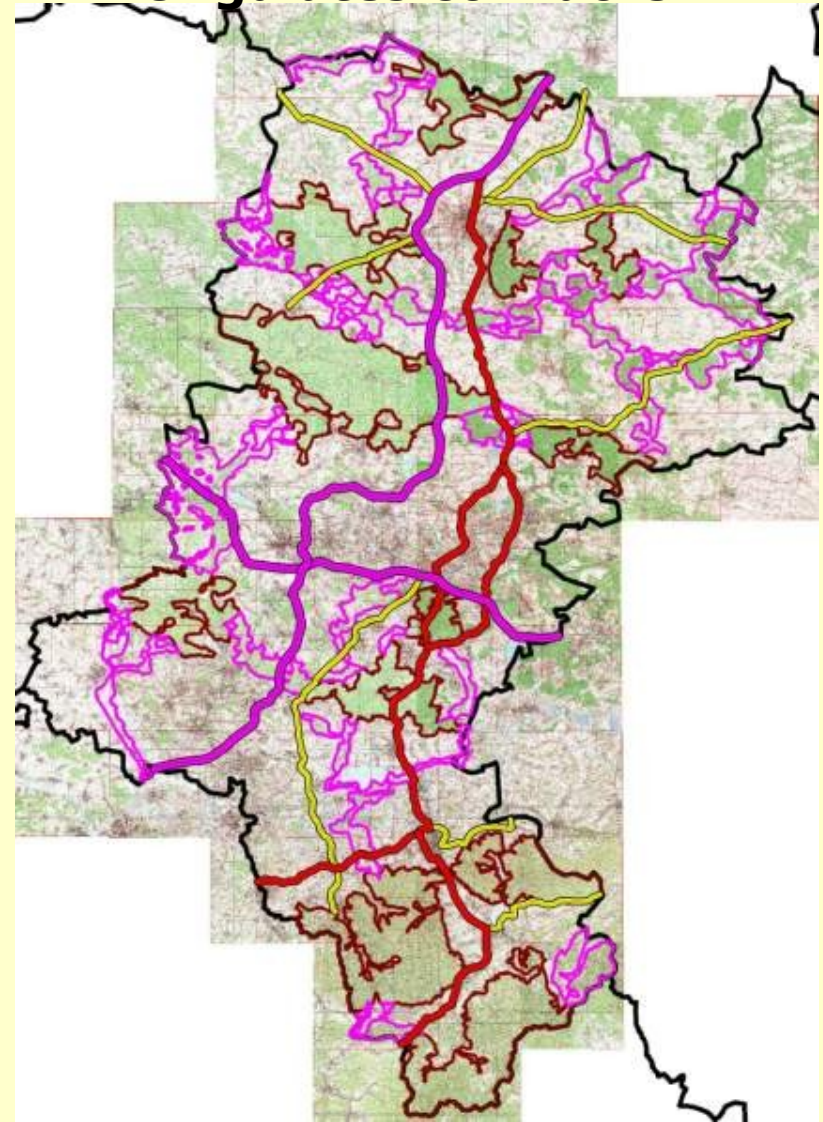


Regional level: Ecological corridors for large mammals in the Silesian Province (S Poland)

Large carnivores corridors



Ungulates corridors



Existing transportation network and planned (up to 2013) highways and express roads

in 2007

690 km of motorways

300 km of express roads

Up to 2013:

1778 km of motorways

2274 km of express roads

TOTAL: about 4000 km of new roads

Planned:

