

An aerial photograph of a forest. The left side of the image shows a dense canopy of vibrant green trees. The right side shows a dense canopy of dead, greyish-brown trees. The text is overlaid on the center of the image.

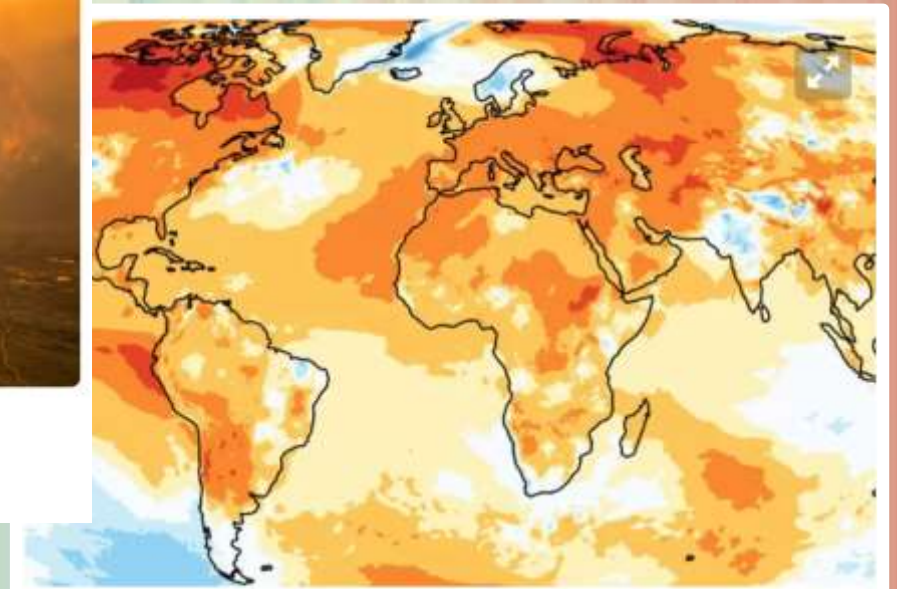
# Klimaat Klim bos

Sanne Verdonck & Ellen Desie



Technologie & Wetenschap  
Een man probeert een bosbrand te ontfuchten in Gennadi op Rhodes.  
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**Bosbranden in de EU vernielden al 40 procent meer natuur dit jaar dan gemiddeld**



2023 was een uitzonderlijk jaar met records die vielen als dominostenen © G3S/ECMWF



Doosier Wateroverlast  
Wateroverlast in Woumen (foto 95 november).

**Het is officieel: 2023 is wereldwijd het warmste jaar ooit gemeten**



Droogte, brand en keverplagen: Europees bos zucht onder klimaatverandering

Historical Data from HardCRUT 4.6.0.0 and NASA/GISS/GISTEMP v.3

Projections based on CMIP5 RCP scenarios (RCP2.6/RCP4.5/RCP6/RCP8.5)

Projections based on extensions of CMIP5 RCP scenarios



SO<sub>2</sub>

NO<sub>x</sub>

NH<sub>3</sub>

Climate Action

1850

Now

2200

stylised global mean temperatures 1850-2200  
design by @alxrdk based on warming stripes from @ed\_hawkins  
data and methodology on www.warningstripes.com

RCP 8.5  
Emissions between 2100-2150  
+4.8°C +7.8°C by 2200

Emissions peak by 2080  
+3.1°C in 2100/+3.7°C by 2200

RCP 4.5 (shifted to 2019)  
Emissions peak by 2049,  
+2.6°C by 2200

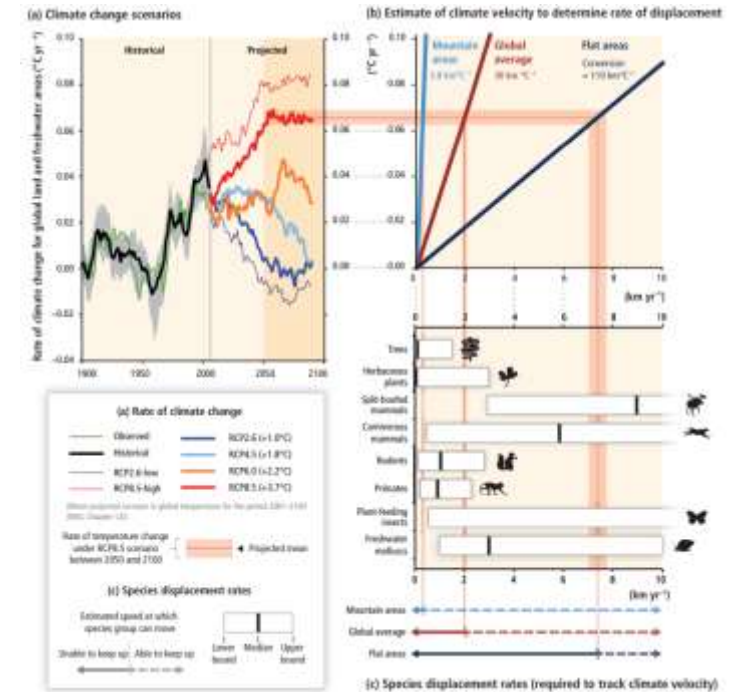
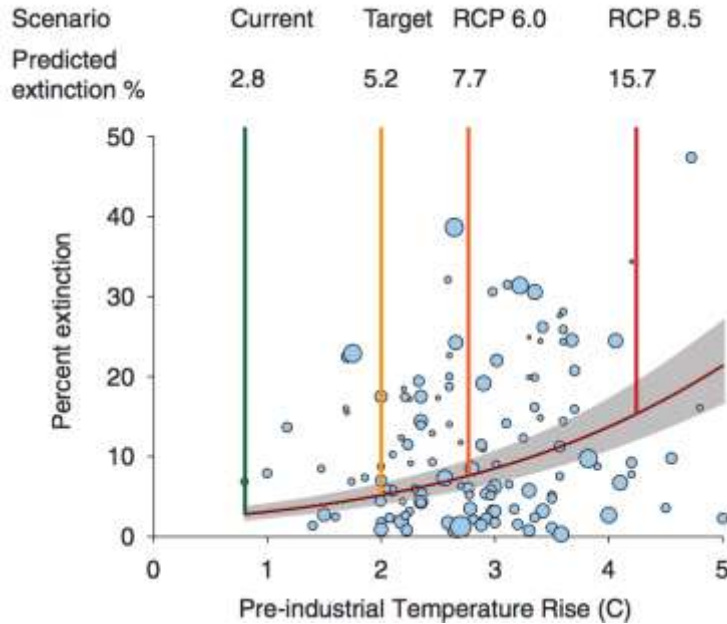
RCP 2.6 (shifted to 2019)  
Emissions peak by 2089  
+1.8°C in 2100/+3.7°C by 2200

# Elke soort die nu leeft in onze bossen heeft 3 opties...

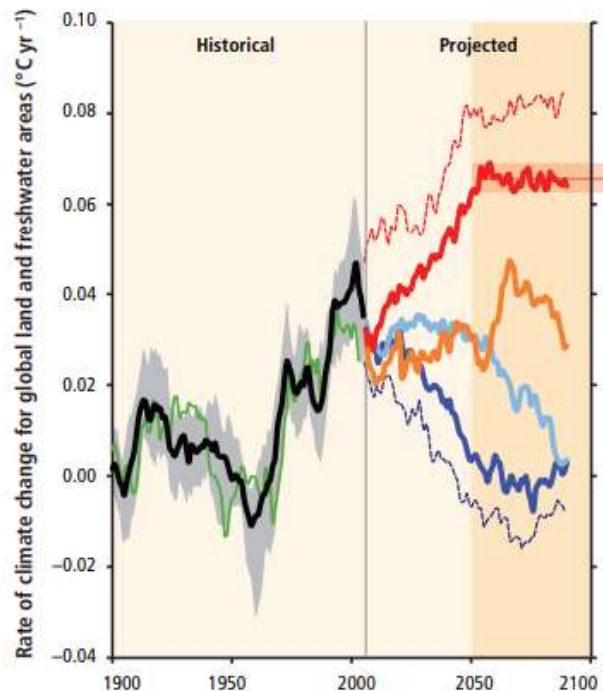
Uitsterven

Aanpassen

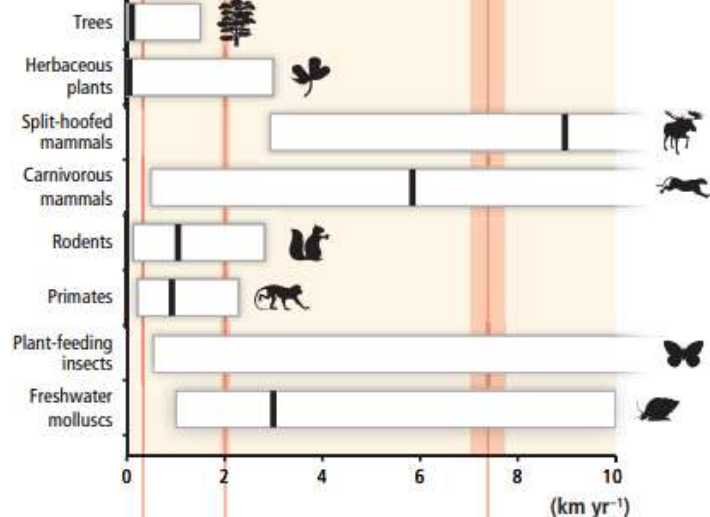
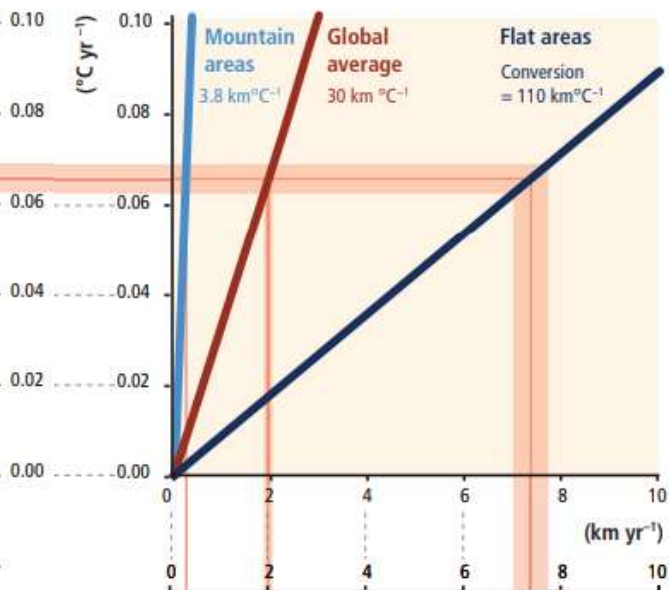
Verplaatsen



