Unexplored opportunities for Butterfly Conservation in Urban Landscapes

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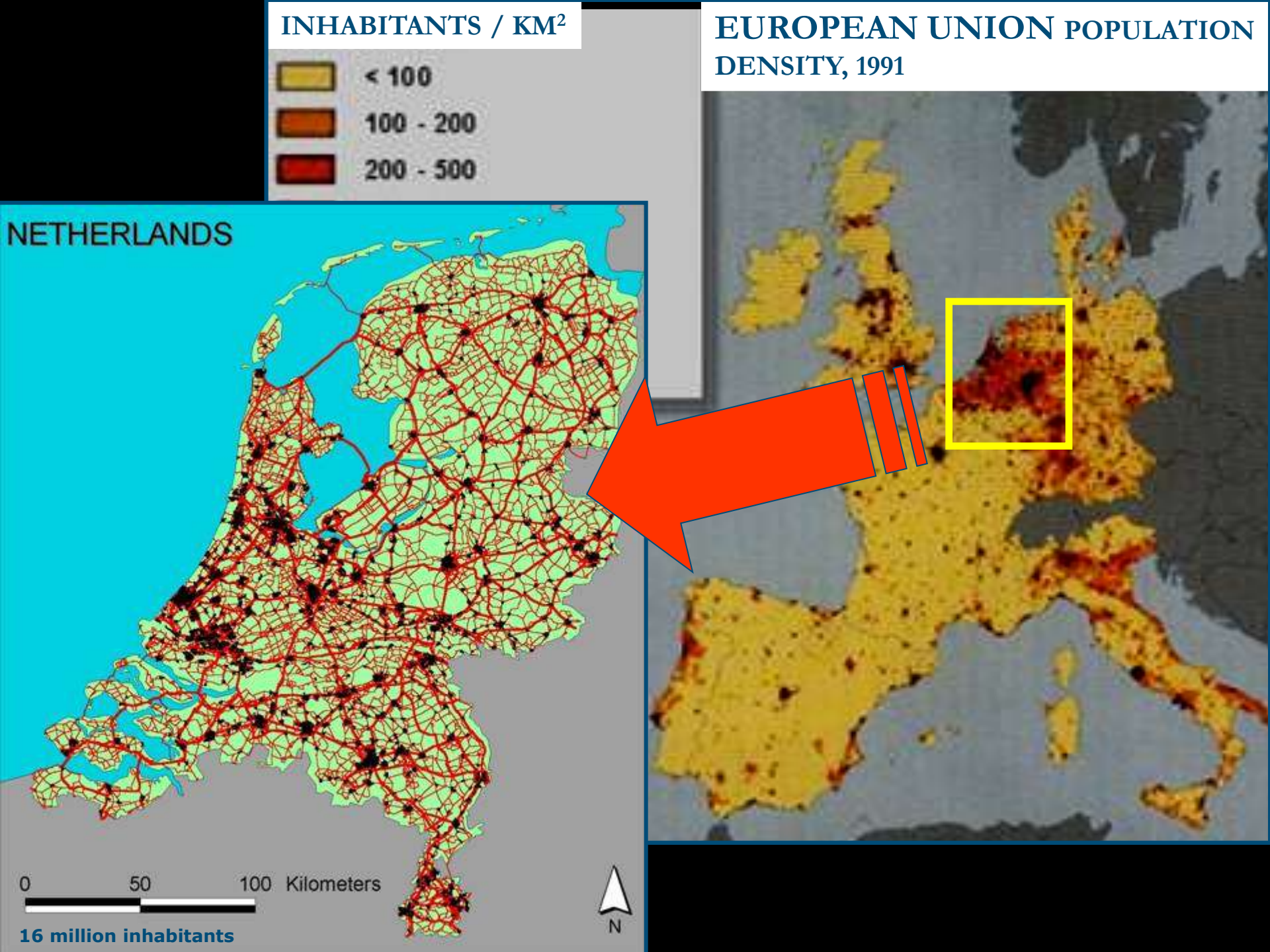
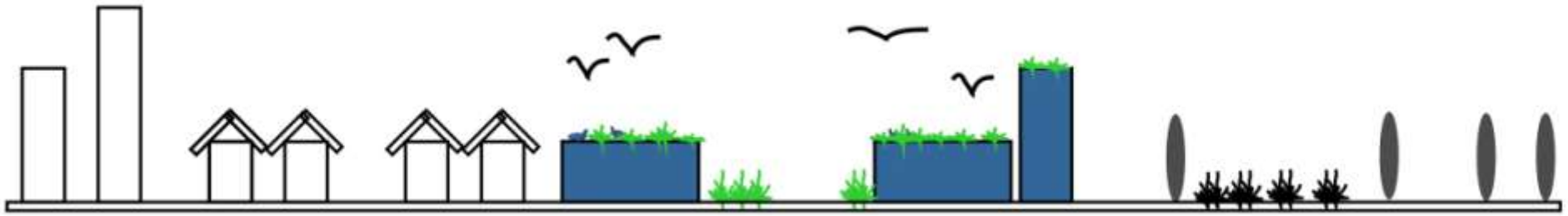
ALTERRA
WAGENINGEN UR

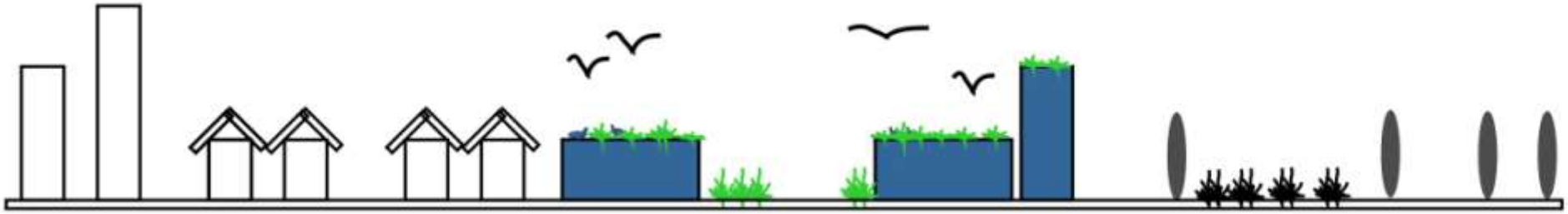

INHABITANTS / KM2
< 100
100 - 200
200 - 500
NETHERLANDS
0
50
100 Kilometers
16 million inhabitants
N
EUROPEAN UNION POPULATION
DENSITY, 1991

