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Funded by the European Union

NaturaConnect receives funding under the European Union's Horizon Europe research and innovation programme under grant agreement number 101060429

Welcome

Basic webinar guidance

- ✓ The webinar is being recorded.
- ✓ Write your questions and comments in the chat, indicating the speaker you address.
- ✓ All presentations, the recording and report will be available at naturaconnect.eu/past events and shared with registered participants.
- ✓ Feel free to rename and state your organisation by clicking on the three dots … next to your name!
- ✓ Please start/stop your camera at your convenience :)

Agenda for today

1) **Brief introduction to NaturaConnect** – Hildegard Meyer (WWF Central and Eastern Europe)
2) **Introduction to climate-resilient planning & methodology** – Moreno Di Marco (Sapienza University of Rome)
3) **The NaturaConnect Methodology & applications for protected areas** – Marta Cimatti (Sapienza University of Rome)
4) **The NaturaConnect Learning Platform tutorial/practical application** – Valerio Mezzanotte (Sapienza University of Rome)
5) **Assessing forest vulnerability to drought and supporting adaptation strategies –** José Atauri, EUROPARC Spain
6) **ForestConnect project: Pilot actions to adapt to climate-driven food scarcity for large carnivores –** Maria Kachamakova, WWF Bulgaria
7) **Open discussion & closing of the webinar** – Hildegard Meyer (WWF-CEE)

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Brief introduction to NaturaConnect

Designing a resilient and coherent Trans-European Network for Nature and People (TEN-N)

July 2022 – September 2026

NaturaConnect co-develops

knowledge, tools and capacity

to support **countries** realizing the **EU Biodiversity Strategy 2030 objectives:**

- 30% of land and sea protected
- 10% thereof strictly
- Establish TEN-N

NATURA CONNECT

Project consortium

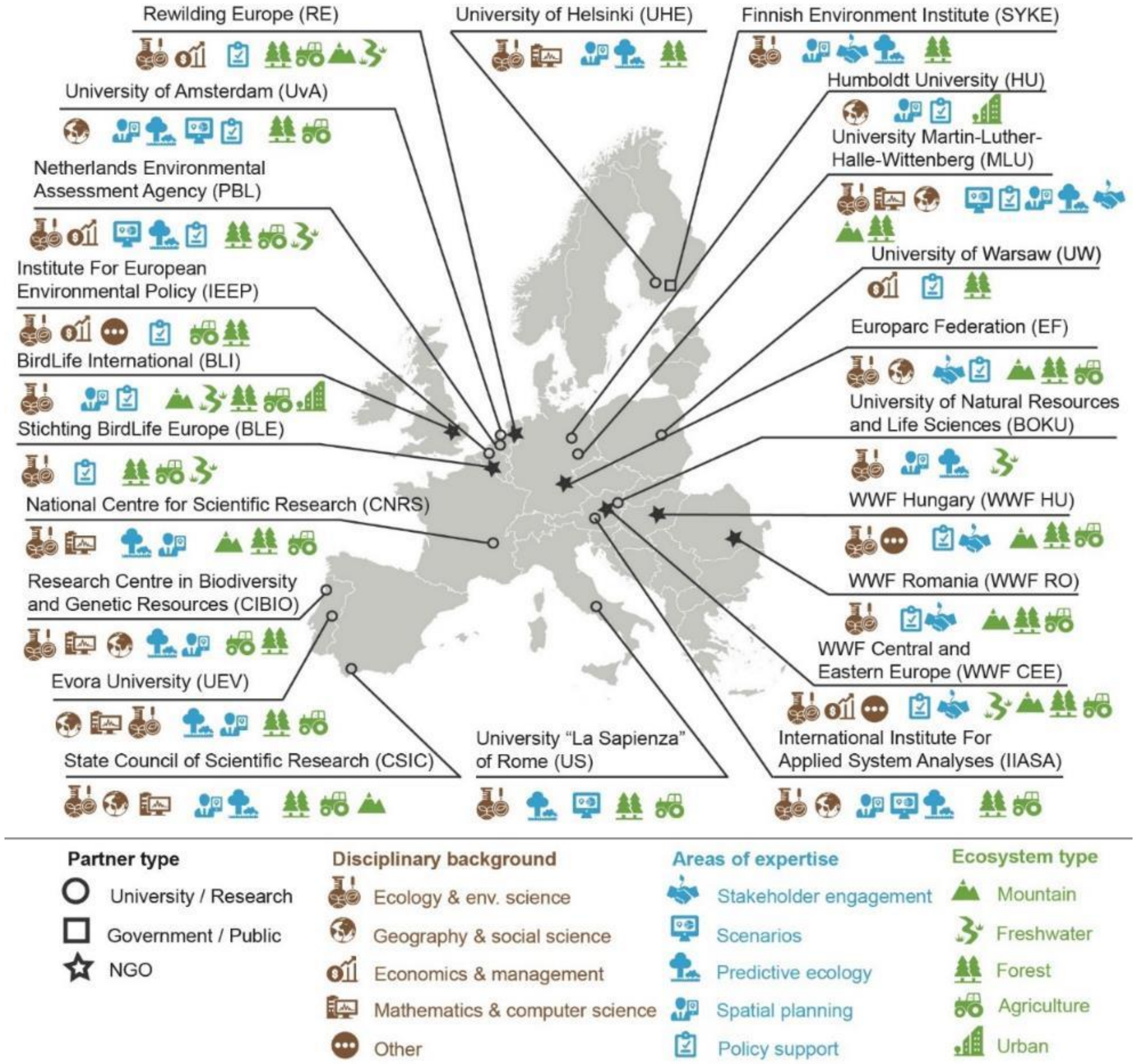
17 Research institutions

5 Policy and practitioner organisations

12 countries across Europe

Lead: International Institute for Applied System Analyses (IIASA), Austria

Co-lead: Martin-Luther-University, Germany



Source: IIASA, 2022

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Mentimeter

Type in menti.com

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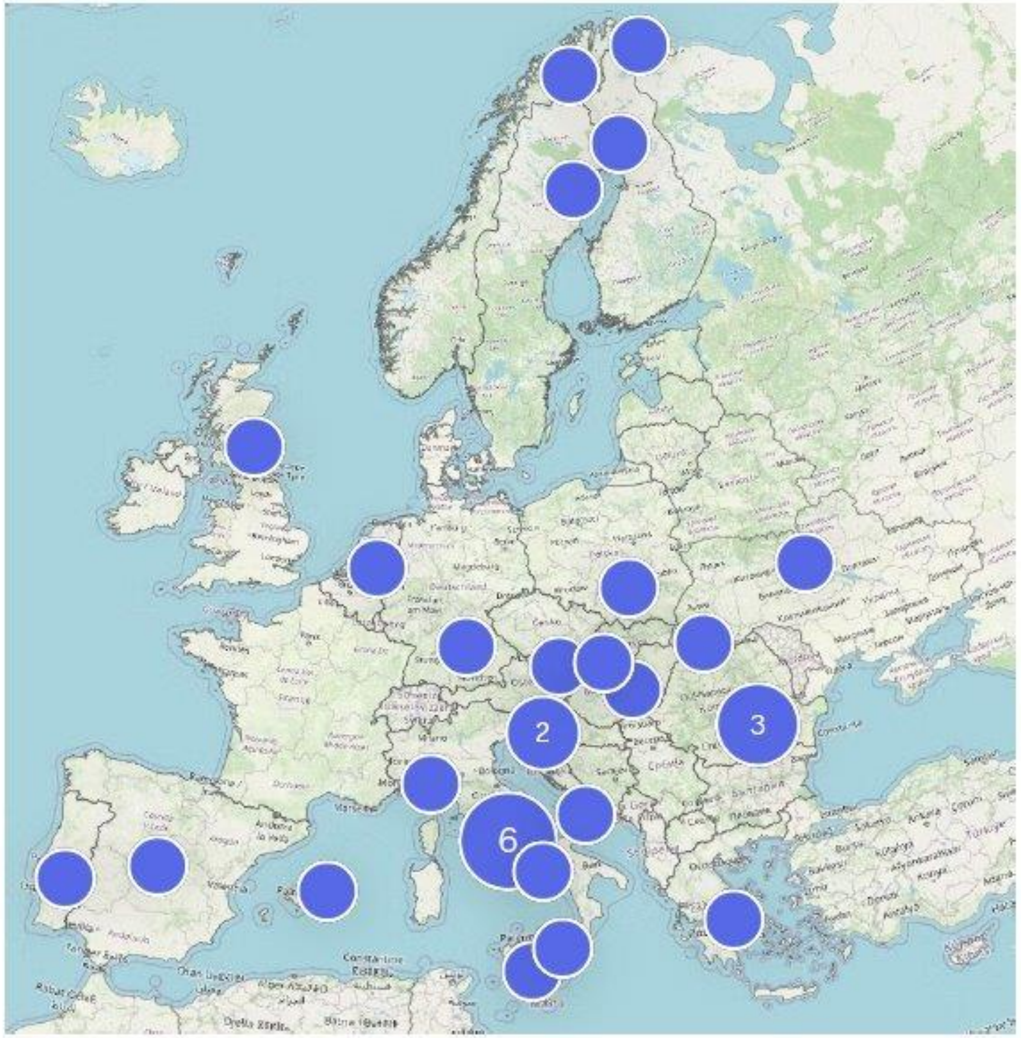
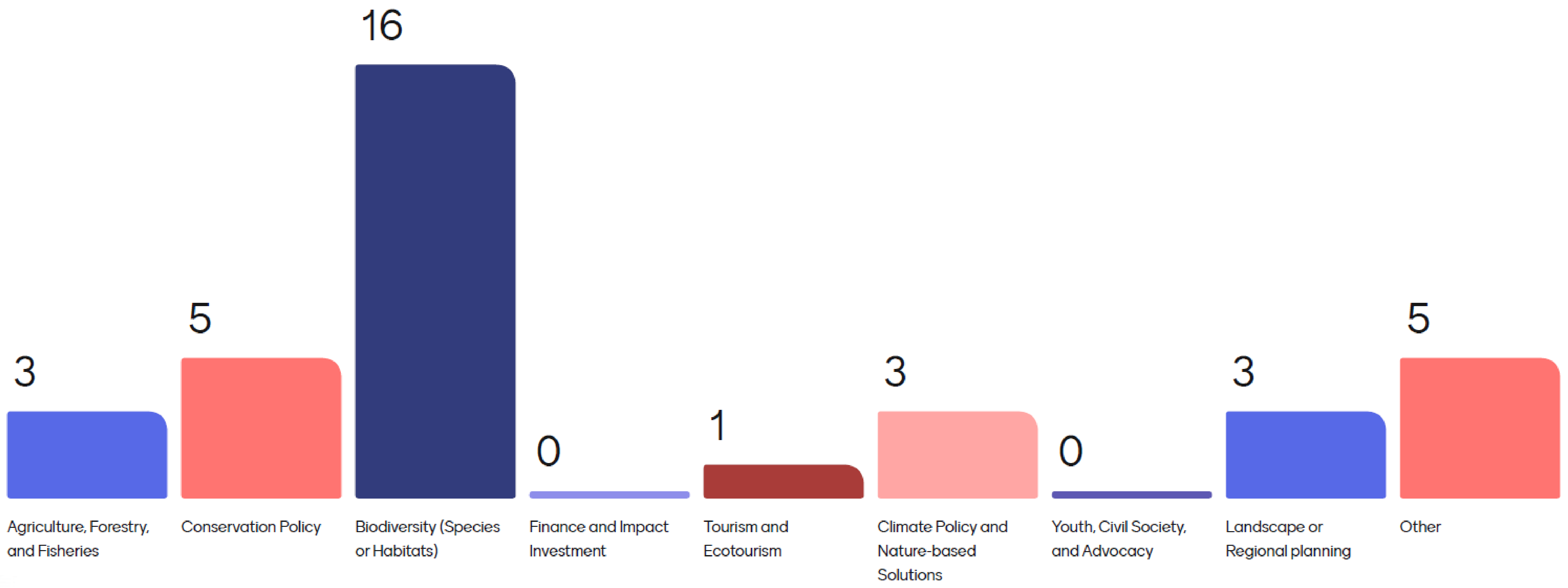
Where are you joining from today?



Mentimeter

What is your primary expertise or background?



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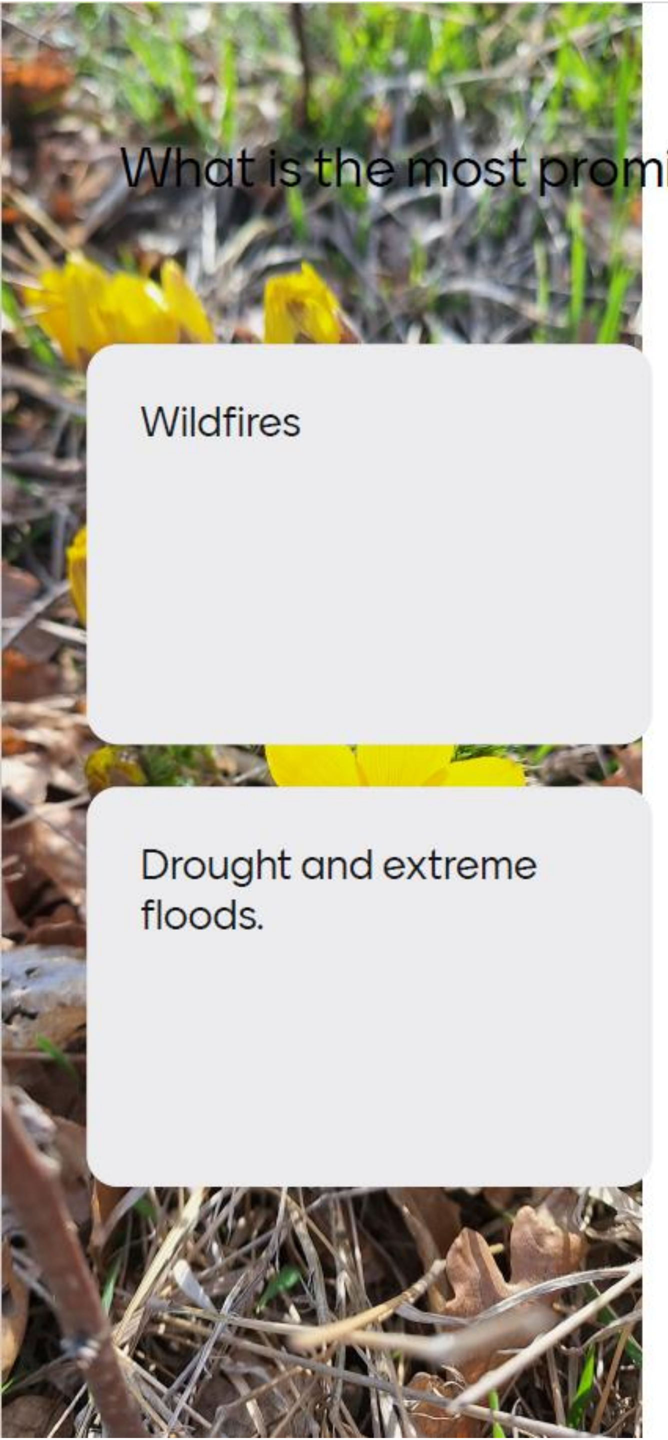
36 / 36



Mentimeter

What is the most prominent threat related to climate change in your region or protected area?

Wildfires	Extreme heat	drought	Drought
Drought and extreme floods.	drought	Drought	Weather extremes, resulting in floods and droughts

28 / 28

Mentimeter

What is the most prominent threat related to climate change in your region or protected area?

Diebacks, invasive species distribution

Agricultural Land Abandonment

Flooding and heavy rainfall - more unpredictable

drought, extreme weather, unpredictability

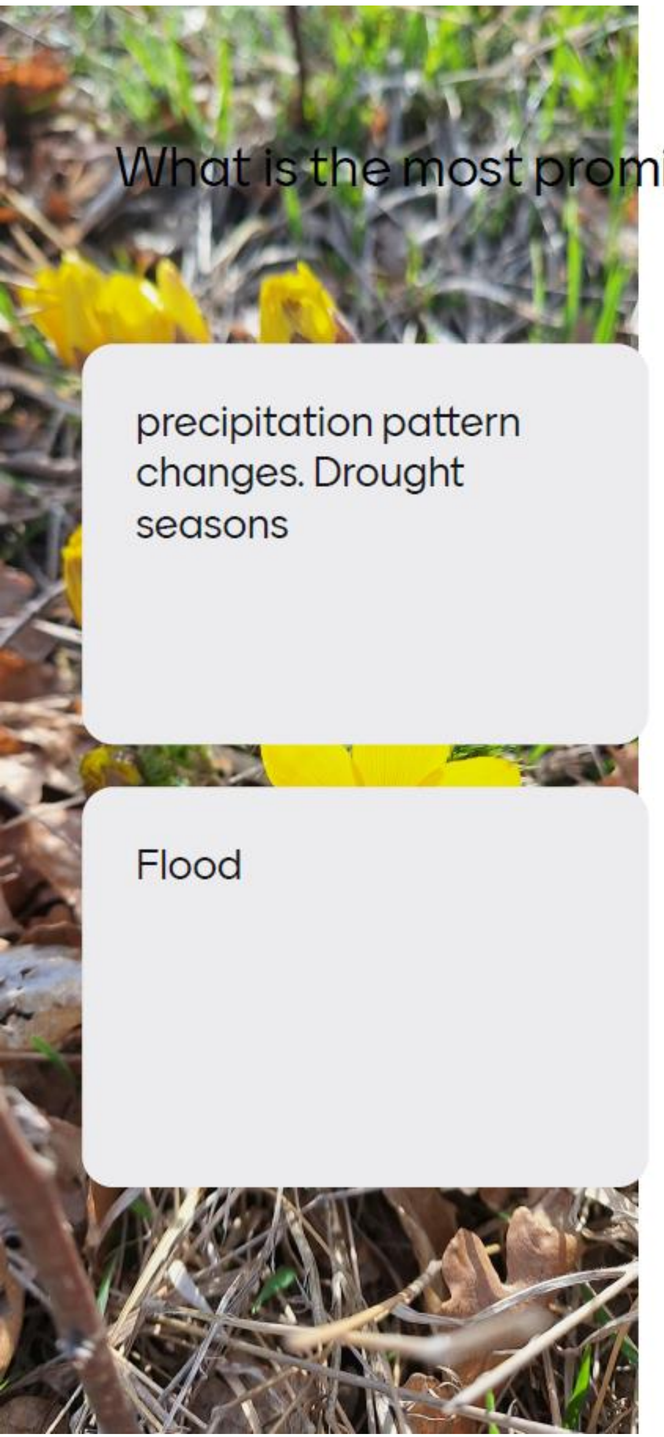
Esrming winters affecting Nordic ecosystems