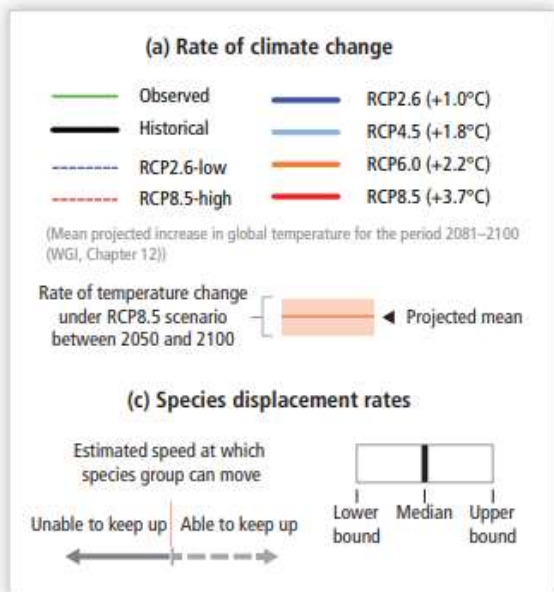
(a) Climate change scenarios



(b) Estimate of climate velocity to determine rate of displacement



(c) Species displacement rates (required to track climate velocity)

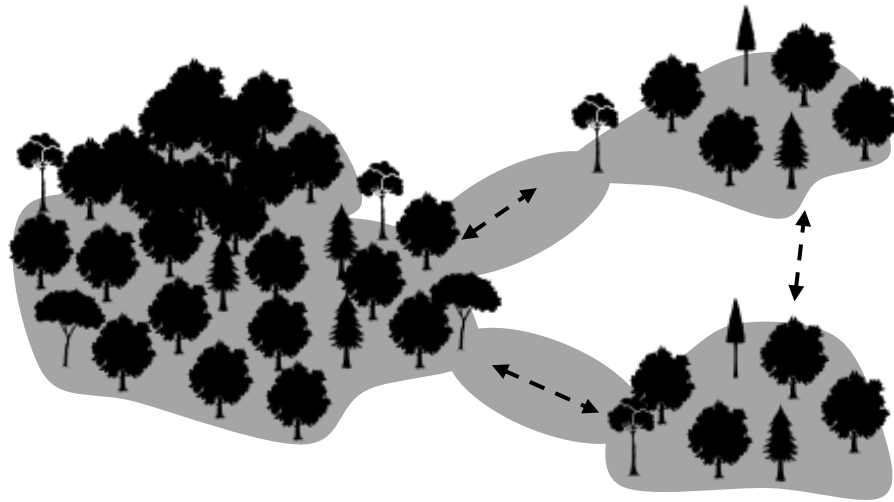


A dense forest with a person in the background. The scene is filled with lush green foliage and tall trees. A person with short grey hair, wearing a dark shirt, is visible in the lower right quadrant, looking upwards. The text "Handje helpen" is overlaid in the center of the image.

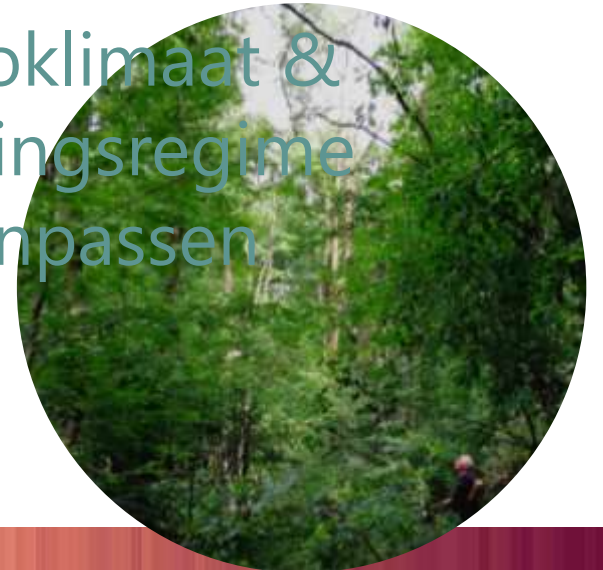
Handje helpen

# Complex systeem met groot aanpassingsvermogen

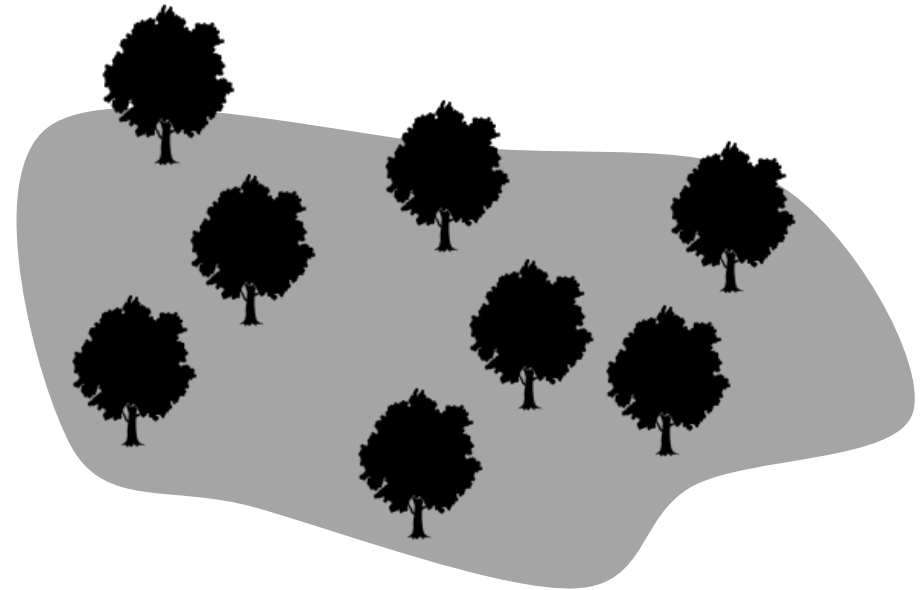
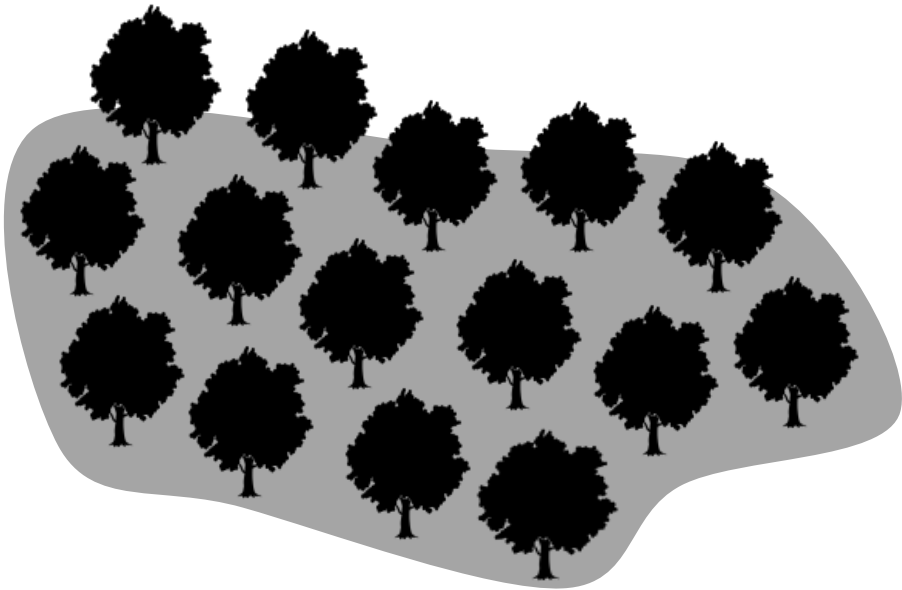
- Adaptatieprocessen Vergroten van populaties , Verhogen van diversiteit , Vrijwaren connectiviteit
- Risicospreiding Verhogen diversiteit



