Biodiversiteit en heterogeniteit

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Stichting Bargerveen

agriculture, nature
and food quality

survival plan woodland + nature

Biodiversiteit & Heterogeniteit

Biologische diversiteit

Heterogeniteit

Relatie

Ontstaan

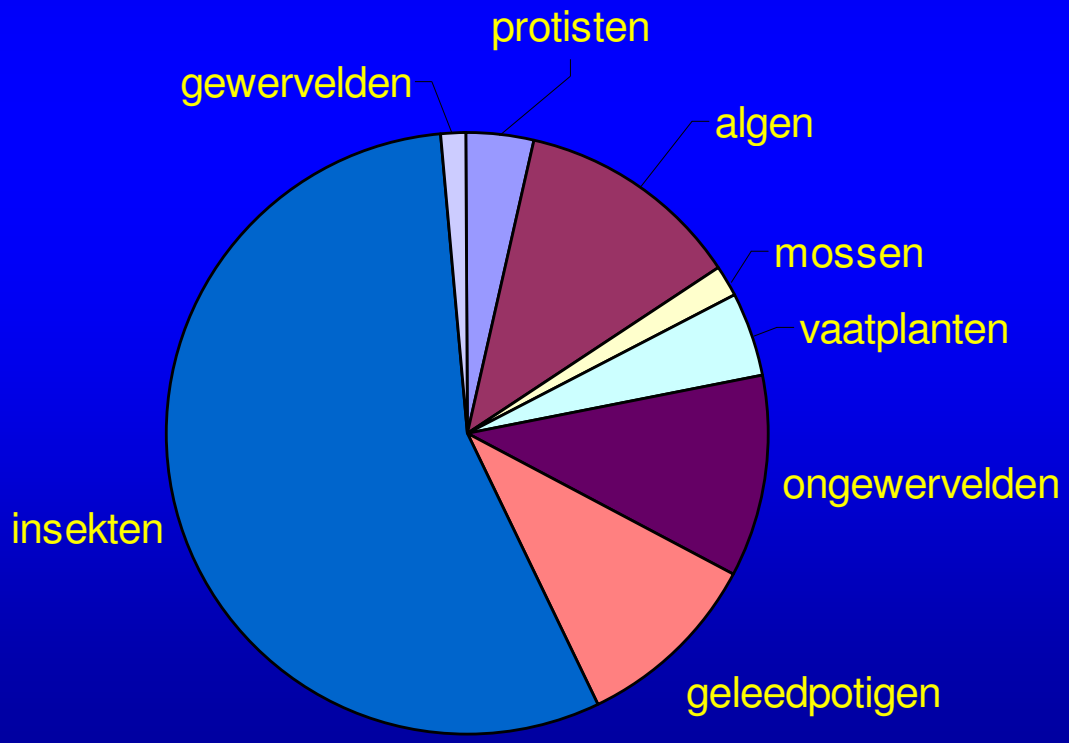
Bedreigingen

Consequenties

Biologische diversiteit

Aspecten van totale verscheidenheid van het leven op aarde

- verscheidenheid aan landschappen en vegetatietypen
- soortenrijkdom
- genetische variatie

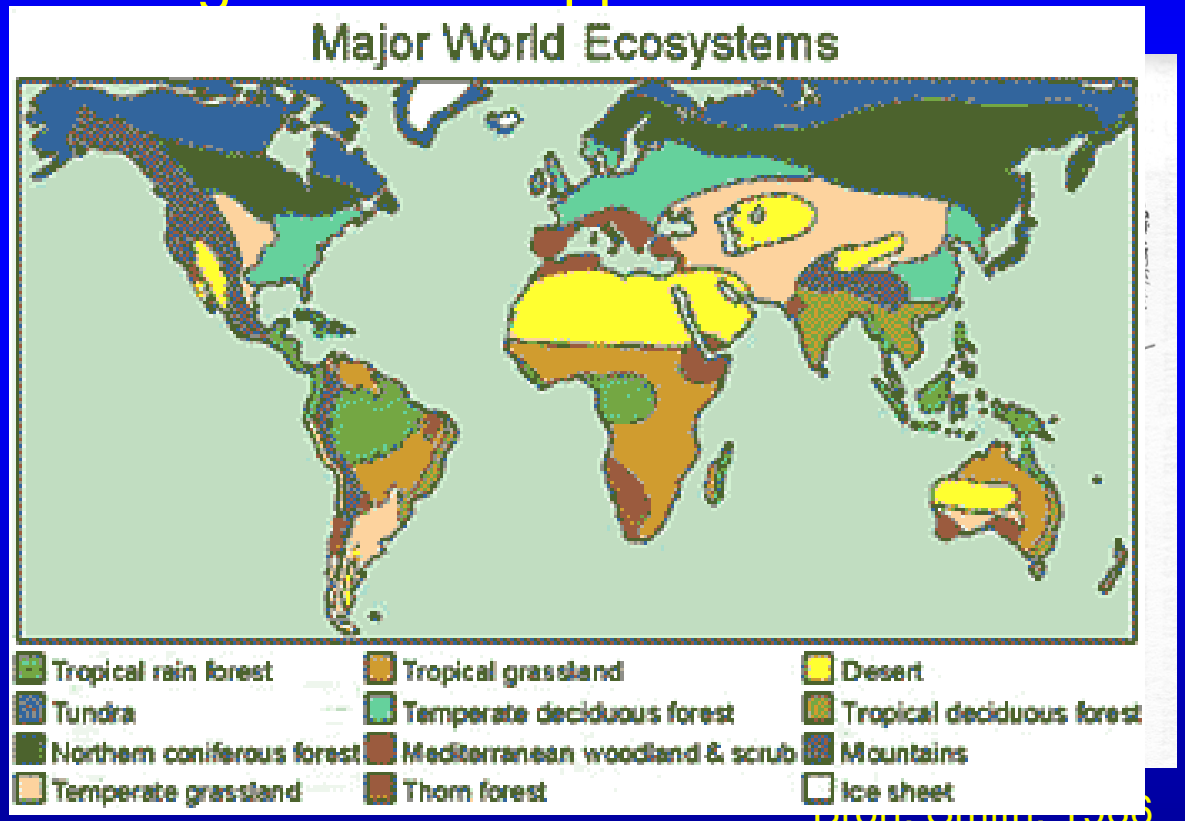


Biologische diversiteit

Schaal:

niet alles is overal

zonatie van gemeenschappen



Bron: Smith, 1966

Biologische diversiteit

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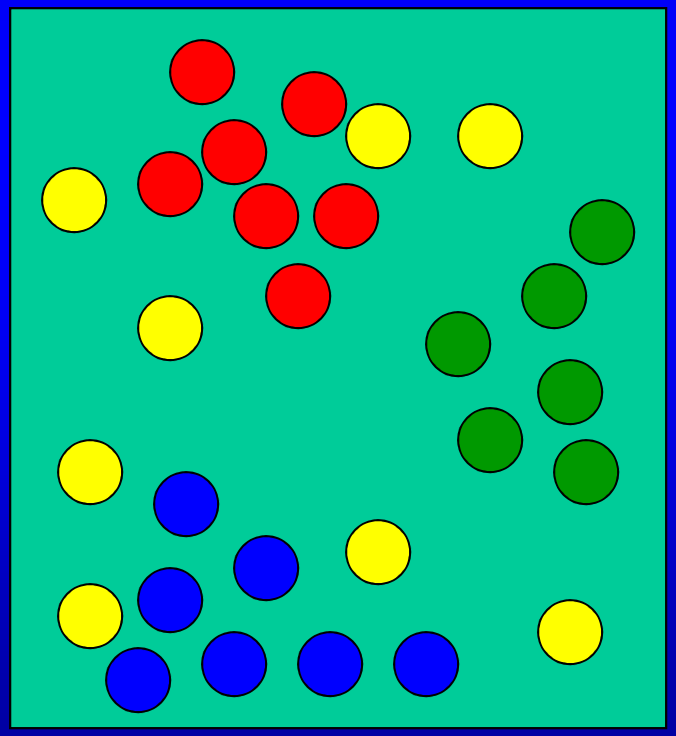
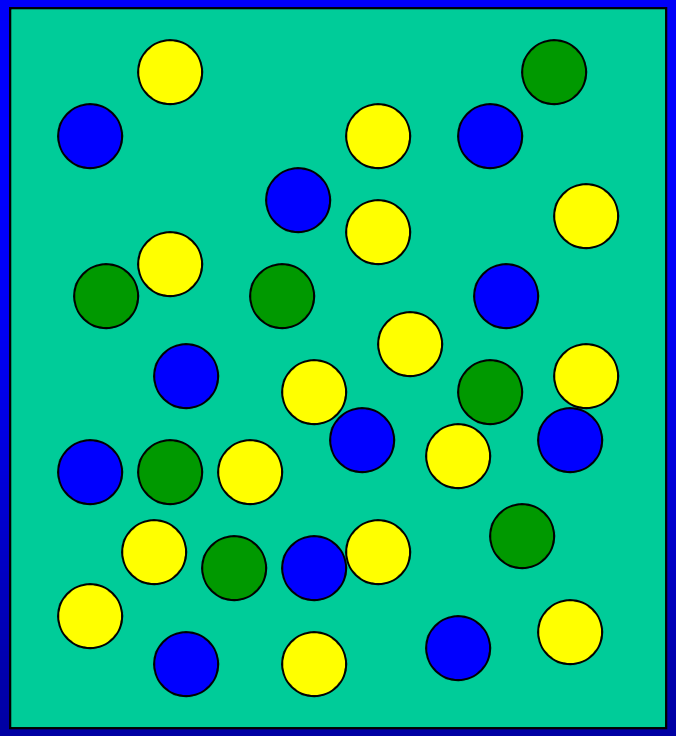
niet alles is overal





Biologische diversiteit

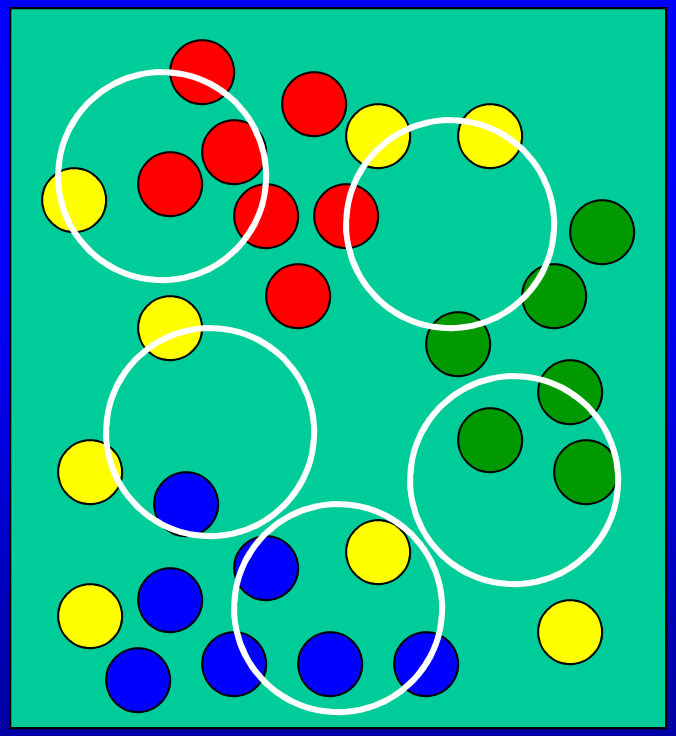
Schaal:
niet alles is overal

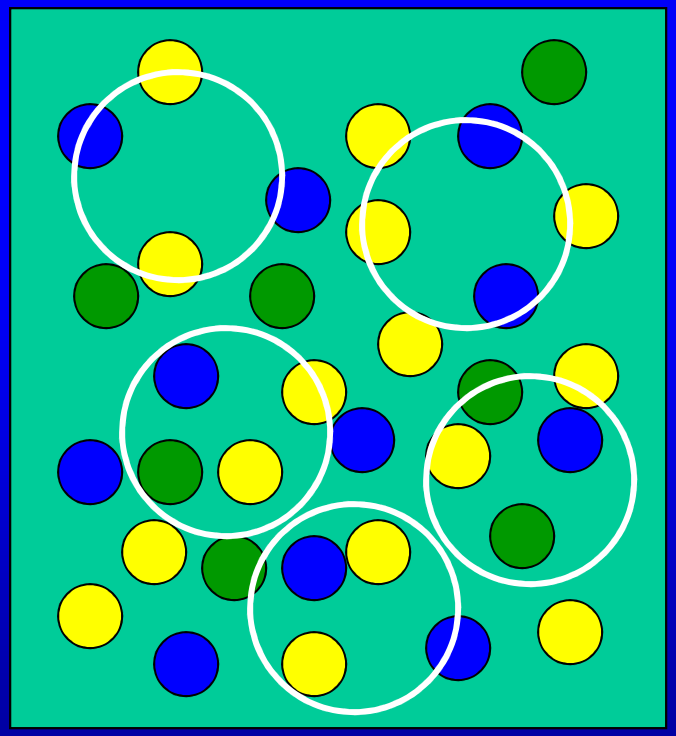
Biologische diversiteit

Schaal:

niet alles is overal

Kleine schaal	2	2,4
Grote schaal	4	3





Biologische diversiteit

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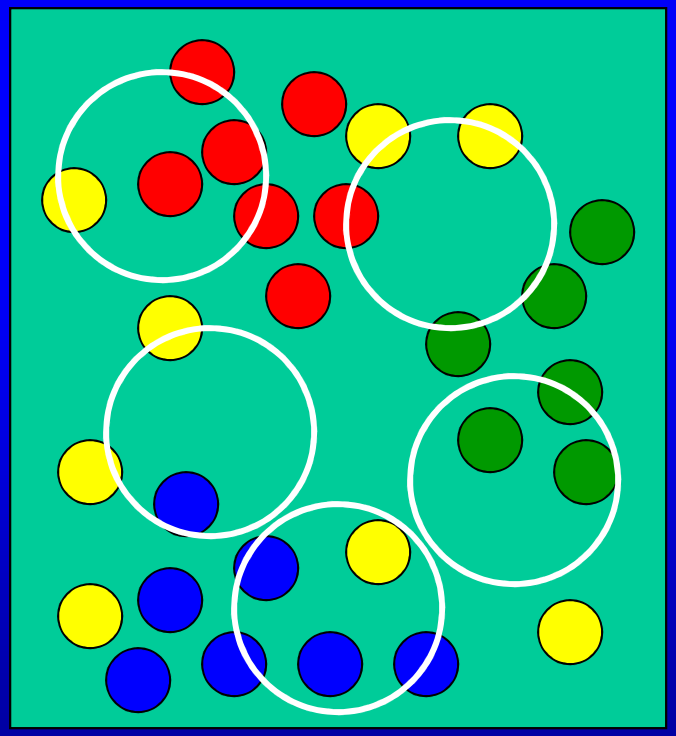
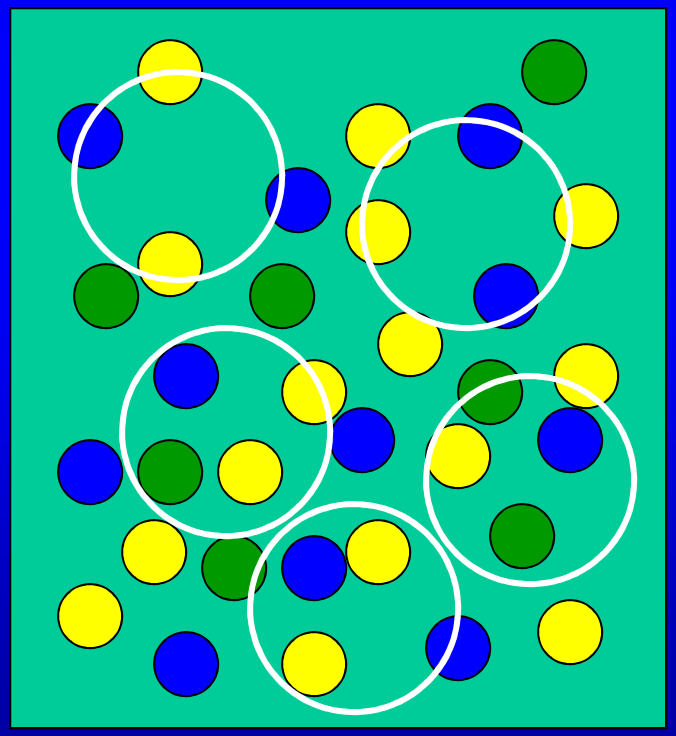
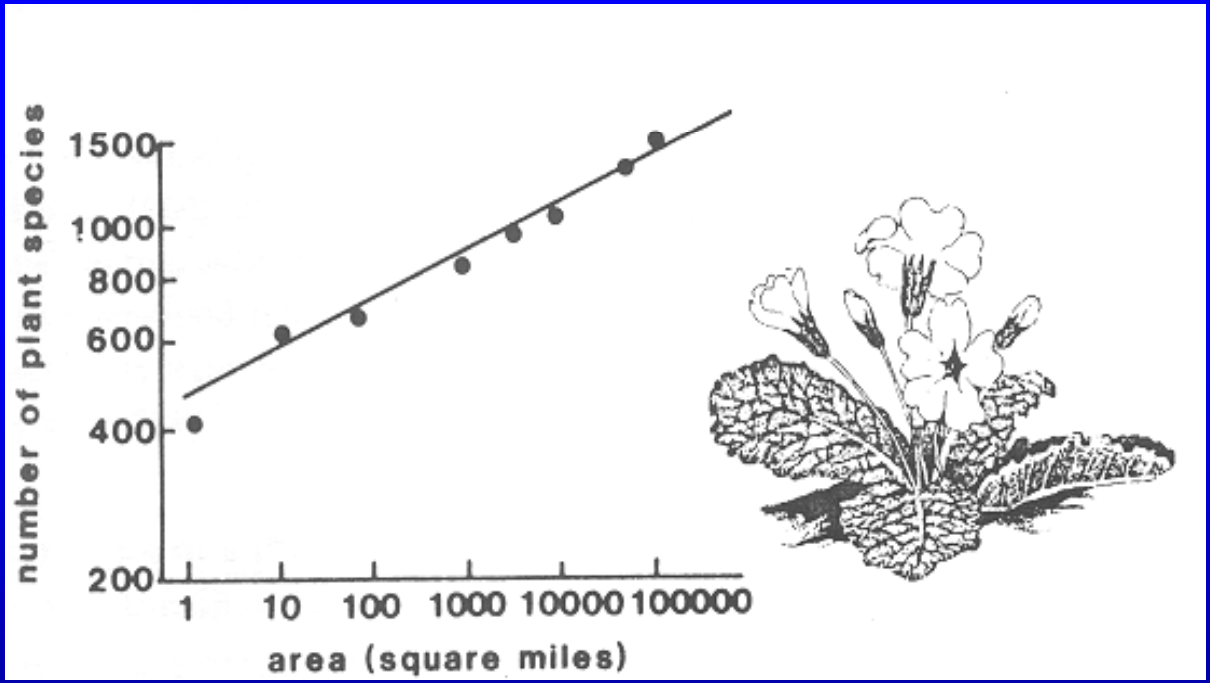