weather extremes

Floods , fires, invasive species, heat

Extremes

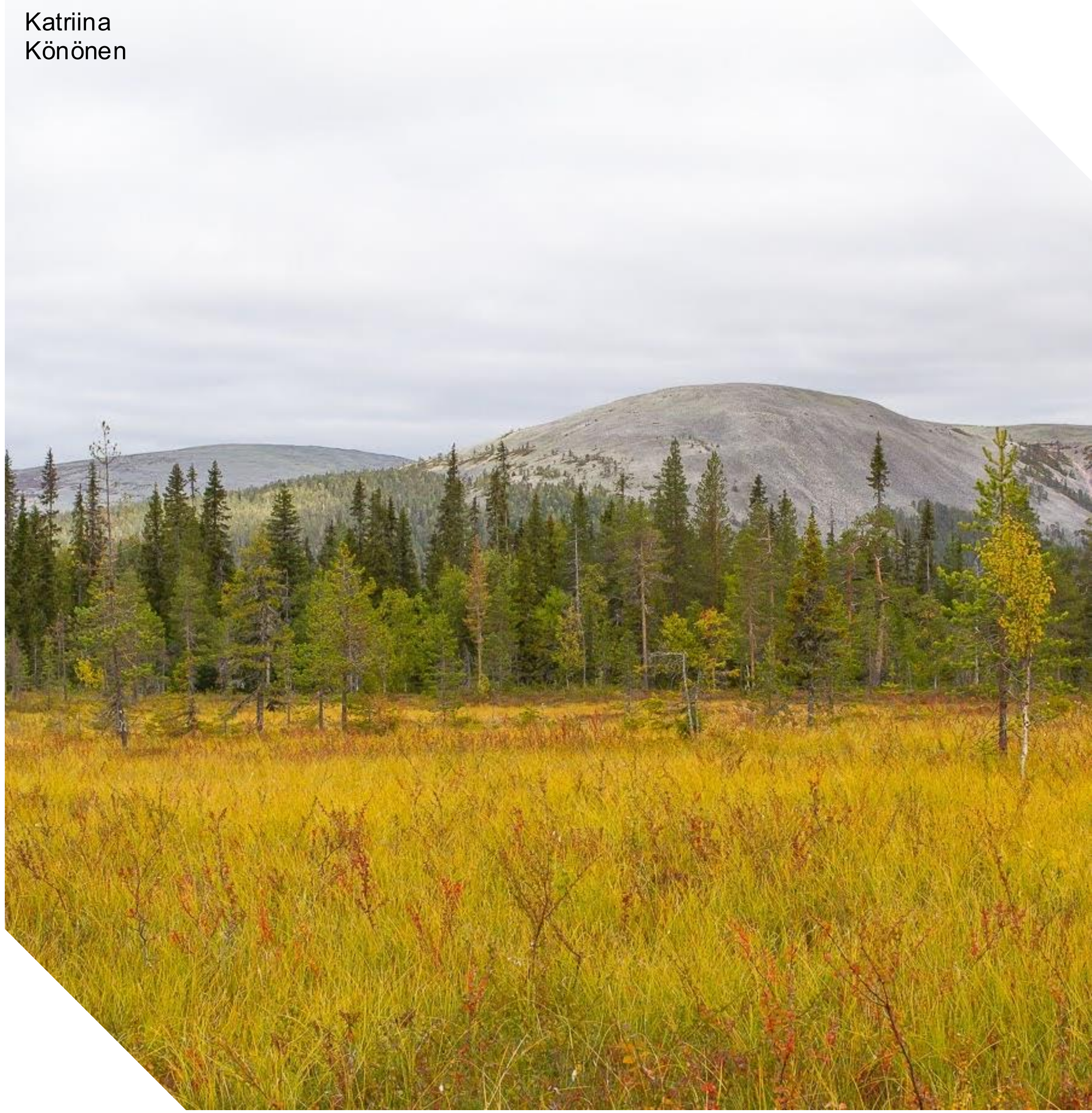
28 / 28



What is the most prominent threat related to climate change in your region or protected area?

- precipitation pattern changes. Drought seasons
- Drought, / Floods
- Fire.
- Massive tourism
- Flood
- salinization (seawater intrusion)
- Less snow and rain on snow events
- dieback of some tree species

Katriina Könönen



Introduction to climate-resilient planning & methodology

Moreno Di Marco, Marta Cimatti, Valerio Mezzanotte

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26/03/2026

Why climate resilient planning

- Average climate velocity in European protected areas is predicted at 1.2-3.3 km/yr

- Average climate magnitude is predicted to be 4.3-6.7 higher than standard deviation of past climate variation

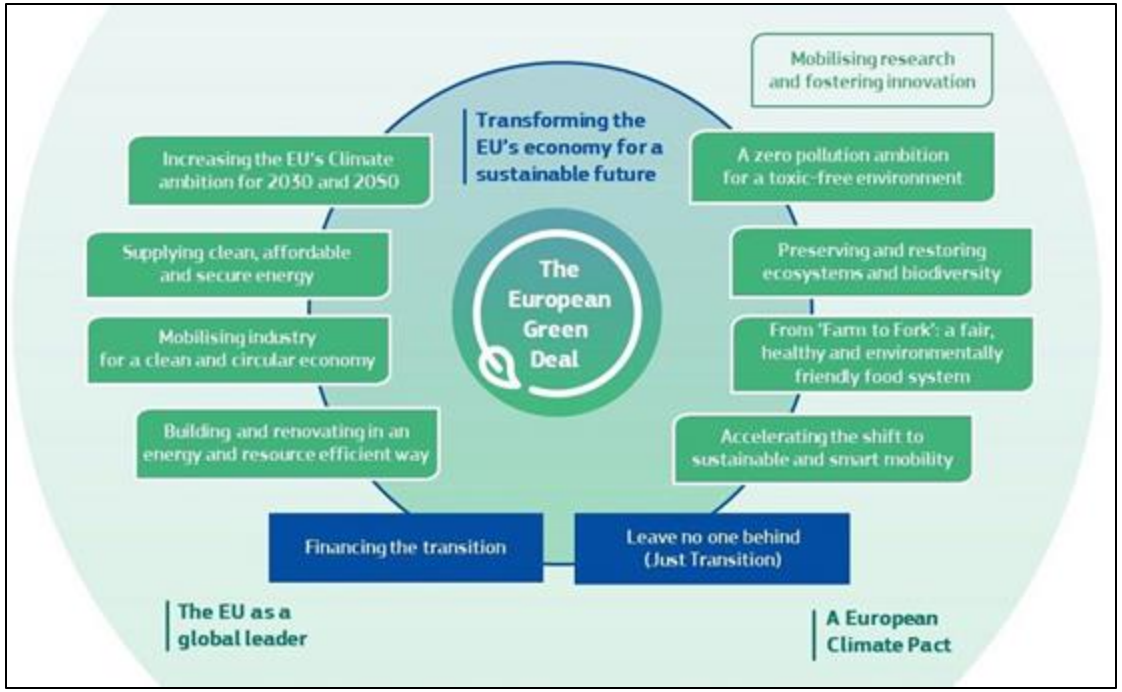
Cimatti et al. (2025) Glob Change Biol, 31: e70261

The disappearance of Doñana's Santa Olalla lagoon in August 2022
© Bernat Armangue/AP Photo

Climate-proofing European environmental action

European Climate Law

by 2020	by 2030	by 2050
- 20%	- 55%	net-zero
(the actual cut was over 30%)		



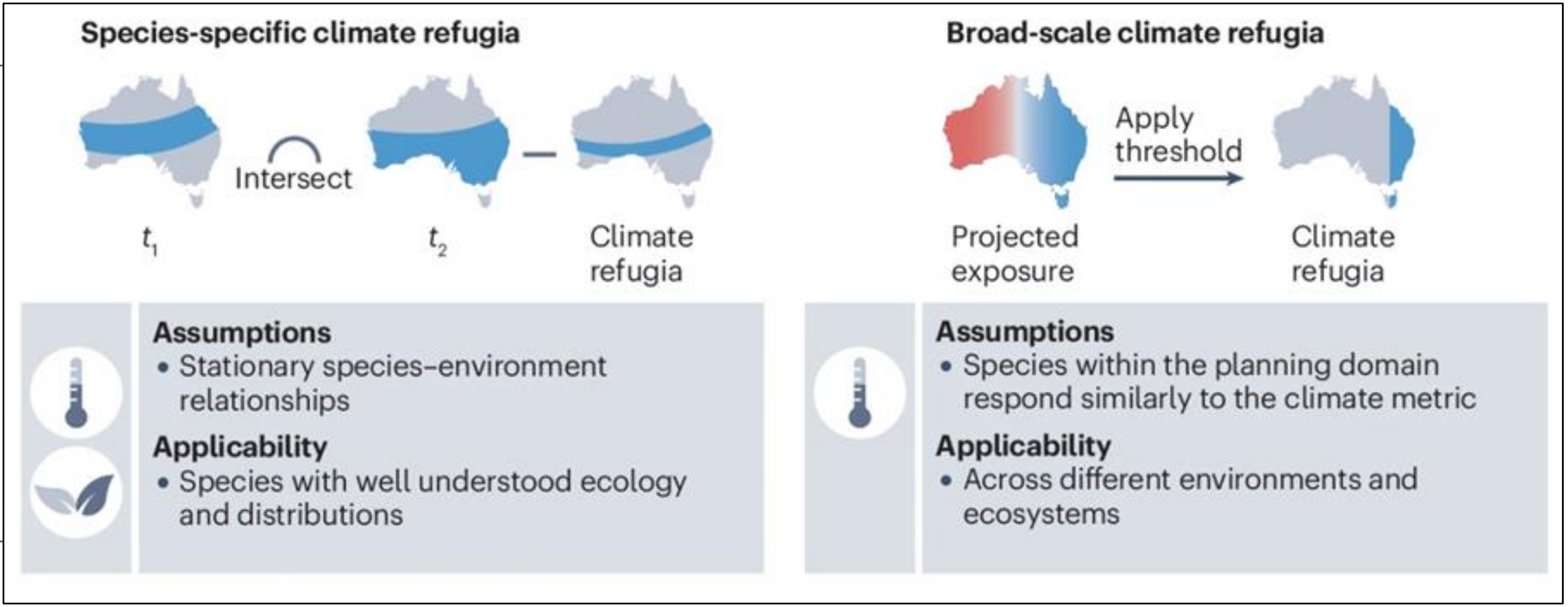
Common approaches for climate-resilient planning

Protect the future habitats of species

Protect areas that facilitate climate connectivity

Protect climate refugia

Protect areas that promote adaptation



Buenafe et al. (2025) Nat. Rev. Biodivers. 1, 284–297

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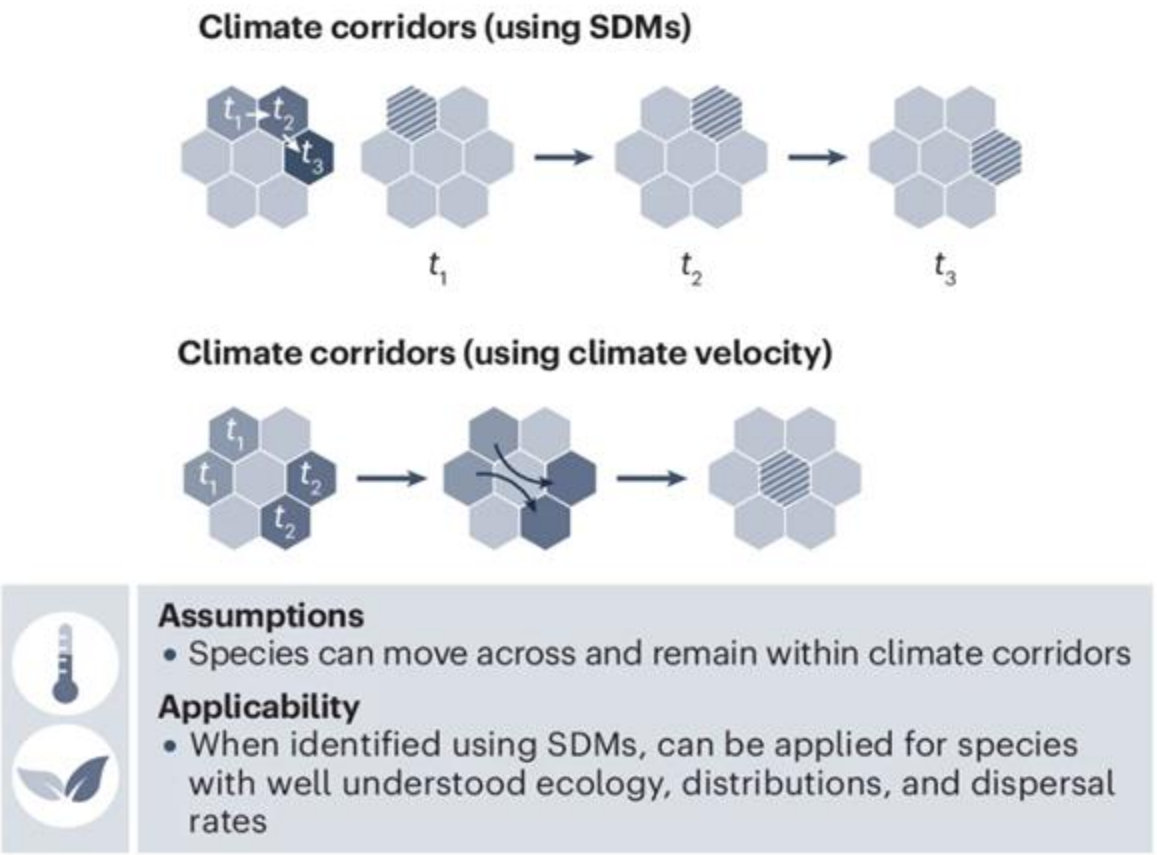

Buenafe et al. (2025) Nat. Rev. Biodivers. 1, 284–297

Common approaches for climate-resilient planning

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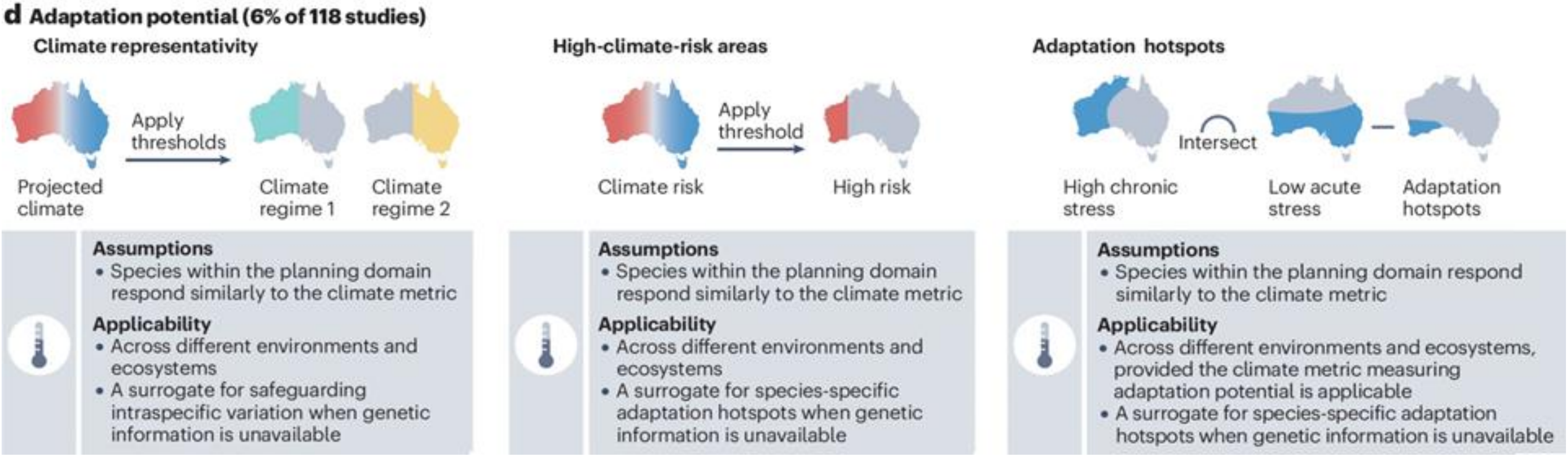
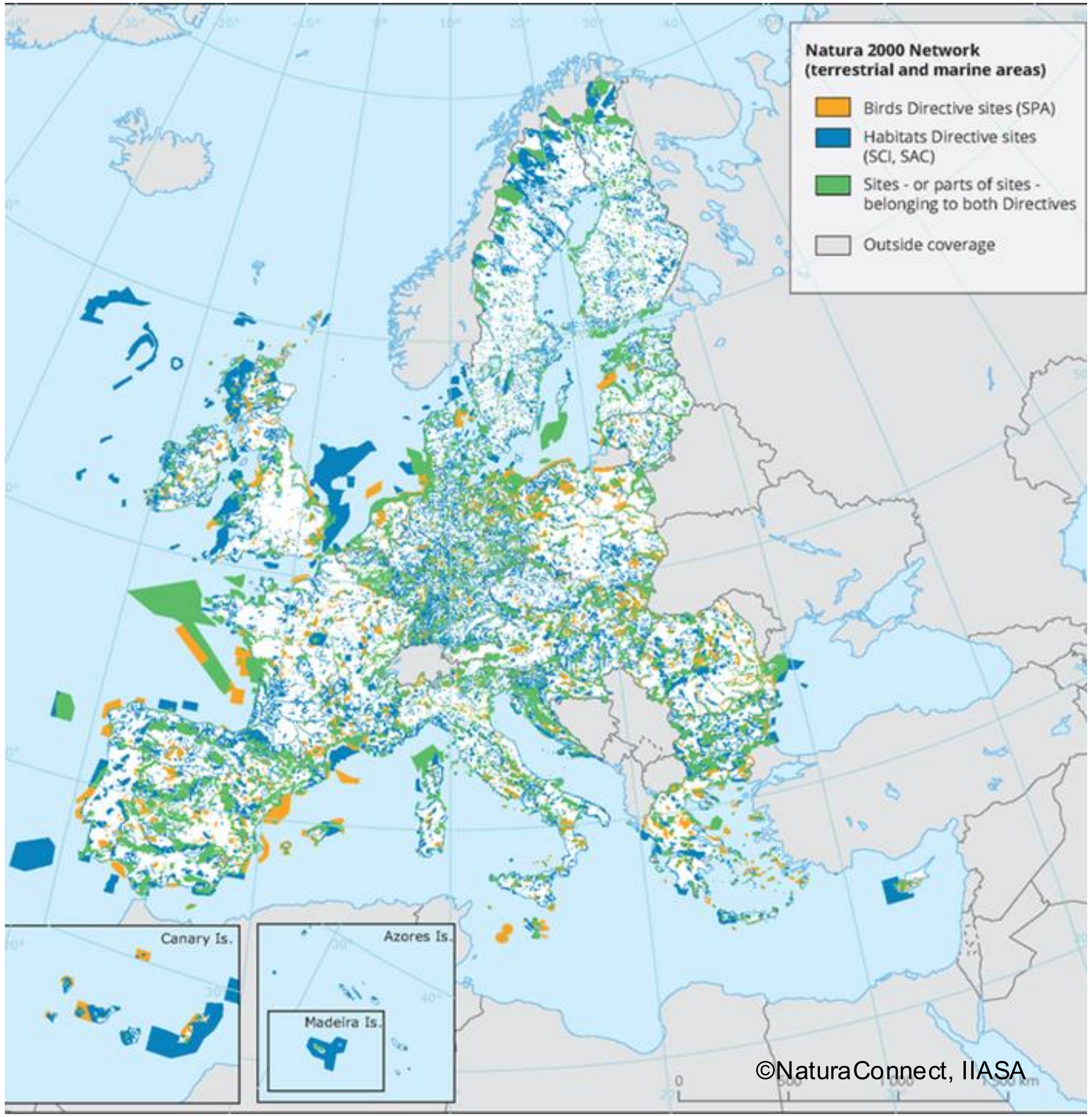


Buenafe et al. (2025)
Nat. Rev. Biodivers. 1, 284–297

Climate-resilient planning in NaturaConnect

NaturaConnect approaches for climate-proofing the Trans-European Nature Network (TEN-N).