Microklimaat &  
dunningsregime  
aanpassen



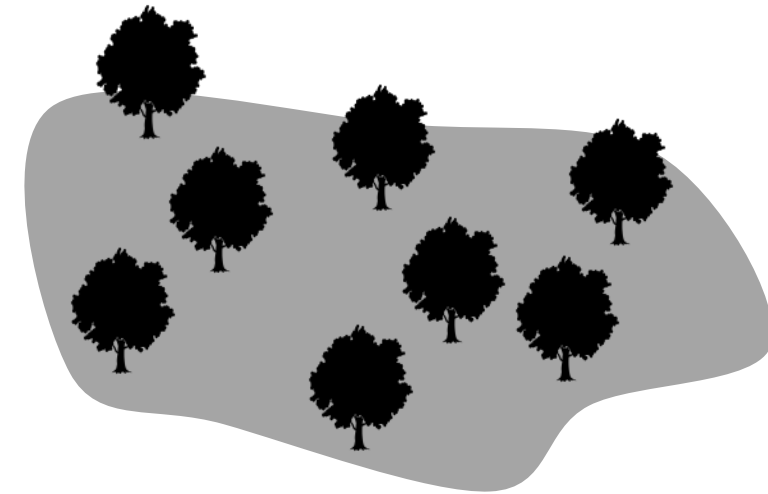
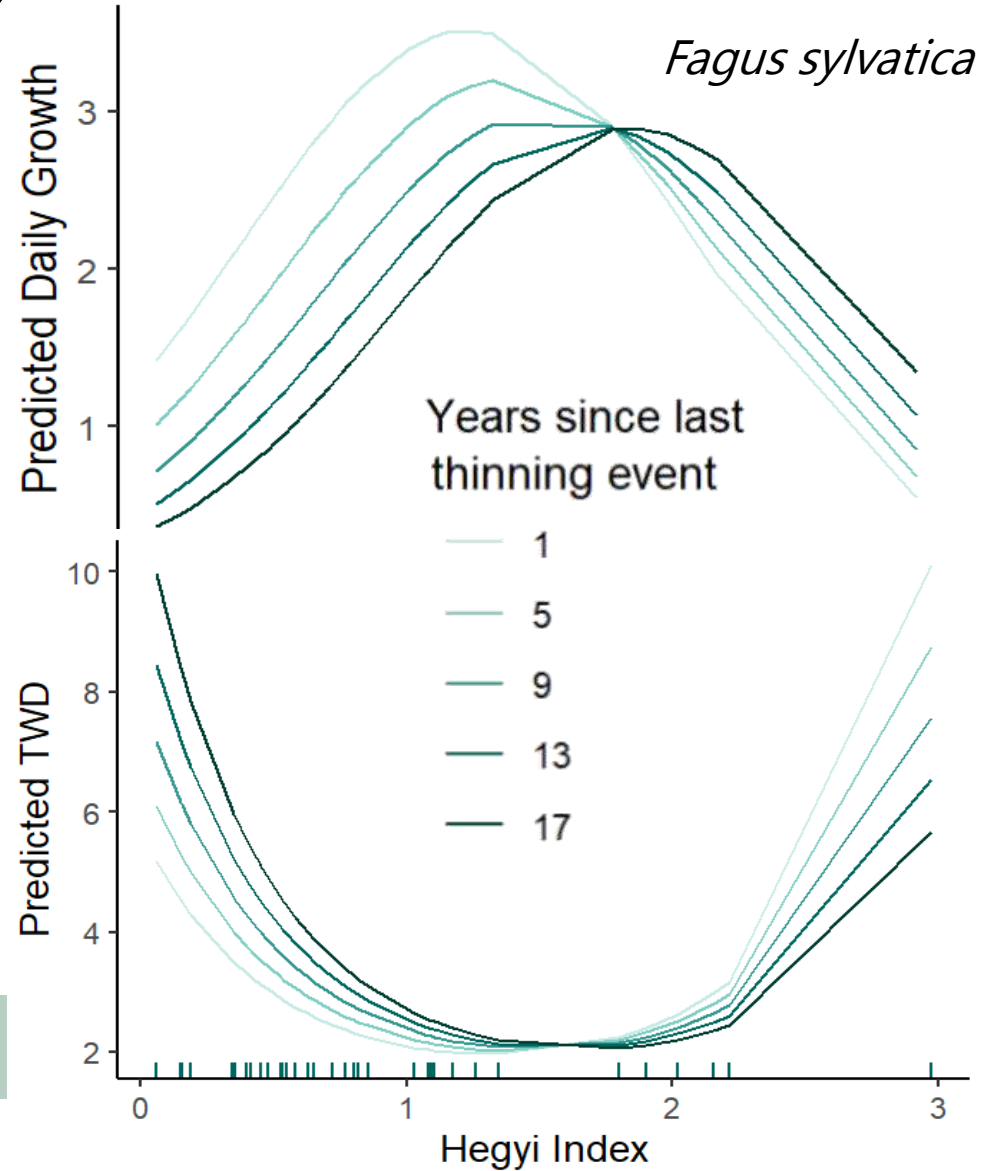
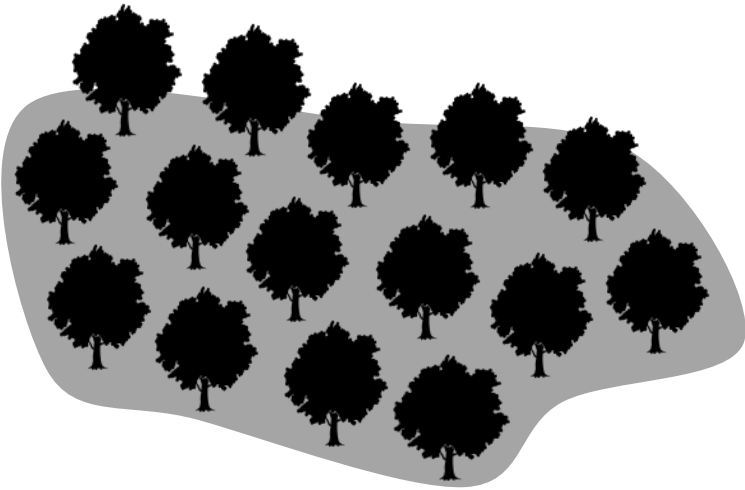
# Dunningsregimes aanpassen



Ruimte voor groei  
Minder competitie voor water, nutriënten, licht...



# Dunningsregimes aanpassen

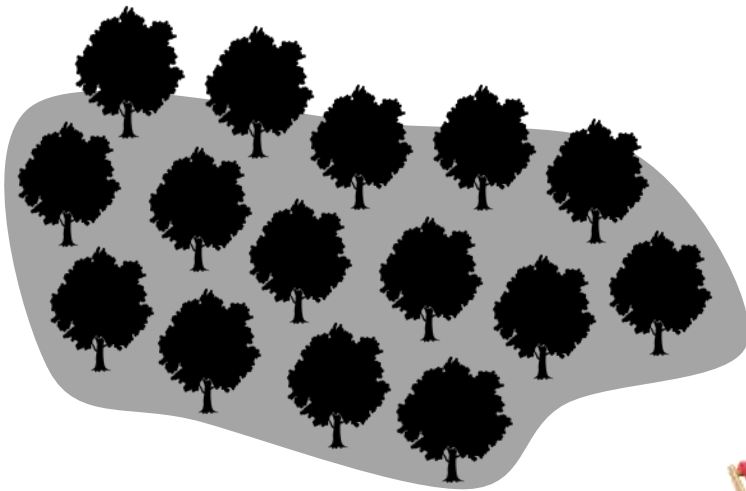


! Preliminaire resultaten !



# Dunningsregimes aanpassen

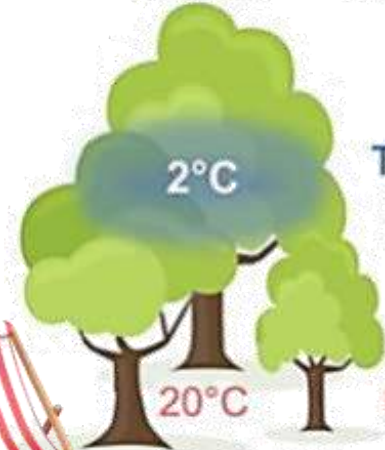
MAAR... wat met het microklimaat?



Baseline survey

22°C

Macroclimate



2°C

Temperature buffering

20°C

Microclimate

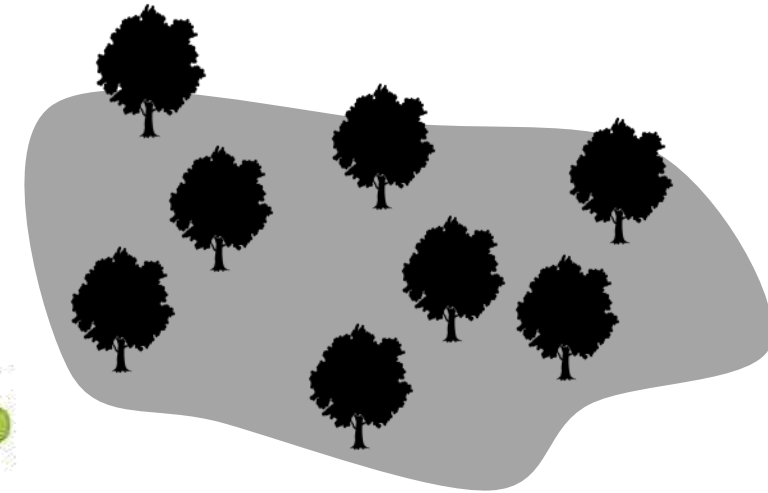
Resurvey

24°C



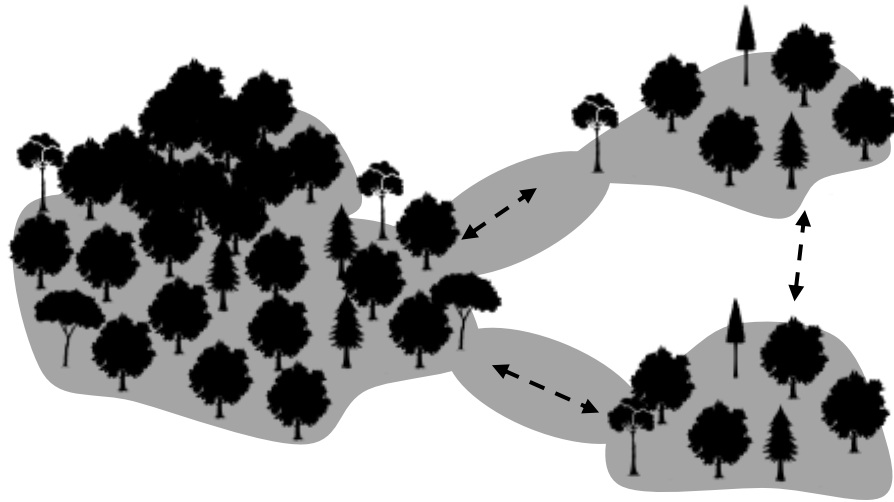
1°C

23°C



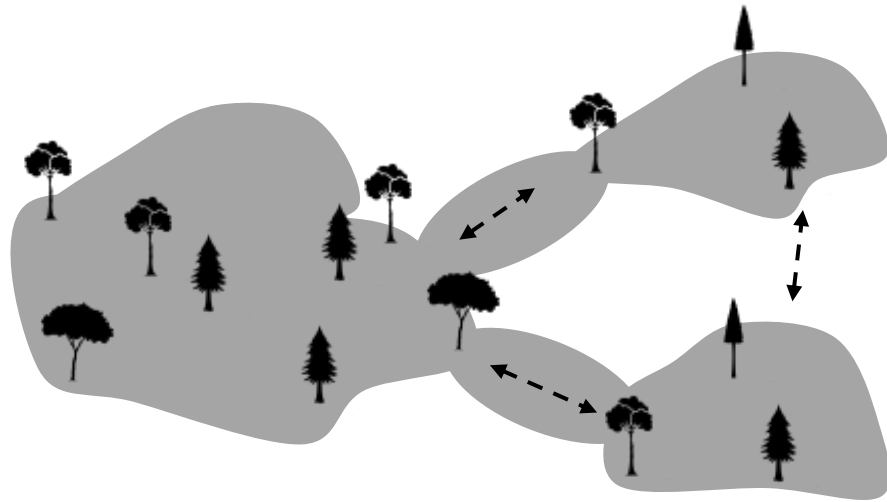
# Complex systeem met groot aanpassingsvermogen

- Adaptatieprocessen Vergroten van populaties , Verhogen van diversiteit , Verbinden en vrijwaren connectiviteit
- Risicospreiding Verhogen diversiteit