- Highways
- Express roads

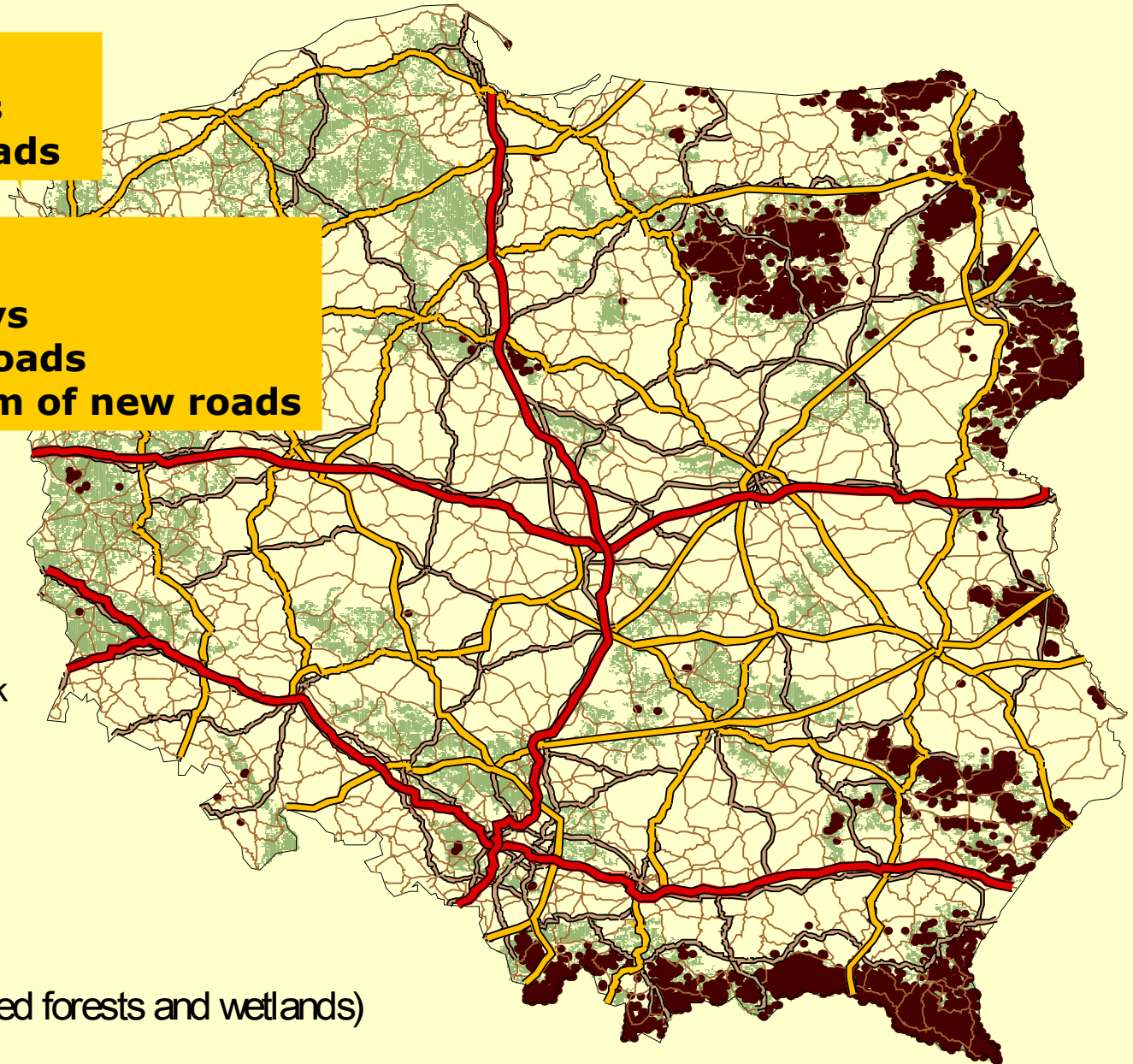
Actual transportation network

- Highways
- Main roads
- Other roads

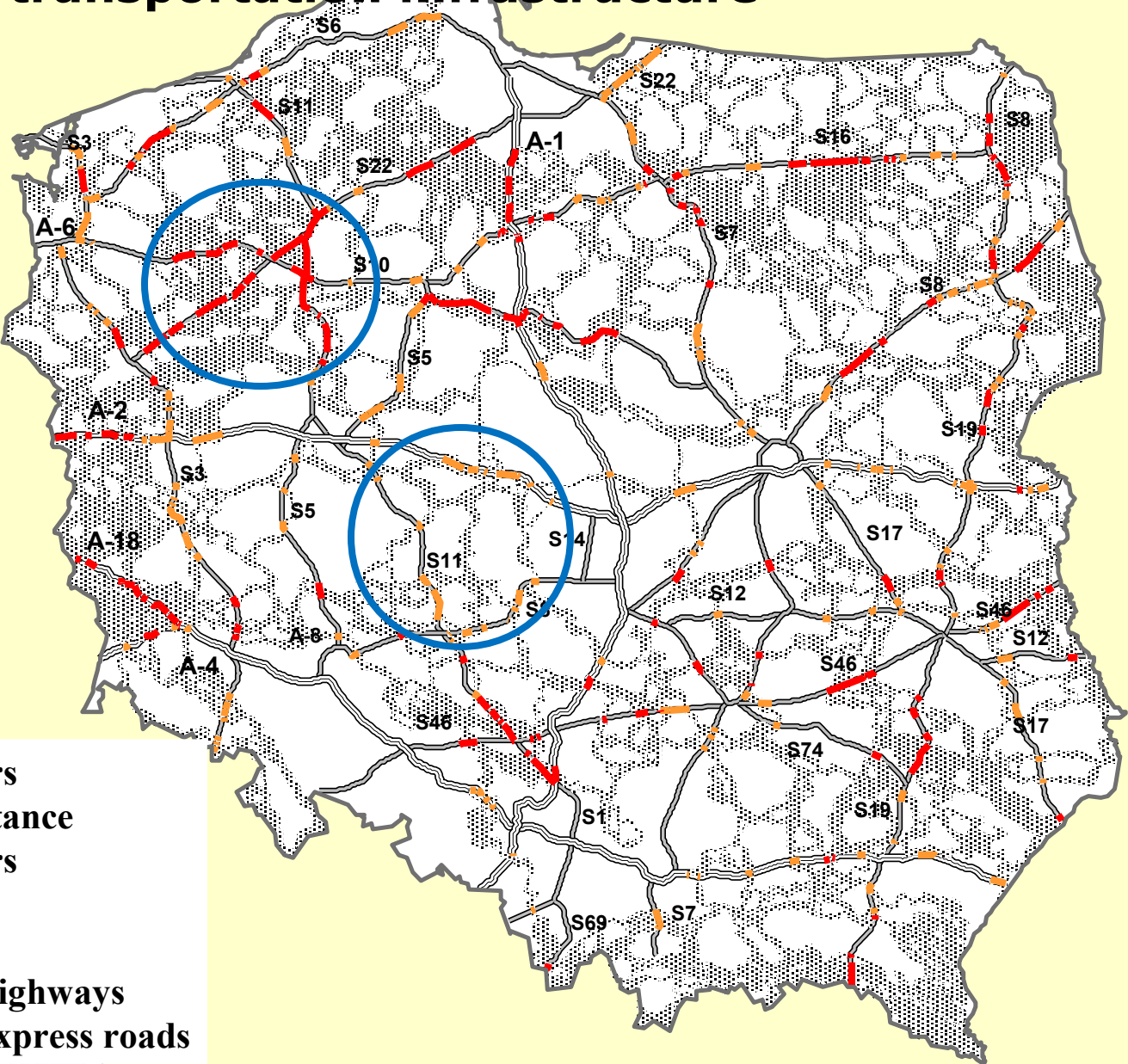
Wolf records

Suitable wolf habitats

(real borders of combined forests and wetlands)



by transportation infrastructure



Manual for EIA, road planners and investors

“Animals and roads:

Methods of mitigation the negative impact of roads on wildlife”

Zwierzęta a drogi

Metody ograniczania negatywnego wpływu dróg
na populacje dzikich zwierząt

Włodzimierz Jędrzejewski, Sabina Nowak,
Rafał Kurek, Robert W. Mysłajek, Krystyna Stachura



Zakład Badania Ssaków Polskiej Akademii Nauk
Białowieża 2004

Animals and Roads

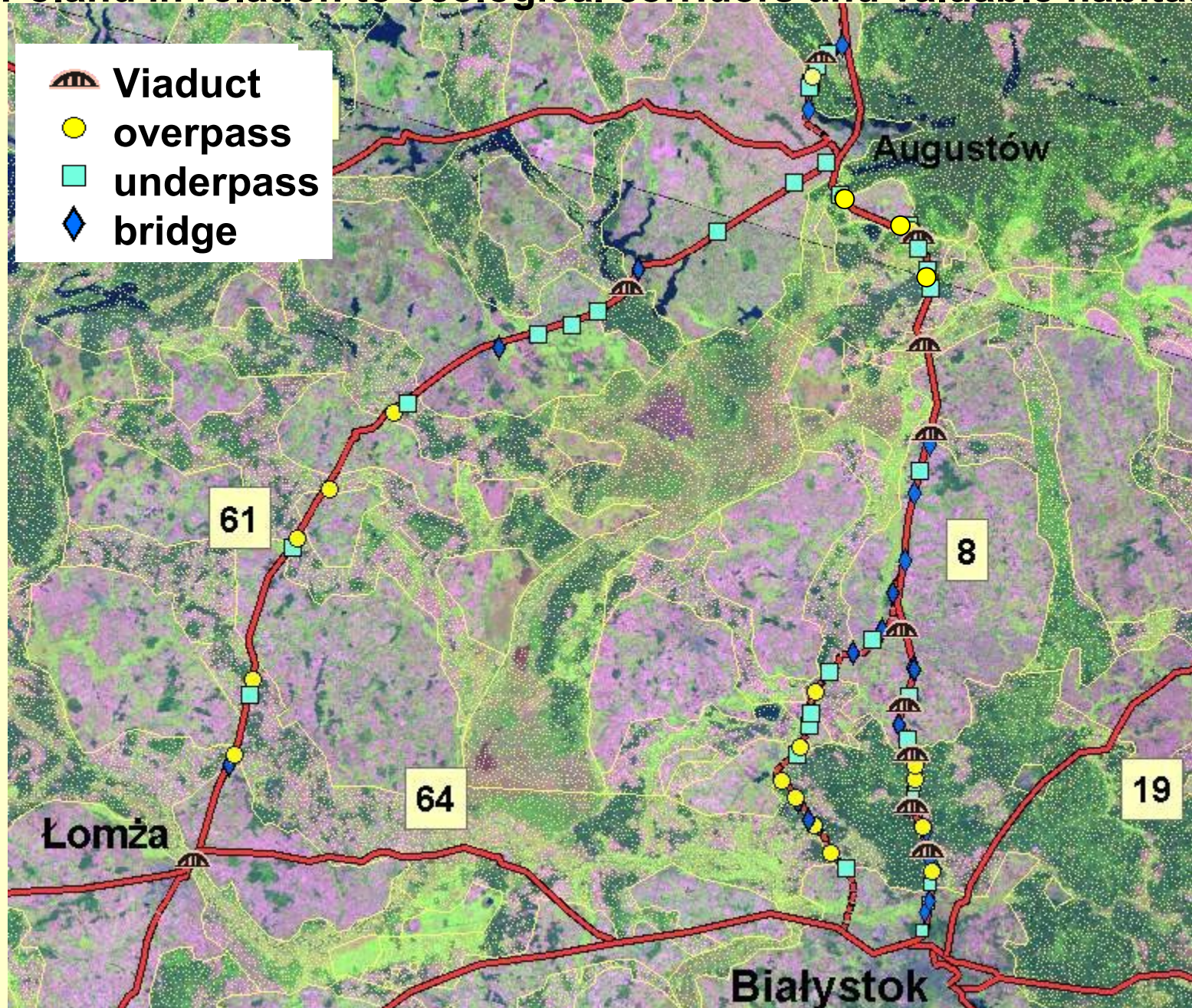
Methods of mitigating the negative impact
of roads on wildlife