- Assess present and future species distribution (using SDMs) and identify climate connectivity nodes
- **Assess climate change exposure** to identify refugia and anticipate risks
- Assess adaptive potential by identifying bioclimatic subcomponents of each species



Cimatti et al. (2025) Glob Change Biol, 31: e70261
Cimatti et al. (2025) bioRxiv, 2025.10.26.684389
Cavalcante et al. (2025) bioRxiv, 2025.10.27.684983

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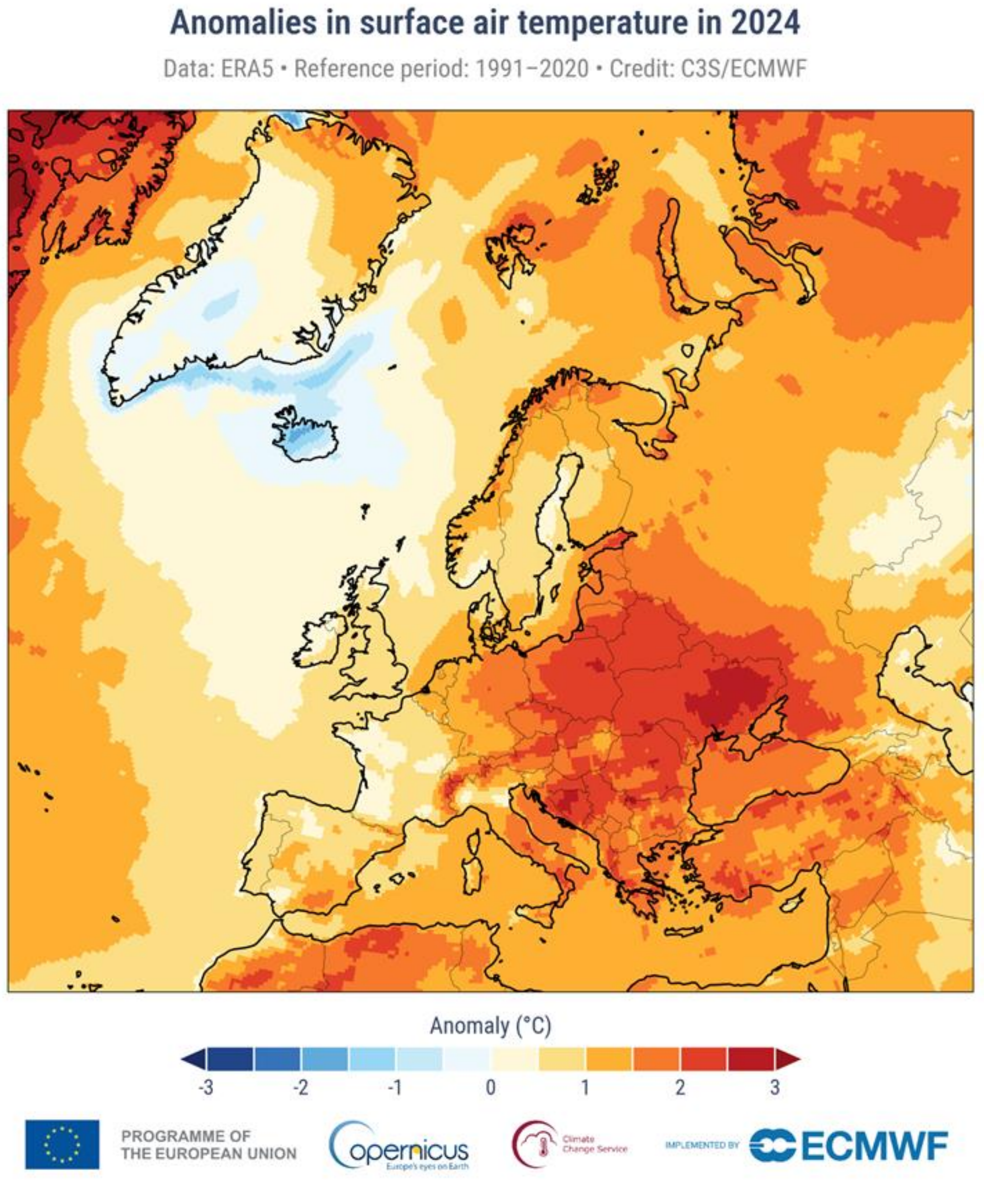
Climate exposure in Europe: today's problem!

Europe is warming faster than other regions: +2.4 °C in 2024 *vs* pre-industrial levels (the world is at +1.3°)

Understanding where climate will change the most, and how far are climatic conditions displaced, is key for any conservation action (for any species/habitat)

Climate change adaptation includes a wide range of actions, targeted to individual species, communities, habitat types, whole ecosystems.



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Methodology & applications for protected areas

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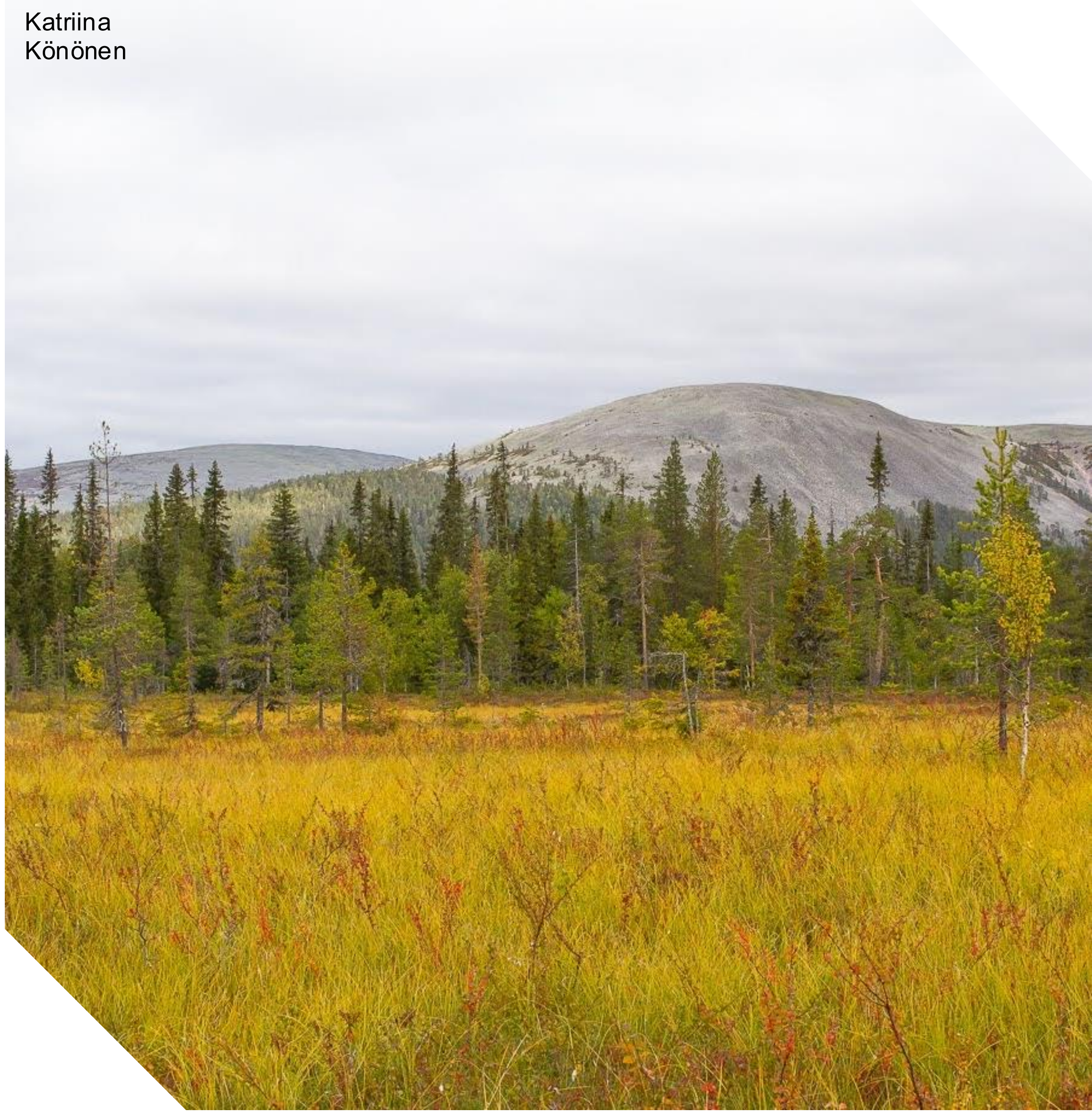
Marta.cimatti@uniroma1.it

Katriina Könönen



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BGC Research Lab

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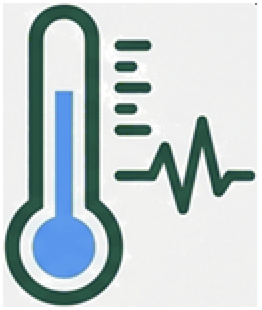
Methodology for measuring climate exposure

Climate metrics can assess the overall exposure of biodiversity to climate change



Local climate Velocity

The speed of the shift

Analog climate Velocity

The Distance to safety

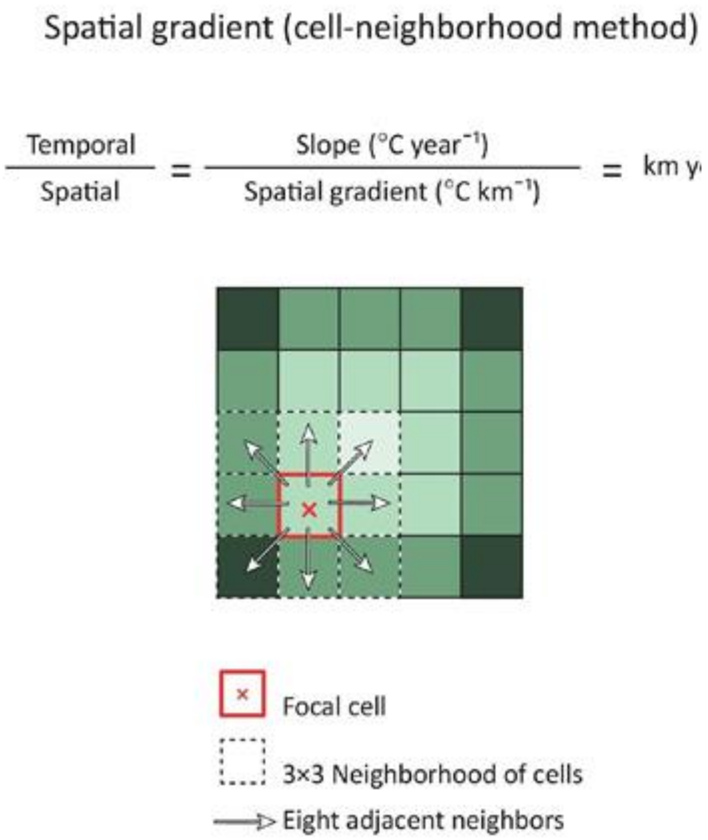
Climate Magnitude

the intensity of the novelty

To climate-proof a protected area, we must quantify the speed of change, the distance to the future habitat, and the dissimilarity of the new climate

Climate exposure in Europe and climate metrics

Local Velocity



Definition: The speed(km/year) climatic conditions (isopleths) travel across the landscape

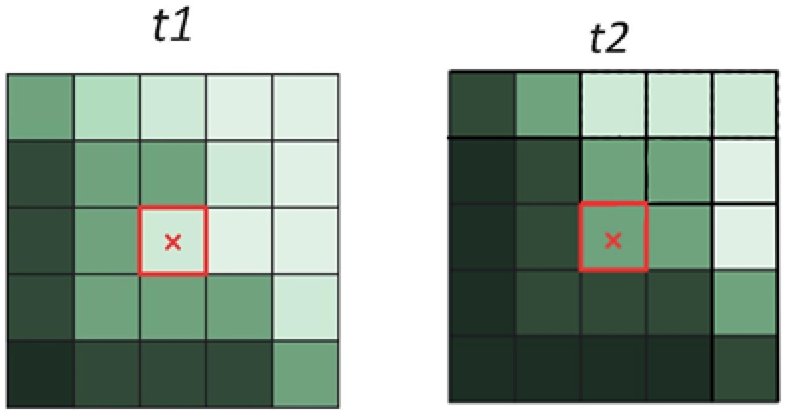
The analogy: the treadmill: How fast and in what direction, must an organism move to maintain its current climatic conditions?

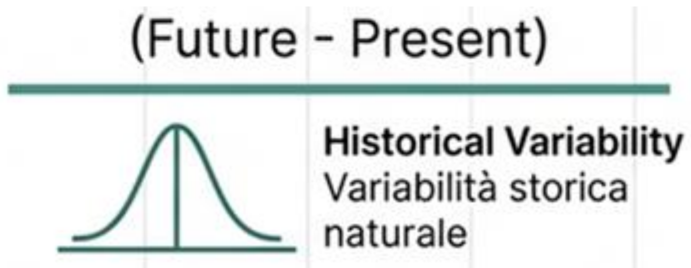
Key factor: Topography
Velocity is often higher in flatlands than mountains

Climate exposure in Europe and climate metrics

Magnitude

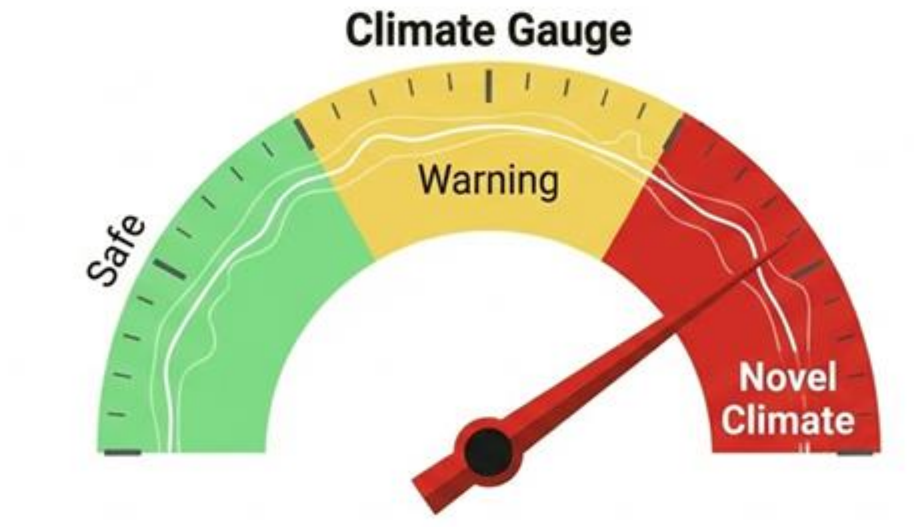
$$\text{Magnitude} = \sqrt{\sum_{k=1}^{2} \frac{(t2_{ki} - t1_{ki})^2}{s_{ki}^2}}$$





Definition: The degree of difference between the future climate and the historical baseline

Key insight: magnitude is a unitless variable. A value of 2 or 3 means the area will experience climate shifts twice or thrice as extreme as its historical baseline norms, overwhelming the adaptive capacity of many species



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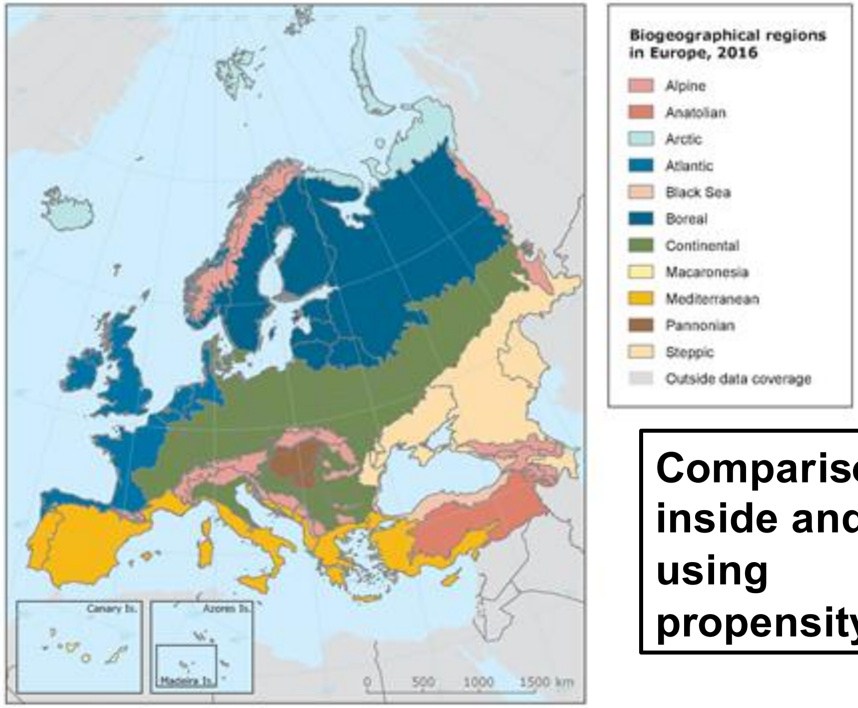
Methodology summary