Distribution of Business sites in the Netherlands



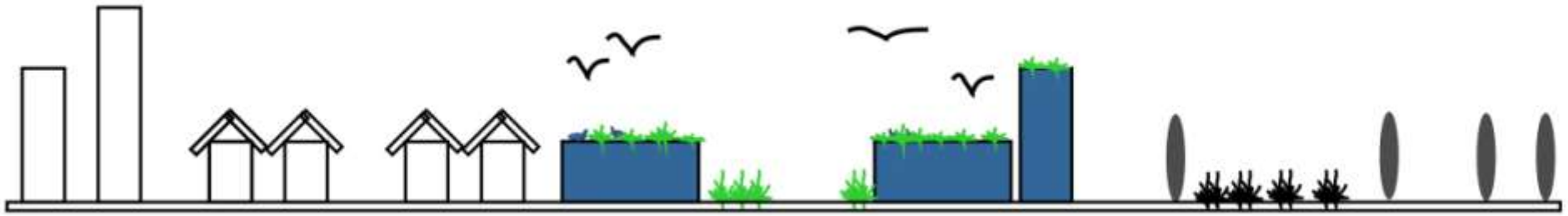
CITY BUSINESS SITE RURAL AREA

Urban wildlife experience



CITY BUSINESS SITE RURAL AREA

Wildlife conservation



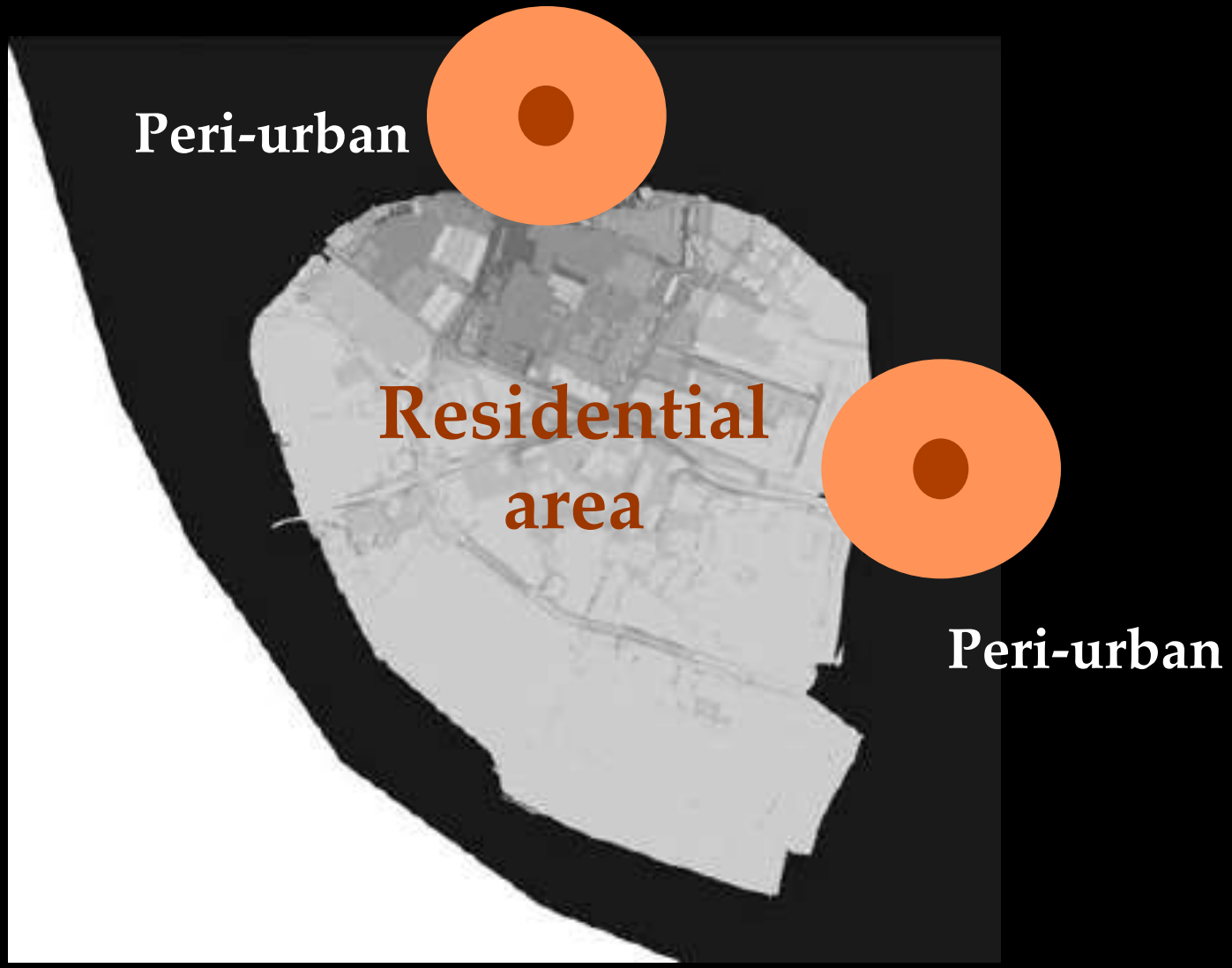
CITY BUSINESS SITE RURAL AREA

Residential area

Peri-urban business site

Residential area

Peri-urban business site


Peri-urban
Residential area
Peri-urban

Correlated random walk model

Meadow brown (*Maniola jurtina*)