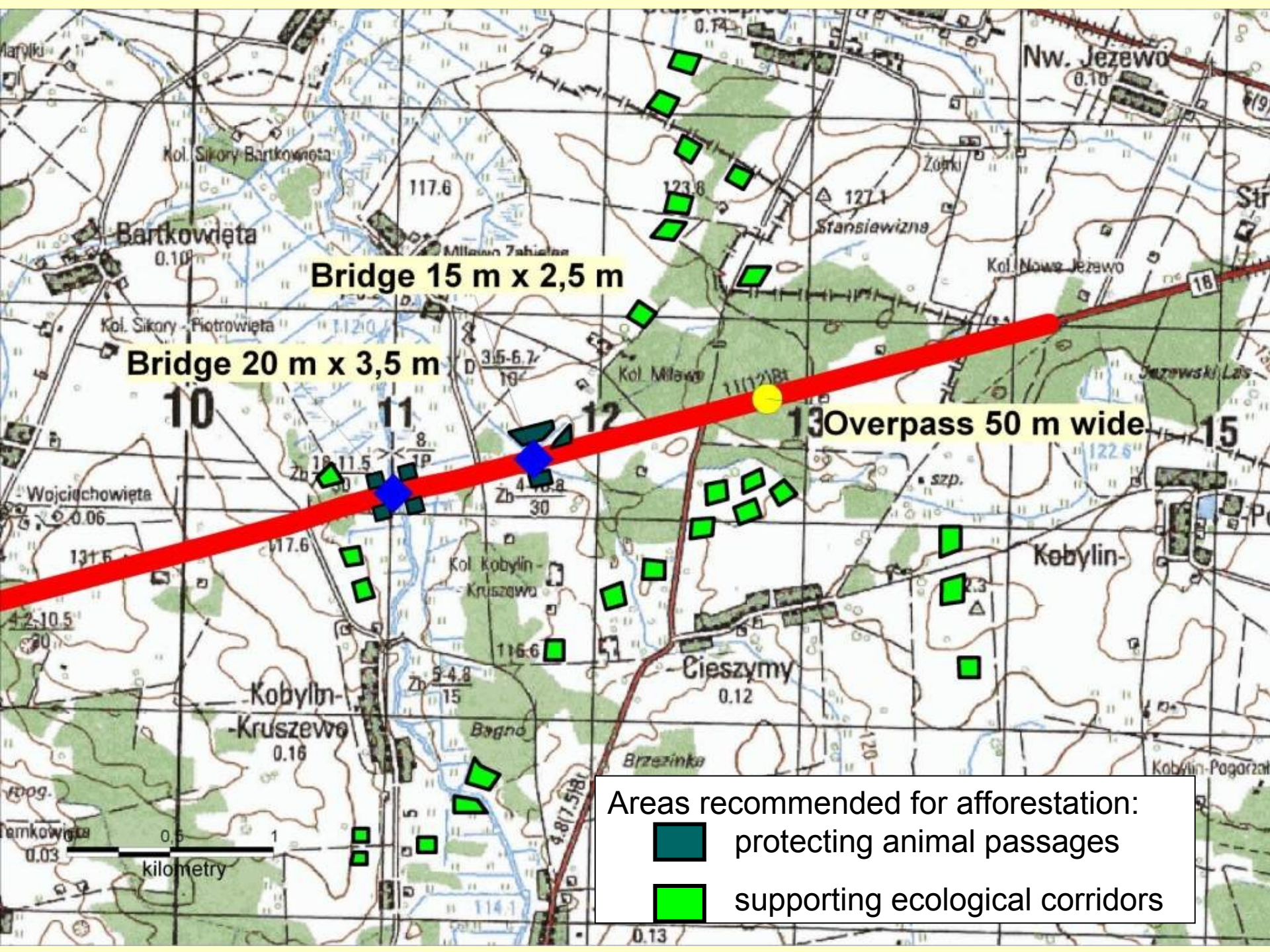
Włodzimierz Jędrzejewski, Sabina Nowak,
Rafał Kurek, Robert W. Mysłajek, Krystyna Stachura,
Bernadetta Zawadzka, Marcin Pchalek



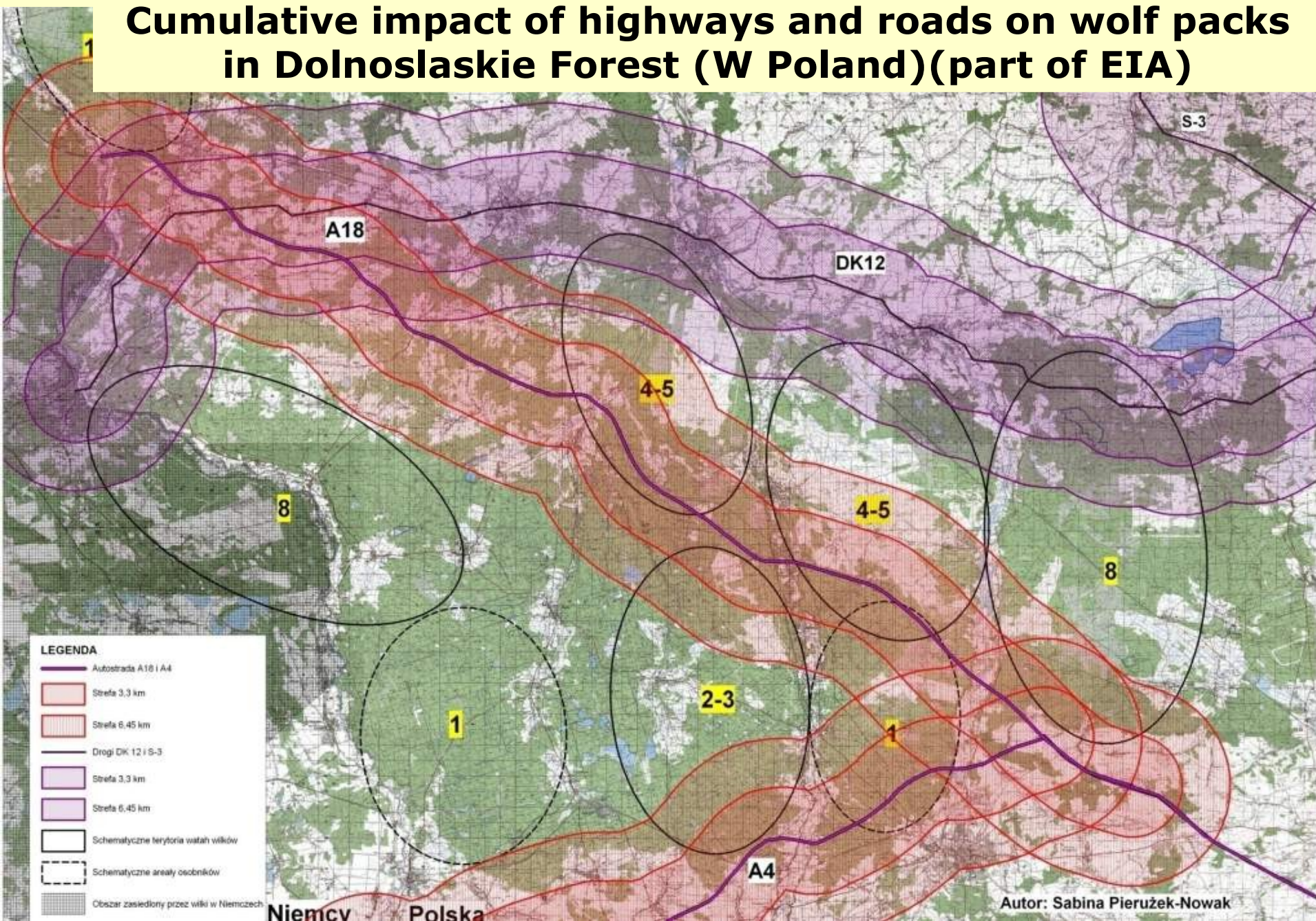
Mammal Research Institute, Polish Academy of Sciences
Białowieża 2009