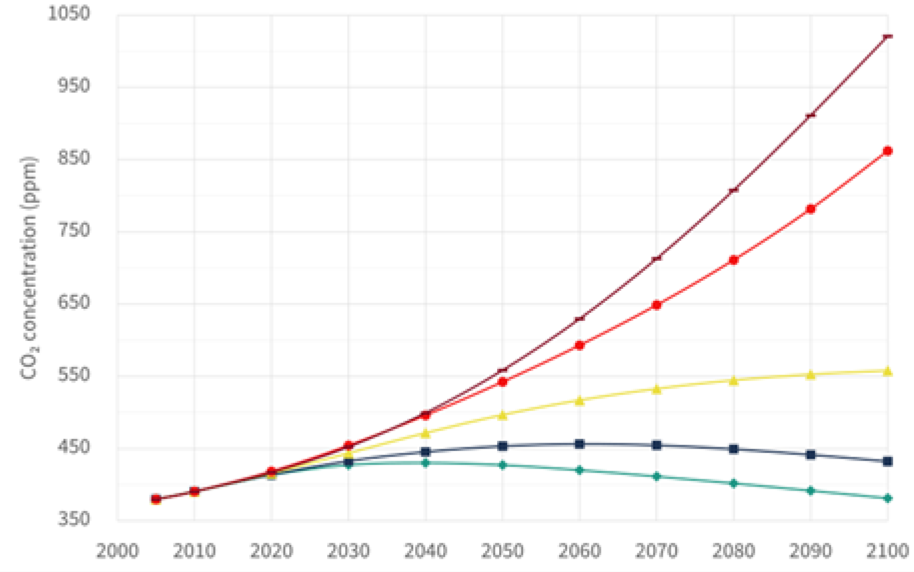
3 climate metrics x 2 bioclimatic variables, Tas and Pr, 1km res

- Local climate velocity
- Analog climate
- Magnitude



Comparison of climate exposure inside and outside PAs (EU28) using propensity-score matching

- **SSP5-8.5: Fossil-fueled Development ~ 5°C**
- **SSP3-7.0: Regional Rivalry ~ 4°C**
- **SSP1-2.6 : Sustainability ~ 2°**



Ensemble model for the “historical“ (1980-2010) and “future“ (2041-2070) time window

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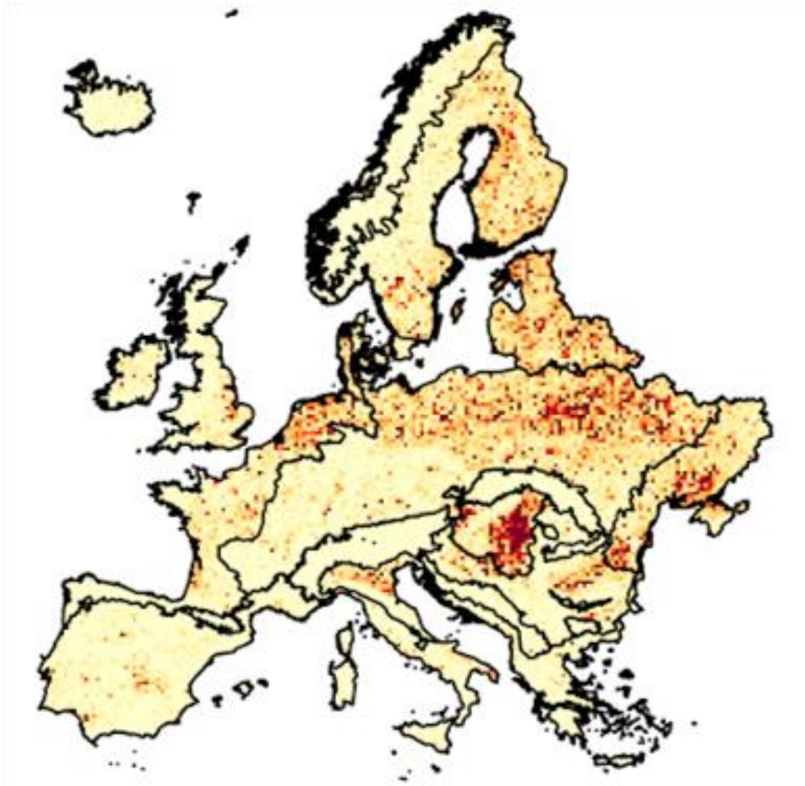
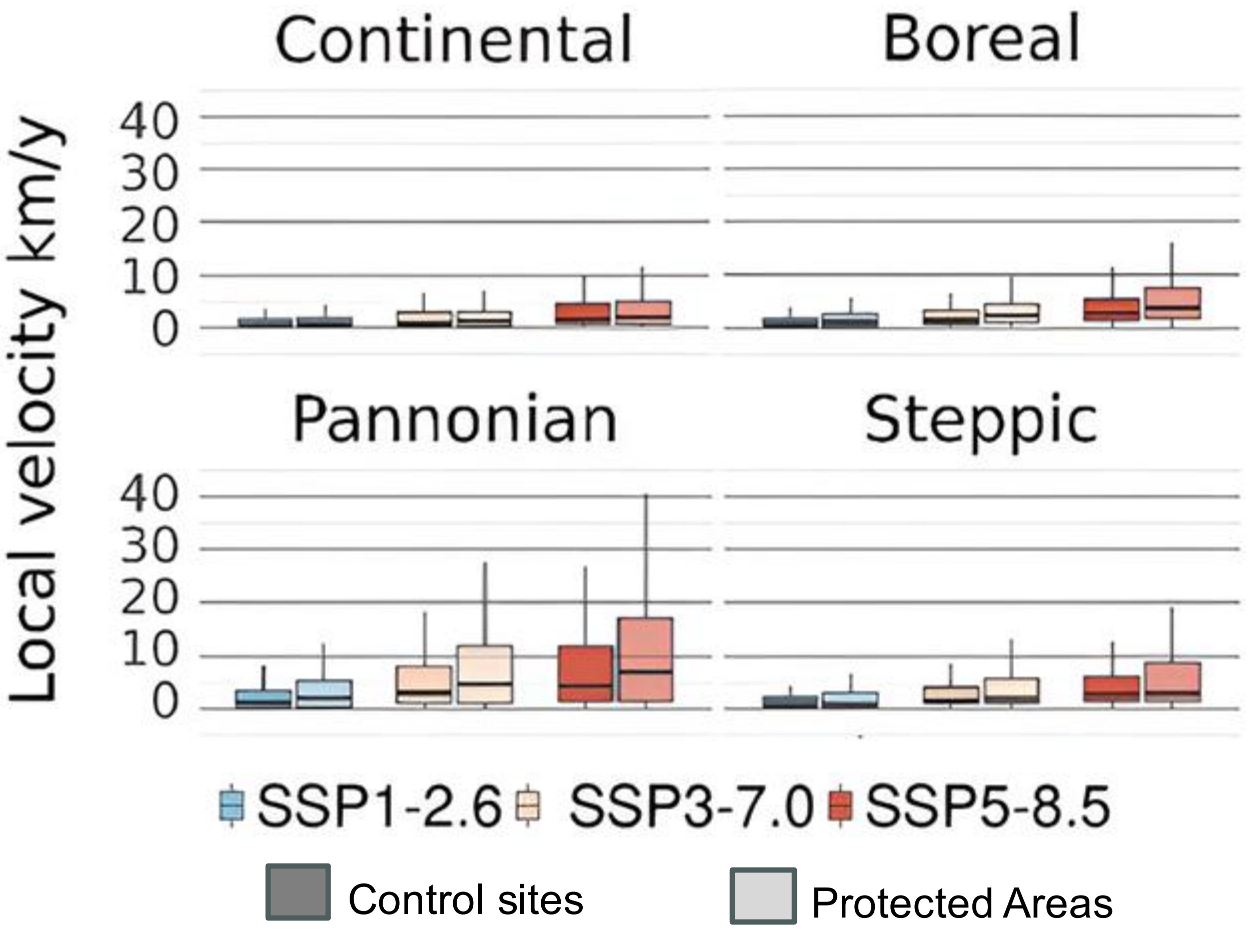
Cimatti et al. (2025) Glob Change Biol, 31: e70261

Results: Local climate velocity in Europe

Ensemble Local Climate Velocity under SSP7-3.0



Median value of **2.2 km/year** (s.d. = 12.4 km/year)
1.7 km/year in 1980-2010
Higher velocity in the north and in flat areas

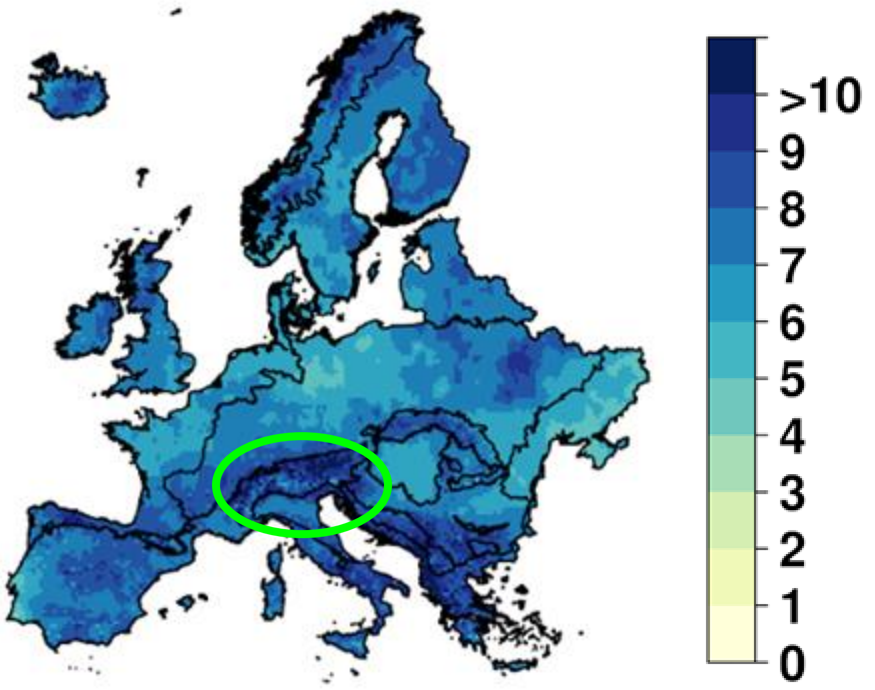


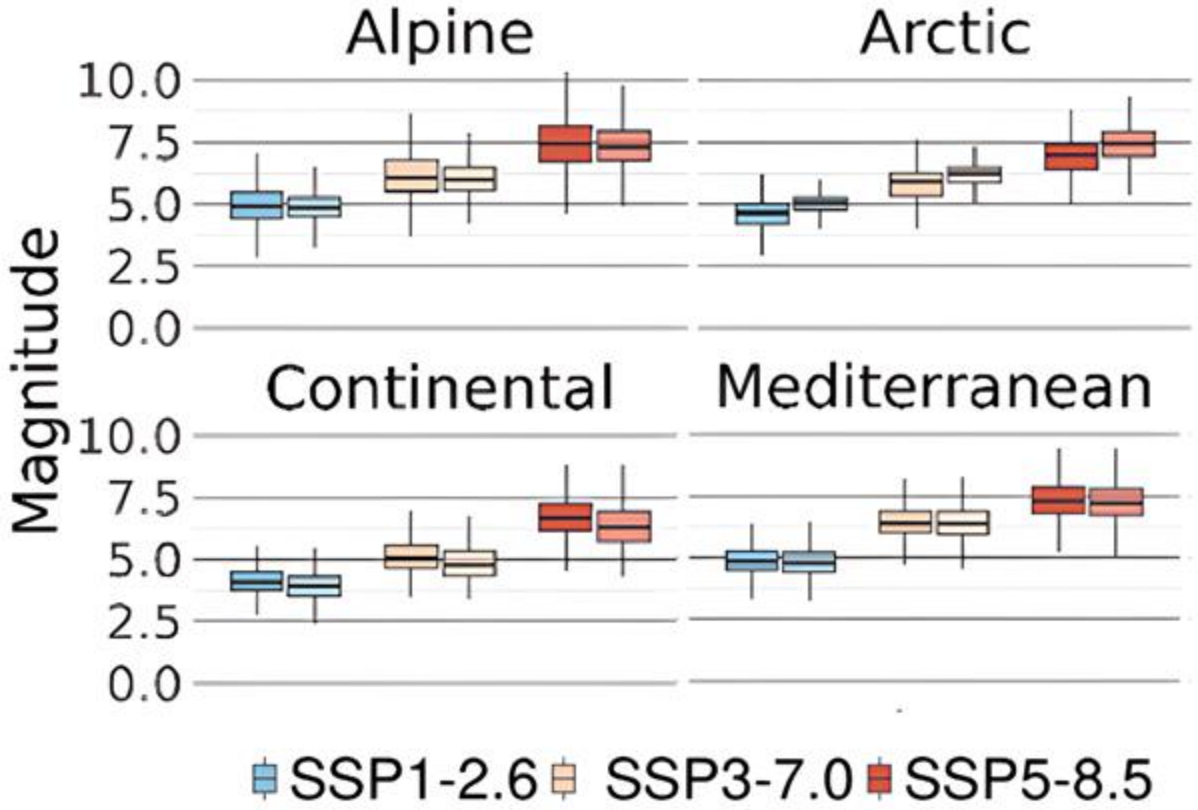
Wilcoxon test: p-value <0.001: ***

Cimatti et al. (2025) Glob Change Biol, 31: e70261

Results: climate Magnitude in Europe

Ensemble Climate Magnitude under SSP3-7.0





Median magnitude value of **4.8** (s.d. = 1.01) under SSP3-7.0
3.9 under SSPP1-2.6
Higher values in mountainous areas and in the south and northeast

Control sites

Wilcoxon test: p-value <0.001: ***

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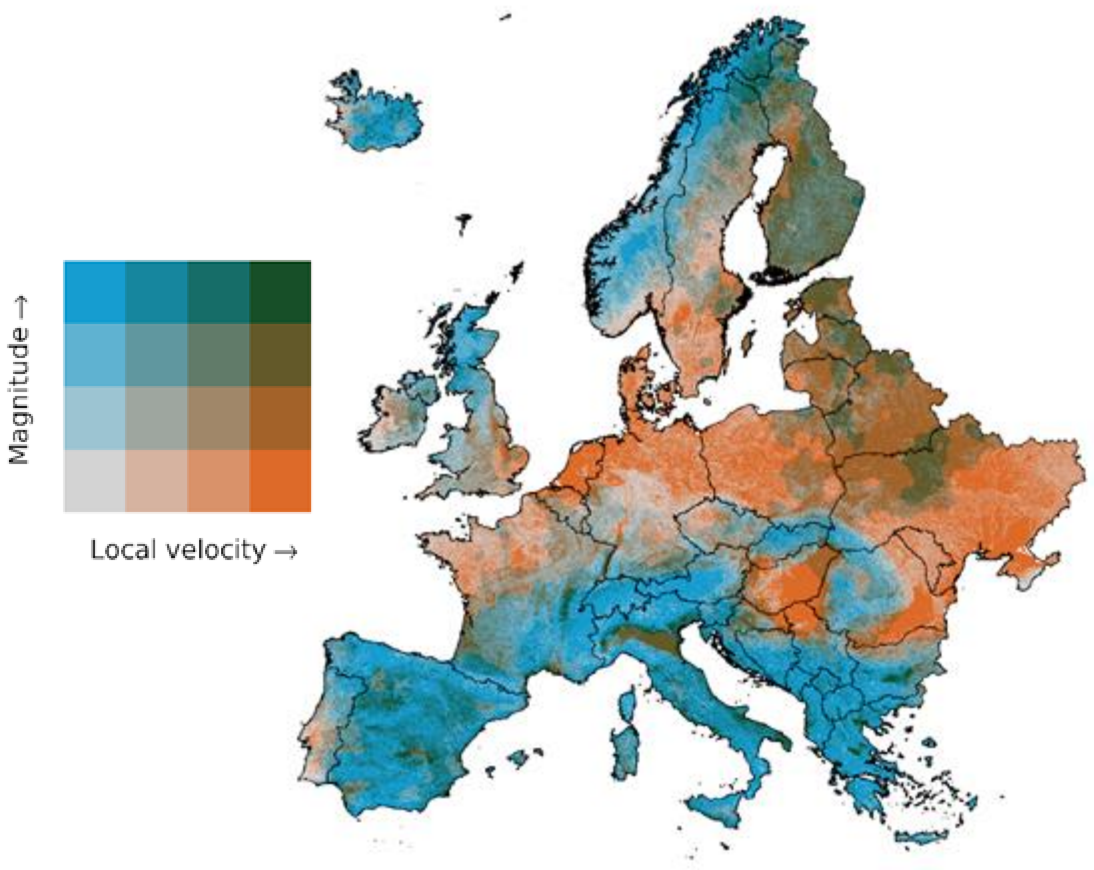
Climate exposure in Europe

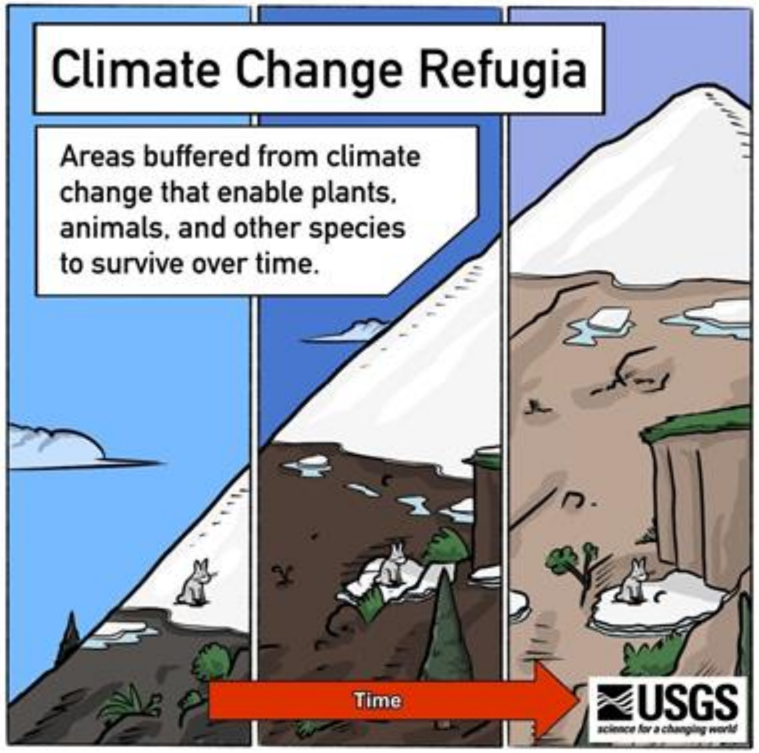
Climate hotspots/coldspots in Europe under SSP3-7.0