Microklimaat &  
dunningsregime  
aanpassen

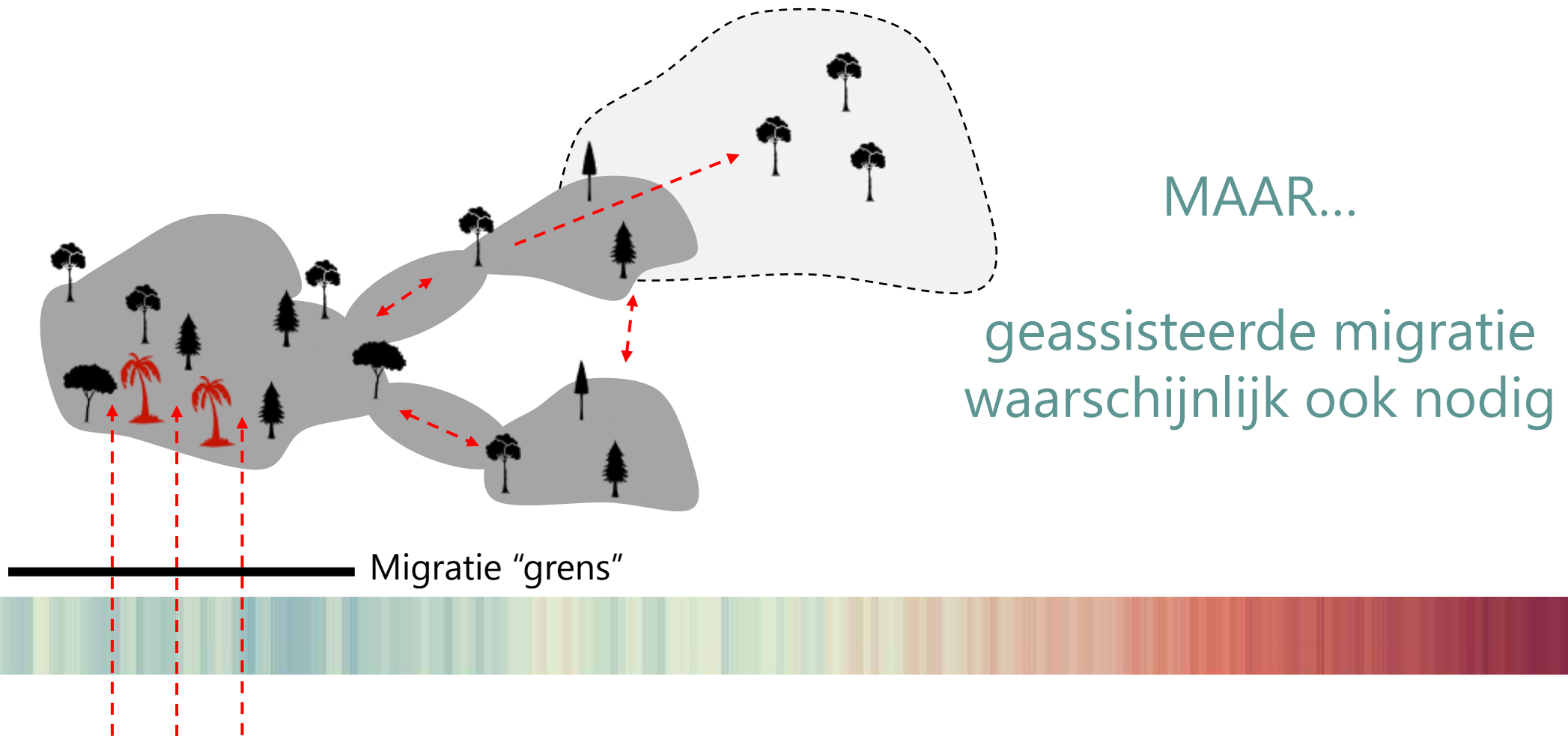
# Complex systeem met groot aanpassingsvermogen



MAAR...

geassisteerde migratie  
waarschijnlijk ook nodig

# Complex systeem met groot aanpassingsvermogen

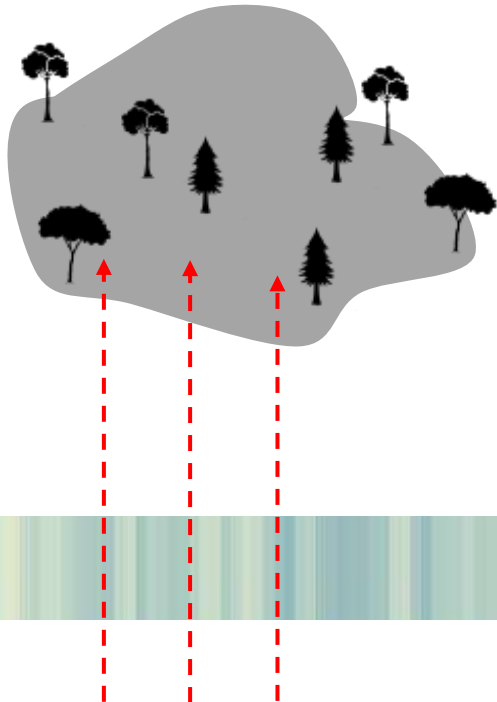


# Project klimaatbomen

**In opdracht van ANB:** lijst met soorten die rol kunnen spelen voor klimaatadaptatie in Vlaanderen

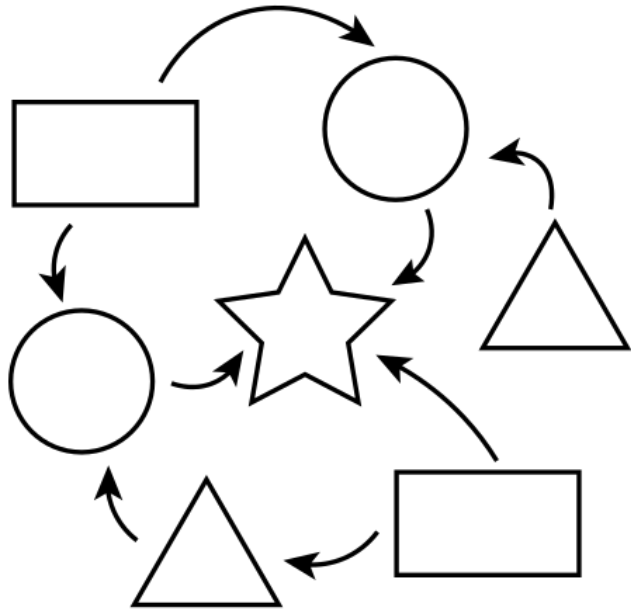


# Project klimaatbomen



- **Oplossing  $\neq$  "super"soort**
- Wél soortengroepen en gemeenschappen
- Nood aan conceptueel kader
- Soortverspreidingsmodellen
- Risico's goed opvolgen

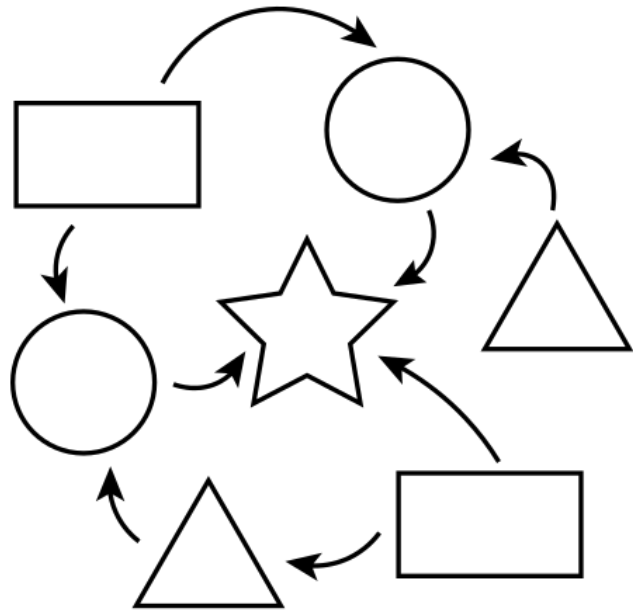
# Project klimaatbomen



- Oplossing  $\neq$  "super"soort
- **Wél soortengroepen en gemeenschappen**
- **Nood aan conceptueel kader**
- Soortverspreidingsmodellen
- Risico's goed opvolgen