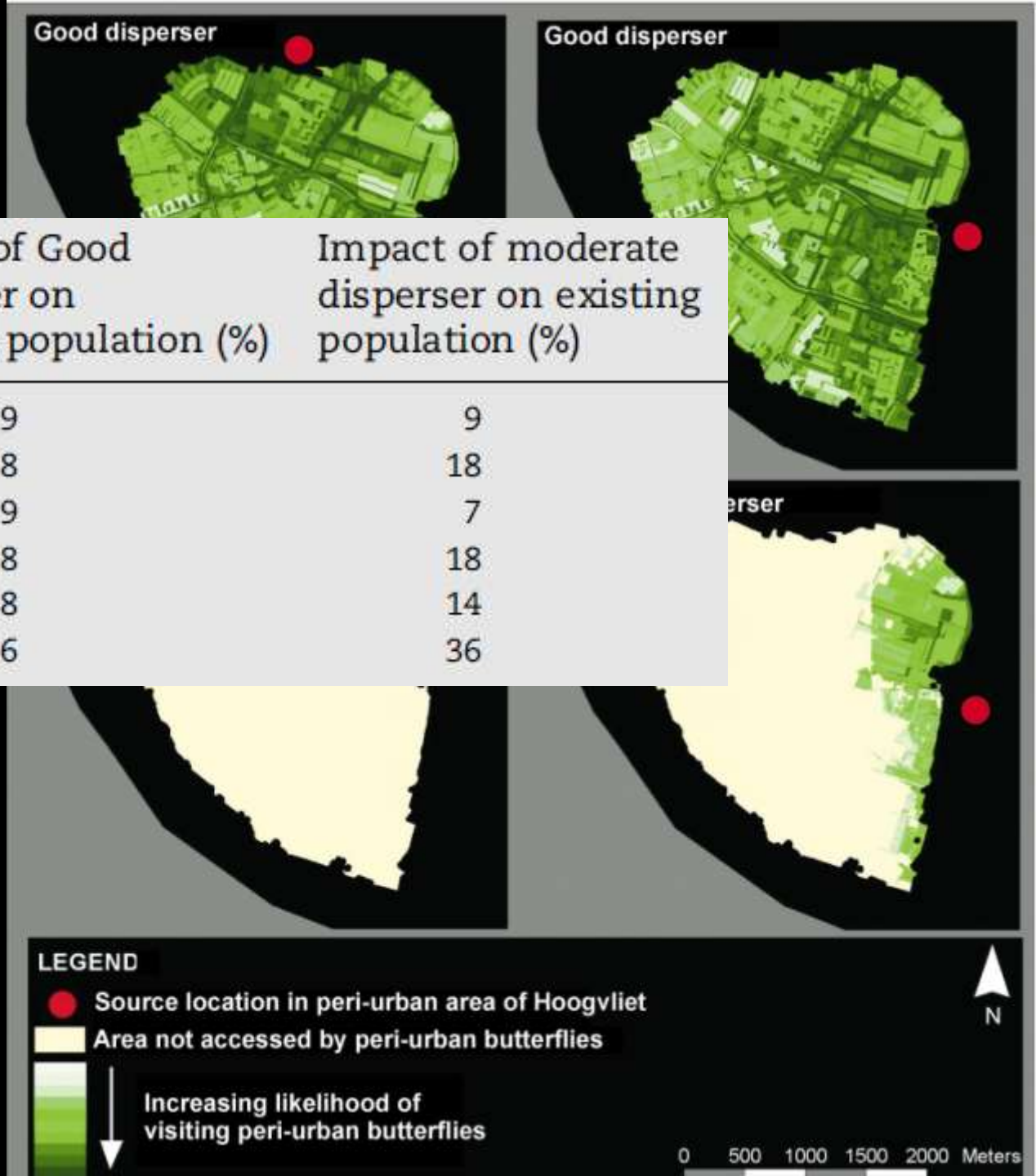
Small tortoiseshell (*Aglais urticae*)

	Movement parameters		Life span (average number of days)
	Step size	SD rotation angle	
Good disperser	22.5 ± 17.6[a,b] (habitat[c])	50[a,b] (habitat)	40[f]
	49.4 ± 29.2[b] (non-habitat[d])	22.5[e] (non-habitat)	
Moderate disperser	2.5 ± 0.6[a,g] (habitat)	90[b,g] (habitat)	7[h]
	7.2 ± 1.1[g] (non-habitat)	56[g] (non-habitat)	

Table B.1 – Boundary-crossing probabilities for 'good dispersers'

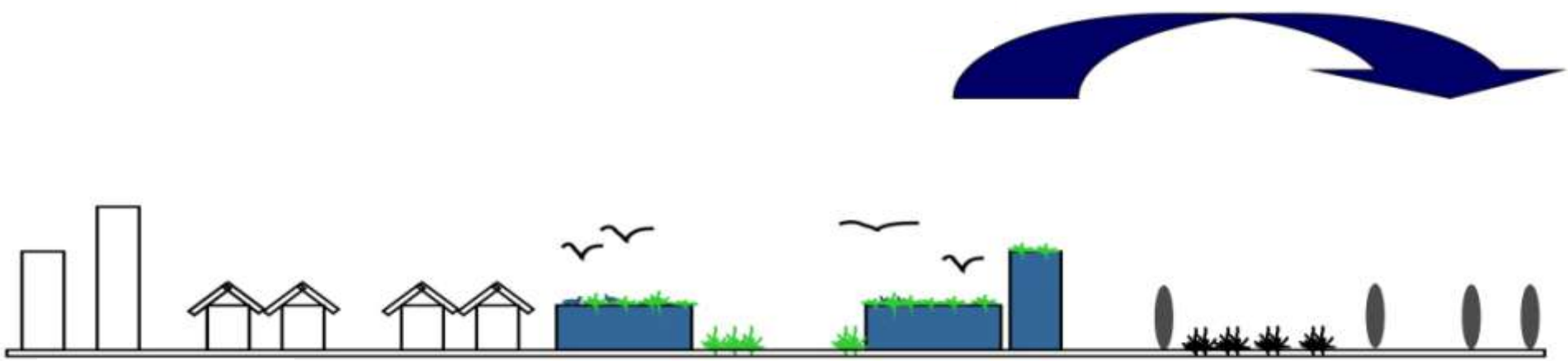
From/to	Semi-detached housing	Enclosed housing	Infrastructure level 1	Infrastructure level 2
Semi-detached housing	X	0.3	0.95	0.86
Enclosed housing	1	X	1	1
Infrastructure level 1	1	0.3	X	–
Infrastructure level 2	1	0.5	–	X
Infrastructure level 3	1	0.7	–	–
Grassland, intensively managed	0.5	0.3	0.95	0.86
Grassland, extensively managed	0.4	0.3	0.95	0.86
Forest	1	0.5	0.95	0.86
Forest edge	0.3	0.3	0.5	0.43
Water	1	0.5	0.95	0.86
Arable land	1	0.5	0.95	0.86
Orchard	0.5	0.3	0.95	0.86