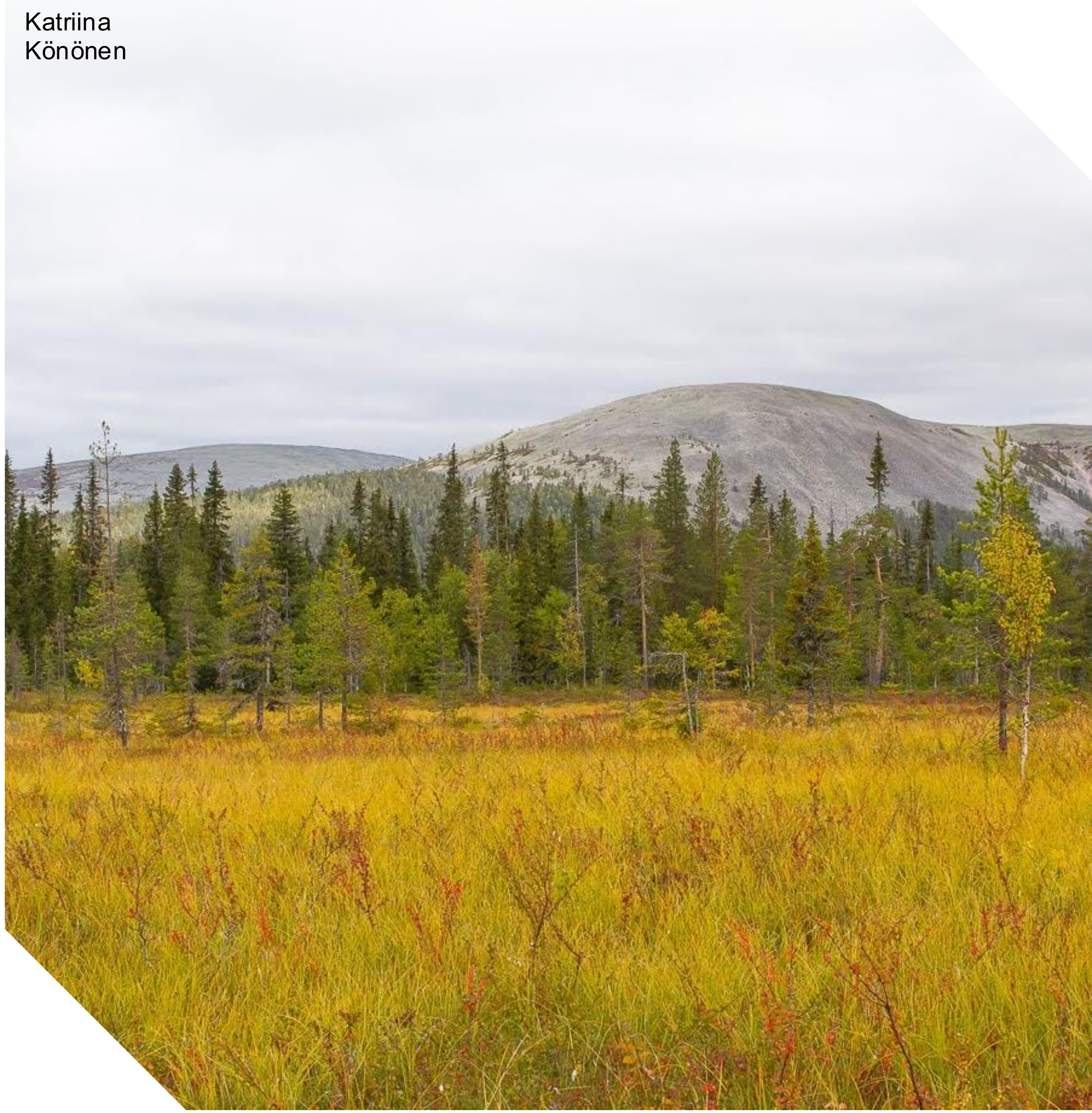
- **Increasing risk** SSP1-2.6 < SSP3-7.0 < SSP5-8.5
- **Higher or similar exposure for PAs and control sites**
- Hotspots of risk & refugia
- 61% (67% three metrics) of protected areas (PAs) overlap with hotspots (1.2% joint hotspot)
- Only 2.4% of PAs are in joint coldspots (1% three metrics)
- --> risk for PA conservation role and **false sense of protection**!

Key adaptation measures for biodiversity conservation

- Account for **climate exposure** during **conservation planning**
- Without adaptive planning, species may be driven out of existing PAs, reducing their effectiveness
- Identify areas and species facing particular risk and **evaluate specific intervention**



- Protect **climate refugia**
- Enhance **landscape connectivity** to facilitate species dispersal
- Preserve **genetic and ecological diversity** to maintain adaptive potential
- Habitat restoration, creation of microhabitat, translocation



The NaturaConnect Learning Platform – Practical application

Moreno Di Marco, Marta Cimatti, <u>Valerio Mezzanotte</u>

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NaturaConnect Learning Platform

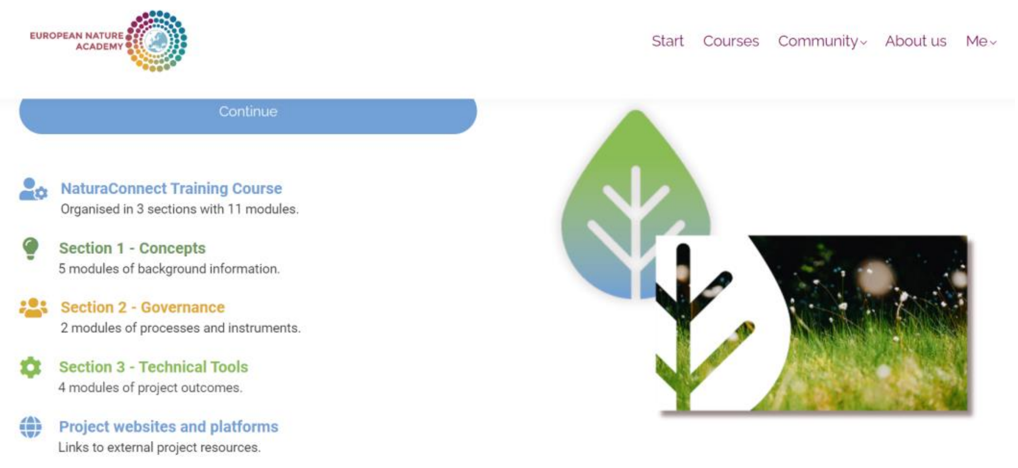
Target audience

Biodiversity conservation managers, spatial planning technicians and data analysts

Objectives

- Improve conservation planning
- Empower users to apply NaturaConnect outputs

Free self-paced course with sequential and stand-alone modules, hosted by the [European Nature Academy]()



Landing page of the NaturaConnect Learning Platform

https://tinyurl.com/ENA-NC

Learning modules

Section 1 - Concepts

Background information.

Modules

1.1. Trans-European Nature Network (TEN-N)

1.2. Cross-sectoral Policy Frameworks

1.3. Nature Futures Framework (NFF)

1.4. Connectivity Conservation

1.5. Integrated Spatial Planning

Section 2 - Governance

Processes and instruments.

Modules

2.1. Stakeholder Engagement

2.2. Financial Instruments

Section 3 - Technical Tools

Project outcomes.

Modules

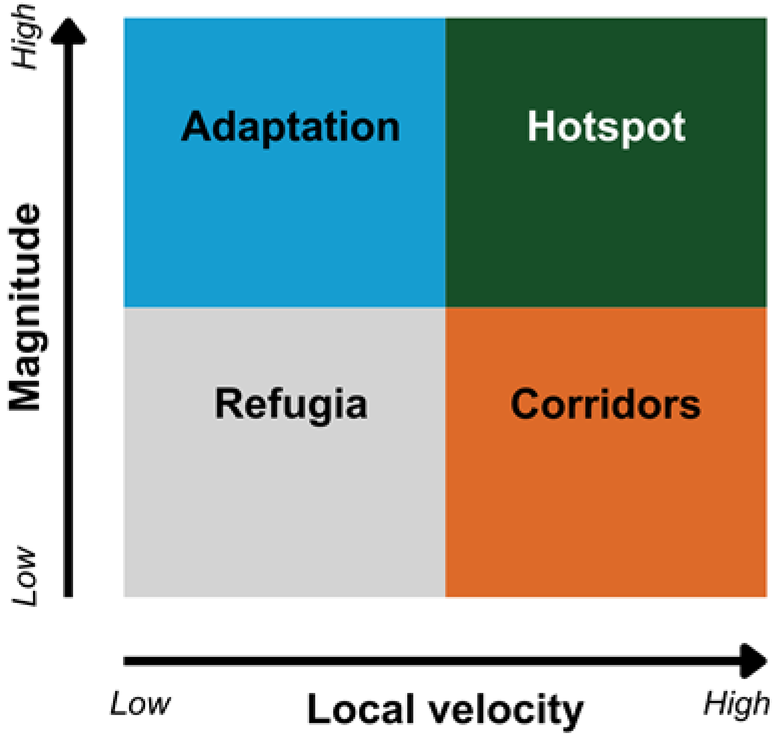
3.1. Biodiversity Modelling

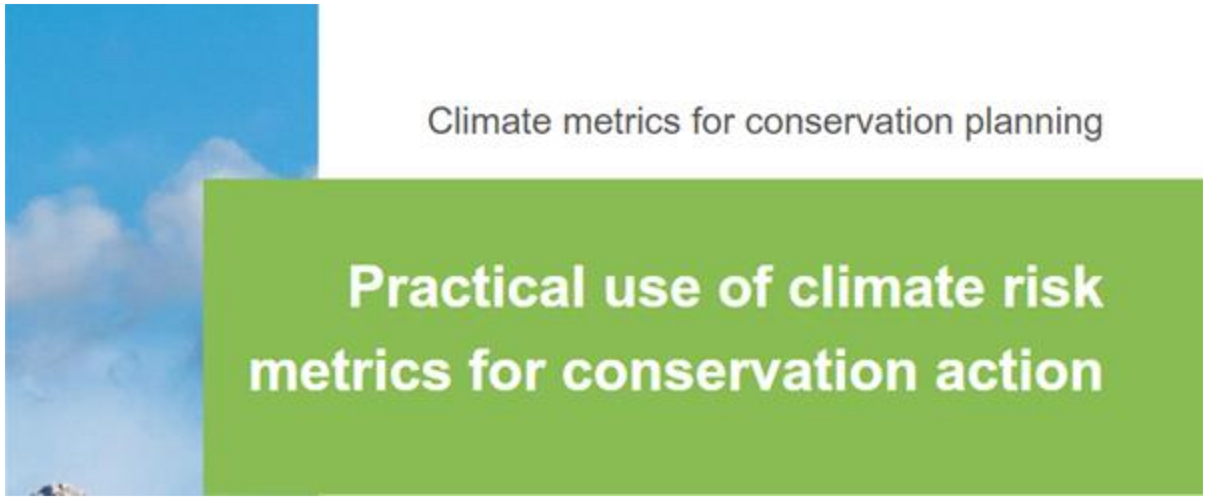
3.2. Scenarios on Land Use and Climate Change

3.3. Connectivity Analyses

3.4. Spatial Planning for Protected and Restoration Areas

Practical application across different scales



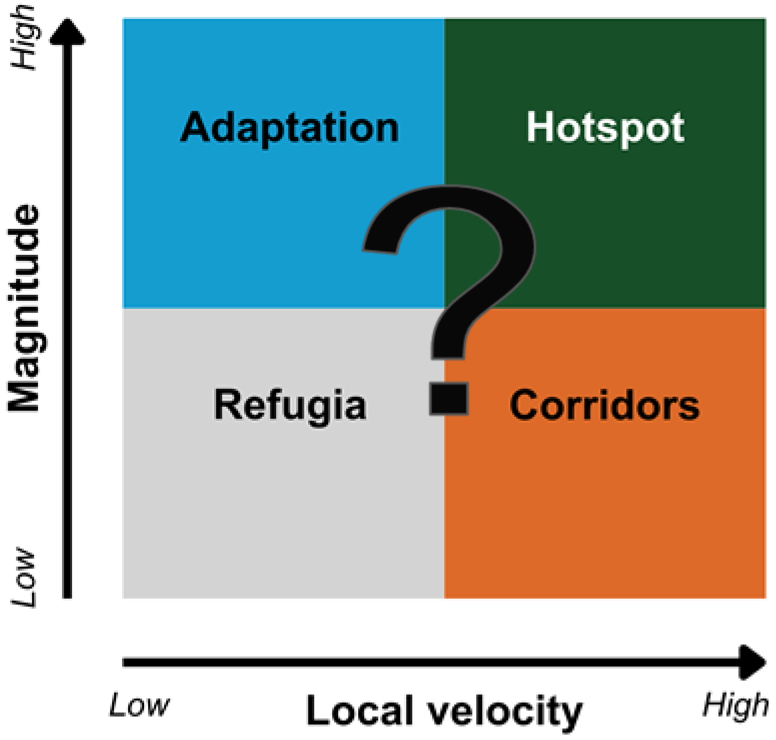


Graphic: NaturaConnect Learning Platform – module on climate metrics for conservation planning

Different conditions, different actions, different scales:

- Restoration practitioner
- Protected area managers
- Regional and national authorities

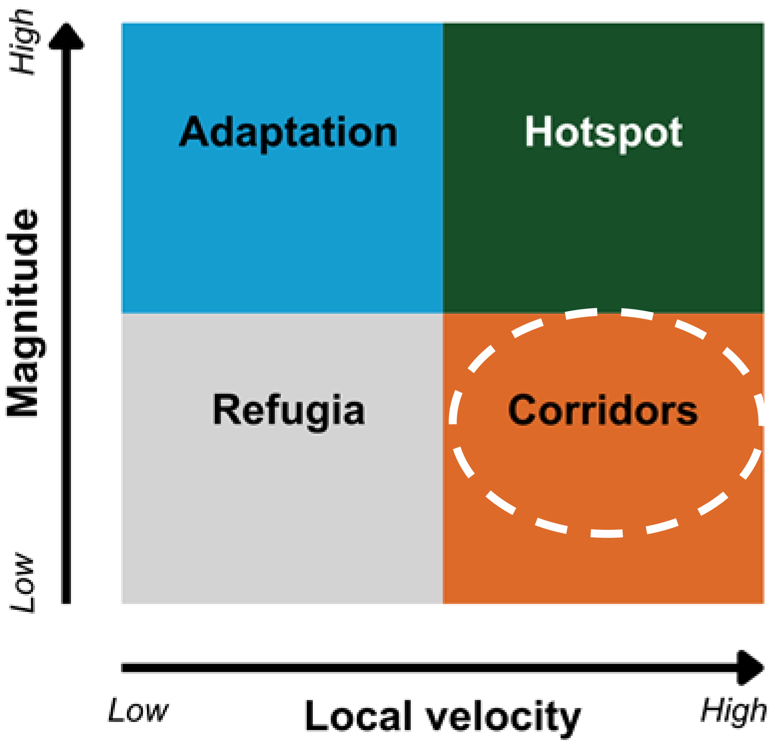
How to define thresholds?



Velocity: species or group-specific dispersal ability, 0.5 km/y for amphibians and reptiles, 3 km/y for mammals and birds (Warren et al., 2018)

Magnitude: statistically based, 5.33 (Williams et al., 2007). When exceeded, it indicates a “novel climate”

High velocity and Low magnitude



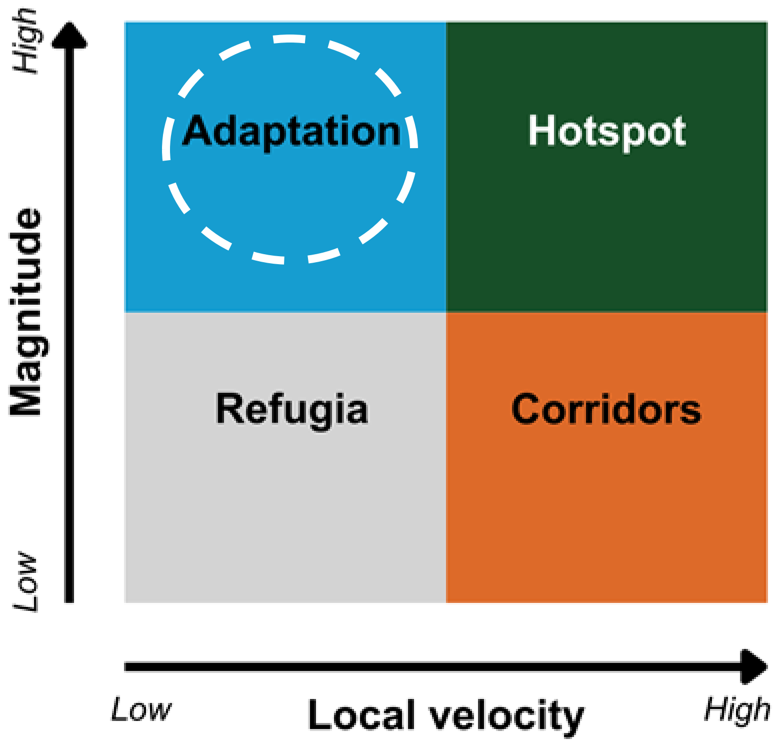
Modest changes in climatic conditions compared to baseline variability in the focal cell but not in the surrounding.

Restoration projects: increase connectivity between patches, create corridors and facilitate species movement.

Protected area management: increase collaboration across nearby protected areas with similar habitats.

Regional and national authorities: inform land use decision highlighting the need for corridors and stepping stones habitats, avoid barriers to movement.