# Project klimaatbomen



## Veerkracht-gebaseerde geassisteerde migratie



BOS 1



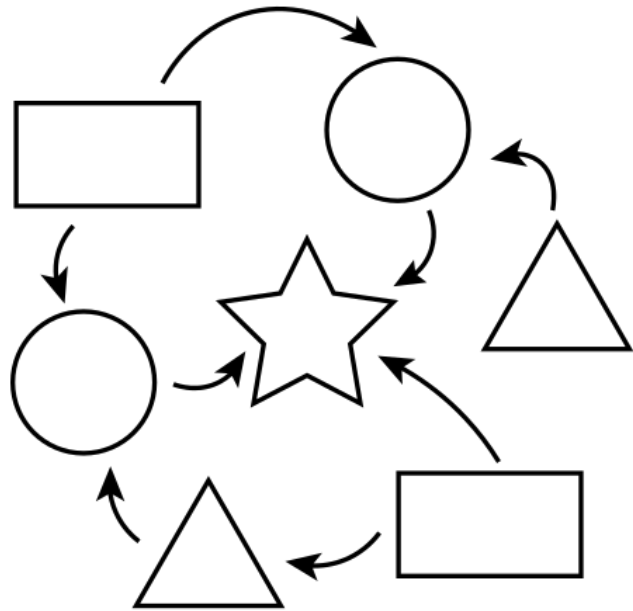
BOS 2



BOS 3



# Project klimaatbomen



## Veerkracht-gebaseerde geassisteerde migratie



BOS 1

SR=2



BOS 2

SR=2

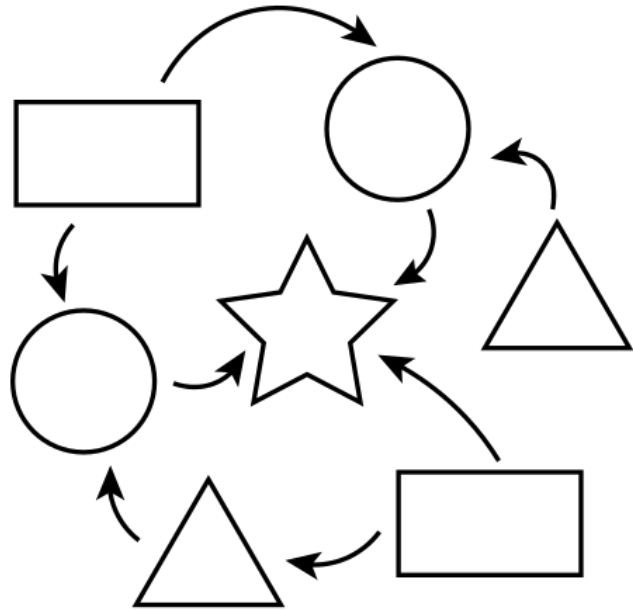


BOS 3

SR=5



# Project klimaatbomen



## Veerkracht-gebaseerde geassisteerde migratie



BOS 1

SR=2  
FD=1



BOS 2

SR=2  
FD=2

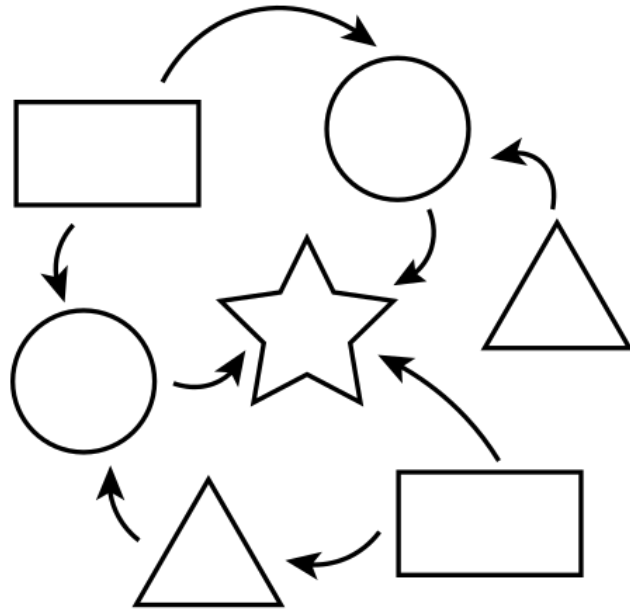


BOS 3

SR=5  
FD=2



# Project klimaatbomen



## Veerkracht-gebaseerde geassisteerde migratie



BOS 1

SR=2  
FD=1



BOS 2

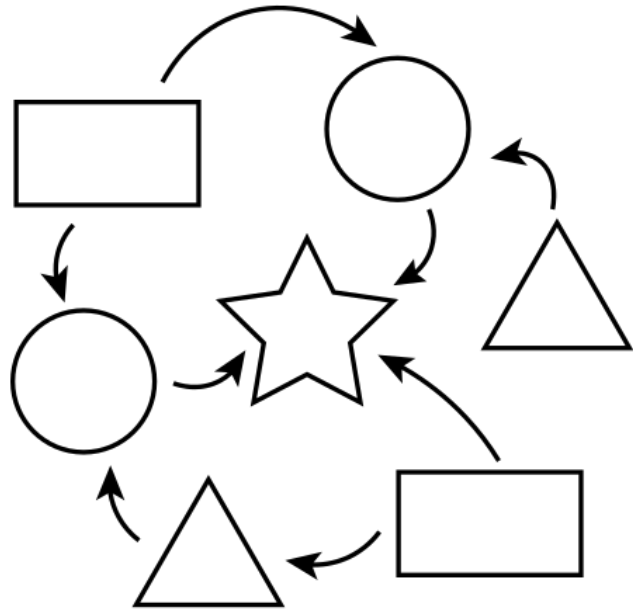
SR=2  
FD=2  
FR=1



BOS 3

SR=5  
FD=2  
FR=2

# Project klimaatbomen



## Veerkracht-gebaseerde geassisteerde migratie



BOS 1

SR=2  
FD=1



BOS 2

SR=2  
FD=2  
FR=1

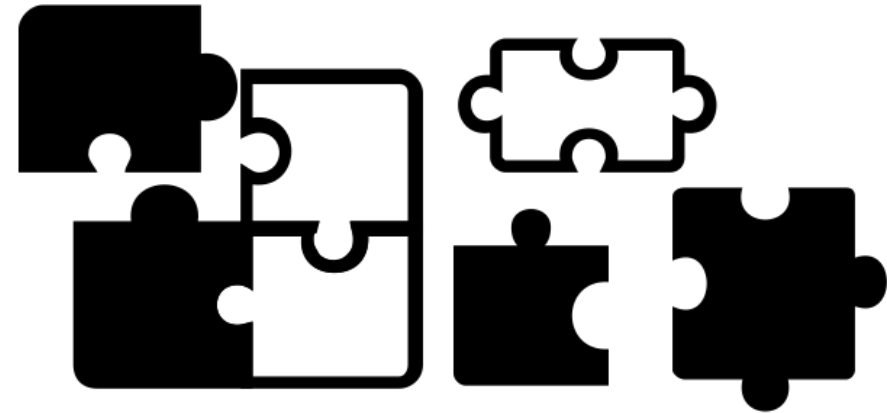
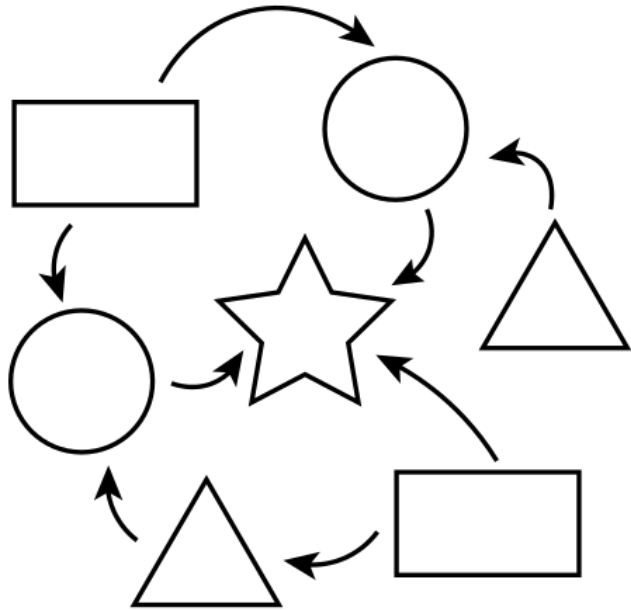


BOS 3

SR=5  
FD=2  
FR=2

# Project klimaatbomen

Veerkracht-gebaseerde geassisteerde migratie



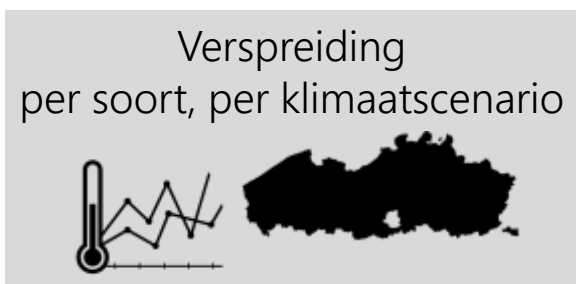
# Project klimaatbomen

Lokale kennis op basis  
van honderden  
jaren met stabiel klimaat



- Oplossing  $\neq$  "super"soort
- Wél soortengroepen en gemeenschappen
- Nood aan conceptueel kader
- **Soortverspreidingsmodellen**
- **Risico's goed opvolgen**

# Project klimaatbomen



- Oplossing  $\neq$  "super"soort
- Wél soortengroepen en gemeenschappen
- Nood aan conceptueel kader
- **Soortverspreidingsmodellen**
- **Risico's goed opvolgen**





*All models are wrong  
but some are useful*



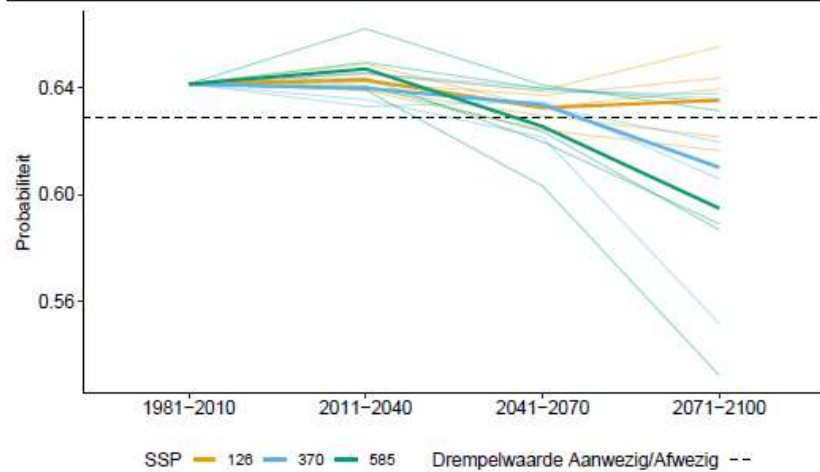
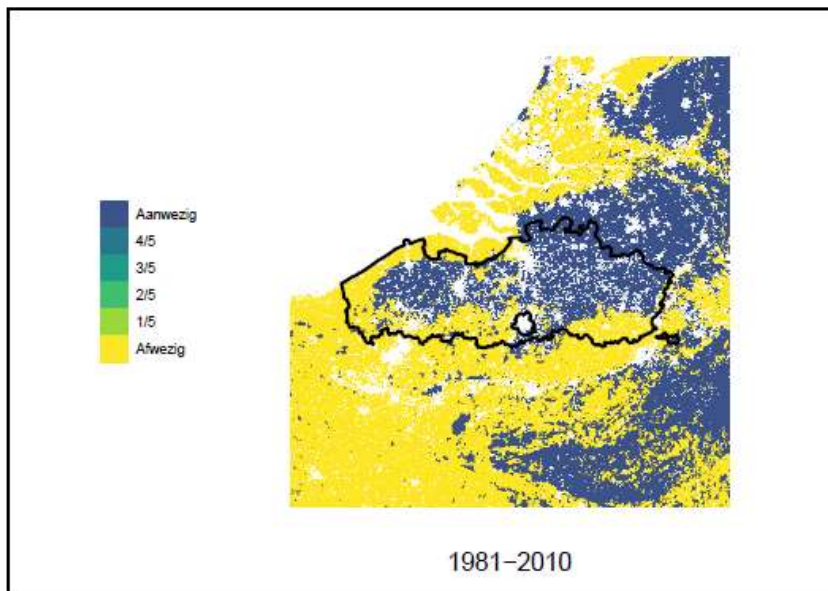
George E.P. Box



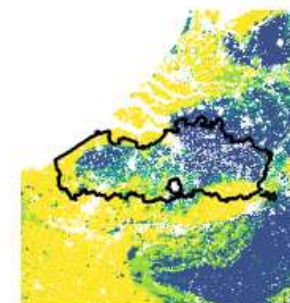
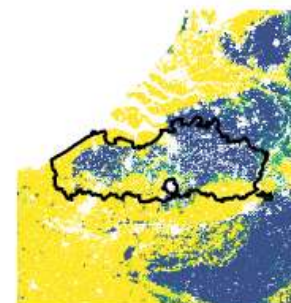
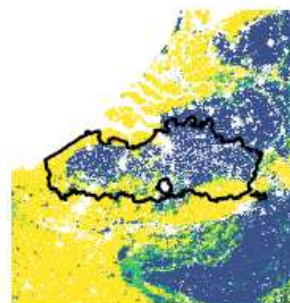
# *Fagus sylvatica* L.