Biotic homogenization

Biologische diversiteit

Species area curves: $S = cA^z$

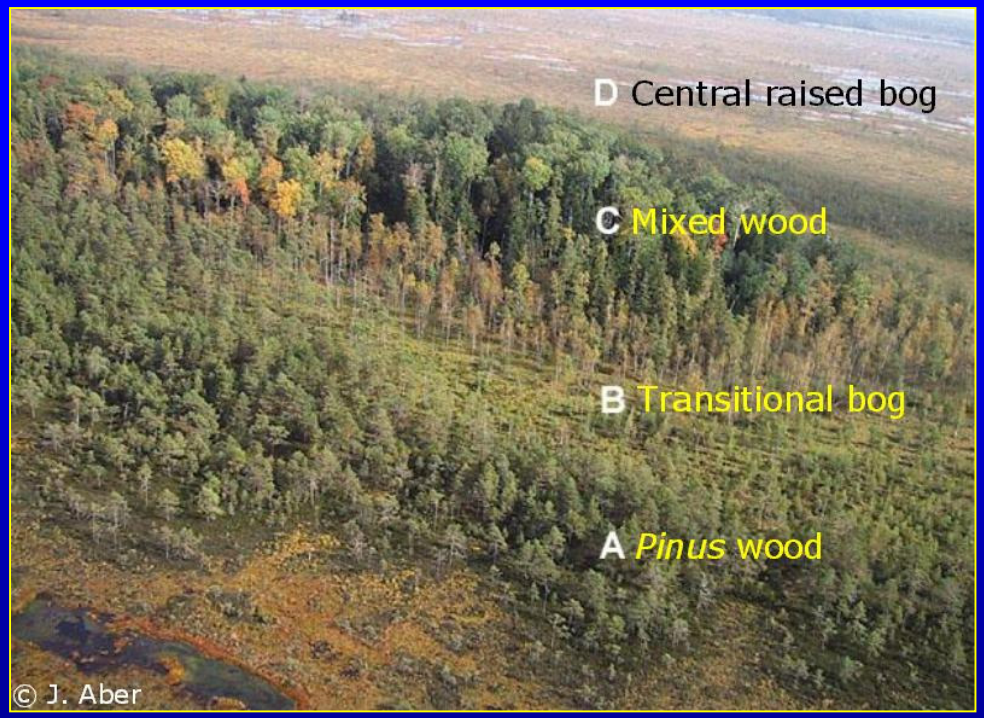


Bron: Magurran, 1984

- Kans
- Homerange
- Habitattypen

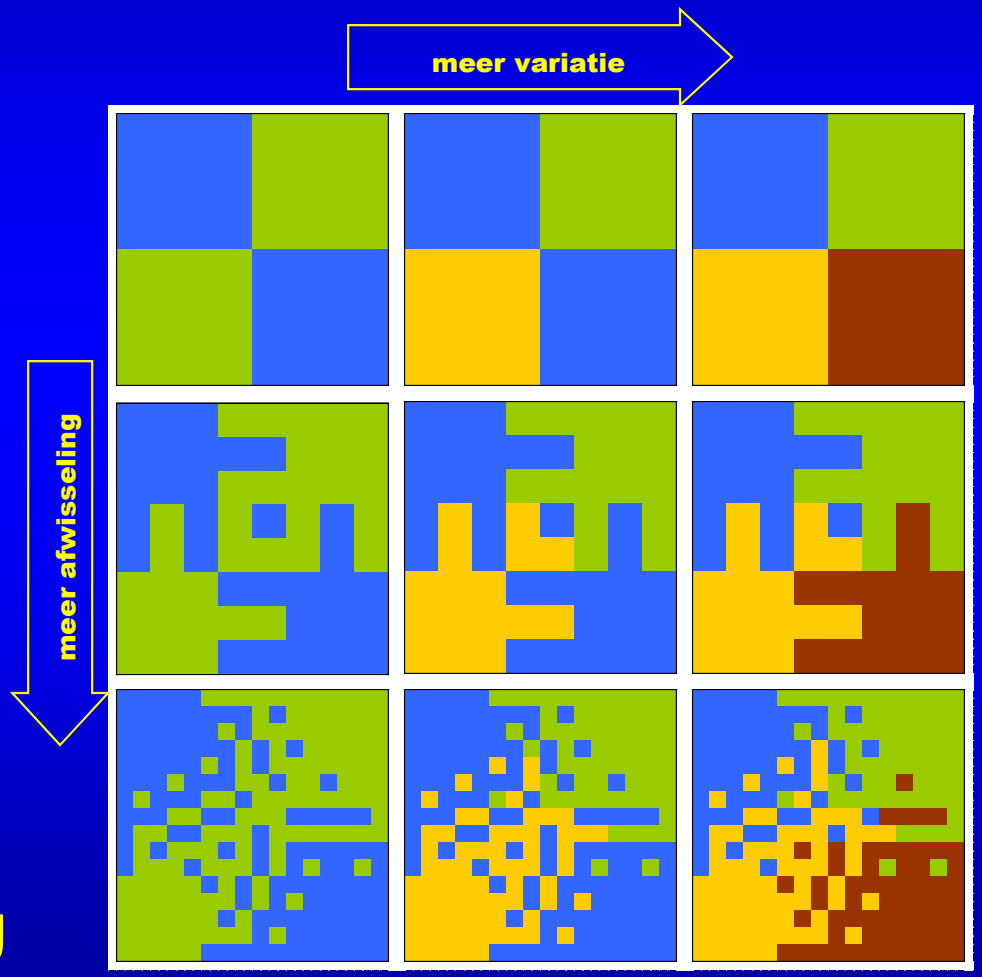
Heterogeniteit

Mozaïeken: scheidingen
Gradiënten: verbindingen



Heterogeniteit

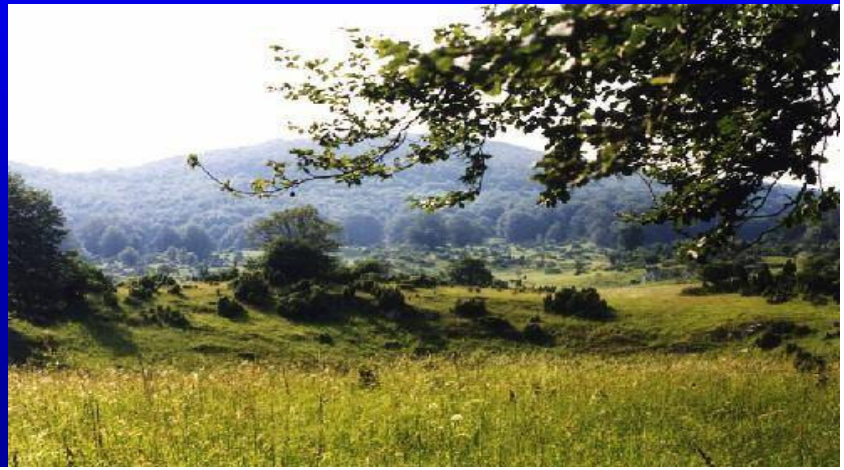
Habitatdiversiteit (habitattypen)
Habitatconfiguratie (maaswijdte)



Versnippering

Heterogeniteit

Schaal



Relatie

Voorkomt extinctie (afzwakken soortinteracties)

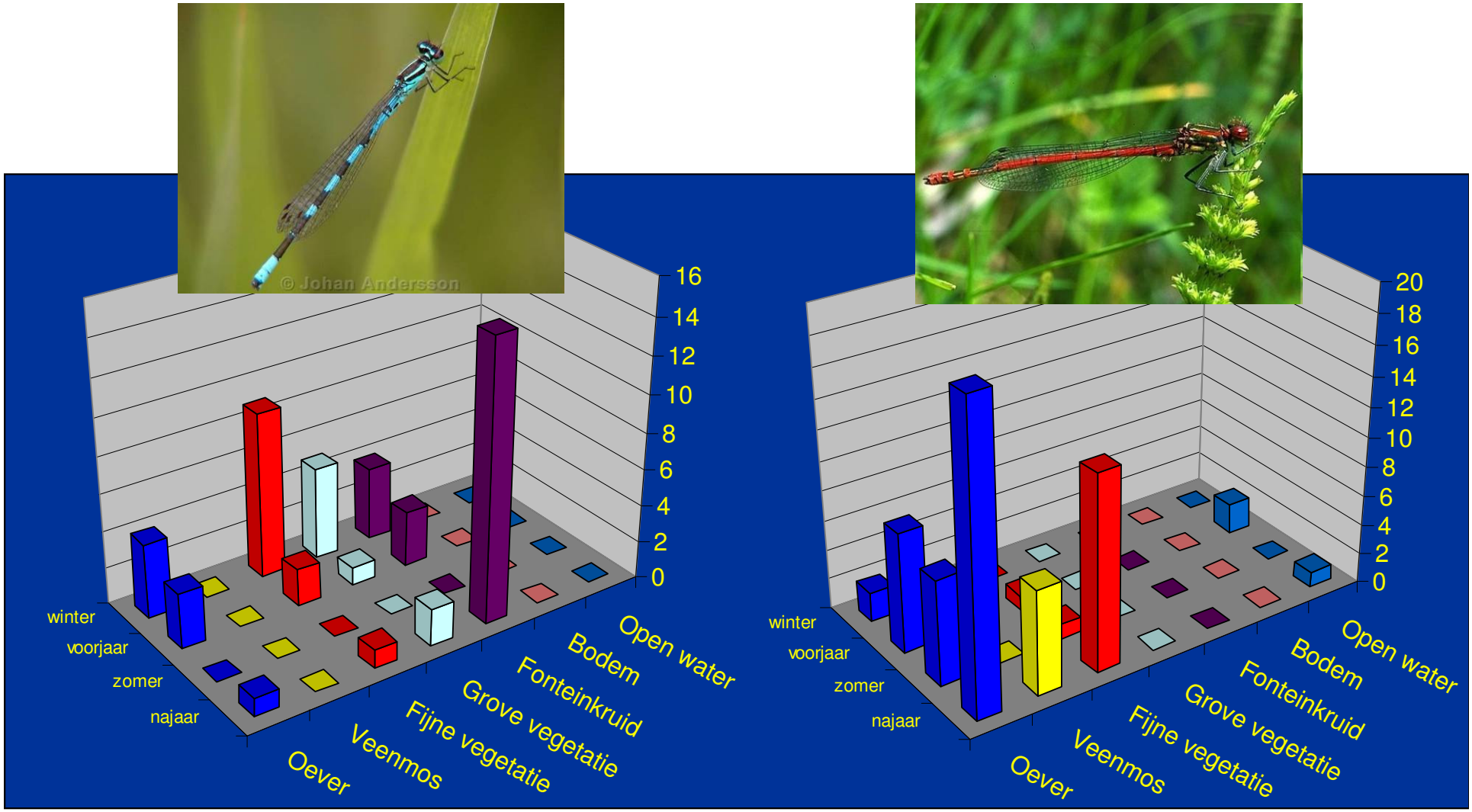
-Competitive exclusion principle

(two species cannot coexist when they have identical needs of a limited resource)

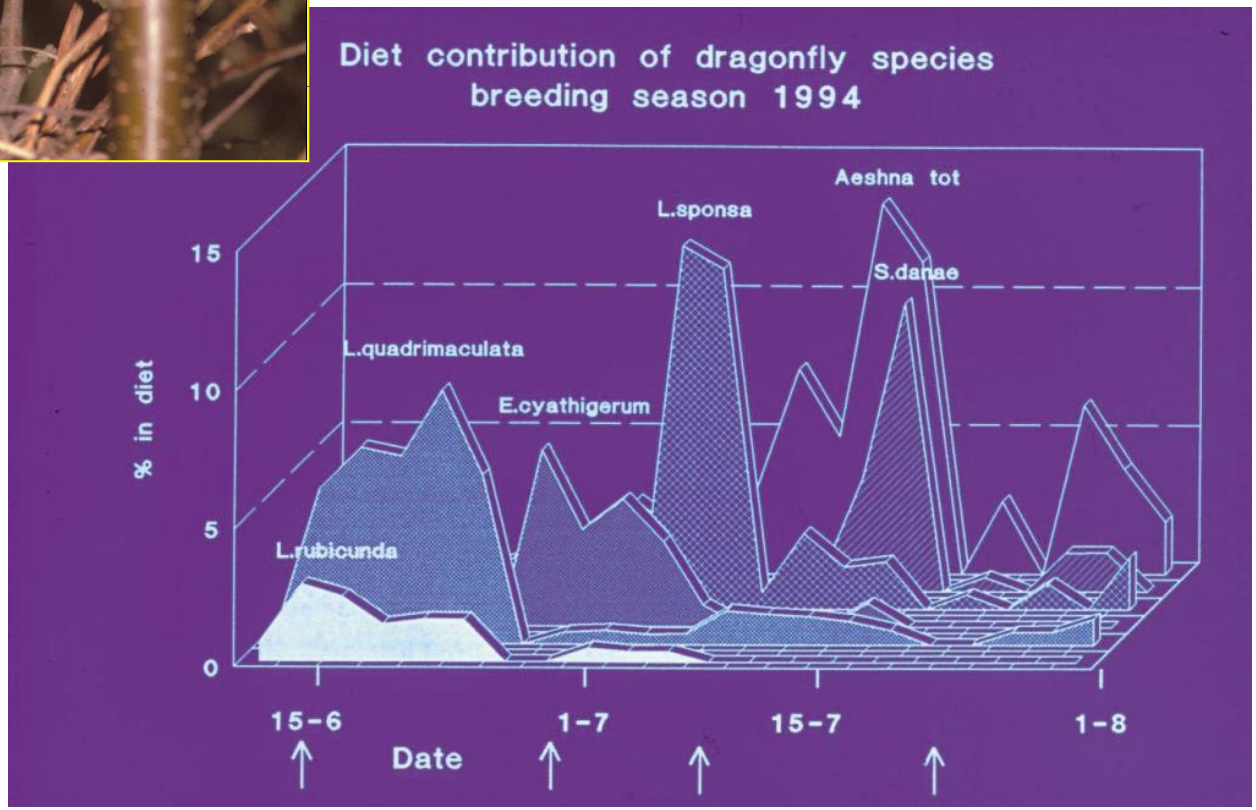
-Niche differentation

-Schuilplaatsen tegen predatoren-parasieten

Ruimtelijke scheiding op verschillende schaalniveaus



Temporele scheiding op verschillende schaalniveaus



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Voorkomt extinctie (afzwakken soortinteracties)