Recommendations for animal passes on planned highways in North Poland in relation to ecological corridors and valuable habitats

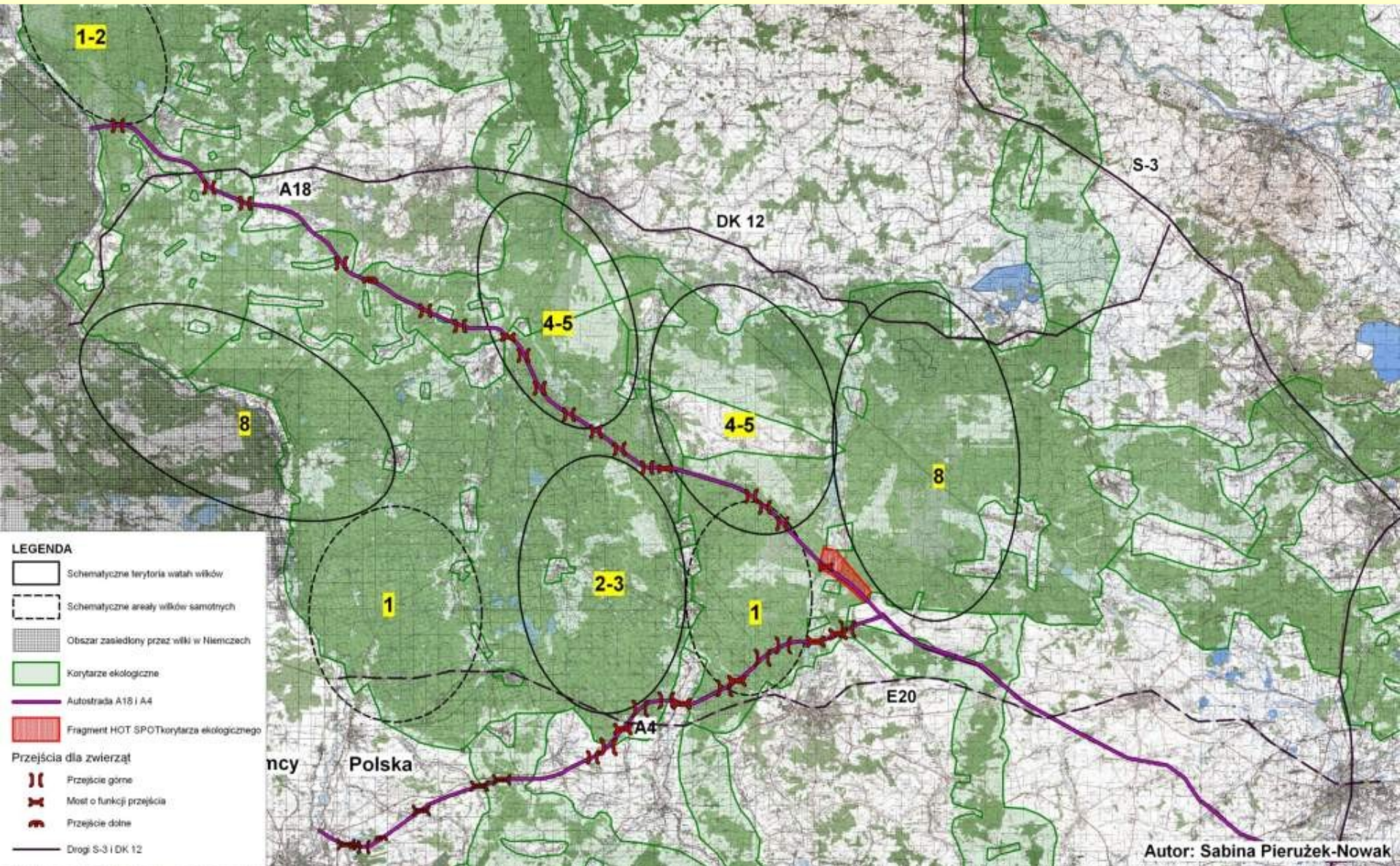




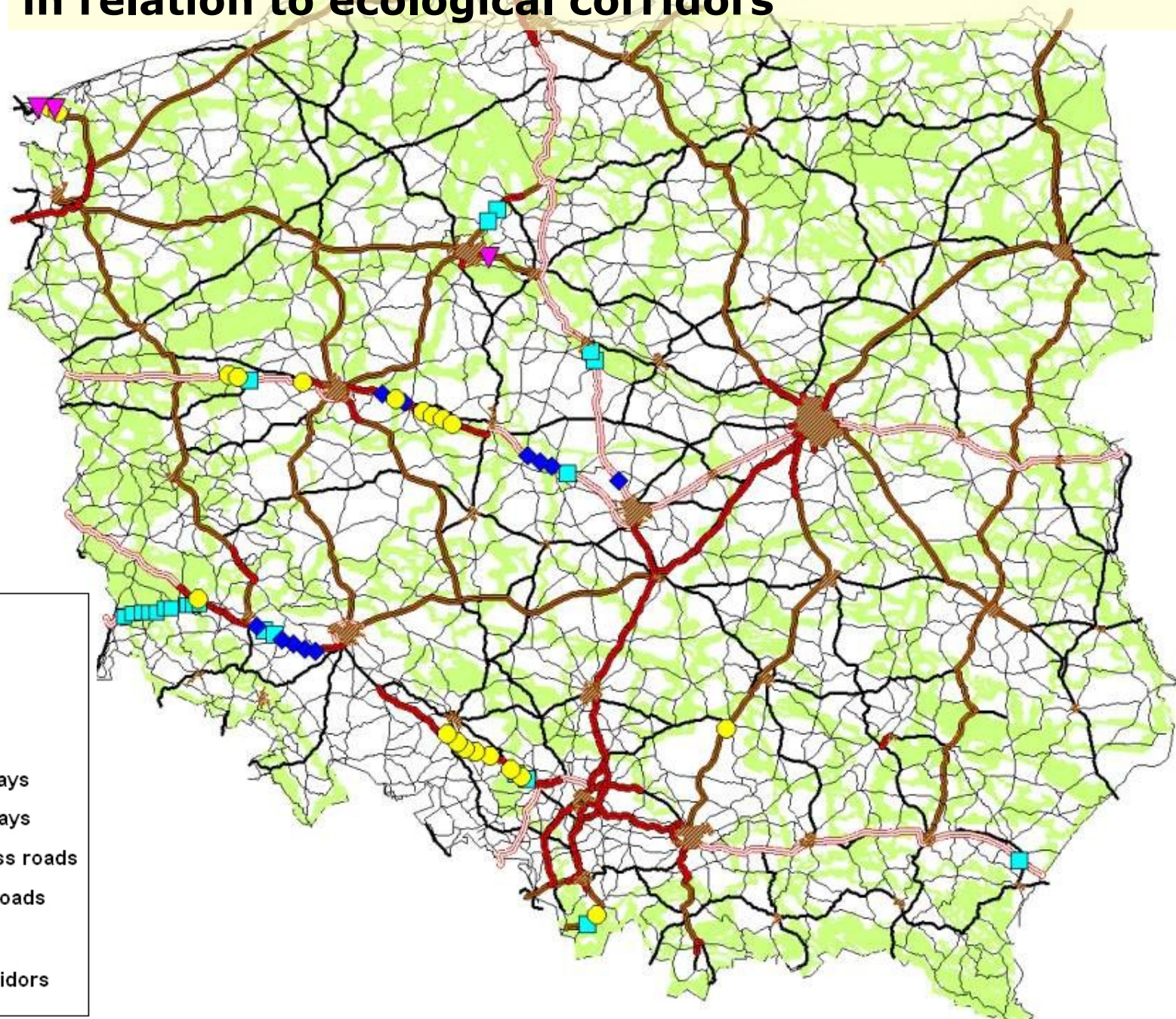
Cumulative impact of highways and roads on wolf packs in Dolnoslaskie Forest (W Poland)(part of EIA)



Recommendations for passages for big and medium-sized animals on A4 and A18 highways in Dolnoslaskie Forest (West Poland)



Existing passes for large animals on the Polish roads in relation to ecological corridors



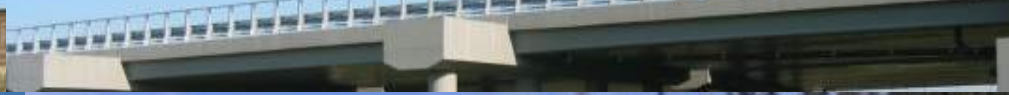
- viaduct
- overpass
- bridge
- underpass
- existing highways
- planned highways
- planned express roads
- existing main roads
- regional roads
- ecological corridors

Animal passages built on Polish highways and railways in the last 10 years

Type of passage	Number in whole Poland	
Overpasses (green bridges) on highways	25	47
Overpasses on railways	2	
Underpasses for: large and medium mammals	20	
culverts (amphibians, rodents etc.)	221	36
Viaducts	18	
Widened bridges	18	
Joint-use passages	31	
Others	10	
Total	343	