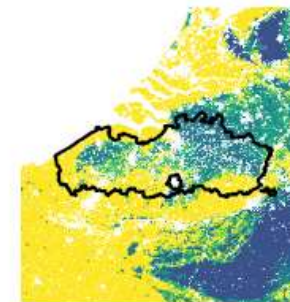
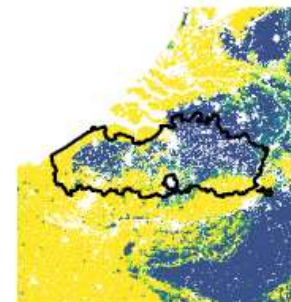
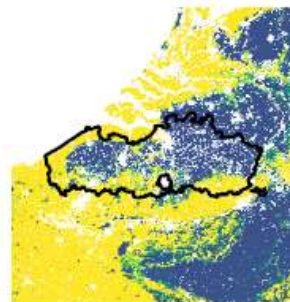
Europese trainingsomvang  
Boyce Index:  $0.85 \pm 0.15$   
TSS Index:  $0.18 \pm 0.02$   
Aantal waarnemingen: 45.367



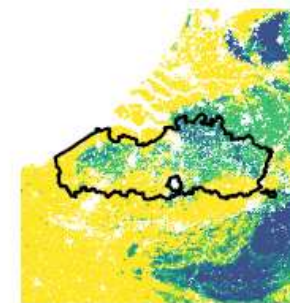
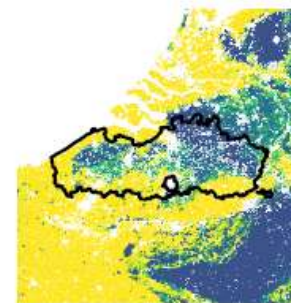
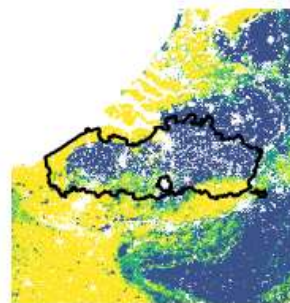
SSP126



SSP370



SSP585



2011-2040

2041-2070

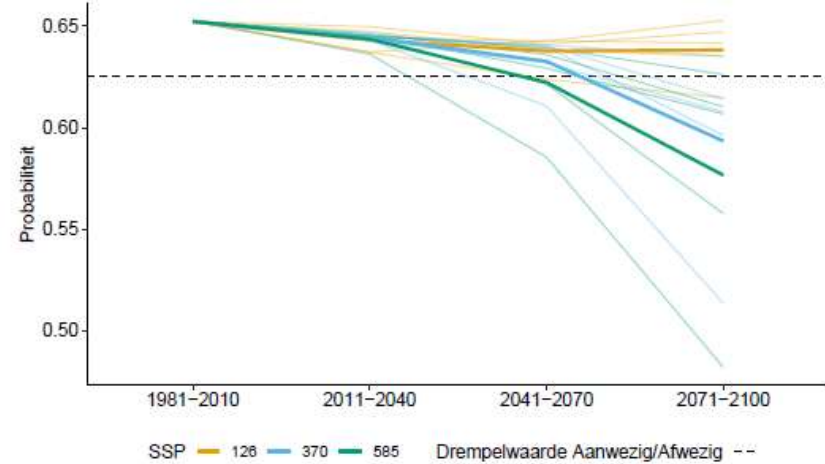
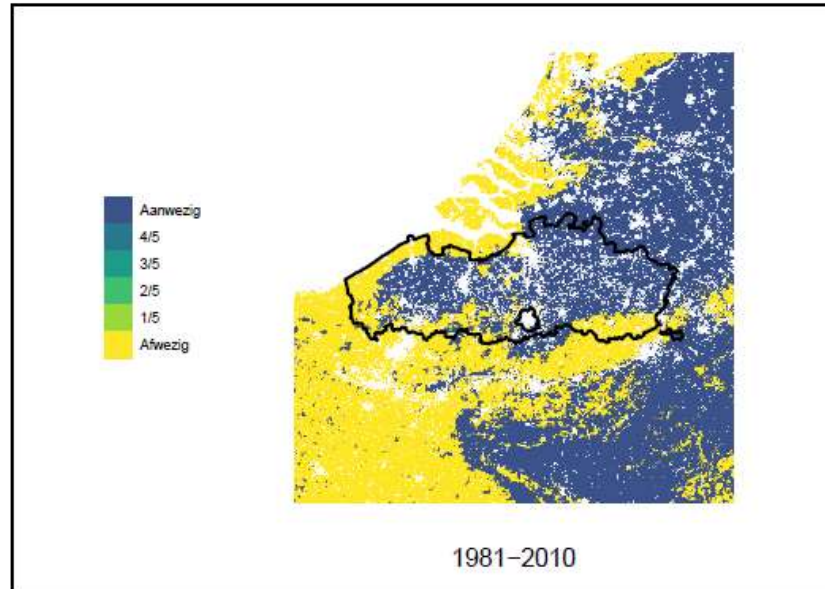
2071-2100



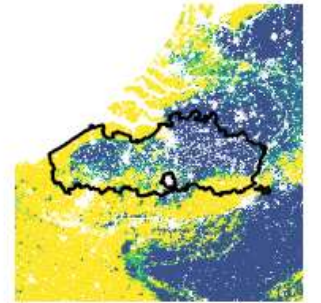
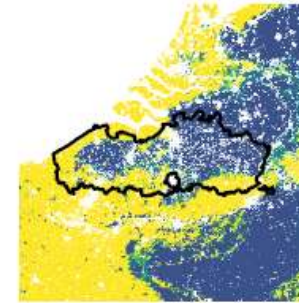
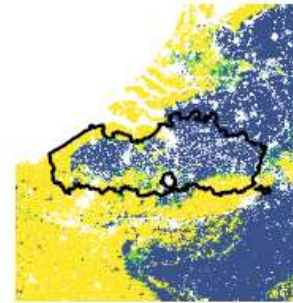
# Betula pendula Roth



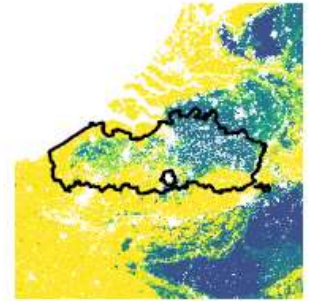
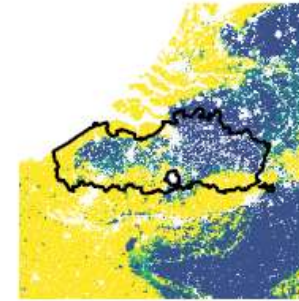
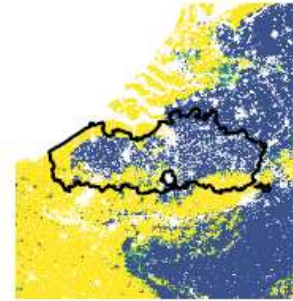
Europese trainingsomvang  
Boyce Index:  $0.79 \pm 0.14$   
TSS Index:  $0.18 \pm 0.02$   
Aantal waarnemingen: 46.638



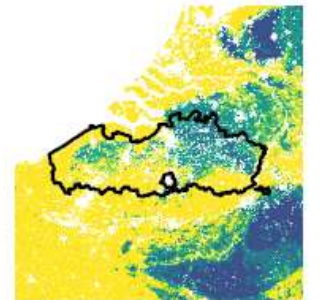
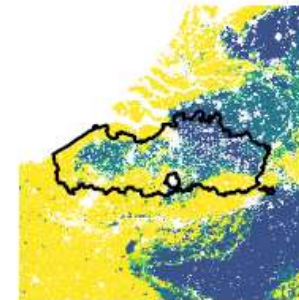
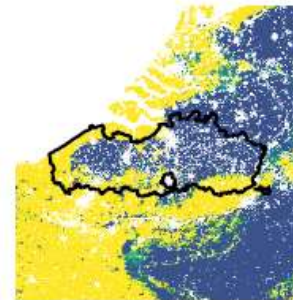
SSP126