Low velocity and High magnitude



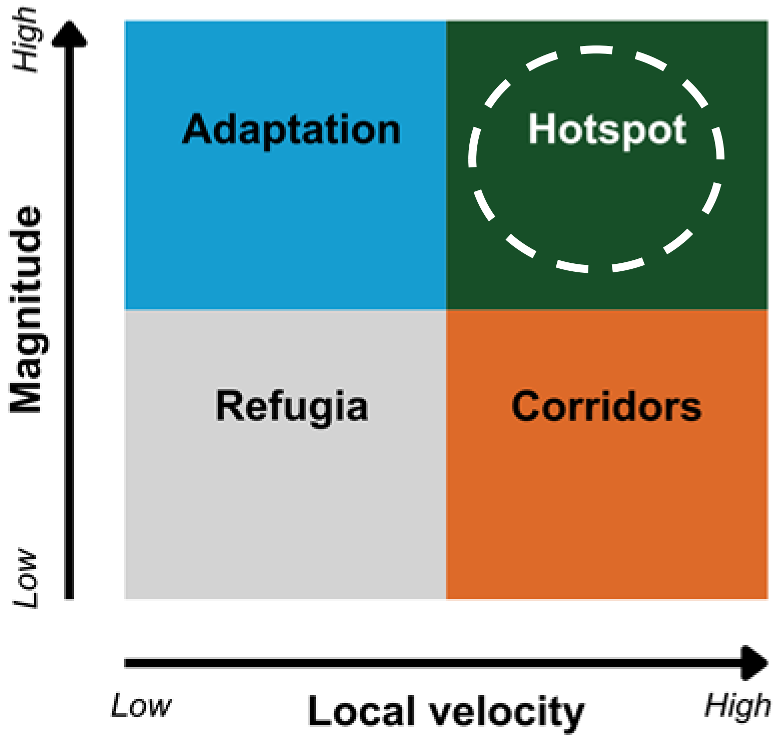
Slow movement of climate conditions across space, but with intense local changes compared to the baseline variability

Restoration projects: site-specific actions to adapt to extreme local shifts. Carefully evaluate species climatic niche during planning

Protected area management: Create microrefugia, for example shady patches or water features like artificial ponds

Regional and national authorities: embed microrefugia into planning of protected areas, with specific funding for this kind of adaptation

High velocity and High magnitude



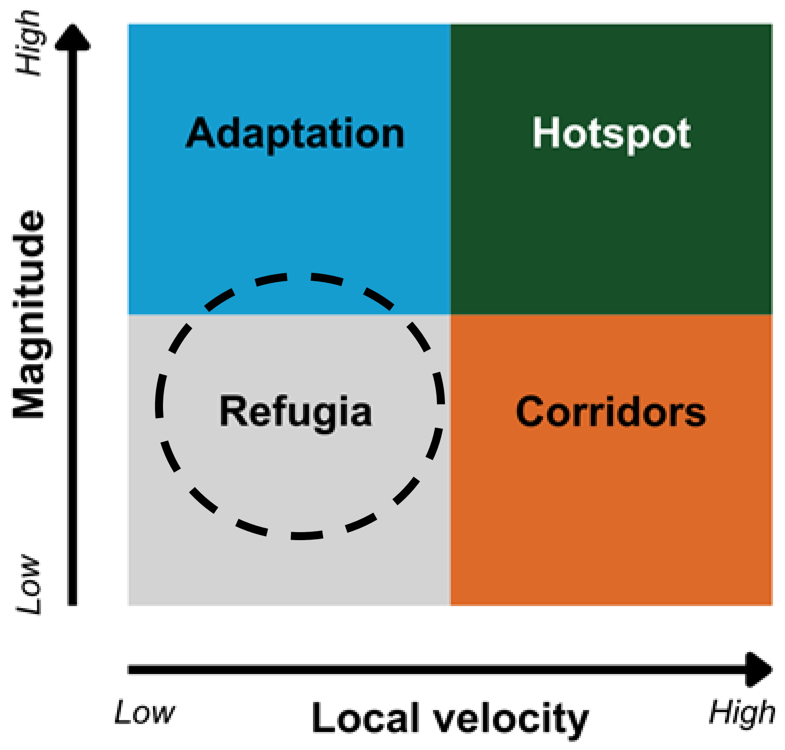
Climatic conditions change rapidly and with high local intensity.

Restoration projects: future-proof restoration by looking at future climate rather than to historical conditions

Protected area management: Multifaceted approach, assisted migration, monitoring, experimental adaptive management

Regional and national authorities: assess each conservation project to ensure climatic compatibility. Prioritize area based on climatic trade offs

Low velocity and Low magnitude



These areas offer favourable conditions for long-term species persistence

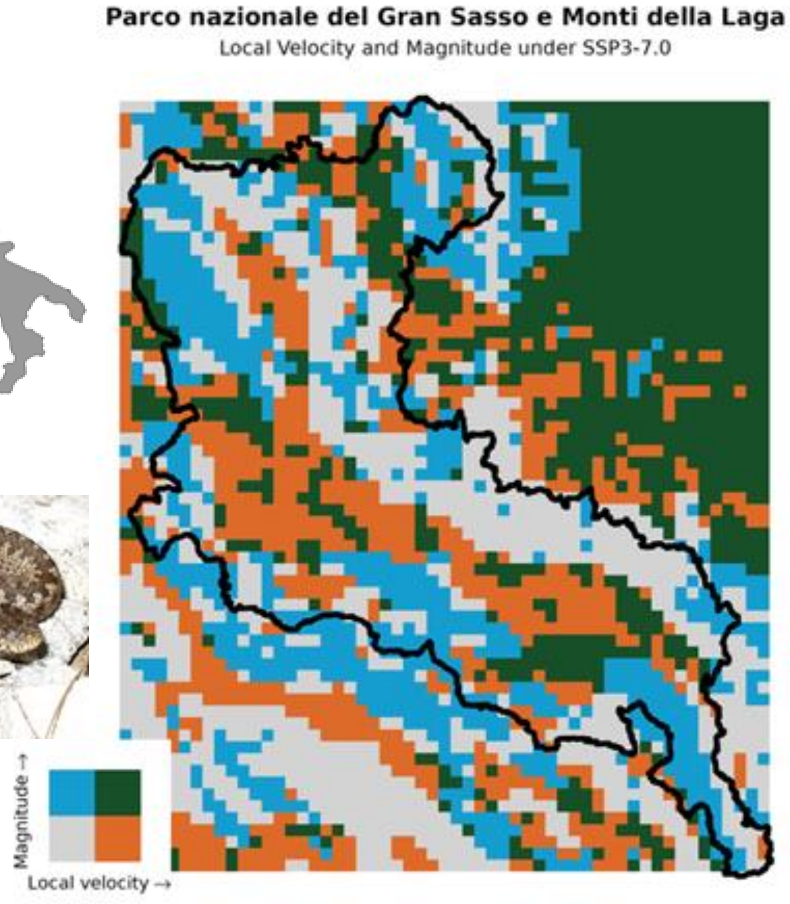
Restoration projects: degraded climatic refugia are crucial area for conserving species, especially if close to nearby biodiversity rich areas

Protected area management: enhance connectivity to climatic refugia. monitor and asses these area to benchmark the impact of climate change on other areas.

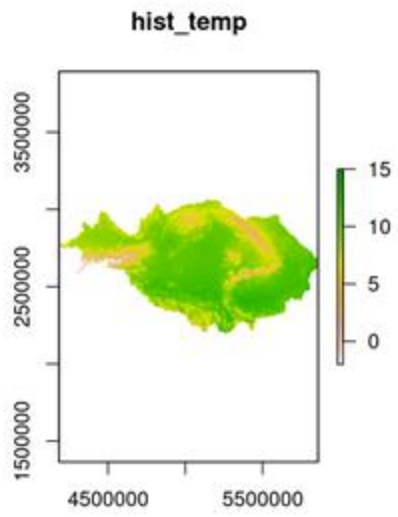
Regional and national authorities: refugia are conservation strongholds, avoid disruptive land use. Ensure protection and/or connectivity to these areas.

Practical example: Gran Sasso National Park

- This central Apennine protected area is rich in endemic Italian species.
- Climate analysis shows the south-eastern portion, particularly north-facing slopes, is less exposed to climate change.
- Conversely, south-facing slopes show higher exposure (velocity and magnitude).
- Mountain peaks are the most exposed, with no analogue climate within hundreds of kilometres (1 km/y equals a 60 km shift; 7 km/y equals 420 km).
- These high-altitude zones face major climate shifts, limiting species' migration options and posing a high risk to biodiversity, such as the threatened high-elevation snake *Vipera ursinii*, whose habitat could shrink significantly in 30 years.



How to elaborate climate metrics by yourself?



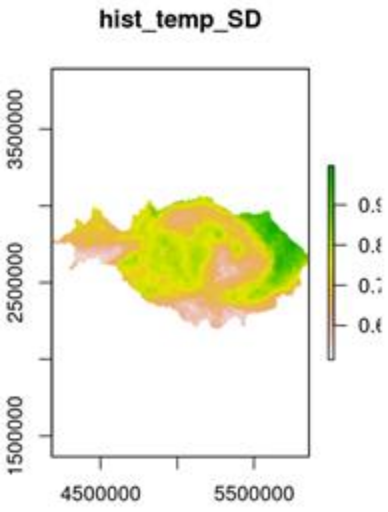

```
# Combine rasters into a stack
climate <- raster::stack(hist_temp, hist_prec, hist_temp_SD, hist_prec_SD, ssp126_temp,
ssp126_prec)

#rename them
names_climate <- c("hist_temp", "hist_prec", "hist_temp_SD",
       "hist_prec_SD", "ssp126_temp", "ssp126_prec")
names(climate)<-names_climate
```

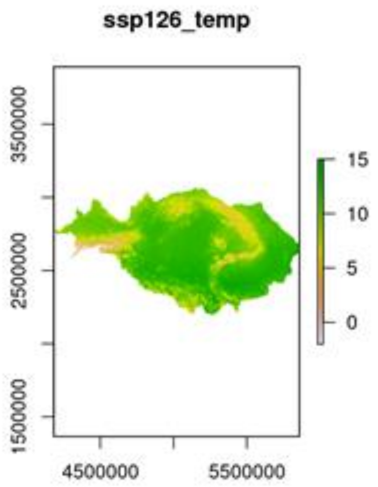
Topic 3.2.b

Tutorial - Calculating climate change exposure using multiple metrics: a practical introduction

Analogue (distance-based) climate velocity.

$$dVoCC = distance\ to\ climate\ analogue/time\ between\ analogous\ climates$$





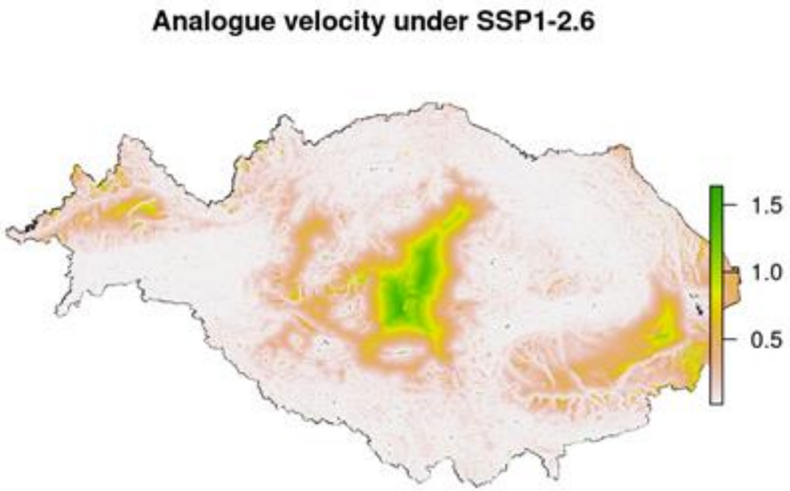

```
#crop the stack
climate<- raster::crop(climate,dan_car)

#mask and plot
climate<-mask(climate,dan_car)

par(mfrow = c(1, 2))

plot(climate[[2]],main=names(climate[[2]]),zlim=range(0,2500))
plot(climate[[1]],main=names(climate[[1]]),zlim=range(-2,15))
```

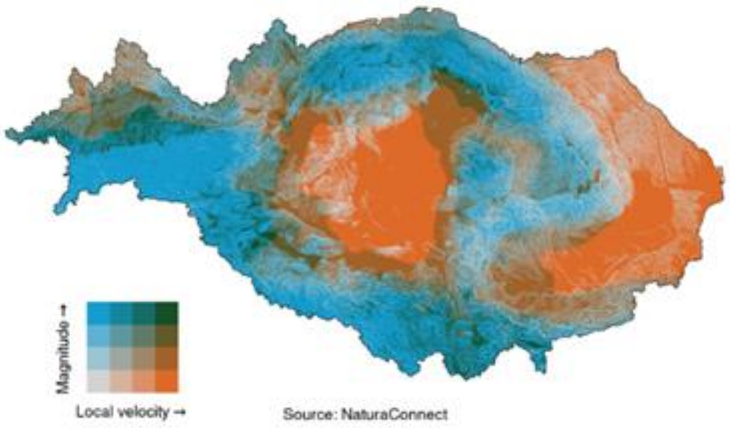
Learning Platform tutorial

Define the threshold used to identify each climate analogue using **1.5 standard deviation** from the historical mean for both temperature and precipitation.

Key step: identification of a **biologically meaningful maximum distance** within to look for a climate analogue, due to computational time.

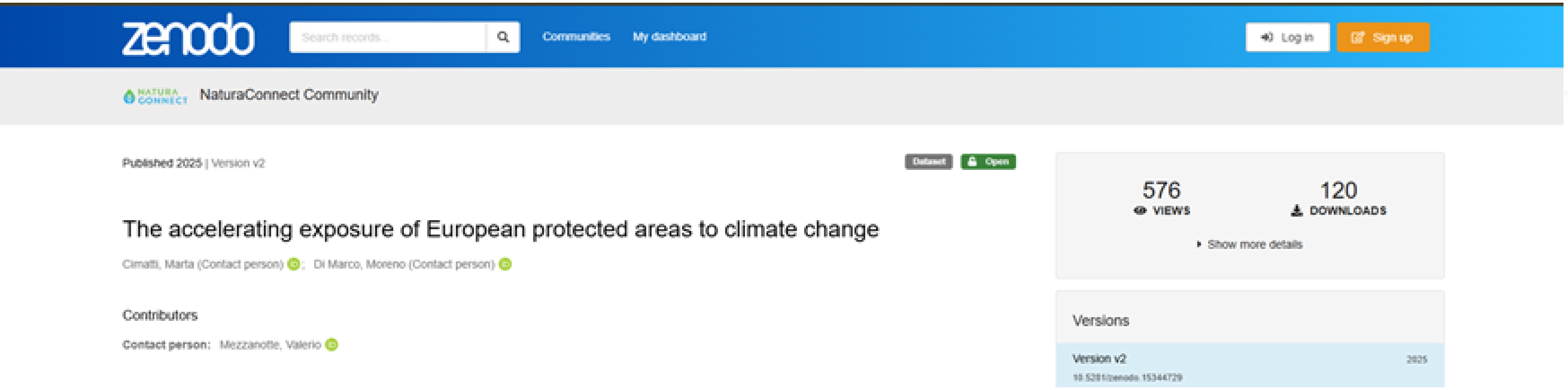
```
#now we can use the dVoCC function, please note that this step may take some time to complete
and requires some Gb of RAM:
dvocc_dan_car= dVoCC(clim = climate_df,
            n = 2, # number of climate variables,here temperature and precipitation
            tdiff = 60, # number of years between time periods
            method = "Variable", # specificy that all cells will have different threshold
            distfun = "Euclidean", # specify function to calculate distances to analogues
            lonlat = FALSE, # not projected coordinates
            geoTol = 100000, #set max distance to analogue (in map units, in this case meters),
here to 100 km
            climTol =NA #since method is variable this has to be NA
            )
```





You are now ready to evaluate the climatic exposure of any area of your interest!

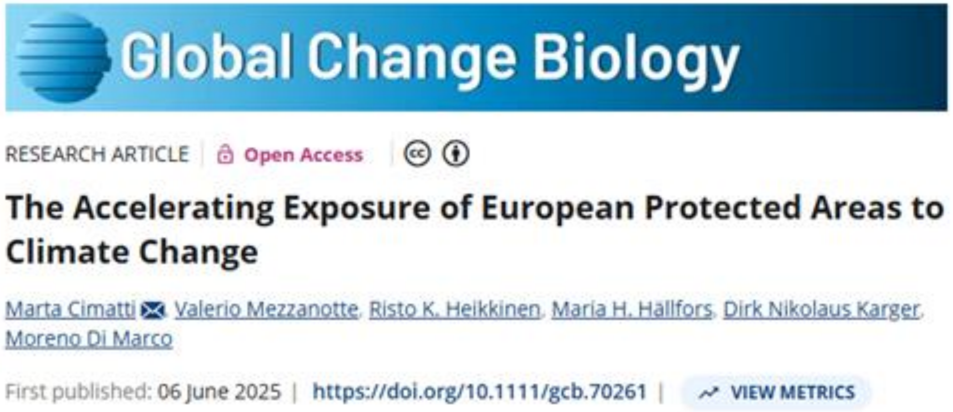
Data and resources



Read our work: https://doi.org/10.1111/gcb.70261

Download our data: https://zenodo.org/records/15344729

Learning platform: https://tinyurl.com/ENA-NC



Questions & Answers

www.biodiversitychange.com

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Assessing forest vulnerability to drought and supporting adaptation strategies