Passages for big animals recently built in Poland



Passages for small animals



Animal passes planned to be built in Poland

843 crossing structure for the use of animals movement are planned

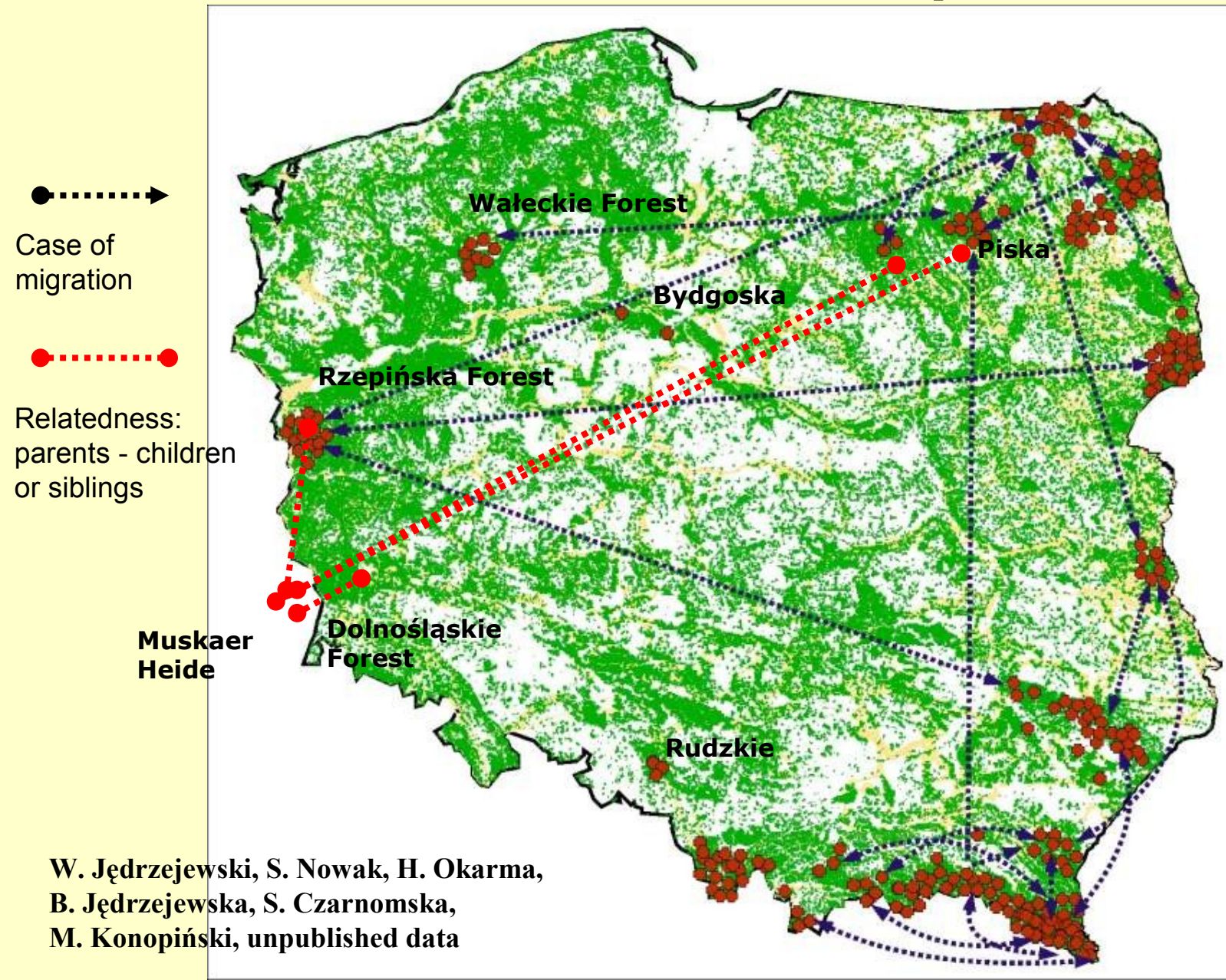
- 
- The map displays the geographical distribution of 843 planned animal crossing structures across Poland. These structures are represented by colored symbols: purple triangles for viaducts, yellow circles for overpasses, blue diamonds for bridges, and cyan squares for underpasses. The symbols are concentrated along major road corridors, particularly in the western and southern parts of the country. The map also shows a network of roads: thick red lines for existing highways, double red lines for planned highways, brown lines for planned express roads, black lines for existing main roads, and thin grey lines for regional roads. Light green shaded areas represent ecological corridors, which are often intersected by the planned road infrastructure.
- viaduct
 - overpass
 - bridge
 - underpass
 - existing highways
 - planned highways
 - planned express roads
 - existing main roads
 - regional roads
 - ecological corridors