Scenario	Impact of Good disperser on existing population (%)	Impact of moderate disperser on existing population (%)
A	19	9
B	38	18
C	19	7
D	28	18
E	38	14
F	56	36



Do business sites potentially provide conservation opportunities for Red List species?

Wildlife conservation



Scientific name	Red List status	Dispersal range	Area required for a local population (ha)	Preferred vegetation	Abundance in NL (# km^2)
Aricia agestis	Near threatened	<1.0 km	1.0–2.0	Dry calcareous grassland	1215
Hesperia comma	Endangered	<1.0 km	0.5–1.0	Dry open grassland	260
Hipparchia semele	Near threatened	1.5 km	1.0–2.0	Dry open grassland	1134
Issoria lathonia	Vulnerable	1.5 km	2.0–5.0	Dry pioneer vegetation	623
Lycaena tityrus	Vulnerable	<1.0 km	1.0–2.0	Low-productive grassland	748
Ochlodes sylvanus	Near threatened	1.5 km	0.5–1.0	Moist, low-productive, tall grassland	3042
Plebeius argus	Near threatened	<1.0 km	0.5–1.0	Heathlands	905
Pyrgus malvae	Endangered	<1.0 km	0.5–1.0	Heathlands and low-productive grassland	151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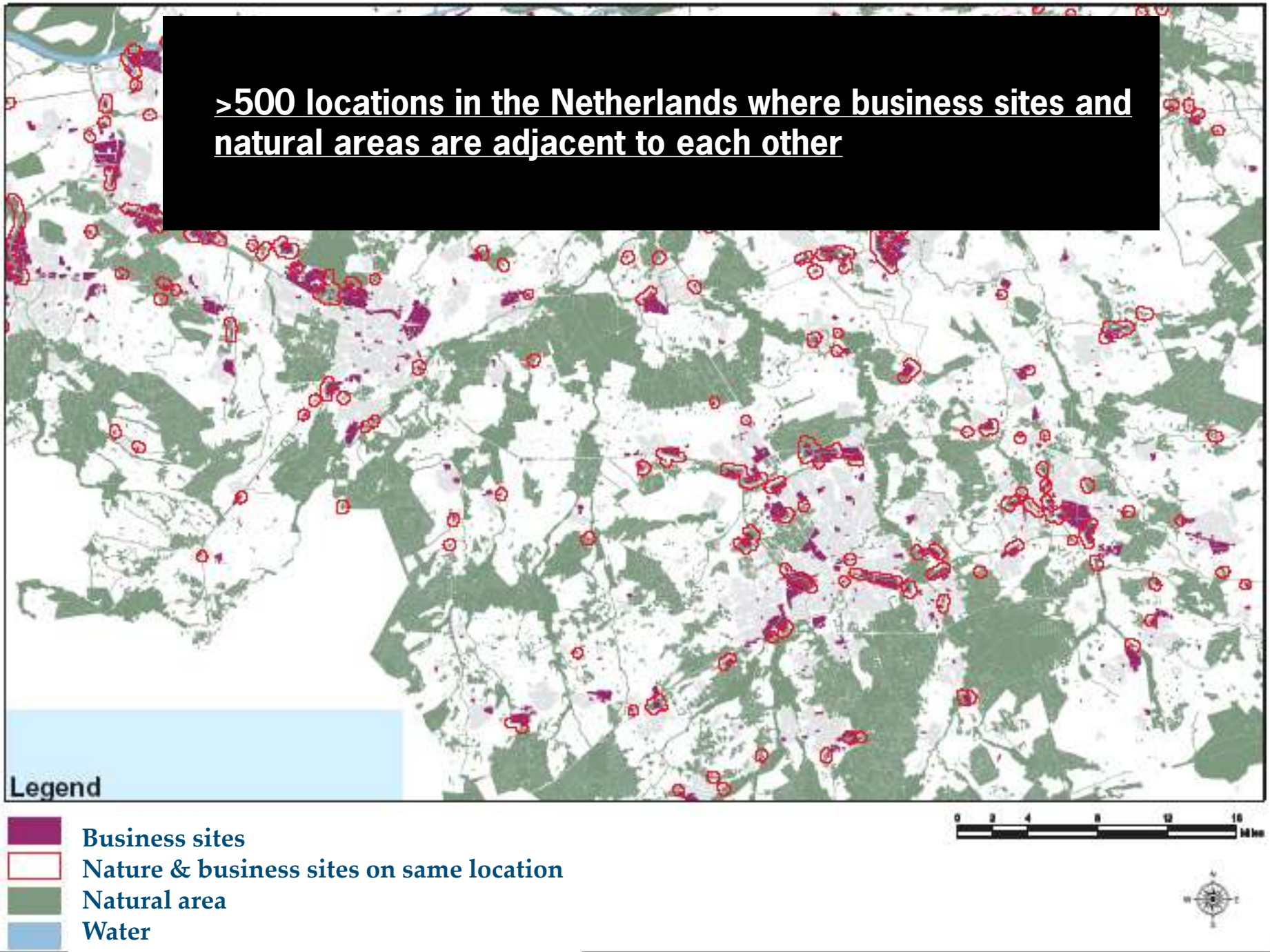
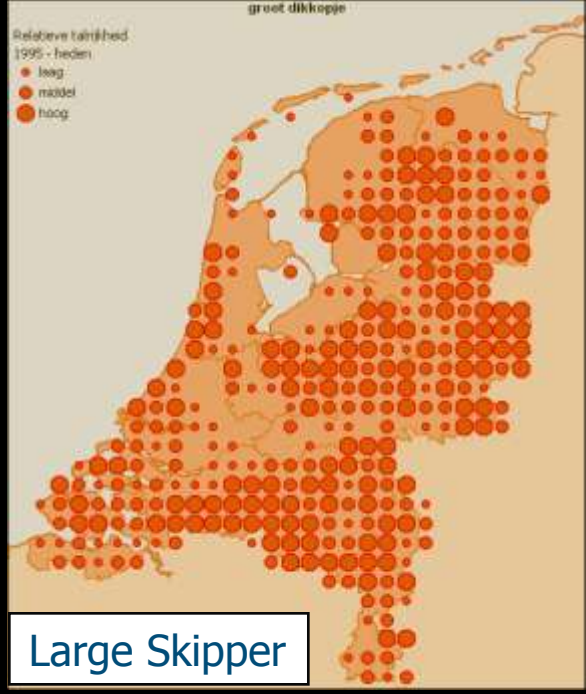
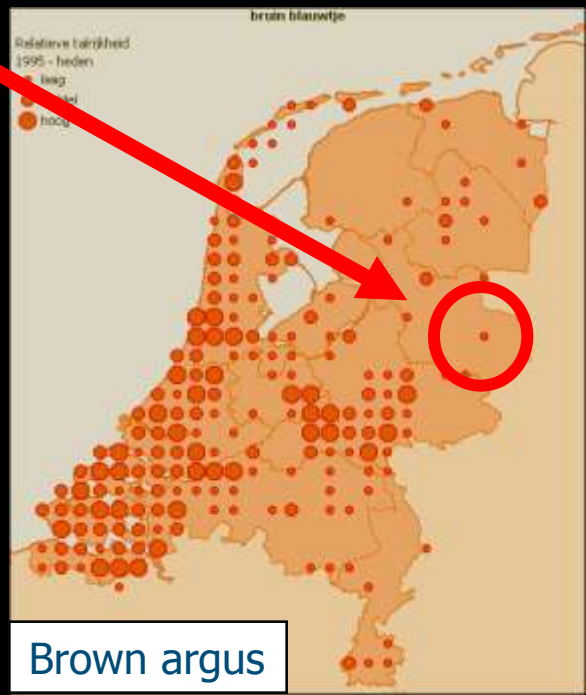
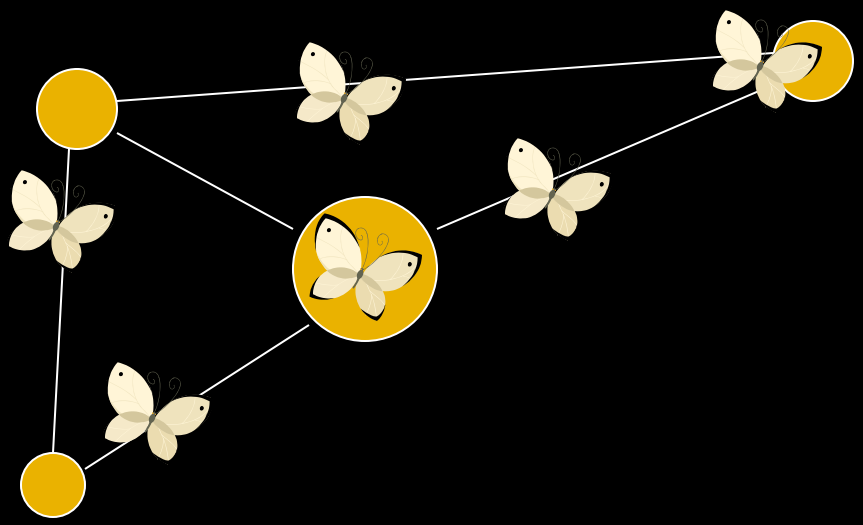