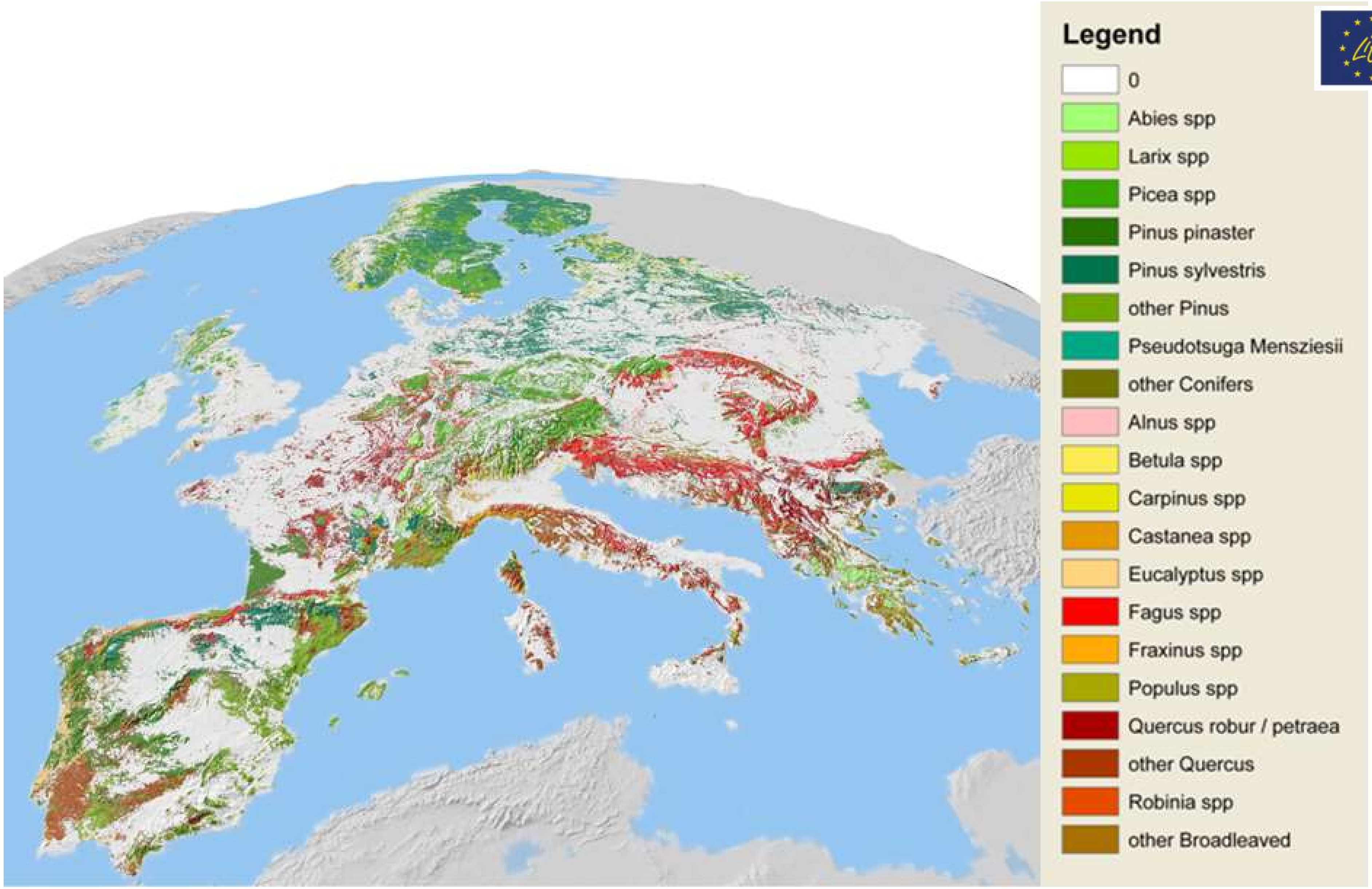
José A. Atauri / EUROPARC Spain

Webinar 26 March 2026

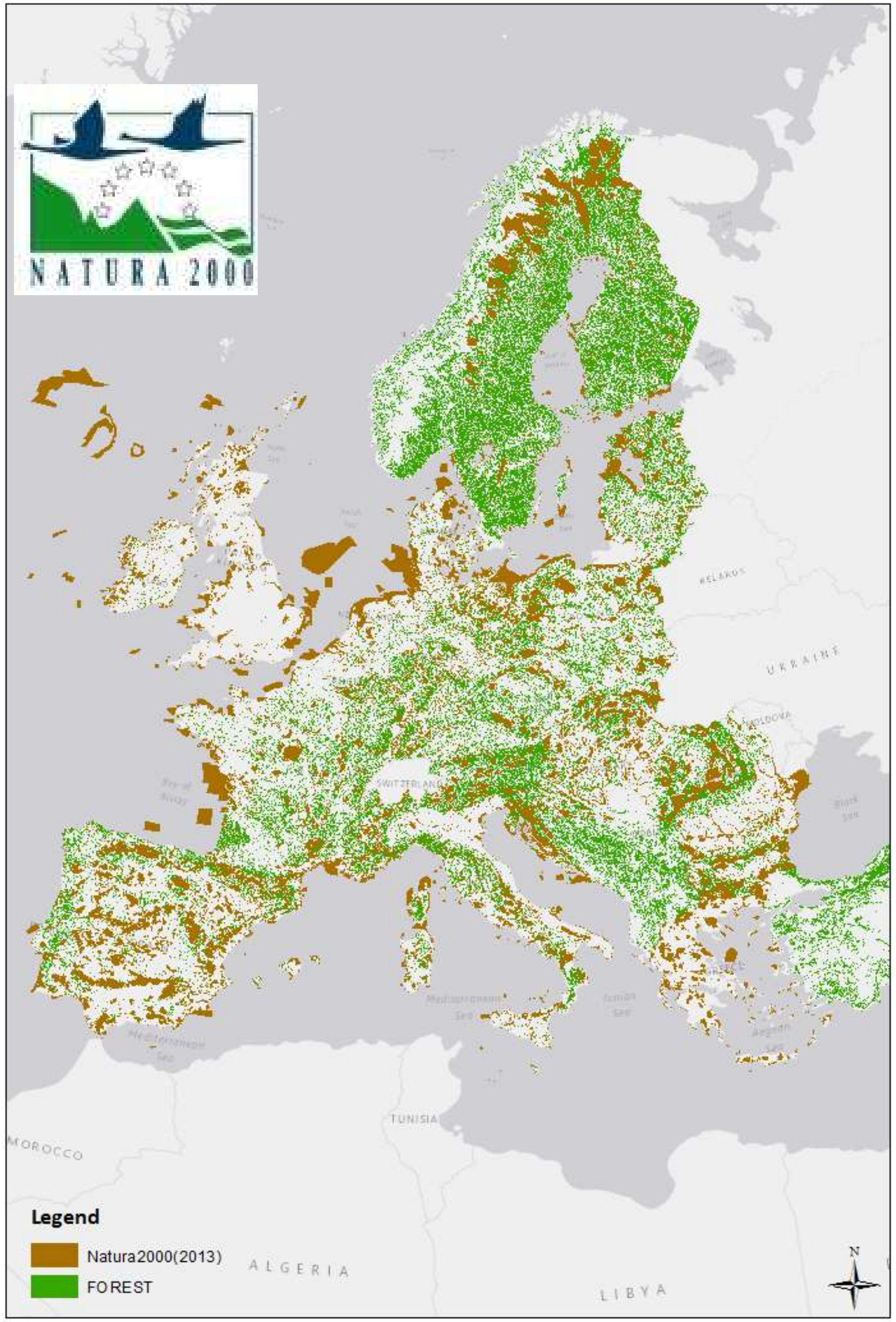
Navigating Climate Change Methodologies ans Applications for Conservation

Fundación Interuniversitaria Fernando González Bernáldez para los Espacios Naturales

Funded by the European Union



Source: European Forest Institute



Adaptation of forests is a priority strategy:

- Large area
- With high conservation values
- Highly vulnerable to climate change
- In a context of rural depopulation and abandonment

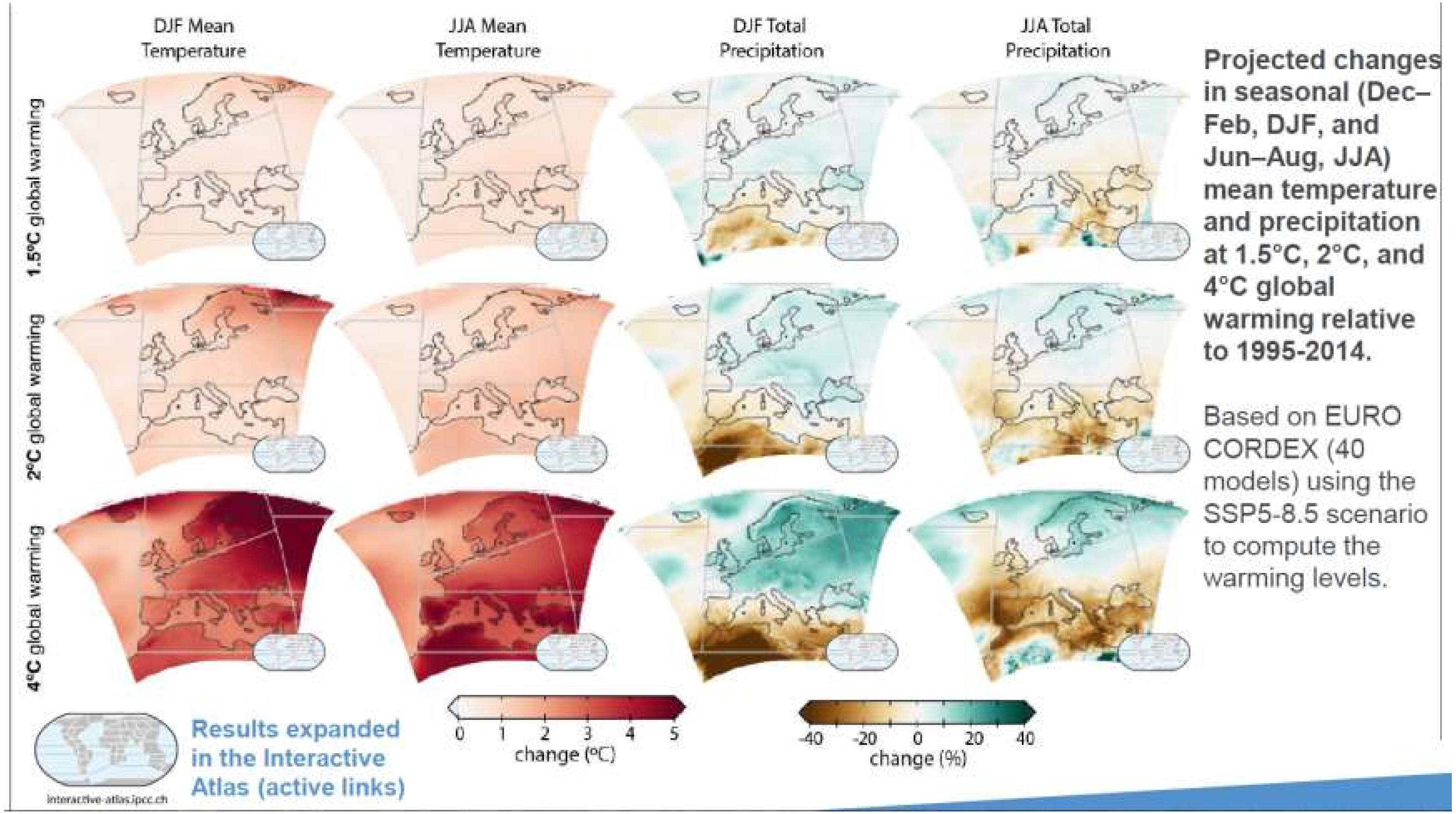
Forest **Habitats of Community Interest** represent 50% of the Natura 2000 area in the EU.

In Spain: Natura 2000 = 27%
80.000 km2 forest in Natura 2000

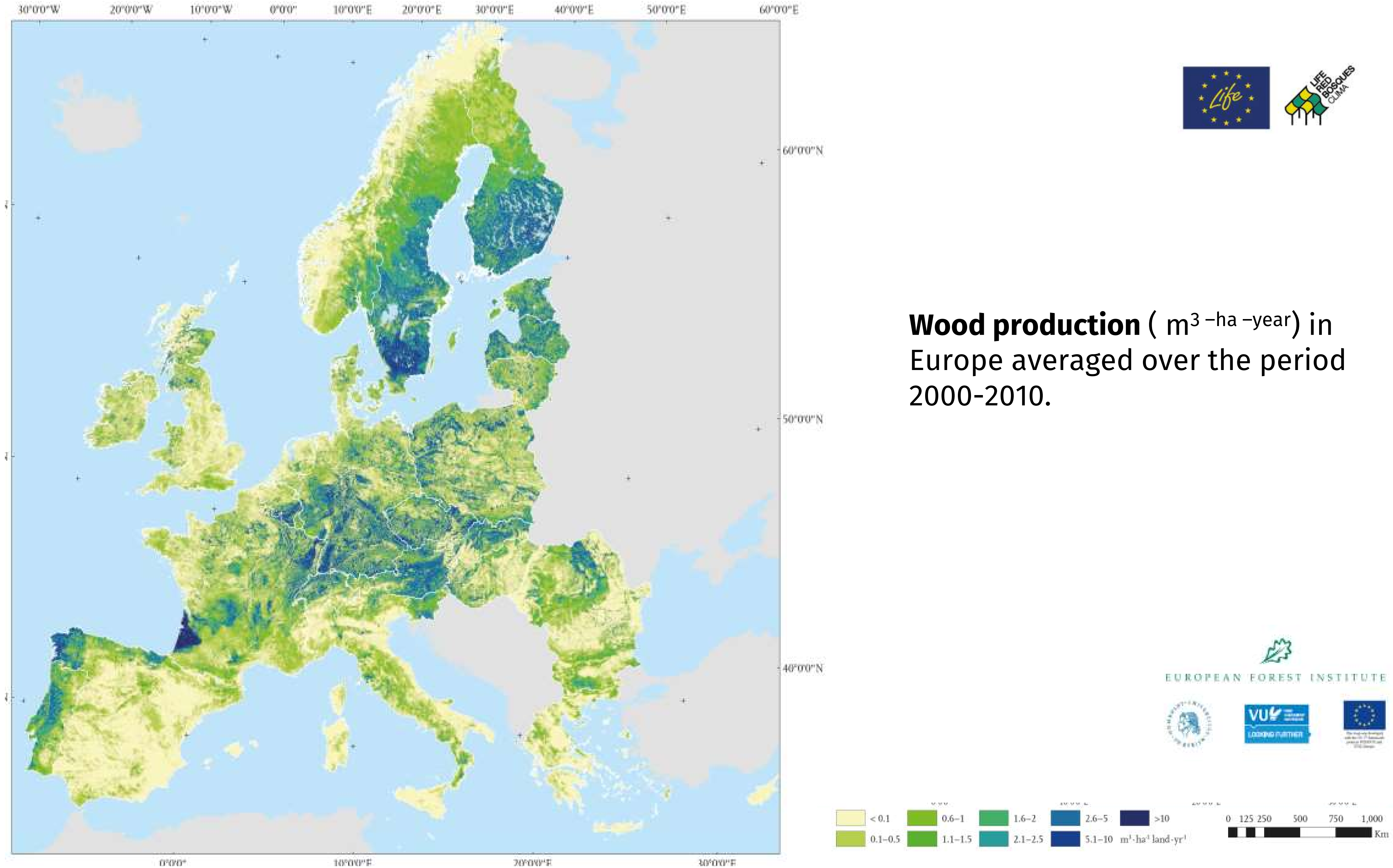
An Bollen & Darline Velghe. 2015. Forest thematic report. University of Antwerp

Climate change will be (is) specially intense in the Mediterranean basin

Temperature increase. More frequent heat waves
More intense and frequent droughts



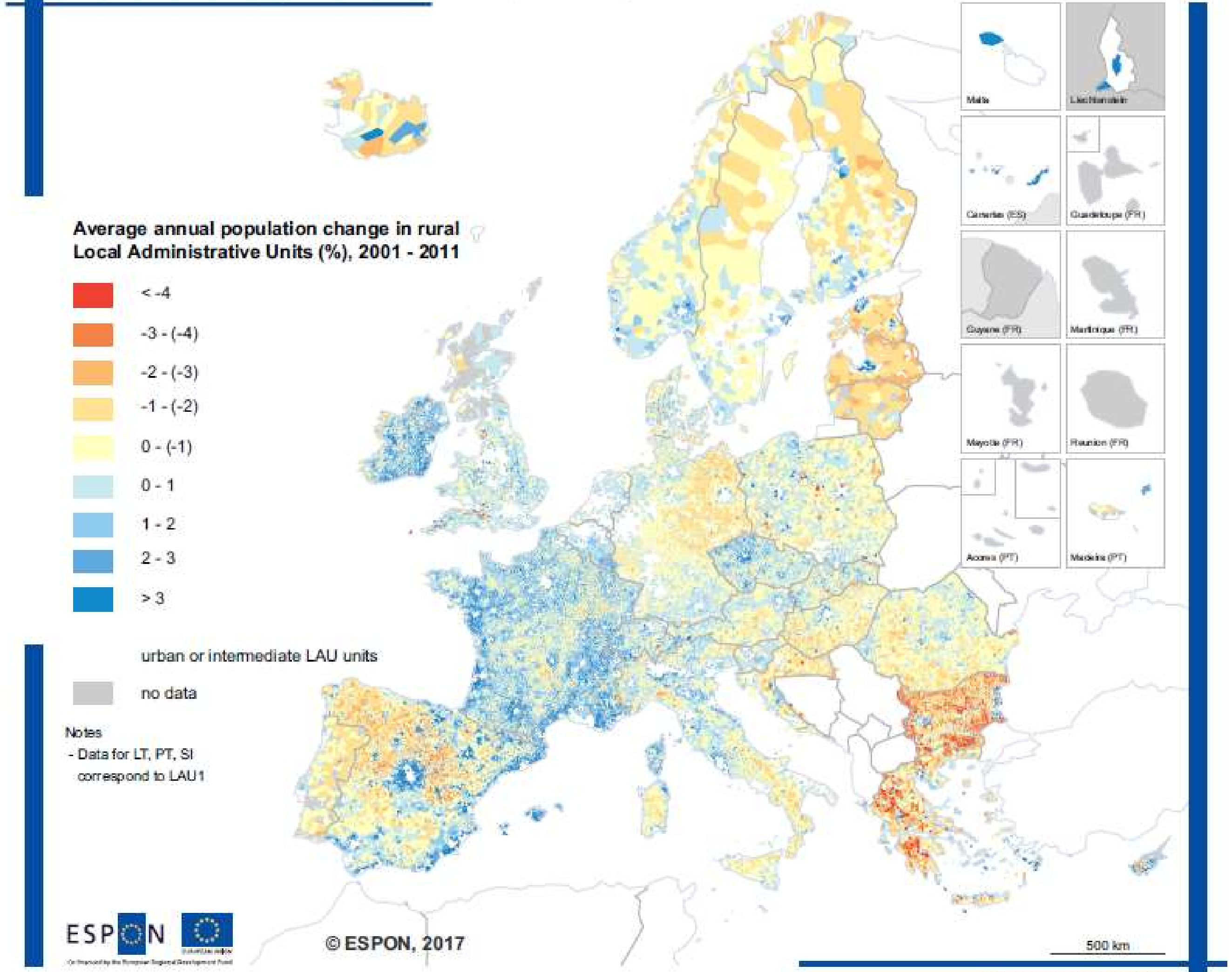
IPCC, 2021



Wood production (m^3 $^{-ha}$ $^{-year}$) in Europe averaged over the period 2000-2010.