SSP370



SSP585



2011-2040

2041-2070

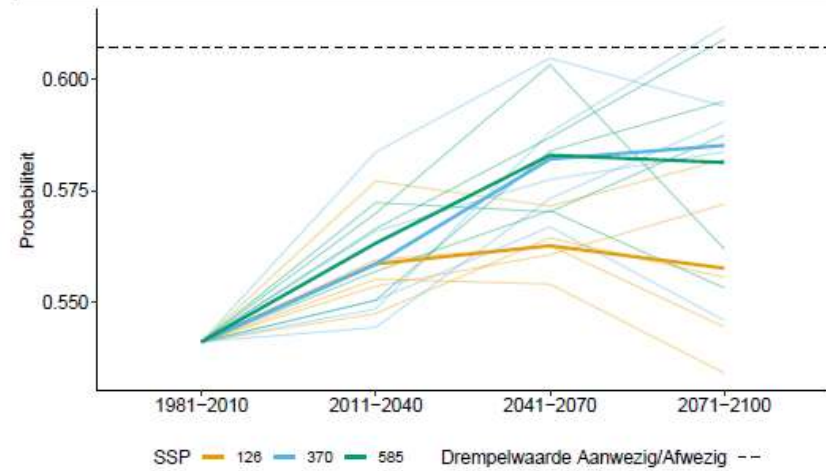
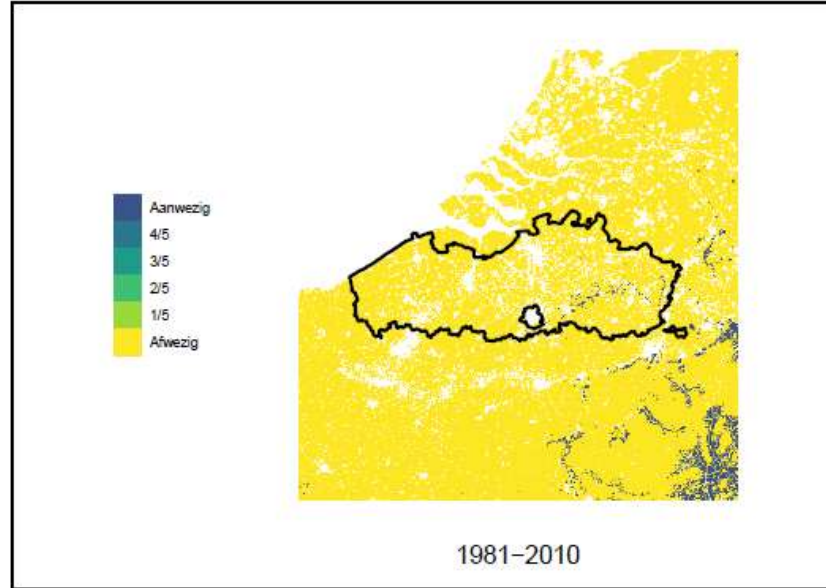
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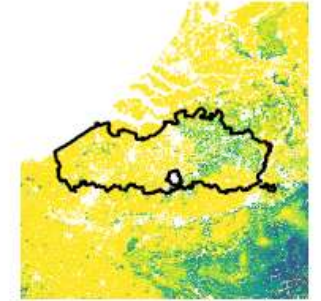
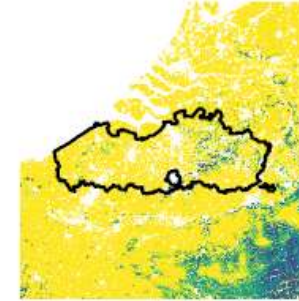
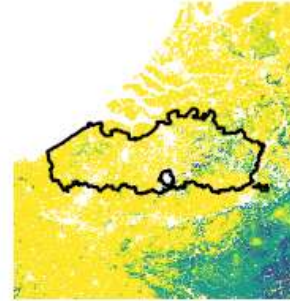
# *Quercus pubescens* Willd.



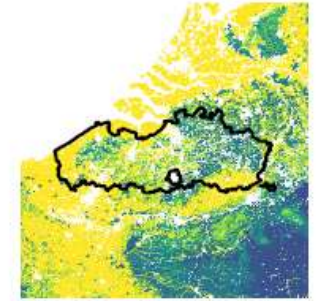
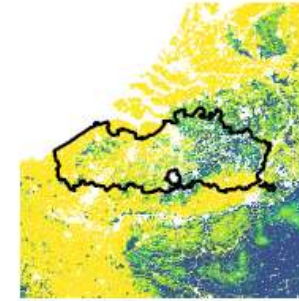
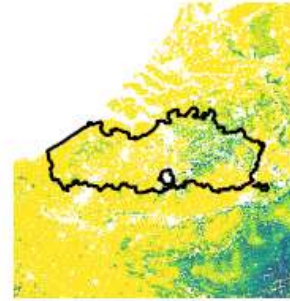
Europese trainingsomvang  
Boyce Index:  $0.97 \pm 0.03$   
TSS Index:  $0.18 \pm 0.02$   
Aantal waarnemingen: 21.419



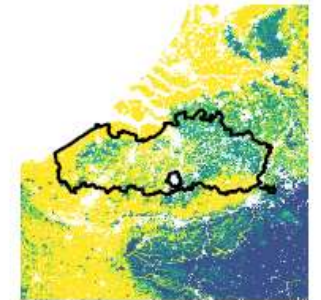
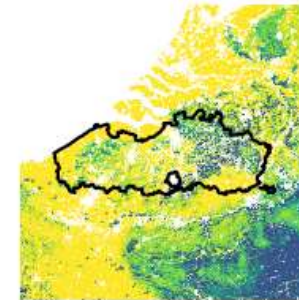
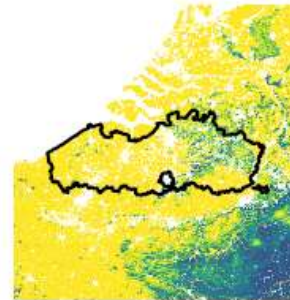
SSP126



SSP370



SSP585



2011-2040

2041-2070

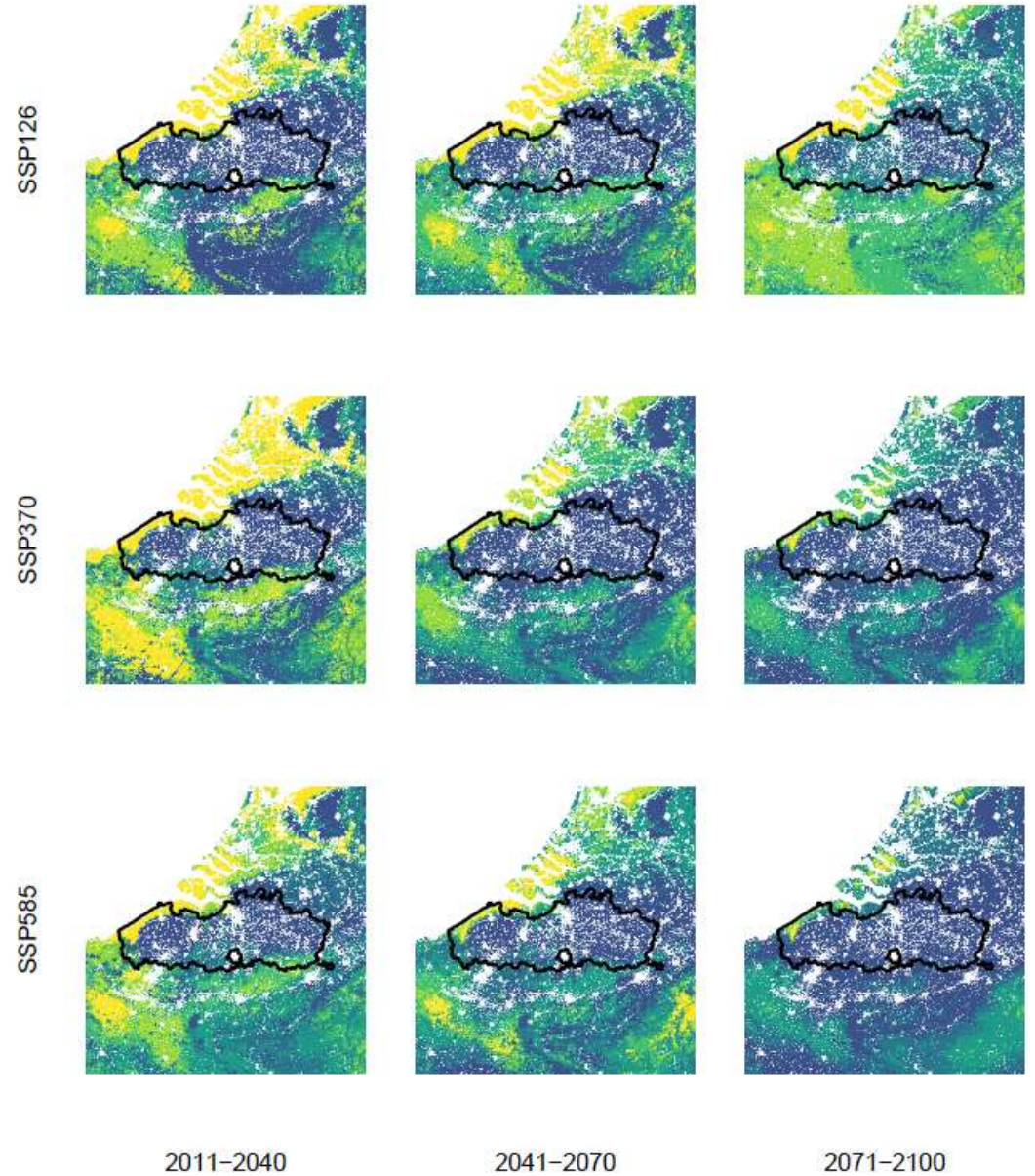
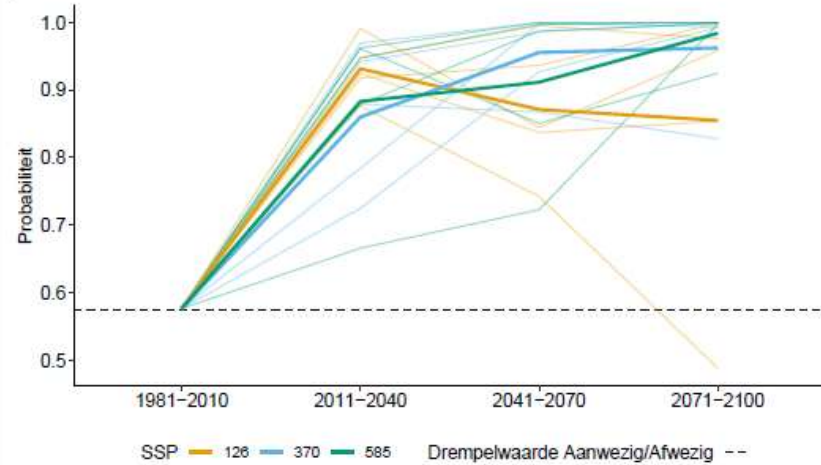
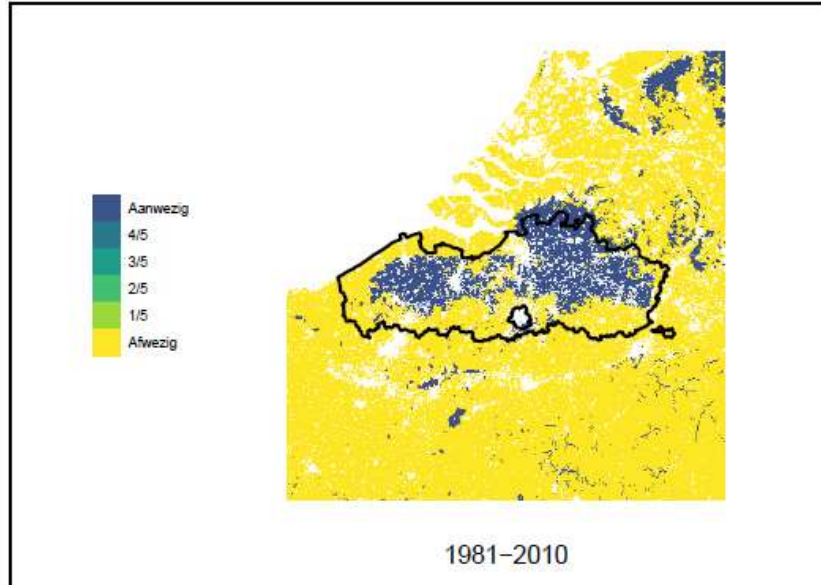
2071-2100