-Competitive exclusion principle

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-Niche differentation

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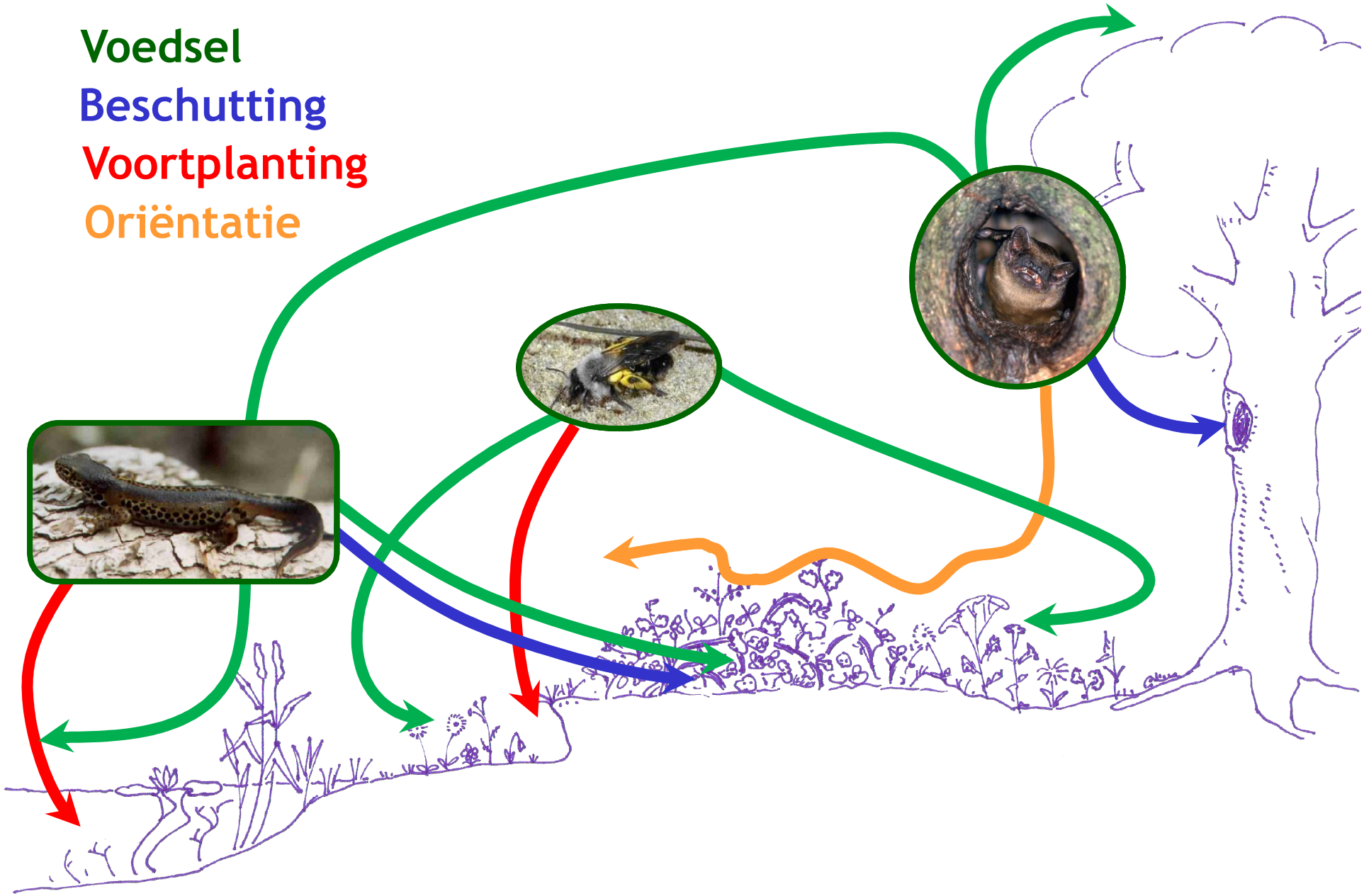
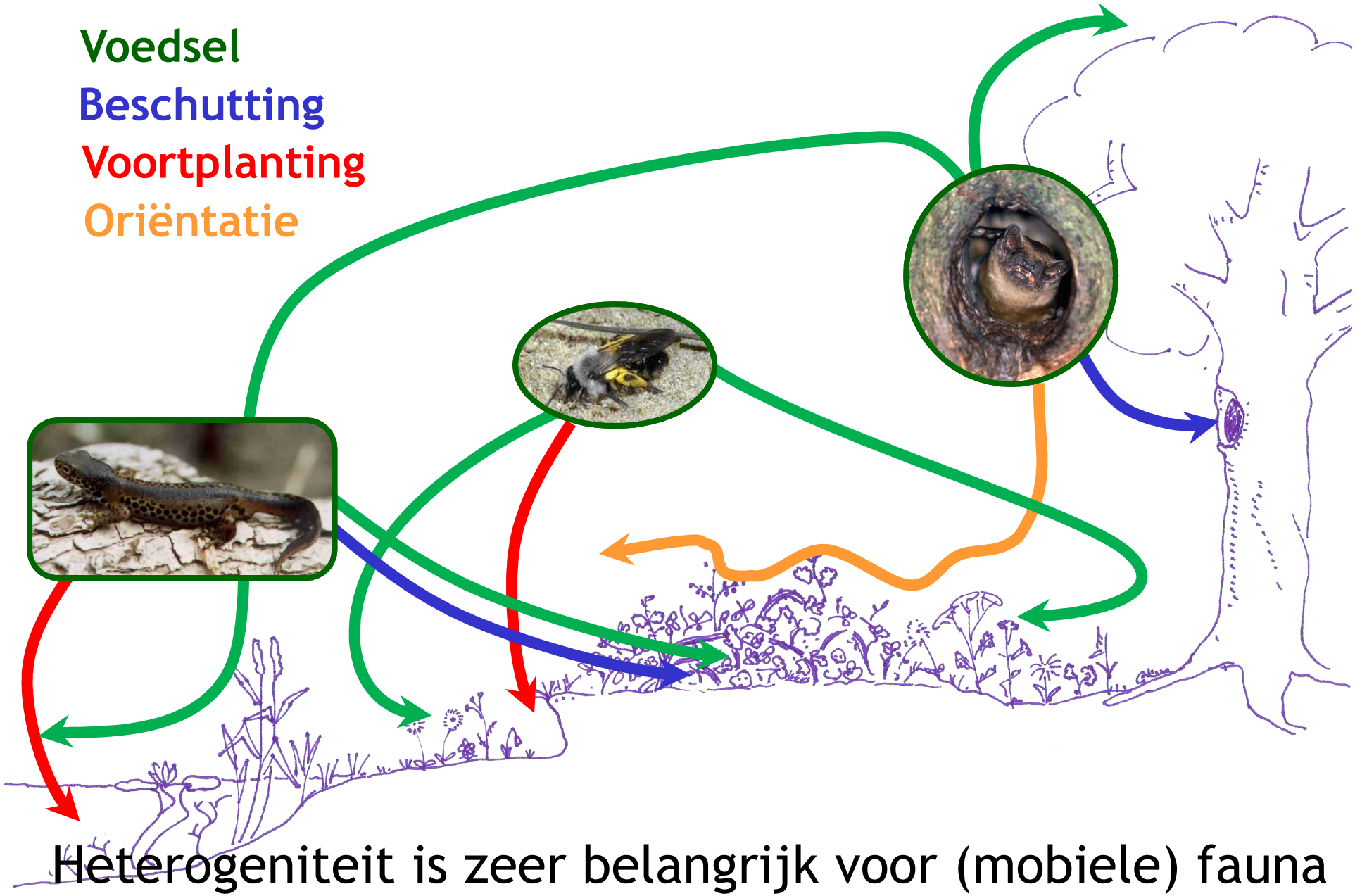
Biedt mogelijkheden

Soorten hebben allerlei aanpassingen-beperkingen om heterogeniteit van landschap te gebruiken

Landschappelijke heterogeniteit & samenhang

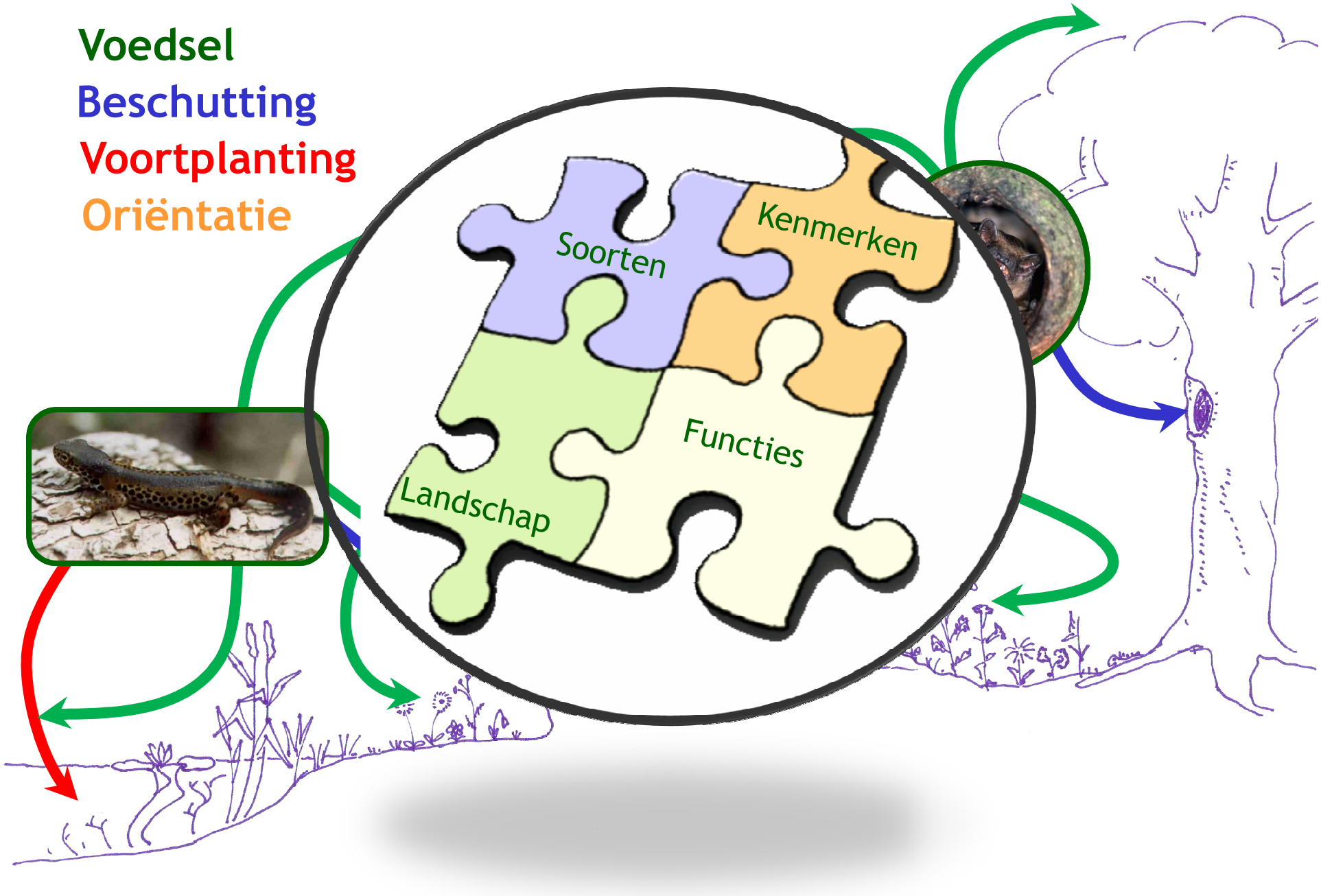


Landschappelijke heterogeniteit & samenhang



Heterogeniteit is zeer belangrijk voor (mobiele) fauna

Landschappelijke heterogeniteit & samenhang



Relatie

Gradiënten

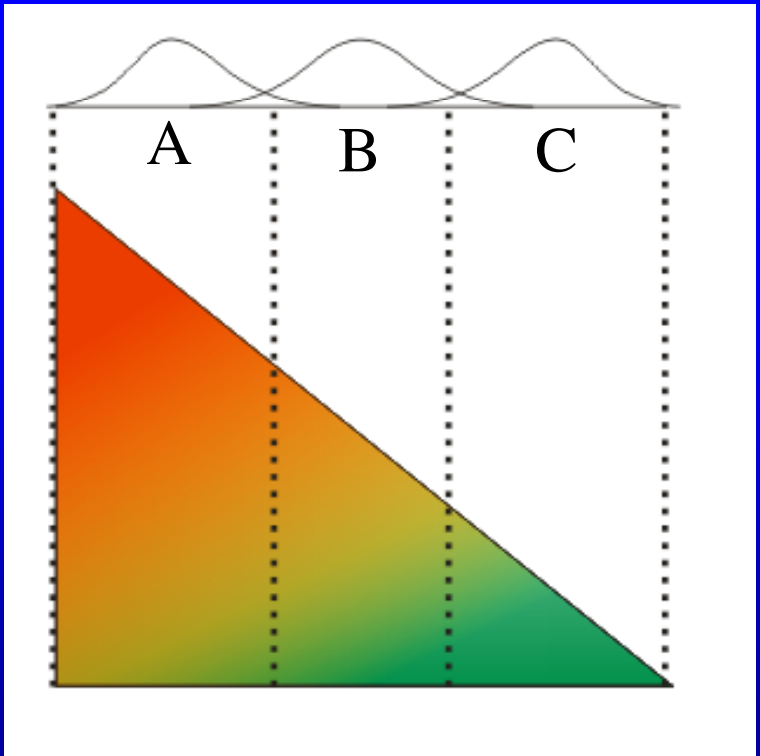
Mozaïeken

Relatie

overgangen (gradiënten)

Soorten gespecialiseerd op omgevingscondities van overgangen

Soorten die concurrentie ontwijken



[theorie van de gradiënten]

Relatietheorie door Van Leeuwen

samenhang tussen verscheidenheid in tijd en ruimte en het voorkomen van soorten

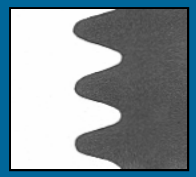
Ruimtelijke variatie

landschap
verschillende schaalniveaus

Tijdelijke variatie

‚milieudynamiek‘

[theorie van de gradiënten]

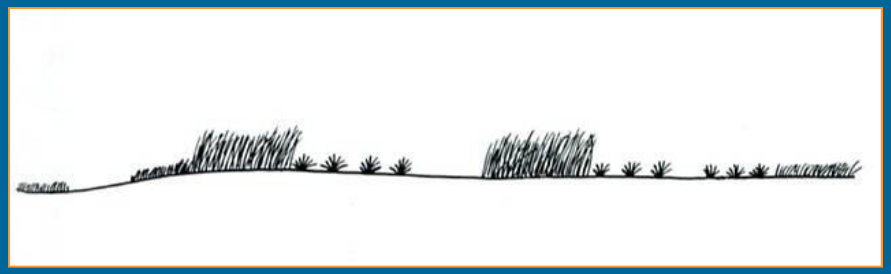


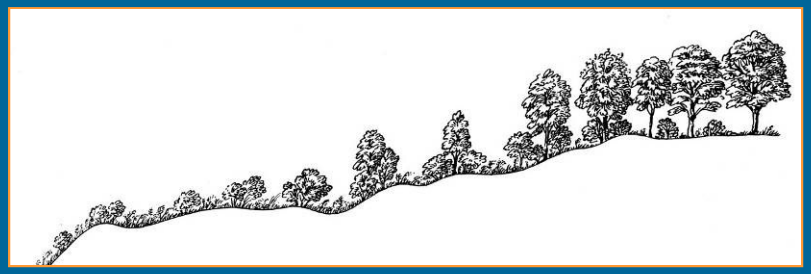
scherpe grens – Limes convergens
„ophopingsgrens“

- hoge milieudynamiek
- soortenarmoede
- massaal optreden

vage grens – Limes divergens
„spreidingsgrens“

- geringe milieudynamiek
- soortenrijk
- beperkt aantal individuen

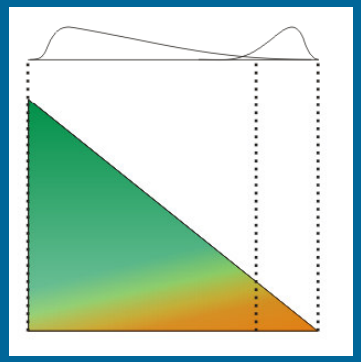


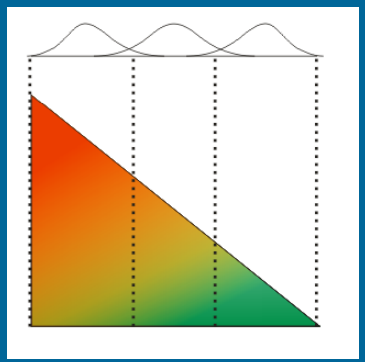


[de gradiëntenkaart]

Voorwaarden

- de laagdynamische (‘zwakke’) component moet domineren





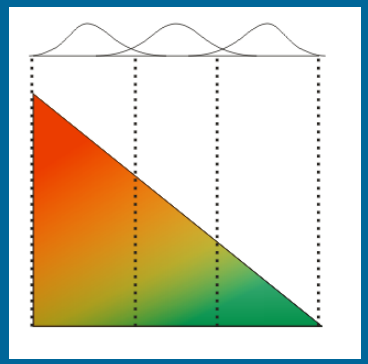
voedselrijk
basisch
mineraal
nat
→ grote milieudynamiek

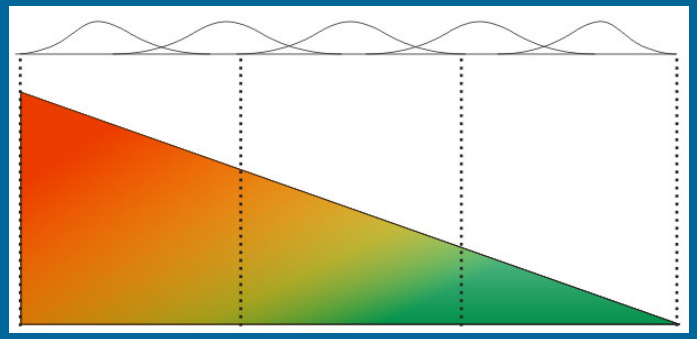
voedselarm
zuur
organisch
droog
→ lage milieudynamiek