>500 locations in the Netherlands where business sites and natural areas are adjacent to each other
Legend
Business sites
Nature & business sites on same location
Natural area
Water


Business sites

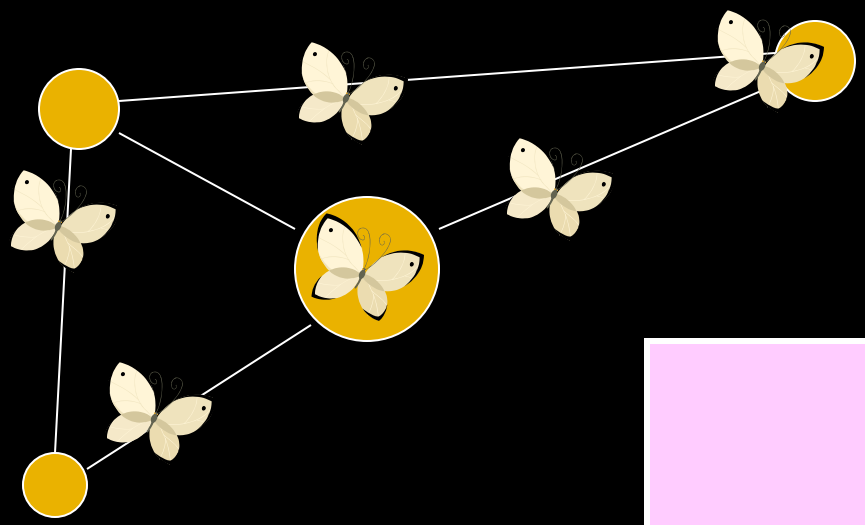

groot dikkopje
Relatieve talrijkheid
1995 - heden
laag
middel
hoog
Large Skipper


bruin blauwtje
Relatieve talrijkheid
1995 - heden
laag
hoog
Brown argus



Vulnerable **(meta)population of butterfly species**

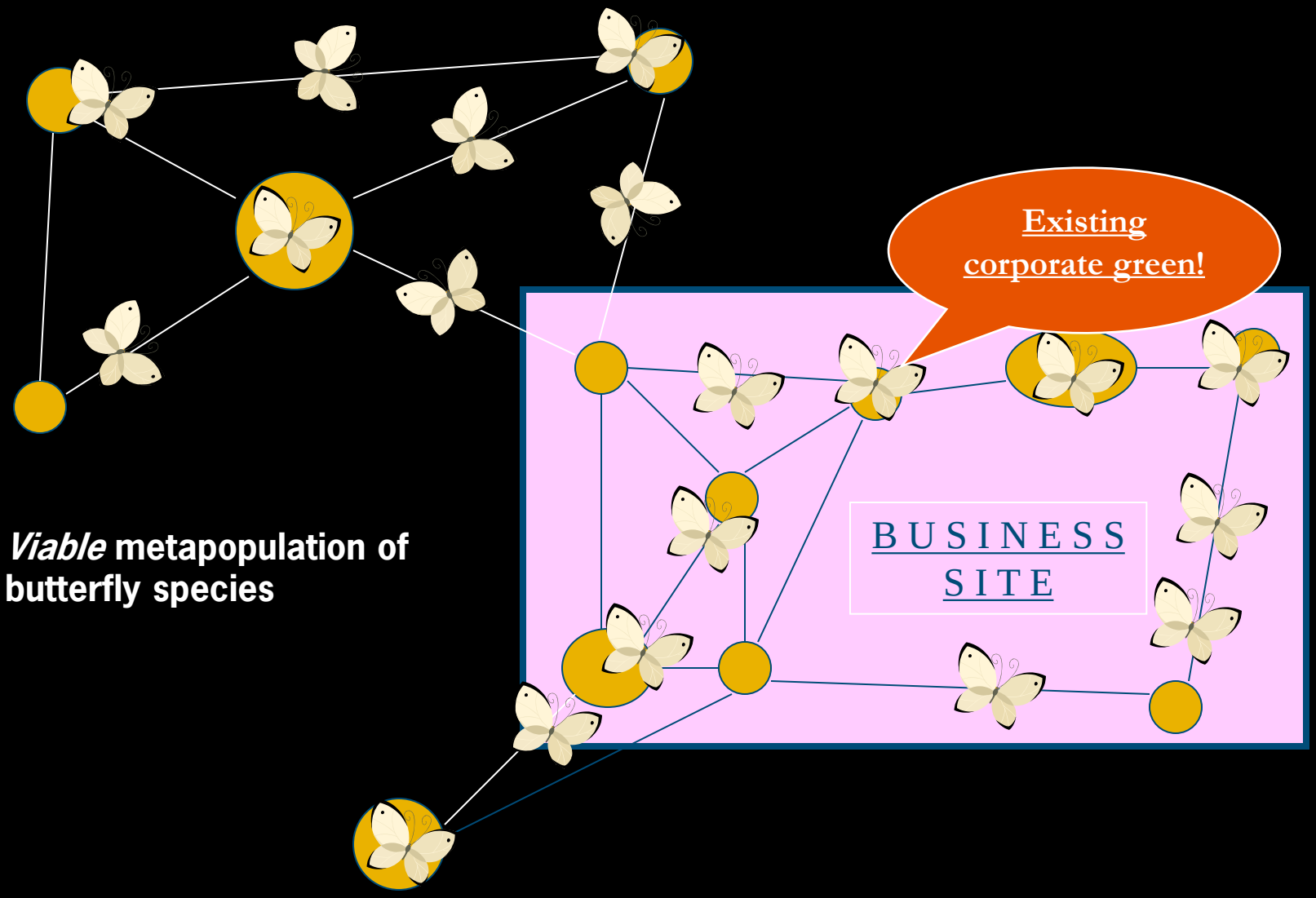
= Butterfly population



Vulnerable **(meta)population of butterfly species**

BUSINESS SITE

= Butterfly population



Viable **metapopulation of butterfly species**

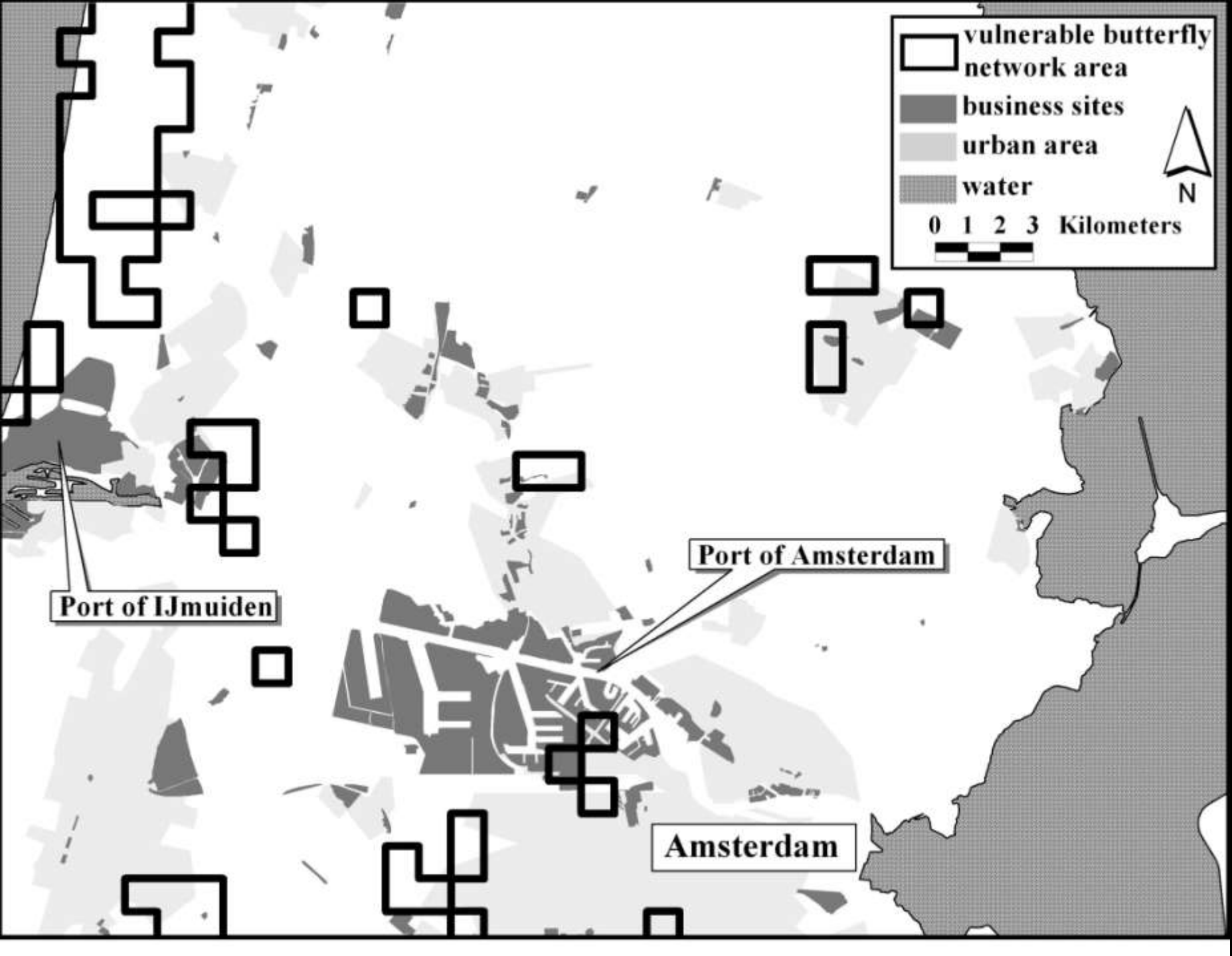

vulnerable butterfly network area
business sites
urban area
water
N
0 1 2 3 Kilometers
Port of IJmuiden
Port of Amsterdam
Amsterdam

Table 4. *Dutch business sites (numbers and proportion) with substantial potential to enhance the persistence of vulnerable butterfly population networks, because these business sites are located in the vicinity of these populations and are large enough to offer habitats for a sustainable population of butterflies. Some sites can support more than one species.*

Business site type	Number of sites	Percentage of total	Average size (ha)	Maximum number of species per site
Distribution centers	2	2.1%	122.1	1
Heavy industrial area	15	16.1%	221.0	5
High-quality business parks	9	9.7%	187.7	2
Industrial seaports	9	9.7%	883.0	2
Mixed business sites	58	62.4%	126.3	2
Total	93	100%	220.7	