# *Amelanchier lamarckii* F.G.Schroed.



Europese trainingsomvang  
 Boyce Index:  $0.78 \pm 0.21$   
 TSS Index:  $0.22 \pm 0.09$   
 Aantal waarnemingen: 3.551



# Klimaatbomen tool

## Klimaatbomen

### Gewichten

**Klimaatgeschiktheid**

0 100

0 10 20 30 40 50 60 70 80 90 100

**Groeiplaatskenmerken**

0 100

0 10 20 30 40 50 60 70 80 90 100

**Ecologische eigenschappen:**

0 100

0 10 20 30 40 50 60 70 80 90 100

**Potentiële risico's:**

0 100

0 10 20 30 40 50 60 70 80 90 100

**Gewicht ecosysteemdiensten:**

0 100

0 10 20 30 40 50 60 70 80 90 100

Som van gewichten: 100

Tabel updaten

Copy CSV Excel PDF Print

Search:

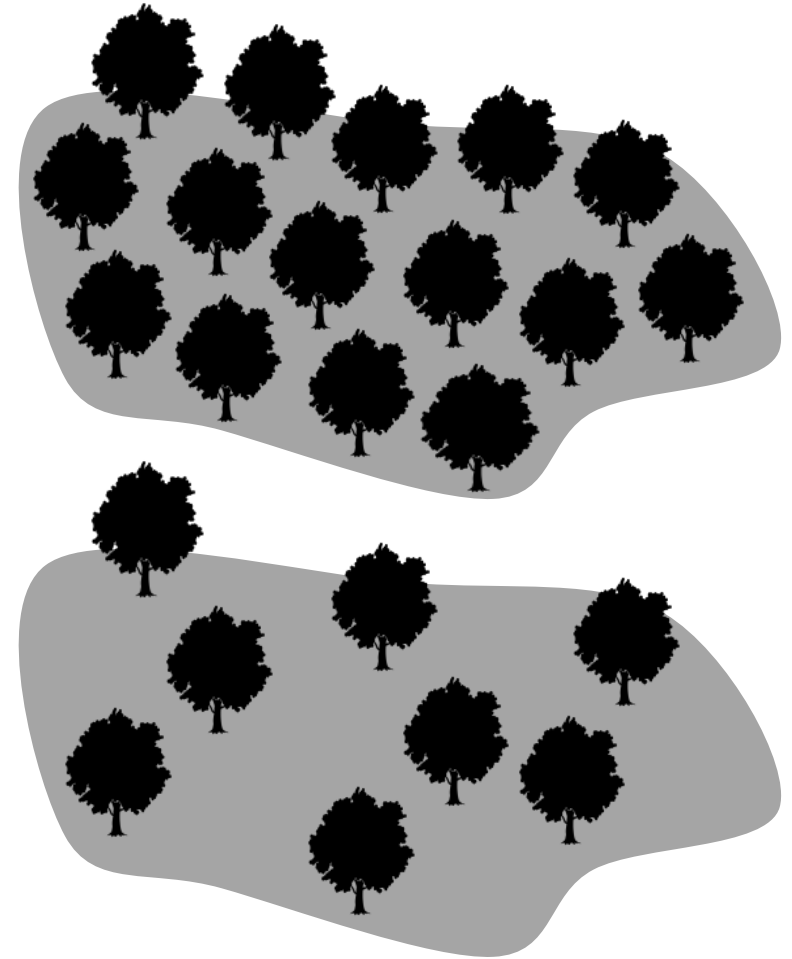
Taxonomische benaming	Nederlandse benaming	Gewogen score (%)	Klimaatgeschiktheid score (%)	Groeiplaatskenmerken score (%)	Ec ki
<i>Celtis occidentalis</i>	Westerse netelboom	100	100	76	
<i>Juglans nigra</i>	Zwarte walnoot	100	100	76	
<i>Populus canescens_x</i>	Grauwe abeel	100	100	78	
<i>Quercus cerris</i>	Moseik of Turkse eik	100	100	82	
<i>Acer negundo</i>	Vederesdoorn	96	96	71	
<i>Ailanthus altissima</i>	Hemelboom	96	96	67	
<i>Albizia julibrissin</i>	Perzische slaapboom of zijdeboom	96	96	80	
<i>Amelanchier lamarckii</i>	Amerikaans krentenboompje	96	96	71	
<i>Calocedrus decurrens</i>	Wierookceder	96	96	69	
<i>Catalpa bignonioides</i>	Groene trompetboom	96	96	82	

An aerial photograph of a forest. The left side of the image shows a dense, healthy forest with vibrant green foliage. The right side shows a forest with many dead, brown, skeletal trees, indicating a significant die-off. A semi-transparent dark horizontal band runs across the middle of the image, containing the text "Take home messages" in white.

Take home messages

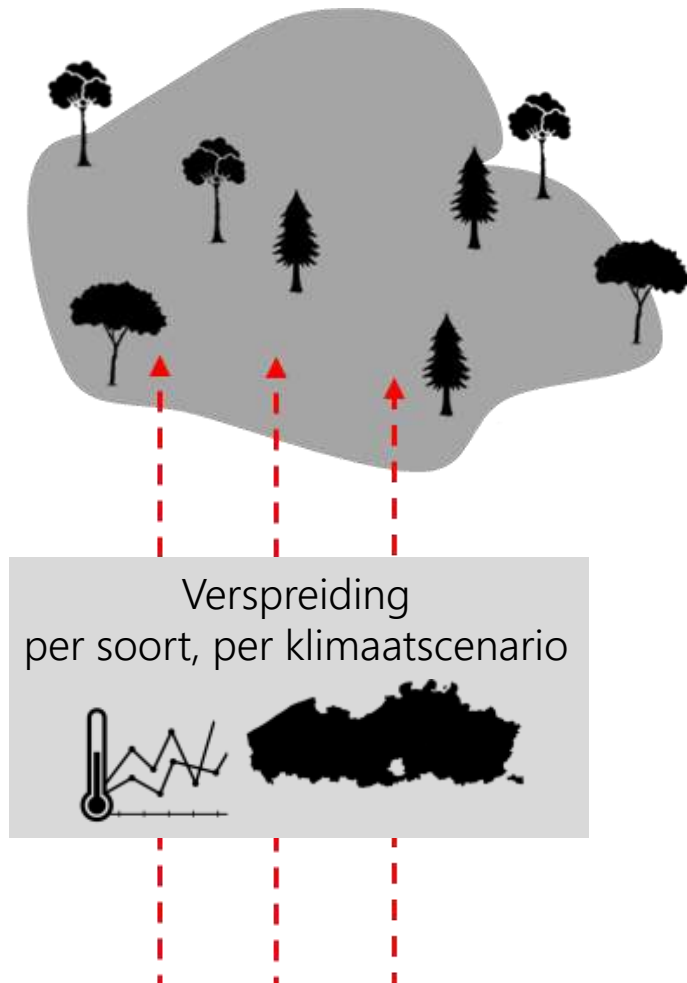
# Dunningsregime & microklimaat

- Dunningsrespons = soortafhankelijk
- Diversifieer je beheer op landschapsschaal
- Denk hierbij aan microklimaat



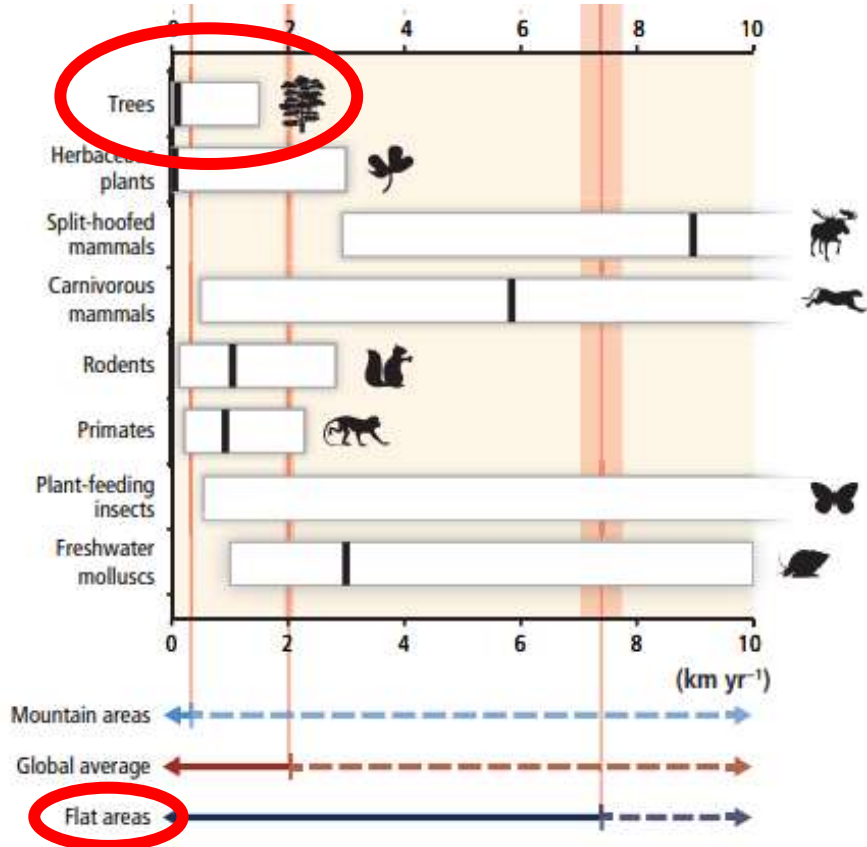


# Geassisteerde migratie



- Oplossing  $\neq$  "super"soort
- Wél soortengroepen en gemeenschappen
- Nood aan conceptueel kader  
= functionele redundantie
- Soortverspreidingsmodellen handige tool
- Risico's goed opvolgen

# Experimenteren en monitoring!



“Beheer” voor veerkracht en aanpassingsvermogen



nu!

# Bedankt voor uw aandacht

Sanne Verdonck & Ellen Desie

**KU LEUVEN**



CENTRUM VOOR  
BOS, NATUUR & LANDSCHAP