[de gradiëntenkaart]

Voorwaarden

- de laagdynamische (‘zwakke’) component moet domineren
- geleidelijke grens

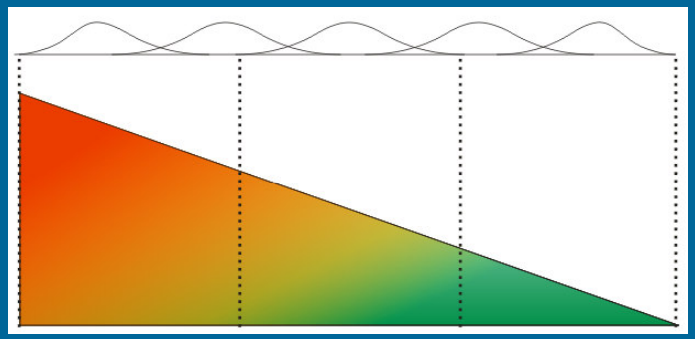


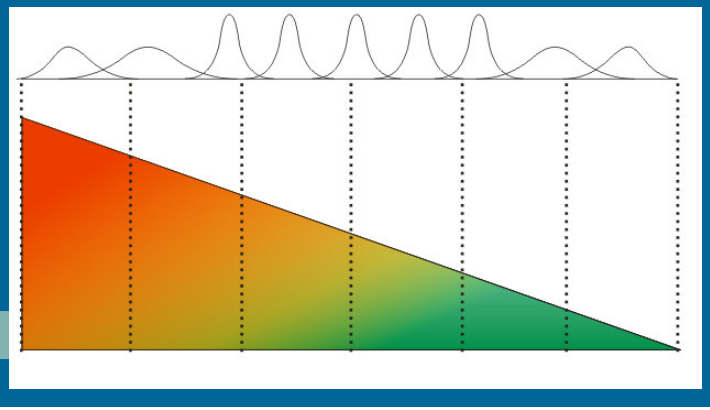


[de gradiëntenkaart]

Voorwaarden

- de laagdynamische (‘zwakke’) component moet domineren
- geleidelijke grens
- stabiliteit





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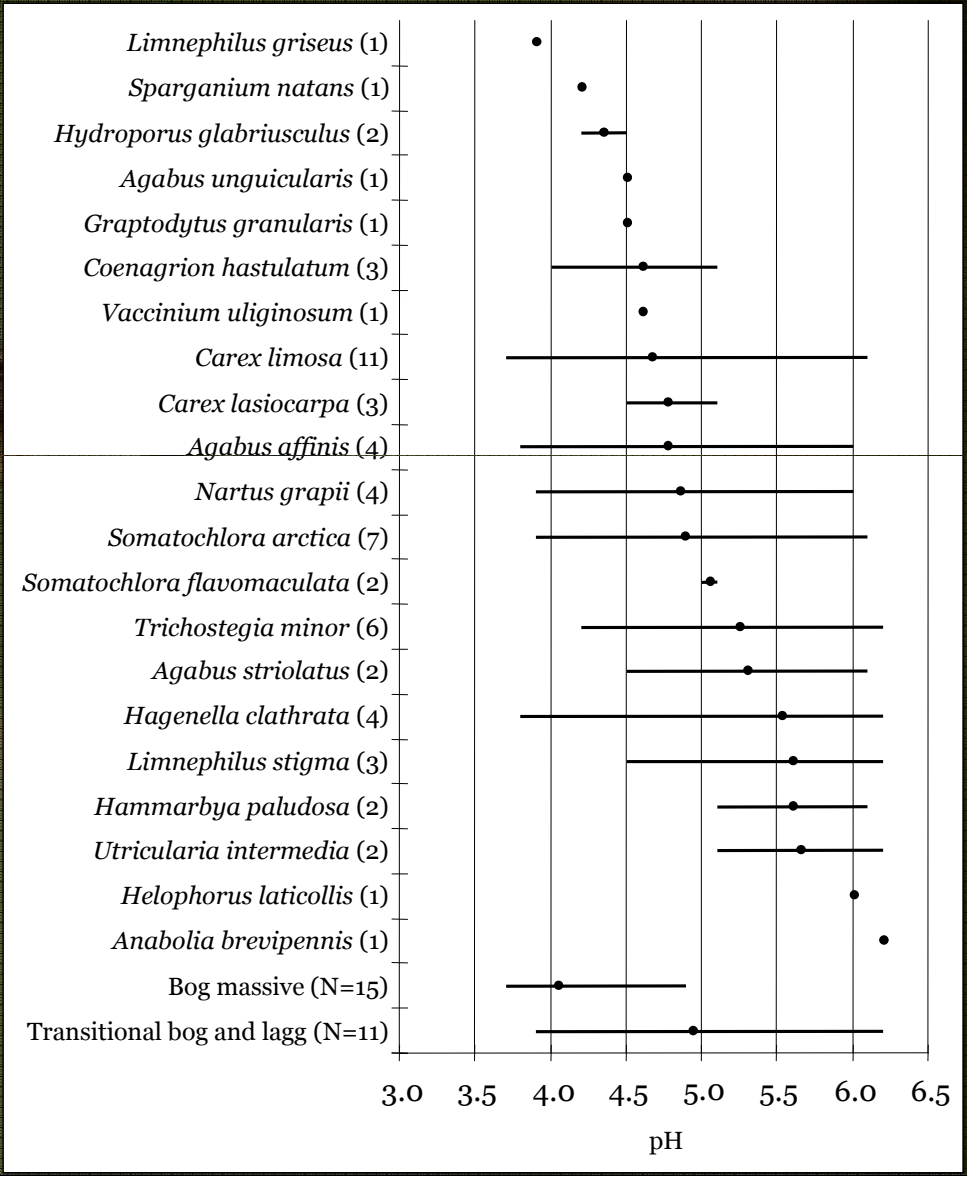
www.dragonflies.de

Levensgemeenschappen in gradiëntsituaties

Libellen ***Odonata***
Somatochlora arctica
Somatochlora flavomaculata
Coenagrion hastulatum

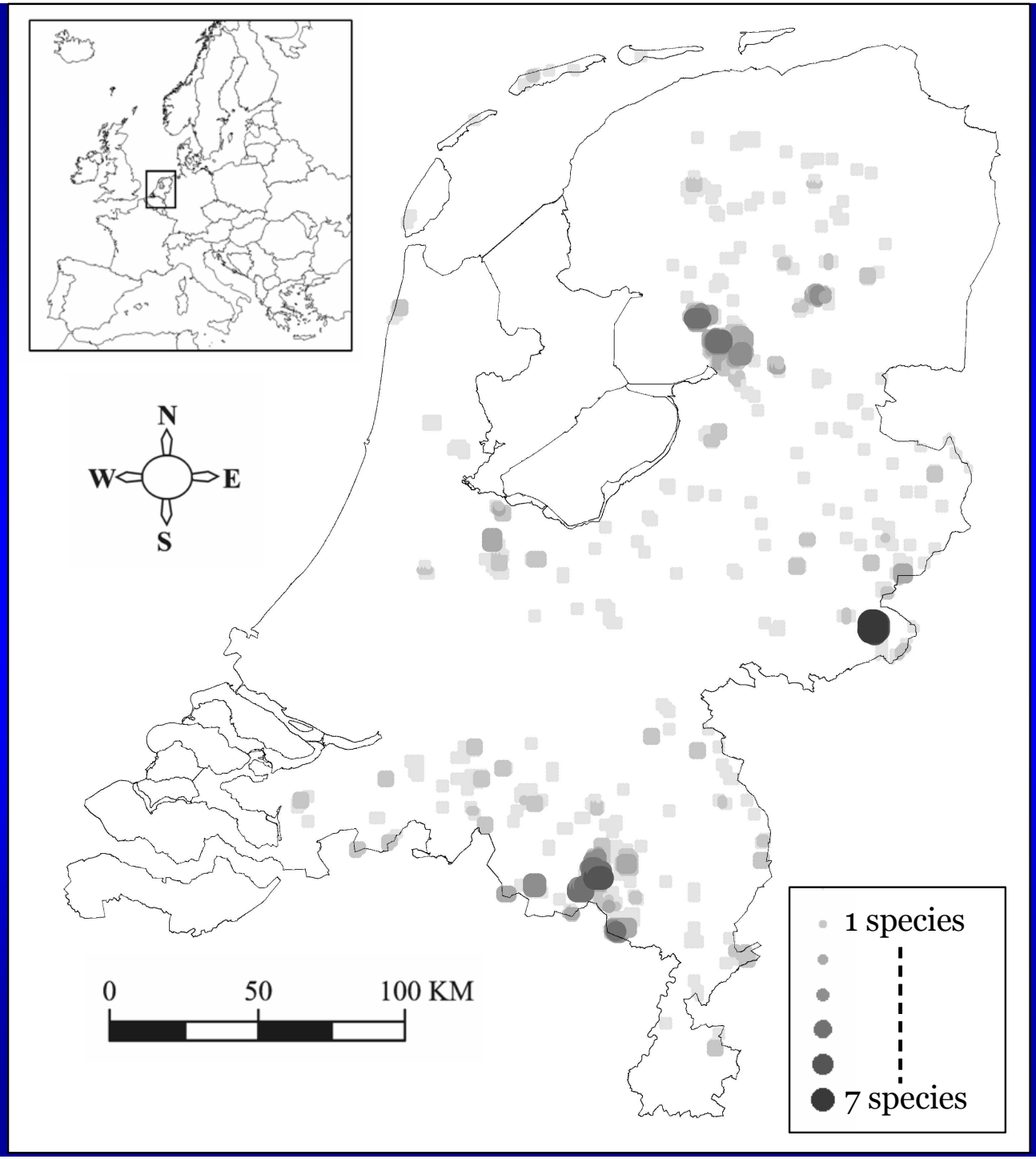
Kokerjuffers ***Trichoptera***
Trichostegia minor
Hagenella clathrata
Limnephilus stigma
Anabolia brevipennis
Limnephilus griseus

Waterkevers ***Coleoptera***
Agabus affinis
Agabus striolatus
Agabus unguicularis
Graptodytus granularis
Helophorus laticollis
Hydroporus glabriusculus
Nartus grapii



Levensgemeenschappen in gradiëntsituaties

	Lagg overgangsveen	Restanten
Libellen ***Odonata***		
Somatochlora arctica	45%	0
Somatochlora flavomaculata	18%	0
Coenagrion hastulatum	18%	0
Kokerjuffers ***Trichoptera***		
Trichostegia minor	45%	0
Hagenella clathrata	27%	10%
Limnephilus stigma	27%	0
Anabolia brevipennis	9%	0
Limnephilus griseus	9%	0
Waterkevers ***Coleoptera***		
Agabus affinis	27%	0
Agabus striolatus	18%	0
Agabus unguicularis	9%	0
Graptodytus granularis	9%	0
Helophorus laticollis	9%	0
Hydroporus glabriusculus	18%	0
Nartus grapii	36%	10%

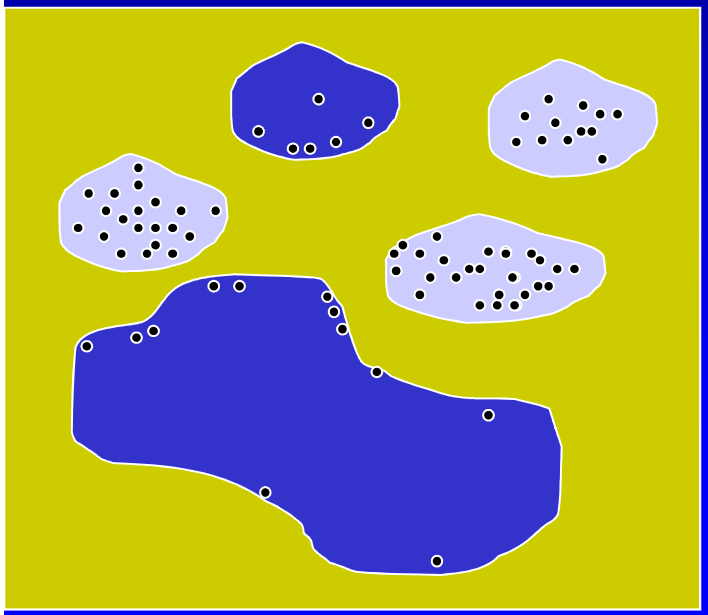

N
W
E
S
0
50
100 KM
1 species
7 species

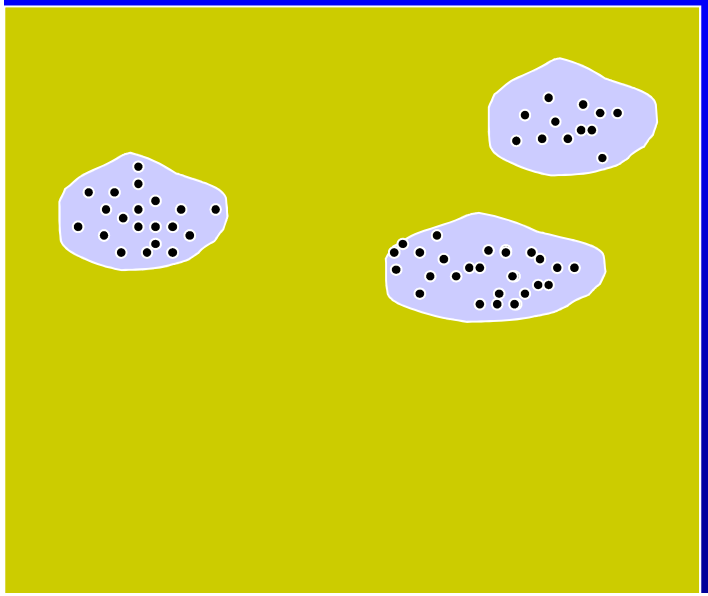
Relatie

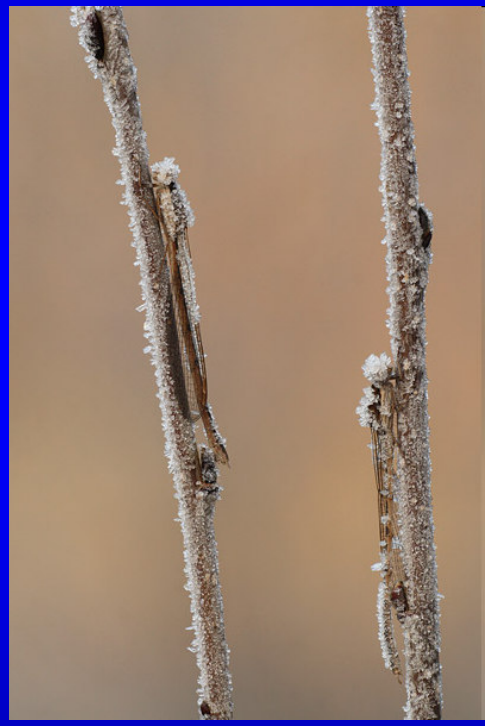
Mozaïeken: meervoudig habitatgebruik

Relatie

risicospreiding

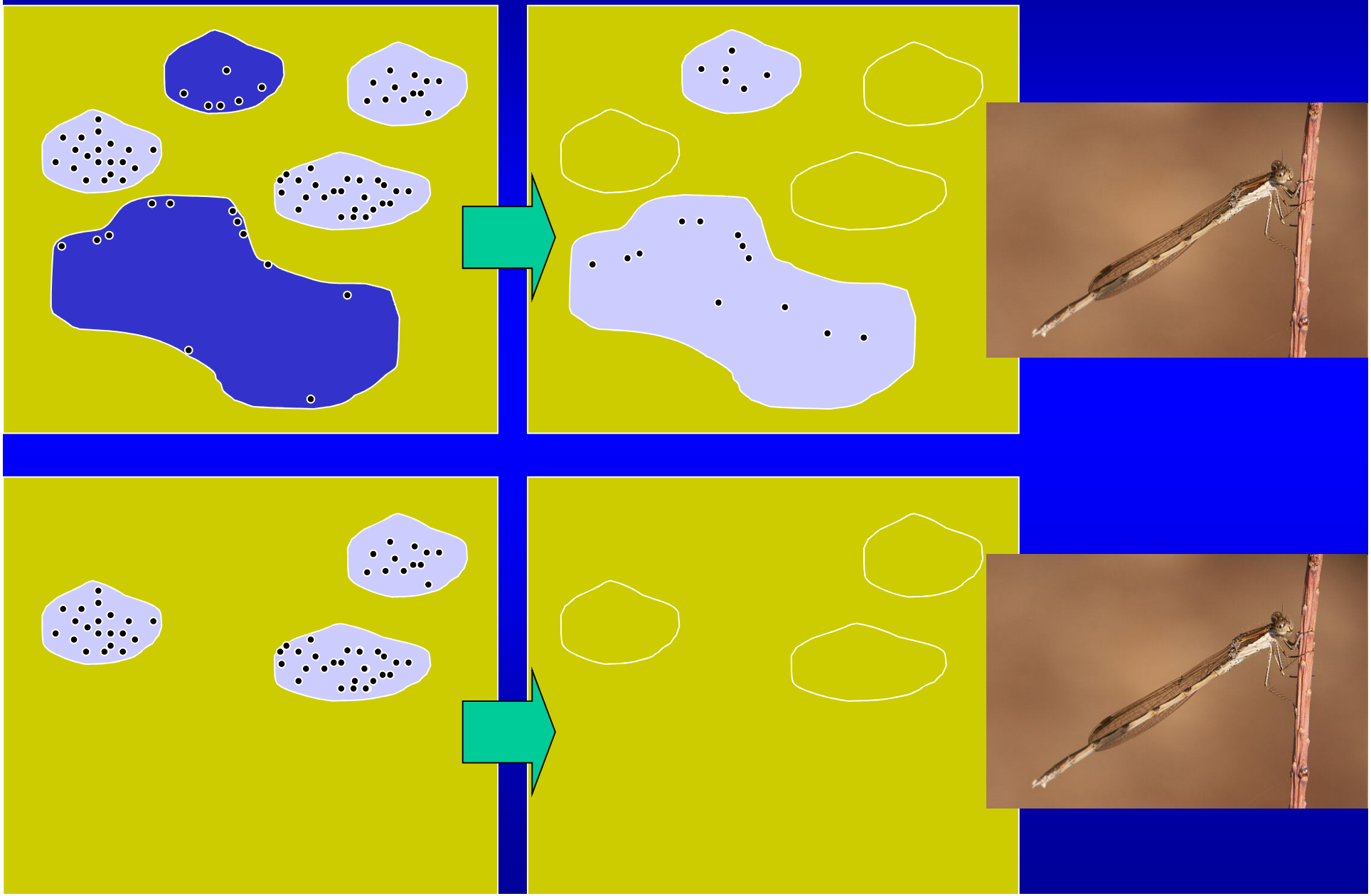






Relatie

risicospreiding



Relatie

Eigenschappen

Er moet wat te kiezen zijn:
- Grootte
-Dispersie
-Zicht
-Kwaliteit voedsel
-...