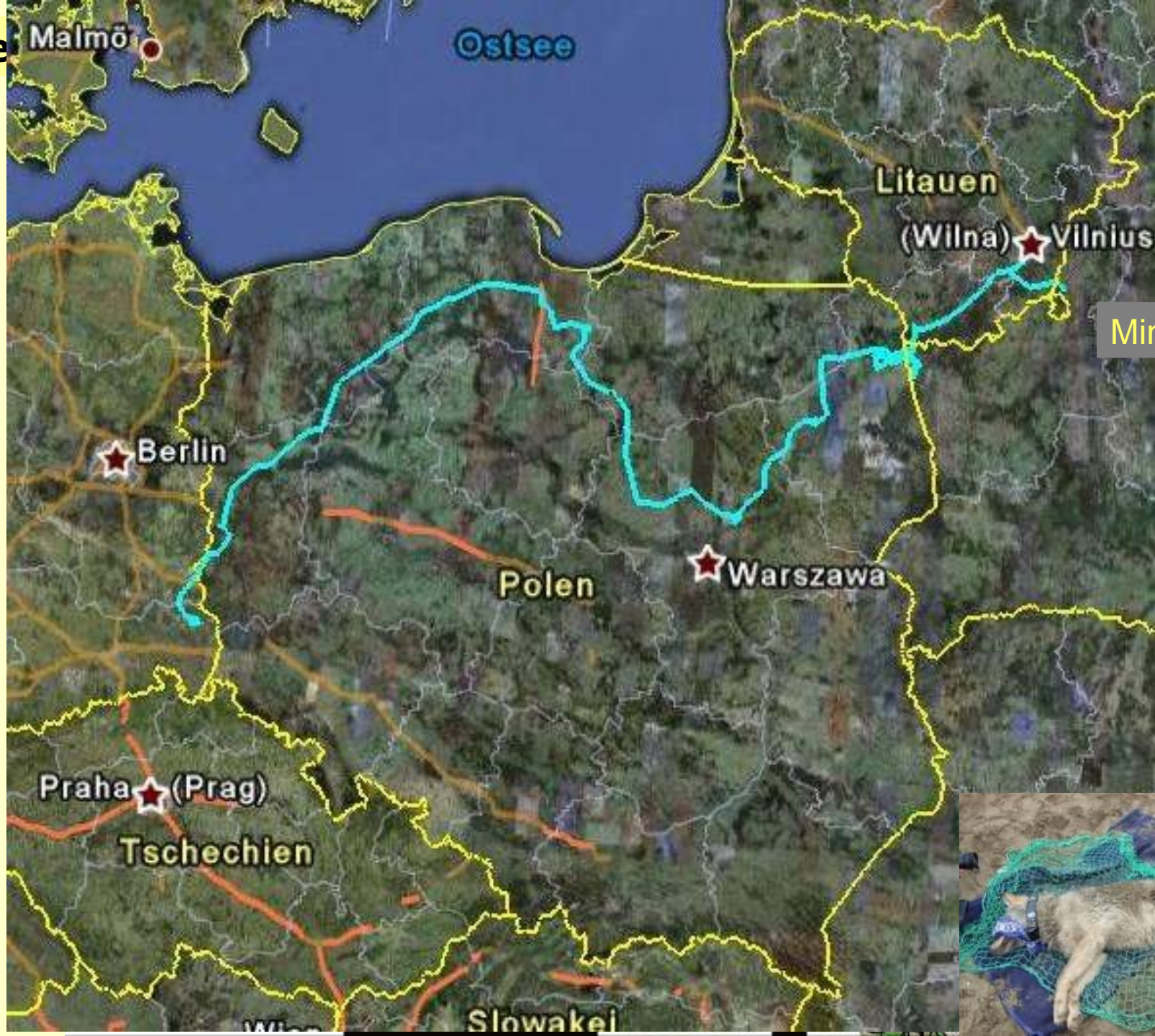
Project of monitoring of wildlife passages in Poland

Association for Nature WOLF
prepared for the Ministry of Infrastructe



Migrations of wolves in Poland, based on DNA analyses





Minsk

km

dra,
Narew



Partners of TEWN project



euRONATUR



Mammal Research Institute
Polish Academy of Sciences
Białowieża



And financially supported by



Thank you for the attention



www.polskiwilk.org.pl
www.polishwolf.org.pl

Habitat Directive

Favourable Conservation Status (FCS)

(DocHab-04-03/03 rev3 and guidance documents)

should be based around the status of two major
Favourable Reference Values (FRV):

1. Favourable Reference Population (FRP)

2. Favourable Reference Range (FRR)

(1) “Population dynamics data on large carnivores indicate that it is maintaining itself on a long term basis as a viable component of its natural habitat” (Article 1 (i)).
(monitoring data indicate the population has a stable or increasing trend).
All segments of the population should have stable or positive trends, and not just the population as a whole.

RECOMMENDATION for Favourable Reference Range

FRR should be considered larger than the area strictly necessary to support the Favourable Reference Population, and it attempts to ensure:

- (1) the continuity of distribution within a given population,
- (2) the possibility for connectivity between populations.

Criteria to be fulfilled in order to reach Favorable Conservation Status for wolf population

- (1) “Population dynamics data on wolves indicate that it is maintaining itself on a long term basis as a viable component of its natural habitat” (Article 1 (i)). (monitoring data indicate the population has a stable or increasing trend).
All segments of a wolf population should have stable or positive trends, and not just the population as a whole.
- (2) “The natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future” (Article 1 (i)) (the overall distribution of the population is stable or increasing).
- (3) “There is, and will probably continue to be, a sufficiently large habitat to maintain wolf population on a long-term basis” (Article 1 (i)) (the quality and continuity of habitat should be sufficient, and have a stable or increasing trend).

(4) The population size and range are equal to or greater than when the Directive came into force.

(5) The favourable reference population size has been reached (will be set at levels greater than those regarded as being viable using the IUCN red list criteria E or D).

(6) The favourable reference range has been occupied.

(7) Connectivity within and between populations (at least one genetically effective migrant per generation) is being maintained or enhanced.

(8) “Member States shall undertake surveillance of the conservation status of the natural habitats and species referred to in Article 2 with particular regard to priority natural habitat types and priority species” (Article 11) and “Member States shall establish a system to monitor the incidental capture and killing of the animal species listed in Annex IV (a)” (Article 12.4). (the population should be subject to a robust monitoring program).

Criteria 1-3 and 8 are taken from the text of the Directive, criteria 4 and 6 are taken from the guidance documents, while criteria 5 and 7 are based on our own recommendations.