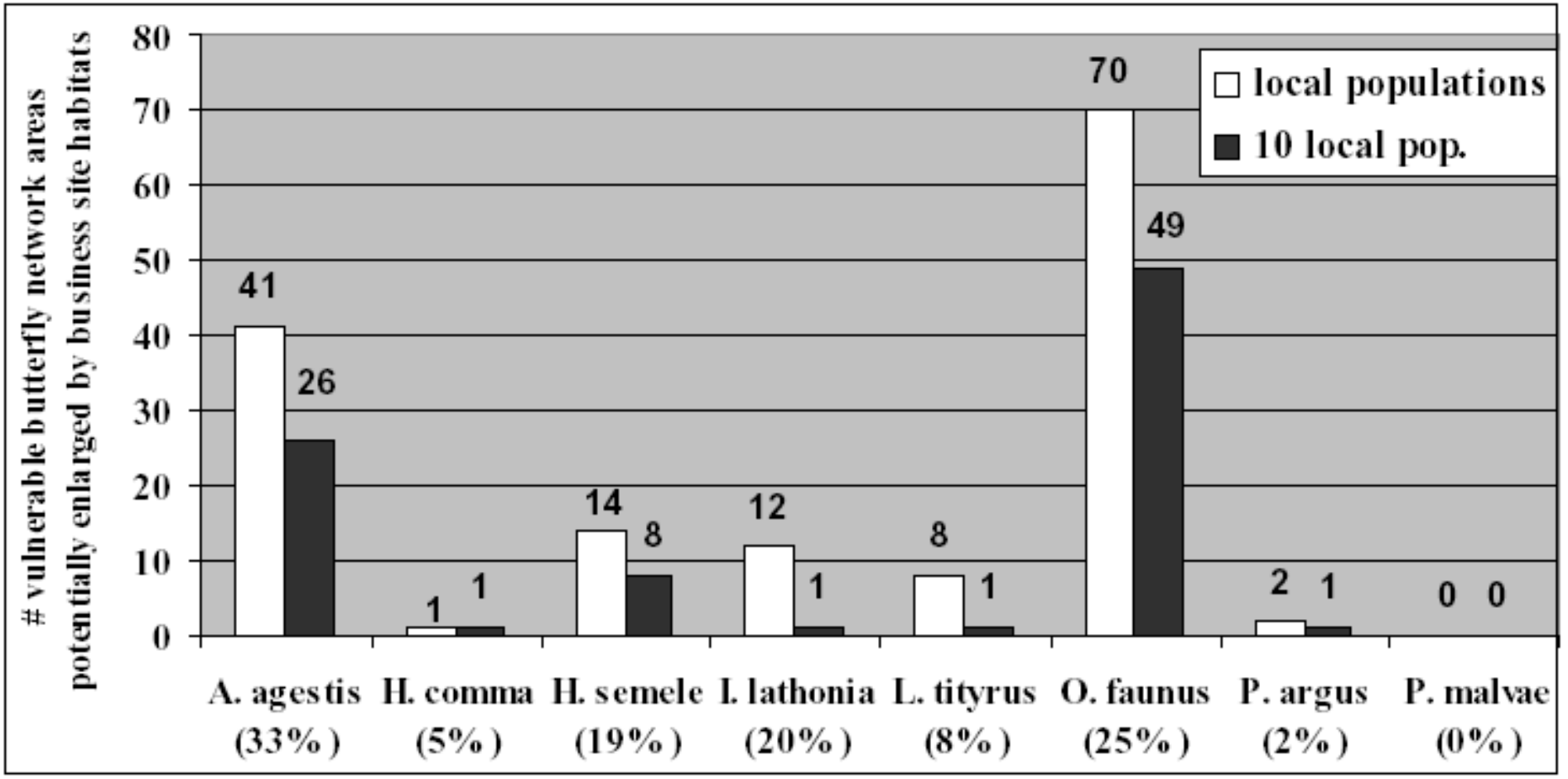
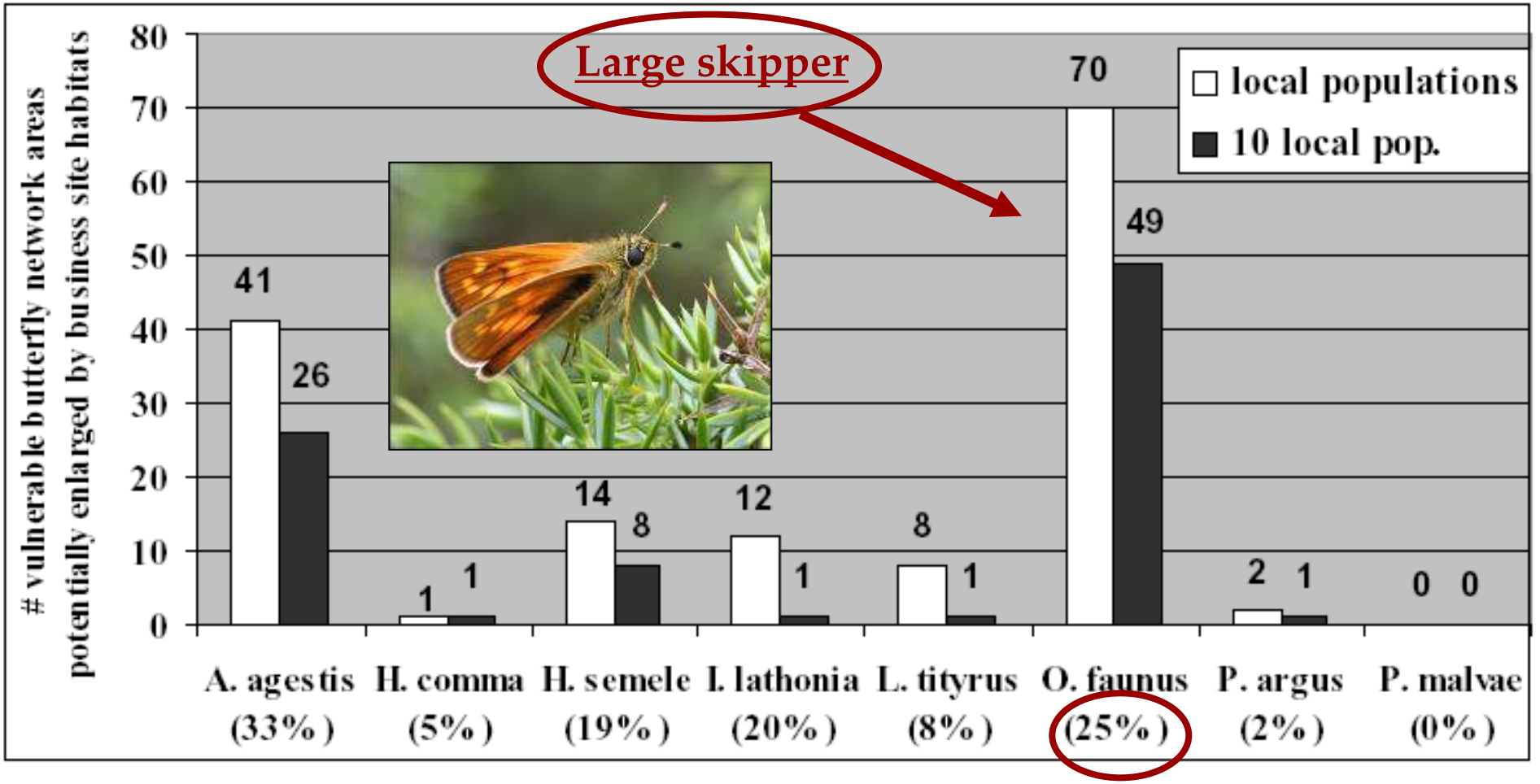


Figure 3. *Number of vulnerable butterfly network areas that can be strengthened with additional habitat (for at least 1 local and for 10 local populations) at a neighboring business site. This number is also given as proportion (%) of the total number of vulnerable network areas. Vulnerable butterfly network area: contiguous area where the species was observed, with population considered as 'vulnerable for extinction' based on population size and network area size.*



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To conclude

Unexplored opportunities to enhance urban butterfly experience

- Urban edges, including peri-urban business sites, may potentially act as sources for inner-city butterfly populations, thereby enhancing wildlife experience of citizens.

- To function as source, the ecological management of the city edge and connecting urban green infrastructure (corridors) deserve more attention.

Snep RPH., Opdam PFM, Baveco JM, WallisDeVries MF, Timmermans W, Kwak RGM, Kuypers VHM 2006. *How peri-urban areas can strengthen animal populations in cities: a modeling approach*. Biological Conservation 127: 345-355.

Unexplored opportunities for conservation of endangered butterfly species

- Peri-urban business sites provide conservation opportunities for butterflies due to their location, size and land use

- If these opportunities are fully exploited, business sites could make a significant contribution in preventing some Dutch Red List butterfly species from extinction.

Snep, RPH, WallisDeVries, MF, Opdam, P 2011. *Conservation where people work: A role for business districts and industrial areas in enhancing endangered butterfly populations?* Landscape and Urban Planning 103 (1): 94 – 101.

Thank you for your attention!

Acknowledgements

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http://www.vlinderwerkgroep.be/literatuur-1/Klaverblauwtje_24_01_2008.pdf