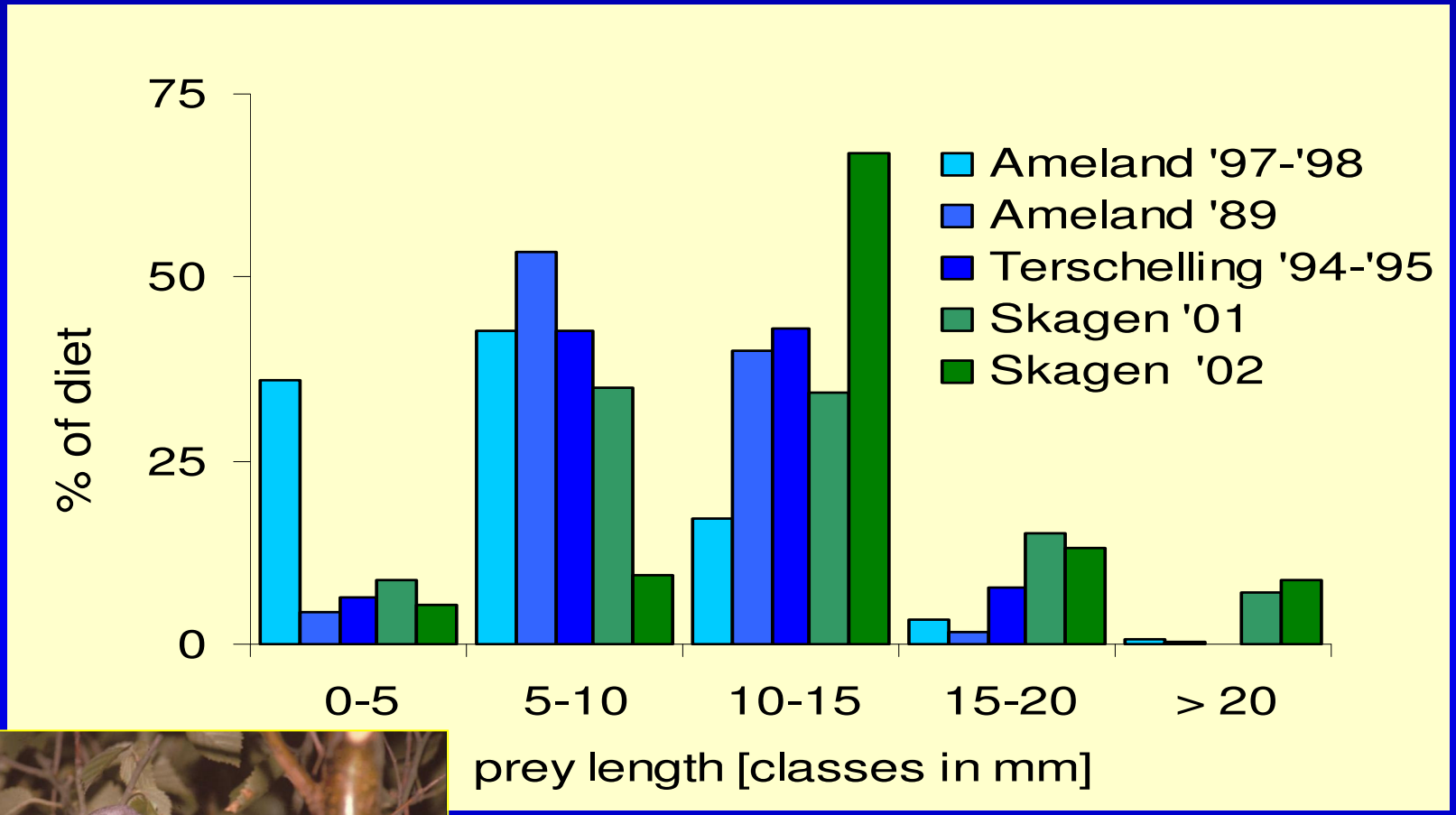
Relatie

Eigenschappen

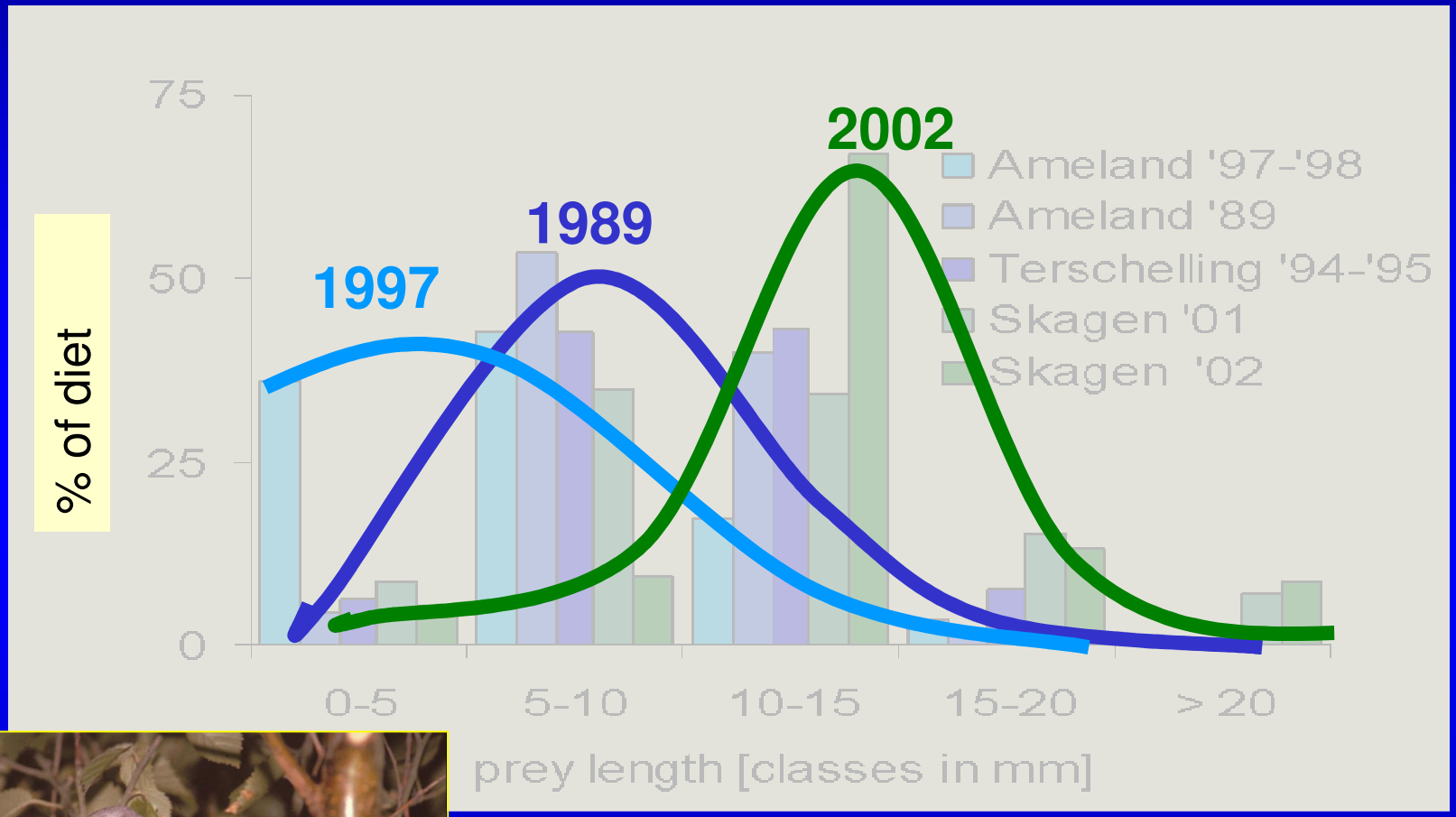
Er moet wat te kiezen zijn:
- Grootte
-Dispersie
-Zicht
-Kwaliteit voedsel
-...

Als dat niet (meer) is:
Selectie op passieve dispersie, hoge reproductie → kleine soorten

PREY LENGHT IN ADULT DIET



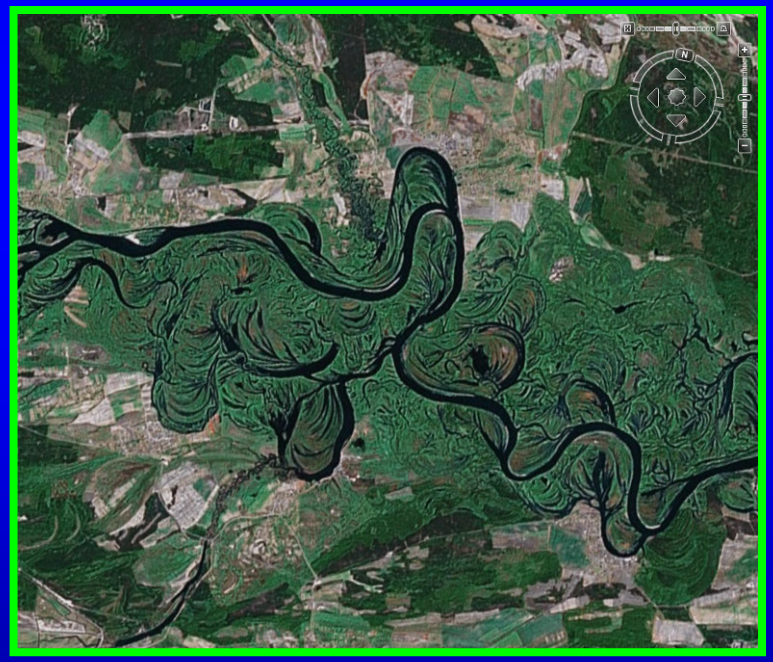
PREY LENGHT IN ADULT DIET

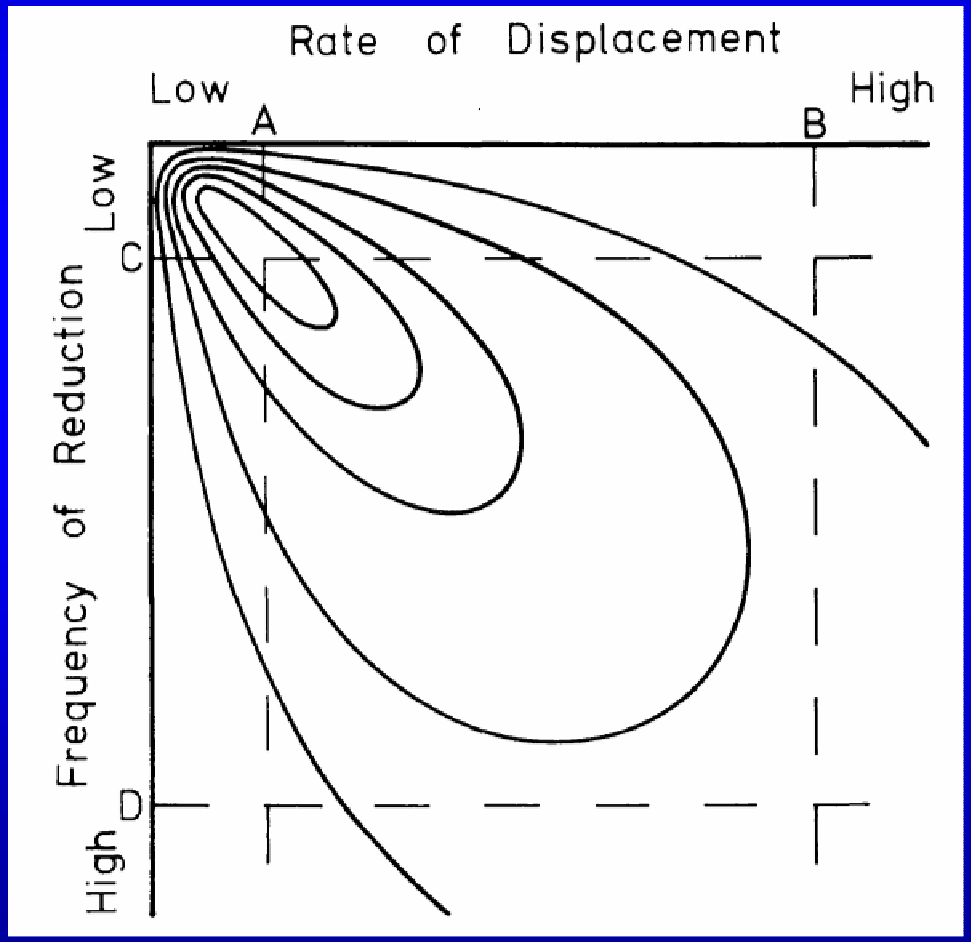


Ontstaan

Vorming: concentratie

Abiotiek (geologie, hydrologie)
Dynamiek (periodieke verstoring)
Biotiek





Huston (1979) A general hypothesis of species diversity. The American Naturalist 113: 81-101

Ontstaan

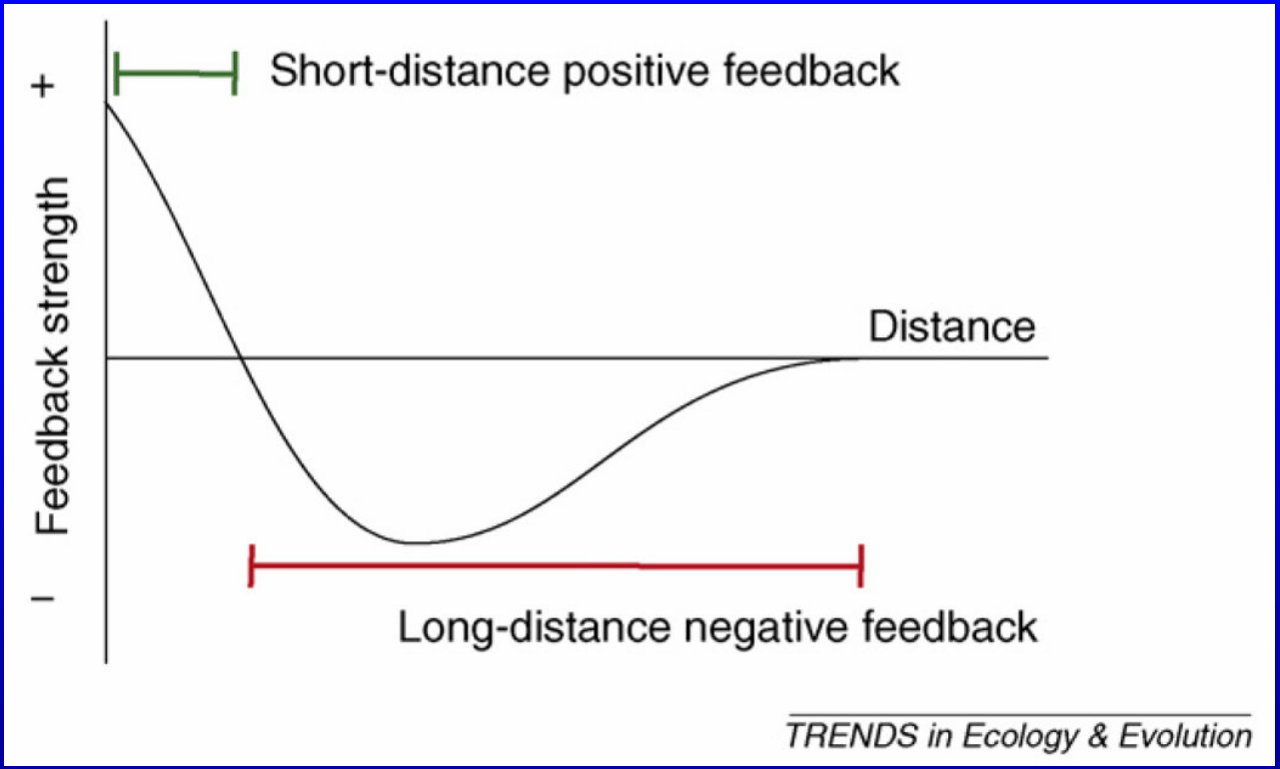
Vorming: concentratie

Abiotiek (geologie, hydrologie)
Dynamiek (periodieke verstoring)
Biotiek
- Gebruiker
    - -Specifiek (gastheer)
    - -Generiek (structuur, predatoren, concurrenten)
- Vormer
    - -Kolonies
    - -Ecosystem engineer
    - -Schaalafhankelijke feedback

Ontstaan

Vorming: concentratie

Biotiek: *“Biodiversity begets biodiversity”*

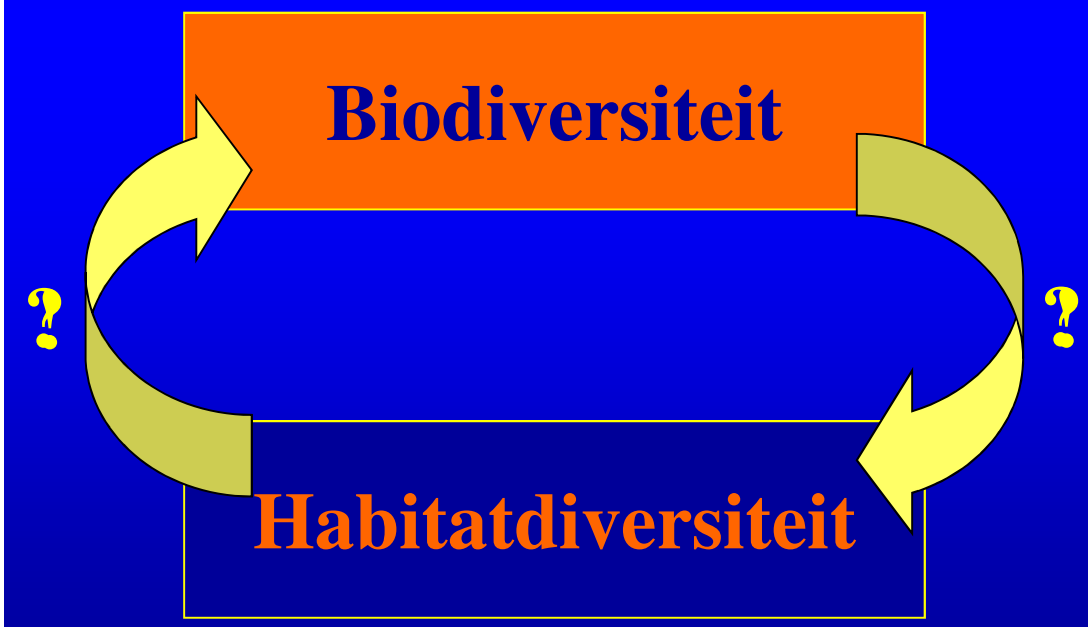


Rietkerk & van den Koppel (2008) Regular pattern formation in real ecosystems. TREE 23 : 169-175.

Ontstaan

Vorming: concentratie

Biotiek: *“Biodiversity begets biodiversity”*

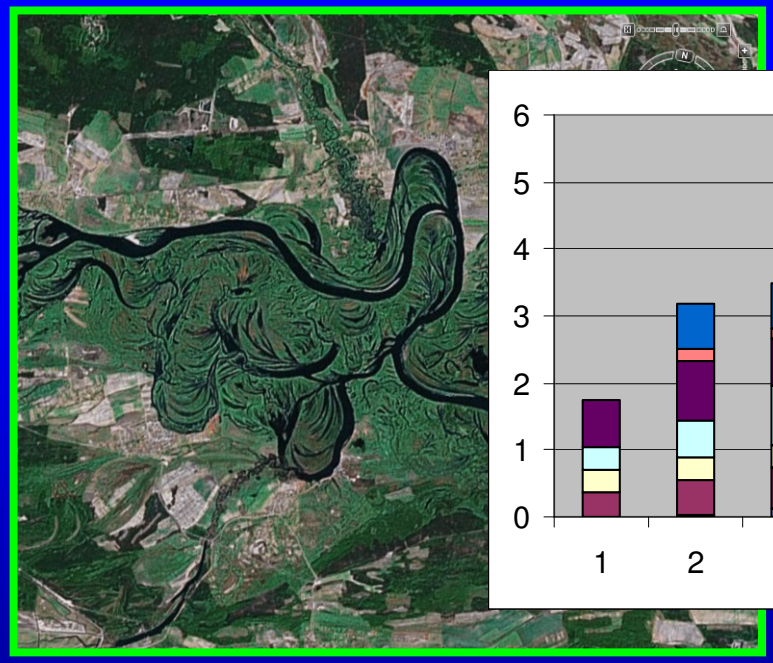


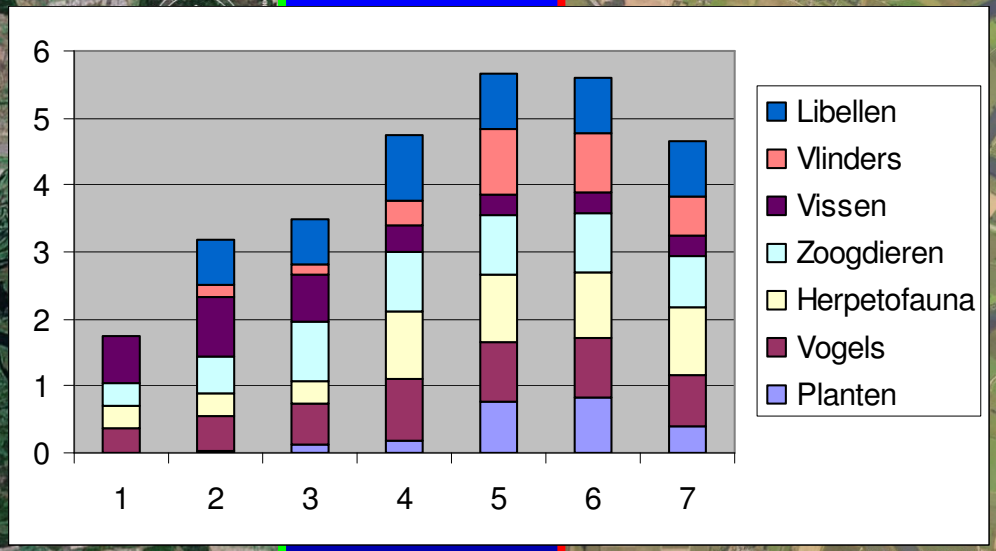
Afbraak: diffusie

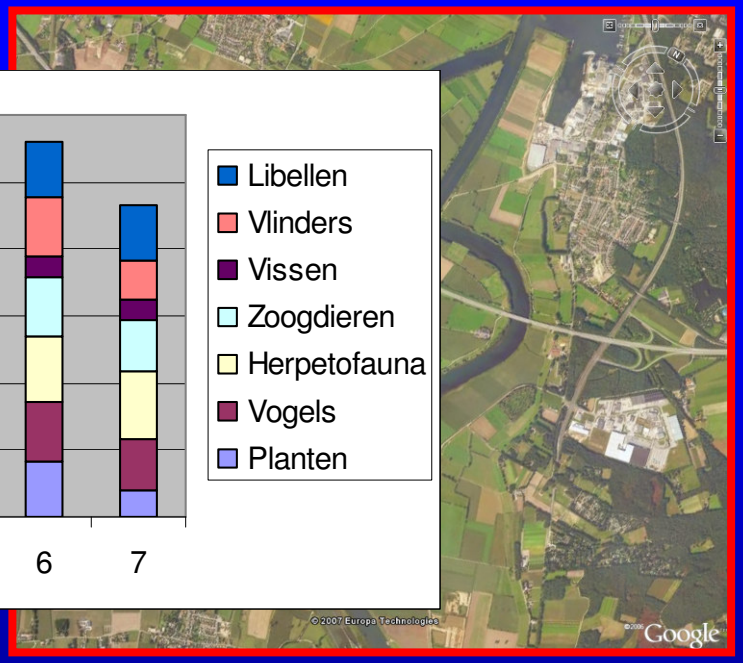
Bedreigingen

Afname oppervlakte (ontginningen)
Verlies invloed vanuit abiotiek (afname grondwaterinvloed)
Verlies dynamiek op voldoende grote schaal
Maskering variatie (grauwsluier)

VER-factoren: Chronisch, grootschalig, intensief







hoog → laag

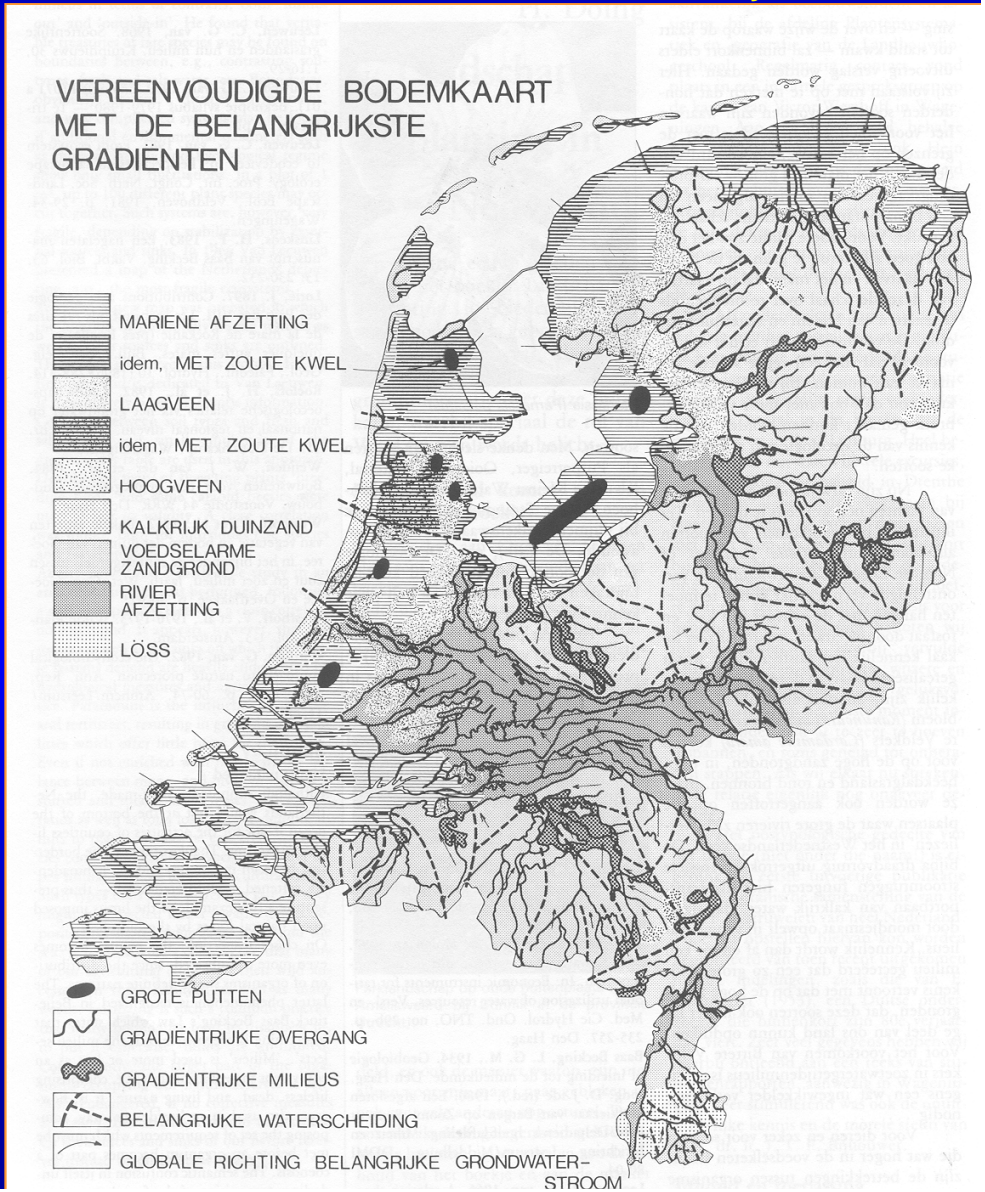
Bedreigingen

Bedreigingen

Consequenties

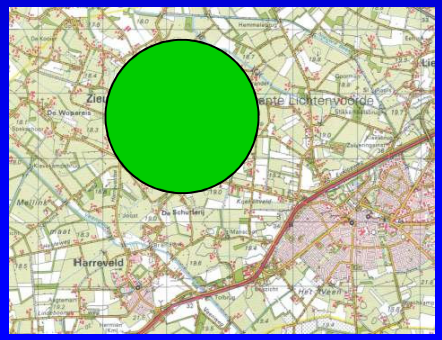
Situatie in Nederland
- grote druk op ruimte
- oorspronkelijk rijk aan gradiënten
- versnippering
- kwaliteitsachteruitgang
  (VER-factoren)

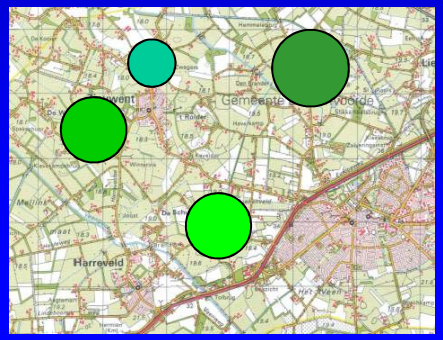
Bron: Baaijens, 1985

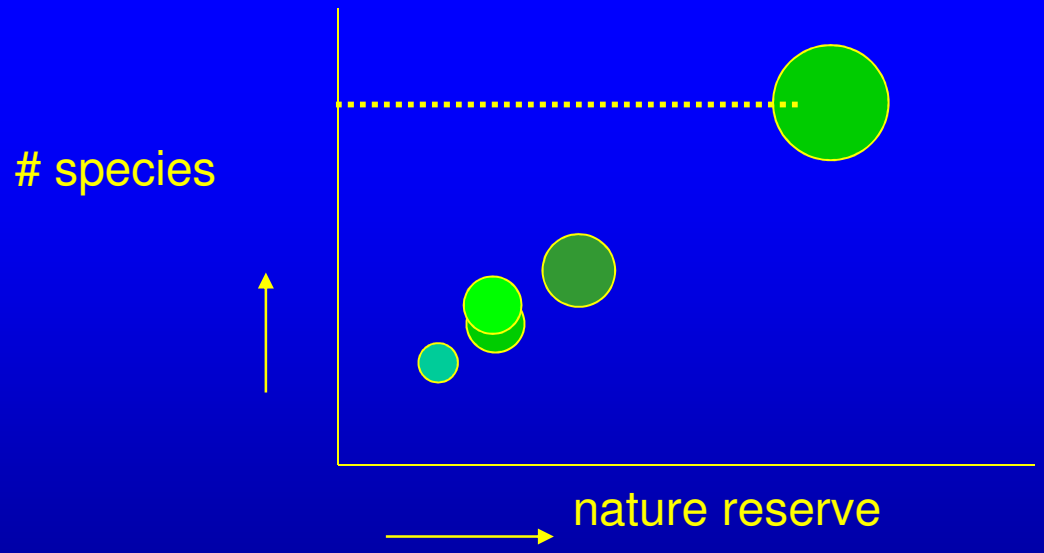


Consequenties

Ontwikkelen, behouden, herstellen biodiversiteit
Single Large Or Several Small (SLOSS)

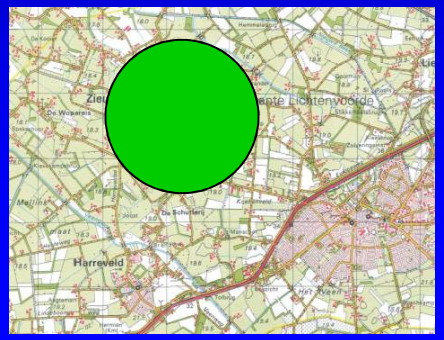


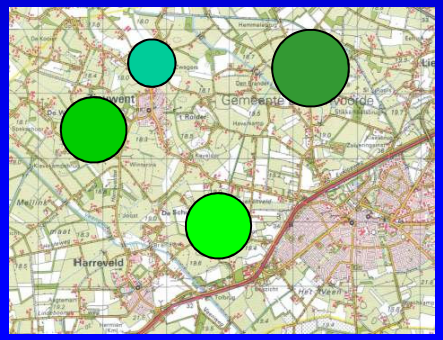


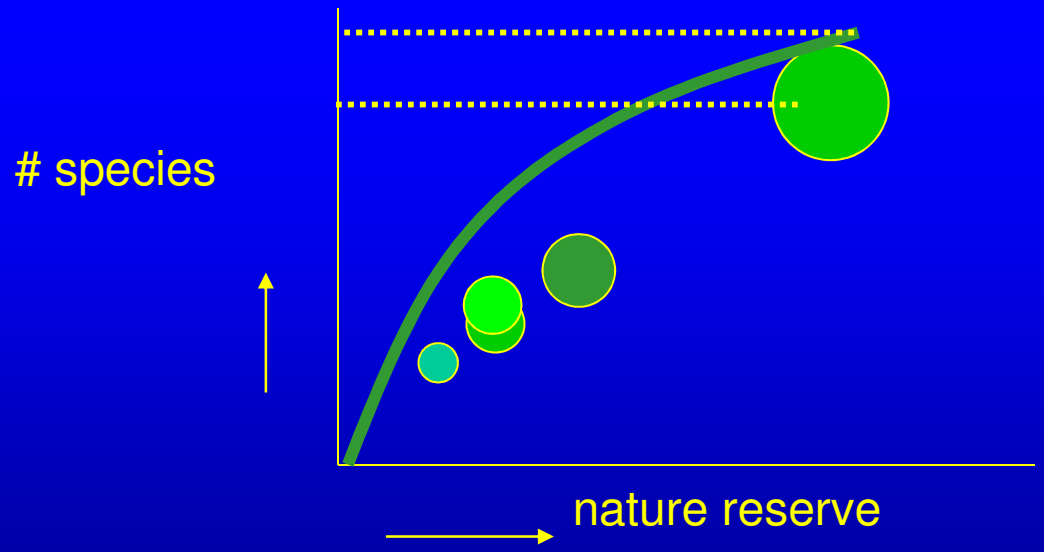


Consequenties

Ontwikkelen, behouden, herstellen biodiversiteit
Single Large Or Several Small (SLOSS)

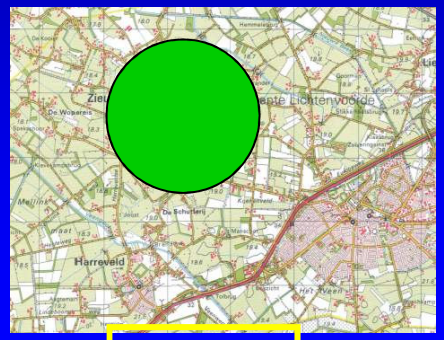


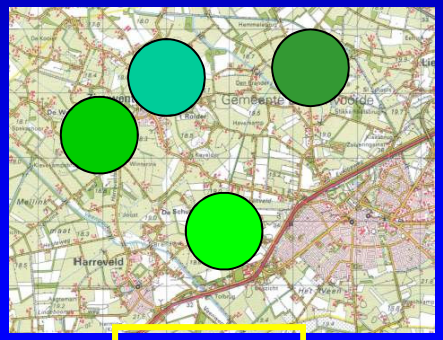




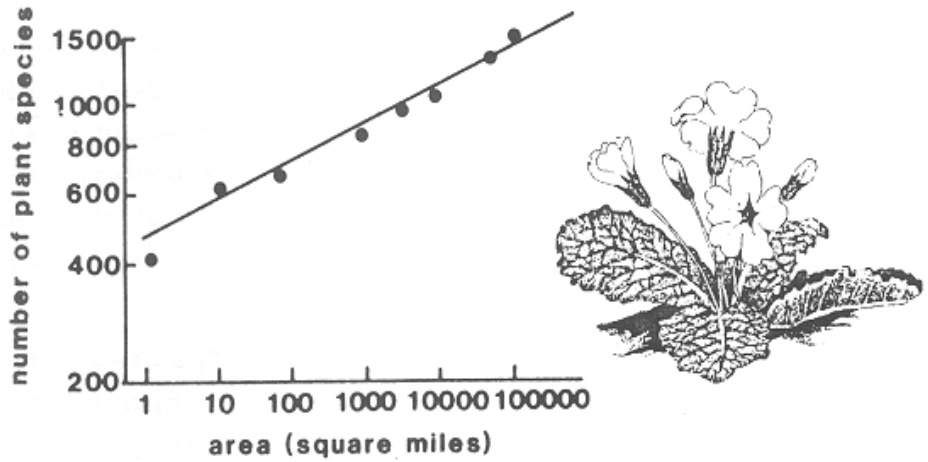
Consequenties

Ontwikkelen, behouden, herstellen biodiversiteit
Single Large Or Several Small (SLOSS)



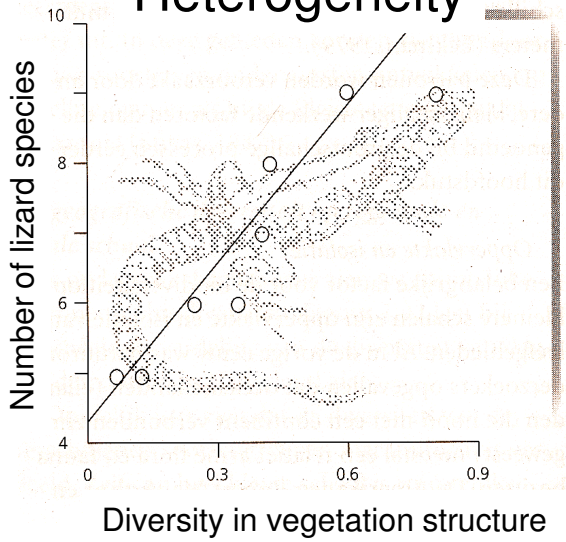


Area



Source: Magurran, 1984

Heterogeneity

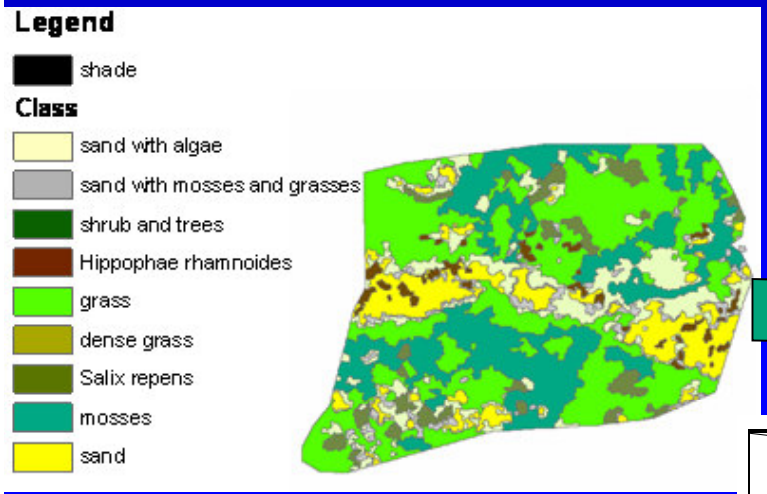


Source: Zoest, 1998

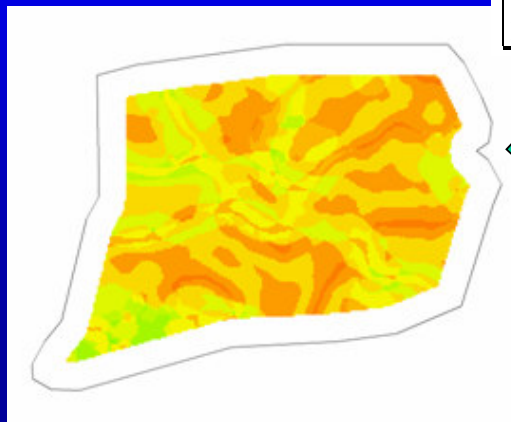
Consequenties

Kennis terreingebruik soorten

Bv. de zandhagedis (*Lacerta agilis*)



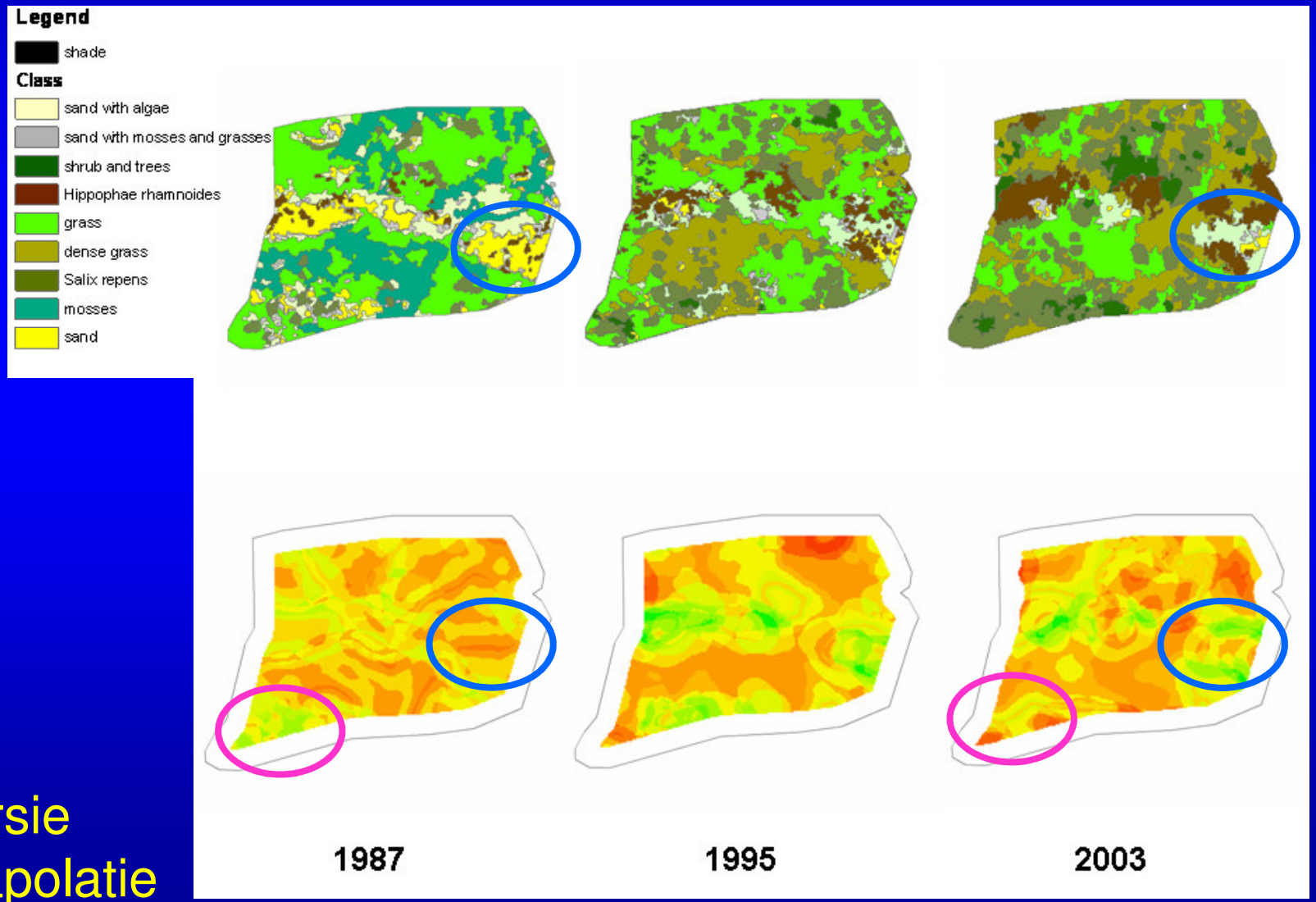
score / structure class	0	+	+++	+	0
Open sand		0-5 %	5-20 %	20-40 %	>40 %
Sparsely vegetated sand		0-5 %	5-25 %	25-40 %	>40 %
Grasscover		0-15 %	15-35 %	35-50 %	>50 %
Open shrubs & trees	0-20 %	20-35 %	35-55 %	55-70 %	>70 %
Dense shrubs & trees			0-5%	5-15 %	>15 %



Consequenties

Kennis terreingebruik soorten

Bv. de zandhagedis (*Lacerta agilis*)

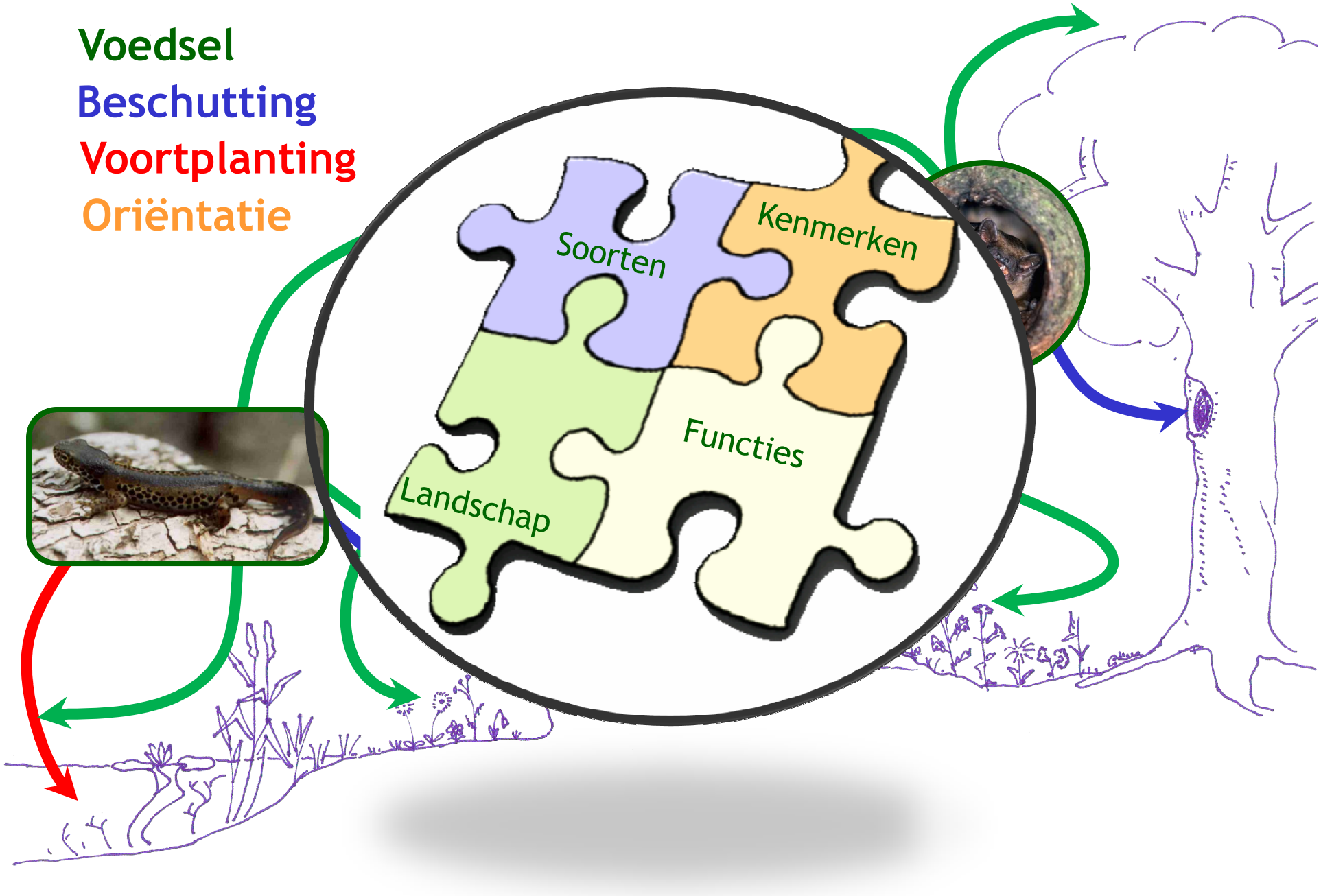


Inversie extrapolatie

Consequenties

Kennis van functioneren ecosytemen
Kennis over gebruik van landschap door soorten
(eisen t.a.v. schuilplek, voedselplek, schaalniveau)

Landschappelijke heterogeniteit & samenhang

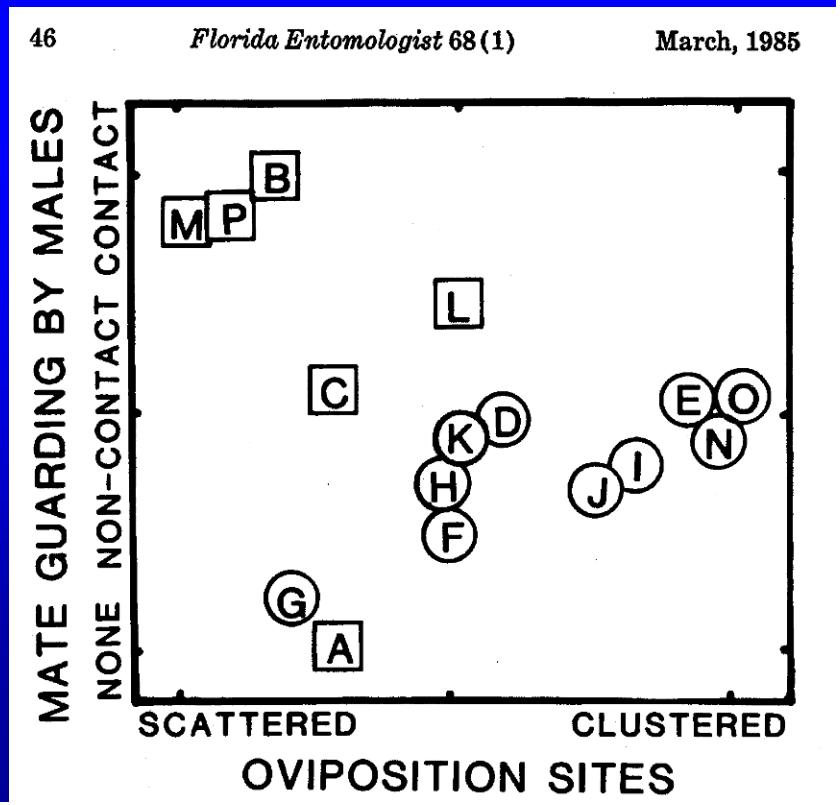


Relatie

Eigenschappen

-Grootte
-Dispersie
-Zicht
-Kwaliteit voedsel
-...

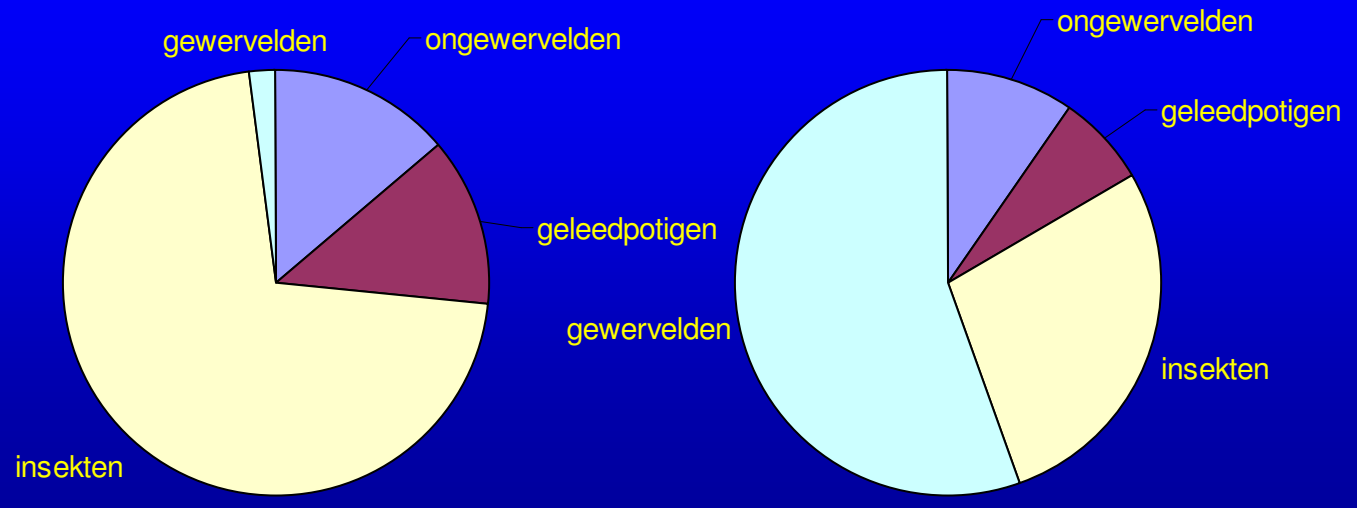
gedrag



Consequenties

Kennis van functioneren ecosytemen
Kennis over gebruik van landschap door soorten
(eisen t.a.v. schuilplek, voedselplek, schaalniveau)

Hulp bij afweging
Hulp bij uitvoering beheer



Bron: Zoest, 1998

Consequenties

Aanpak & risico's

-Terugdringen aantasting
-'Vergroten' oppervlakte (EHS)
- Heterogeniteit?

Consequenties

Aanpak & risico's

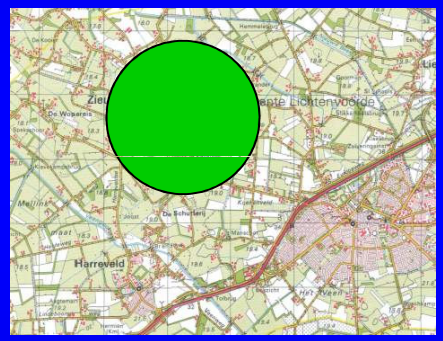
-Terugdringen aantasting (of de effecten daarvan)

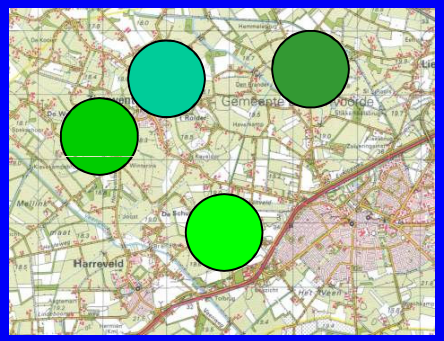
geen/nauwelijks ruimtelijke component:

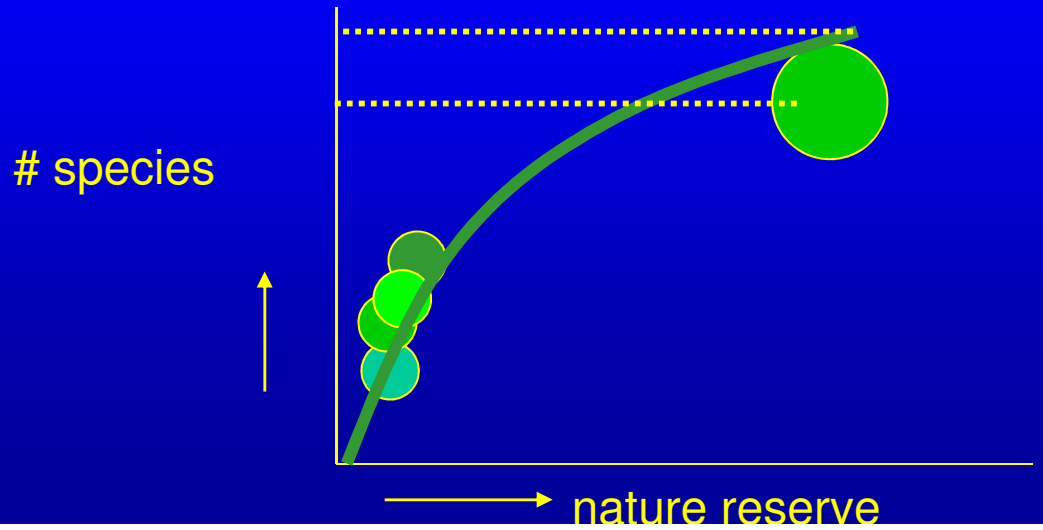
chemie → vegetatie → fauna

Consequenties

Aanpak & risico's
'Vergroten' oppervlakte (EHS)
-Ongewenste soorten profiteren disproportioneel?
-Diffusie

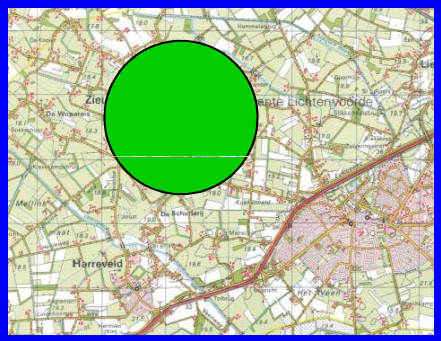


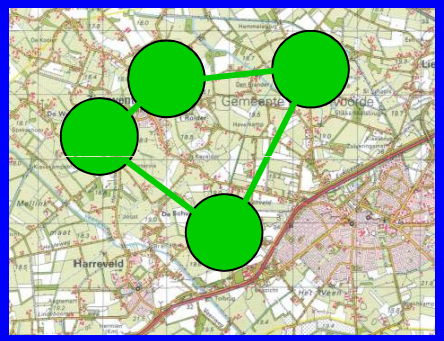


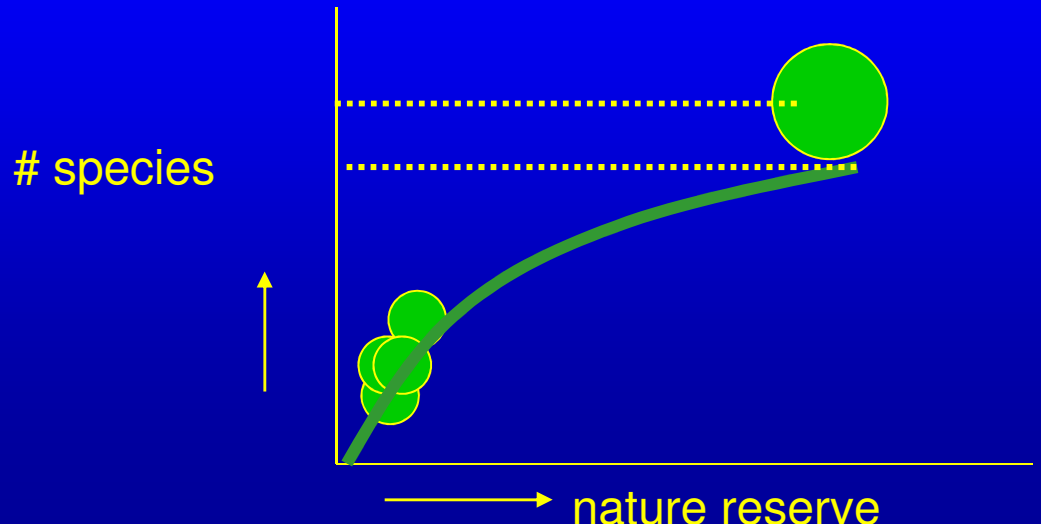


Consequenties

Aanpak & risico's
'Vergroten' oppervlakte (EHS)
-Ongewenste soorten profiteren disproportioneel?
-Diffusie
-Verbonden vs aaneengesloten

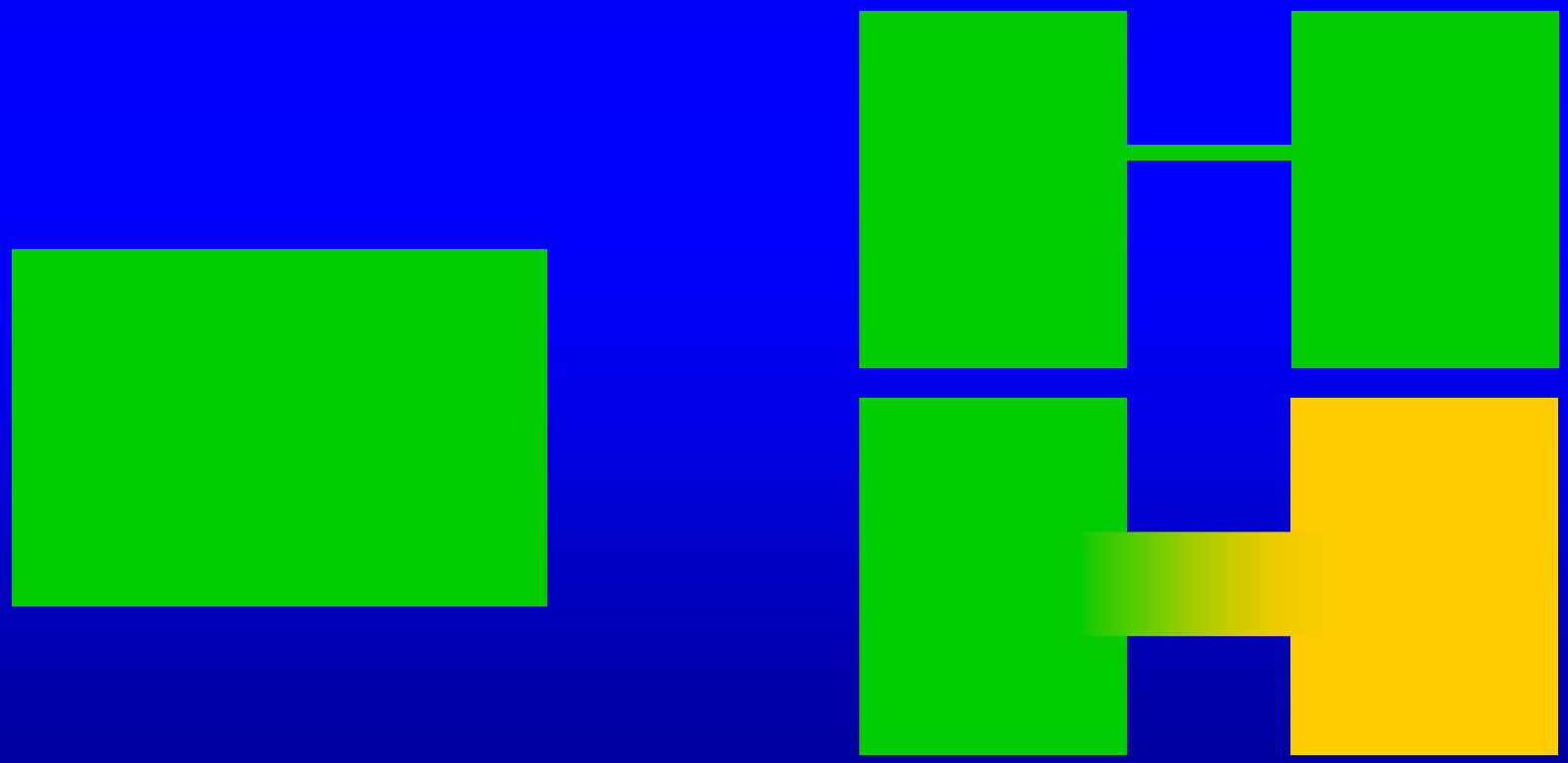






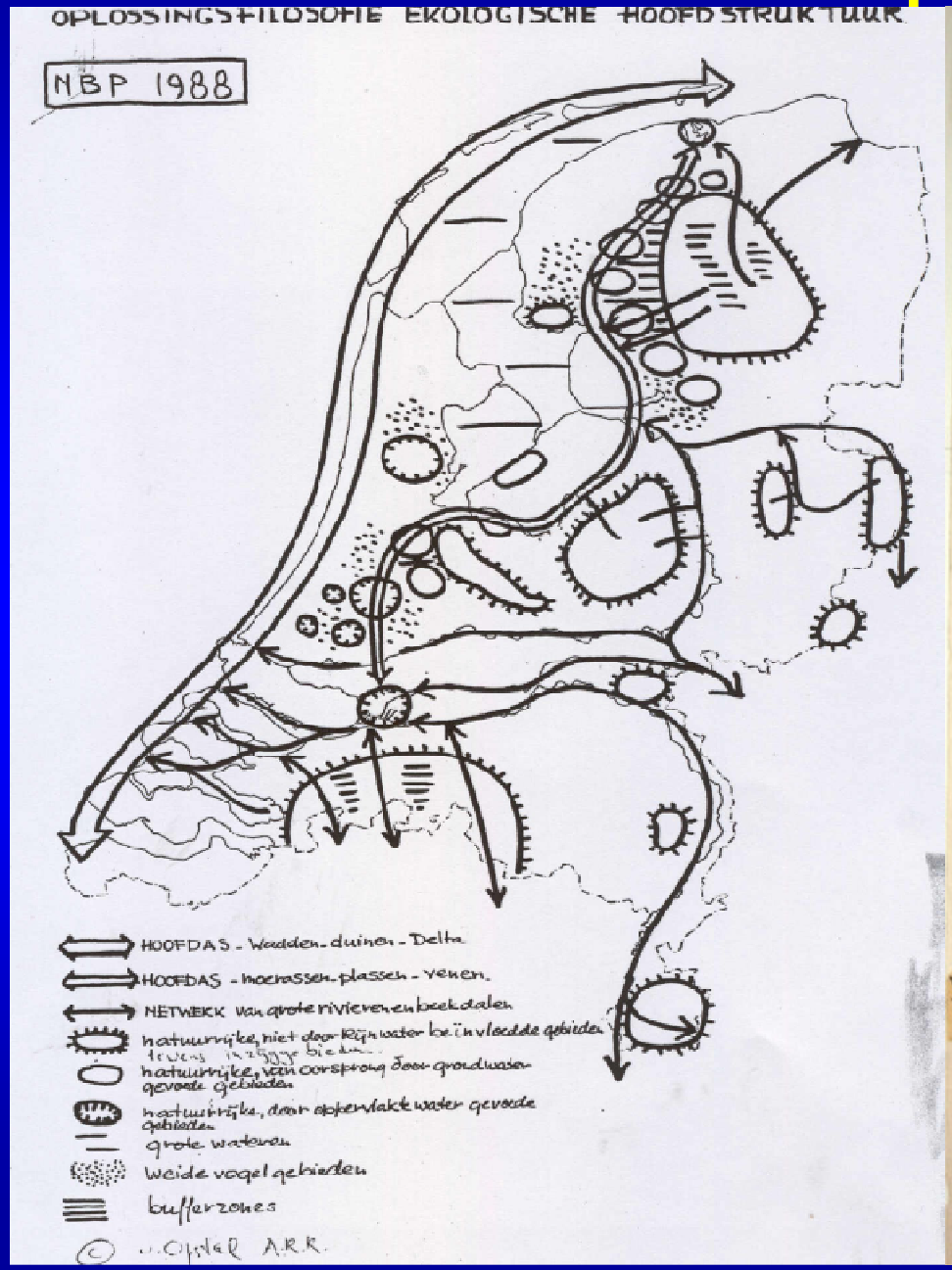
Consequenties

Aanpak & risico's
'Vergroten' oppervlakte (EHS)
-Ongewenste soorten profiteren disproportioneel?
-Diffusie
-Verbonden vs aaneengesloten
-Combineren met herstel heterogeniteit (herstel mozaïeken & gradiënten)



EHS

Consequenties



Consequenties

Aanpak & risico's

-Terugdringen aantasting
-'Vergroten' oppervlakte (EHS)
- Heterogeniteit?

Heterogeniteit behouden en versterken

- Beheer gericht op alle onderdelen in het landschap
- Kleinschalig, gefaseerd
- Grootschalig, laag intensief en reversibel
- Sleutelprocessen weer op gang brengen

Herstel grondwaterinvloed
grootschalige dynamiek
biotiek