EUROPEAN FOREST INSTITUTE

Population change in predominantly rural regions, 2001-2011

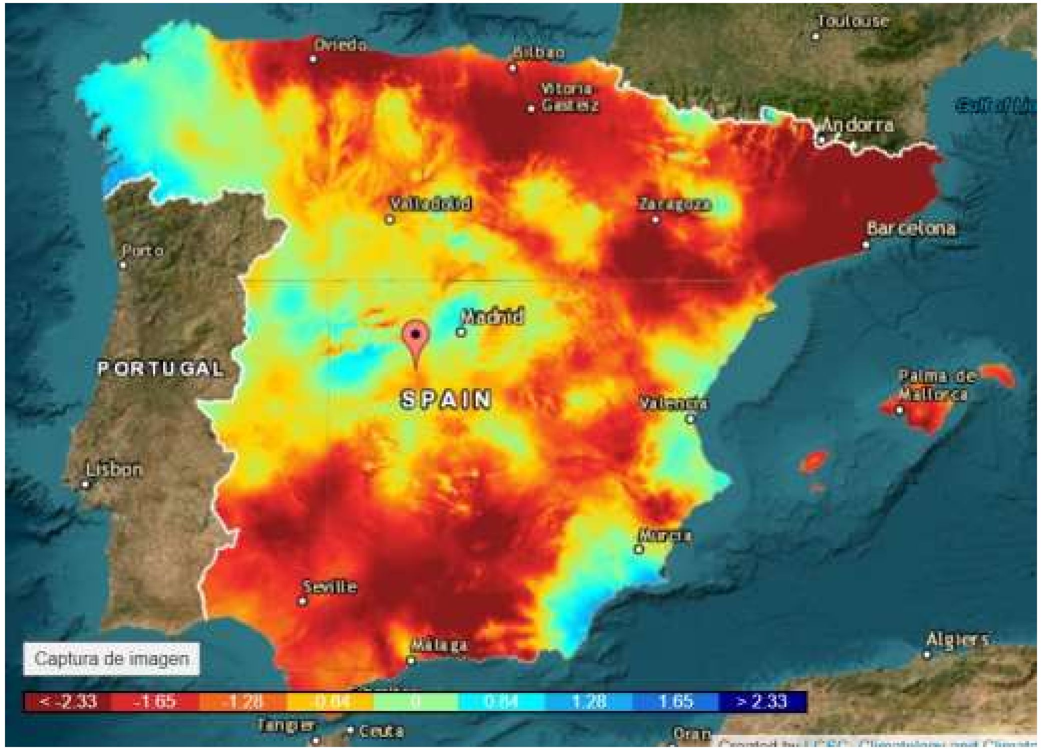


Regional level: LAU2 / 1 (2011)
Source: ESPON, 2017
Origin of data: Eurostat, ESPON, 2017
©UMS RIATE for administrative boundaries

Climatic hazards: drought

Increase in frequency of heat waves and long lasting drougths

Drought index, 2023 (SPEI 24 month)



Monitor de sequía, Vicente-Serrano et al. 2017

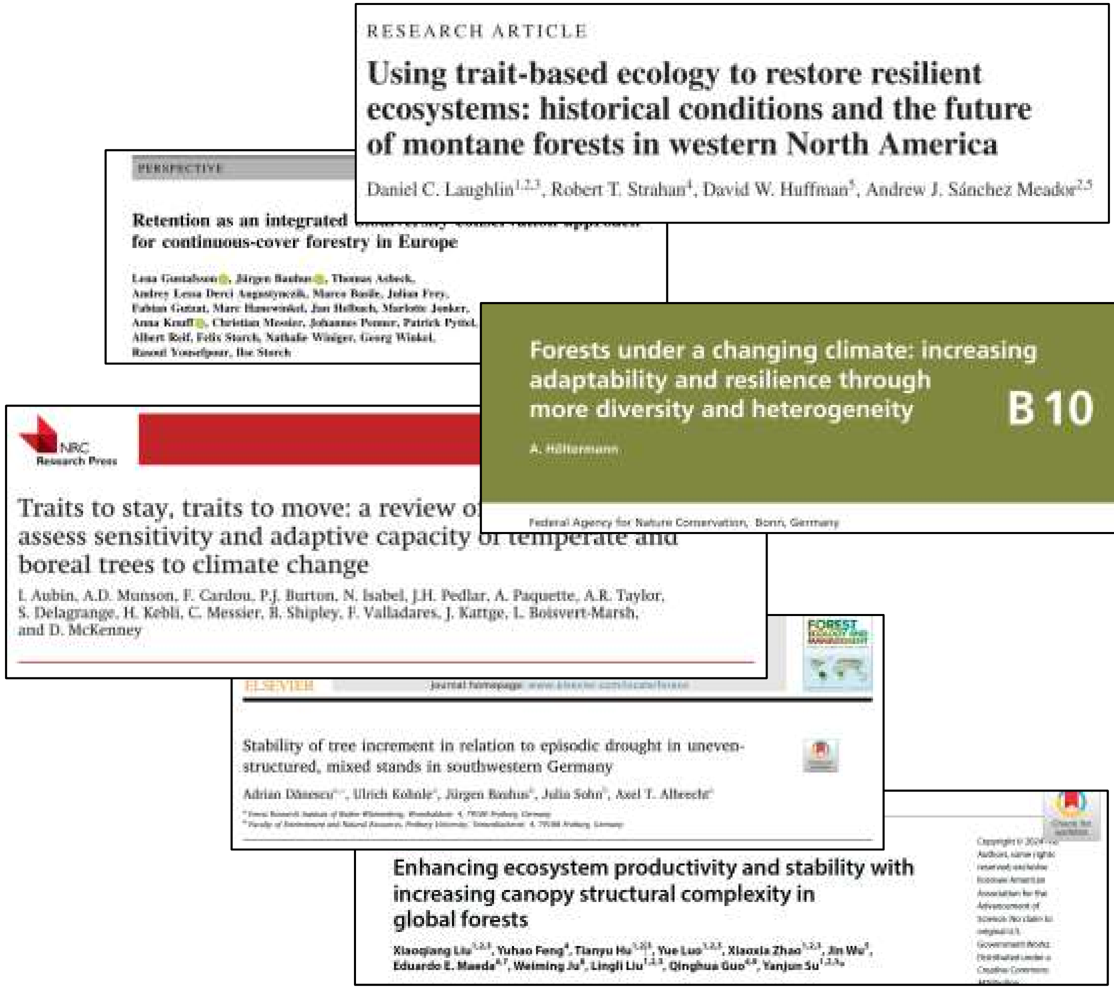
What makes forests more resilient to drought?

•Forests with heterogeneous structure & uneven aged/multi sized are less vulnerable

•Structural diversity/heterogeneity as an adaptation pathway.
•Complexity translates into greater resistance to different types and intensities of disturbances.

Mixed and diverse forests are less vulnerable

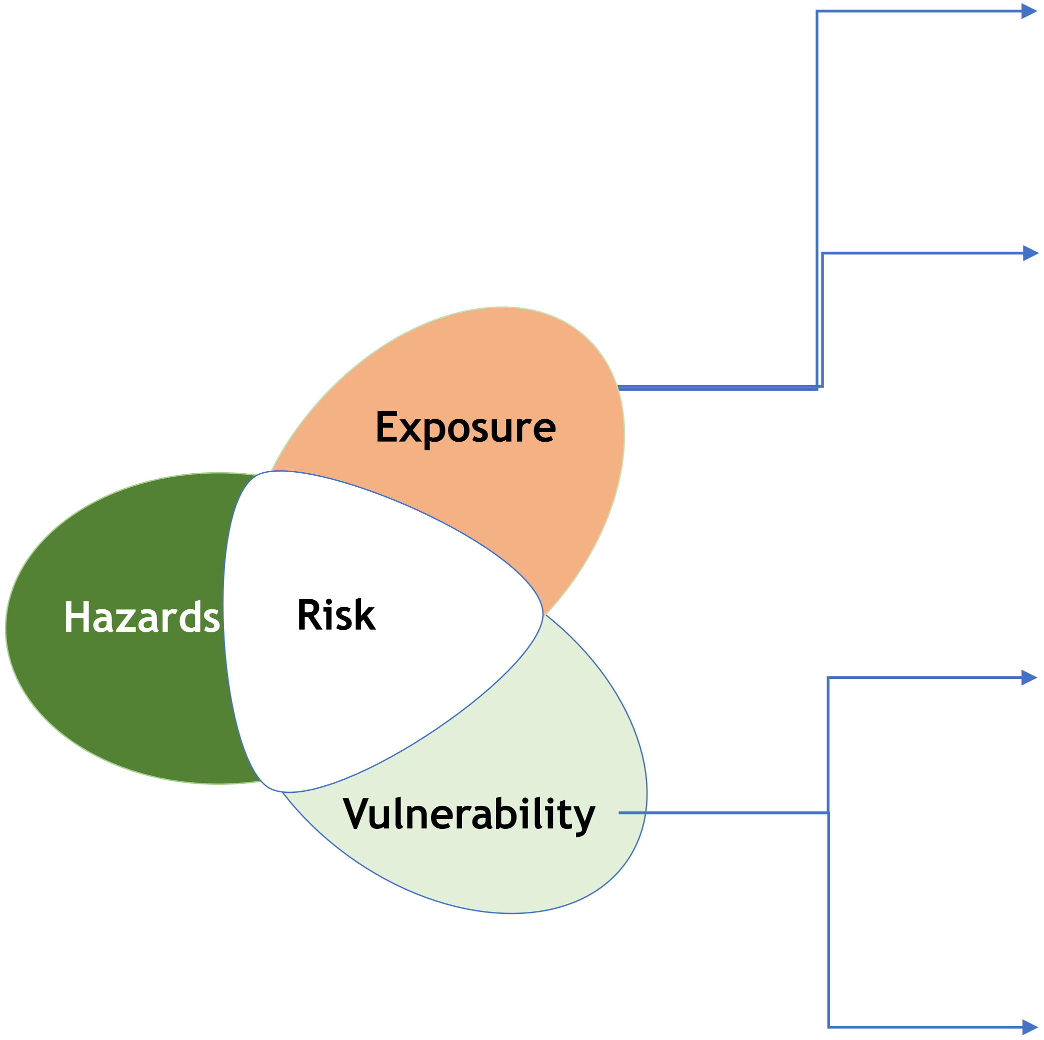
•Tree species diversity
•Functional trait diversity (embolism resistance, resprouting capacity, rooting depth).



Mature forests are more resilient to disturbances

1. Thick and old trees that host microhabitats
2. Clearings in the canopy where regeneration begins
3. Large dead wood, either standing or on the ground
4. Trees of various species and ages with different sizes

An index for assessing drought risk



Climatic exposure
- Frecuency & intensity of drought
- Suitability of species to local climate

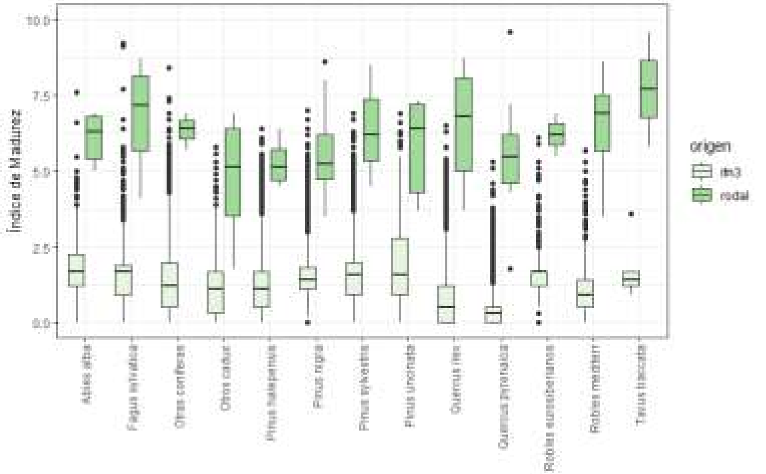
Geographic exposure
- Topographic moisture
- Solar radiation
- Soil development

Susceptibility
- **Functional**
  - Susceptibility to embolism
  - Root depth
- **Structural**
  - Basal area
  - Diversity of age classes
  - Mean diameter
  - Tree species diversity

Adaptative capacity
- Resprouting ability
- Regeneration

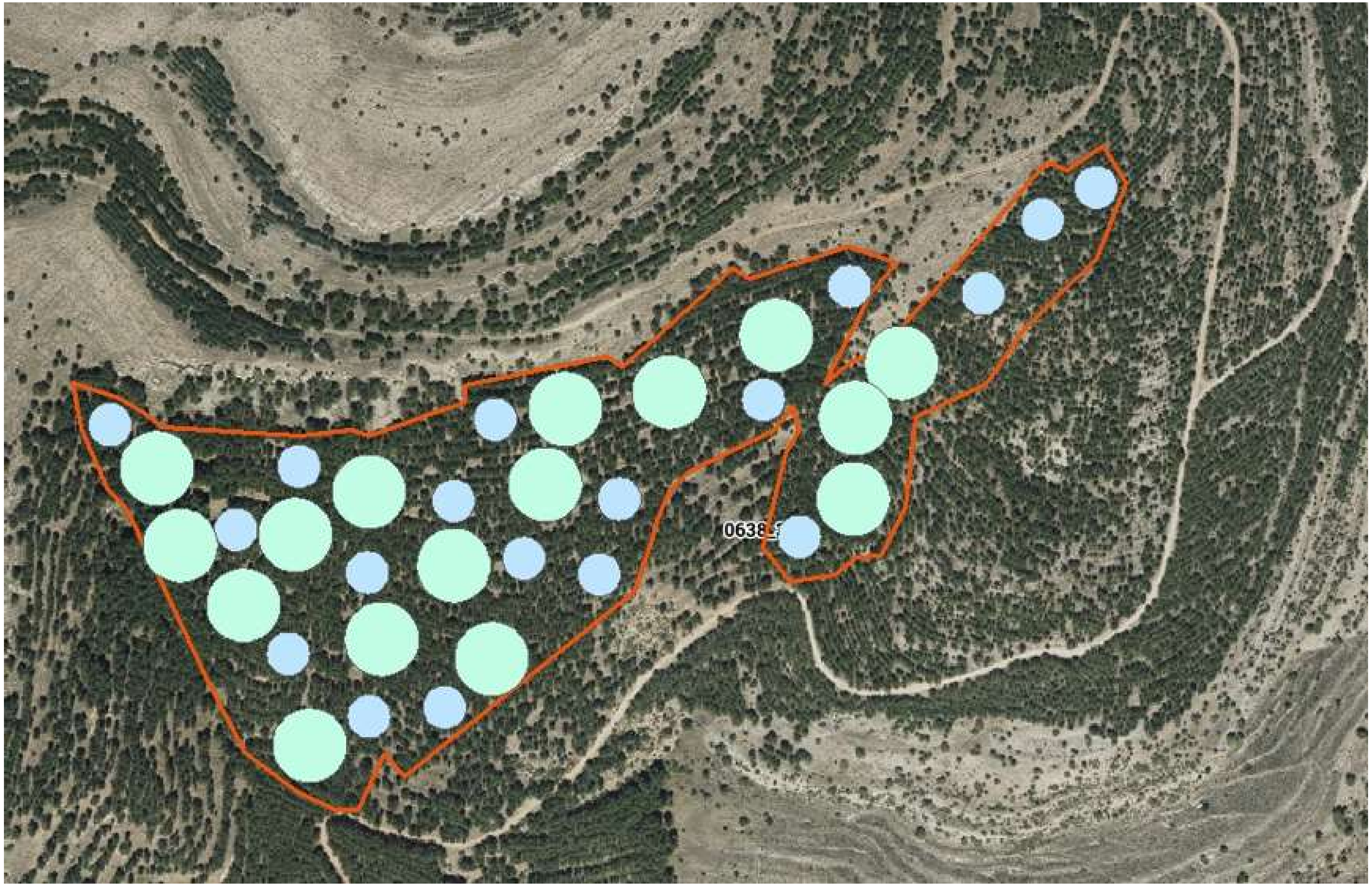
An index for assessing drought risk

Scope	Sub-scope	Criterion	Indicator
Exposure	Climatic exposure		Climatic aridity index
			Climatic suitability of species
	Geographic exposure		Topographic moisture index
			Solar radiation
			Soil depth
Vulnerability	Susceptibility	Functional susceptibility	Mean embolism susceptibility
			Mean root depth
			Embolism susceptibility diversity
			Root depth diversity
		Structural and compositional susceptibility	Basal area
			Mean diameter at breast height (DBH)
			Number of tree species
			Number of diameter classes
	Lack of recovery capacity		Mean resprouting capacity
			Resprouting capacity diversity
			Regeneration index



Applying the index to improve climate change adaptation of *Pinus pinaster* plantations

Risk variables in the face of drought			BAR	IFN3
Risk			7,3	6,2
Exposure			5,7	5,1
	iClimate exposure		5,3	3,9
		Climate aridity index	3,9	4,3
		Climate suitability of species	6,7	3,5
	Geographic exposure		5,8	5,6
		Topographic wetness index	7	7,1
		Solar radiation	7,4	7,4
		Rockiness	2,5	1,9
Vulnerability			8	6,6
	Susceptibility		8,1	6,6
	Average functional susceptibility	Average susceptibility to embolism	6,4	8
		Average depth of roots	6,9	3,3
	Functional susceptibility diversity	Diversity of susceptibility to embolism	9,3	9,7
		Root depth diversity	8	9
	Composition and structural susceptibility	Basimetric area	7,3	3
		Normal mean diameter	9,6	6,8
		Number of tree species	5,9	9,4
		Number of tree species	9,4	8
	Lack of capacity to recover		6,7	7,3
		Average resprouting capacity	9,9	8,7
		Diversity of resprouting capacity	8,8	9,1
		Regeneration index	4,7	6,3



0638

Mean and standard error of the main dasometric variables

Variable	Control	Before treatment	After treatment	Difference (%)
No. of plots	3	3	3	
Basal area (m^2/ha)	34.6 ± 6.7	34.3 ± 4.9	11.9 ± 2.7	-22.5 (-65.4%)
Density (trees/ha)	820.5 ± 162.8	838.2 ± 76.5	254.6 ± 48.6	-583.6 (-69.6%)
Volume with bark (m^3/ha)	132.5 ± 43.8	154.3 ± 40.4	54.5 ± 11.6	-99.8 (-64.7%)
Mean height (m)	7.8 ± 1.7	9.4 ± 1.1	9.9 ± 0.9	0.5 (5.9%)
Mean DBH (cm)	23.2 ± 1.1	22.7 ± 0.8	24.2 ± 1.4	1.5 (6.6%)

Some concluding remarks…

Mechanized forestry is the only option with economic return

Not applicable in all cases (vulnerable habitats, inaccessible places…)

Effect will be noticeable on the long term

EBS have moderate effect on vulnerability. May not be effective under drastic climate change

Most forest area is …

- Young
- Very dense
- Homogeneous, continuous
- Regular structure (few age classes)
- One-species canopy


…should be
• Young and old patches
• Not very dense
• Heterogenous, with open areas
• Irregular (many age classes)
• Several species in the canopy

RedBosques_Clima *LIFE20 CCA/ES/001624* es financiado por la Unión Europea a través del programa LIFE20 Climate Action.
Duración: 09.2021 - 08.2025


ForestConnect project: Pilot actions to adapt to climate-driven food scarcity for large carnivores

Navigating Climate Change: Methodologies and Applications for Conservation.

26.03.2026

Maria Kachamakova

WWF Bulgaria

Zoom Plattform

Project Overview

● 3 regions: Balkans, Dinaric and Carpathians

● 7 countries
● 9 pilot territories
● 23 intervention sites
●13 partners + 10 associated

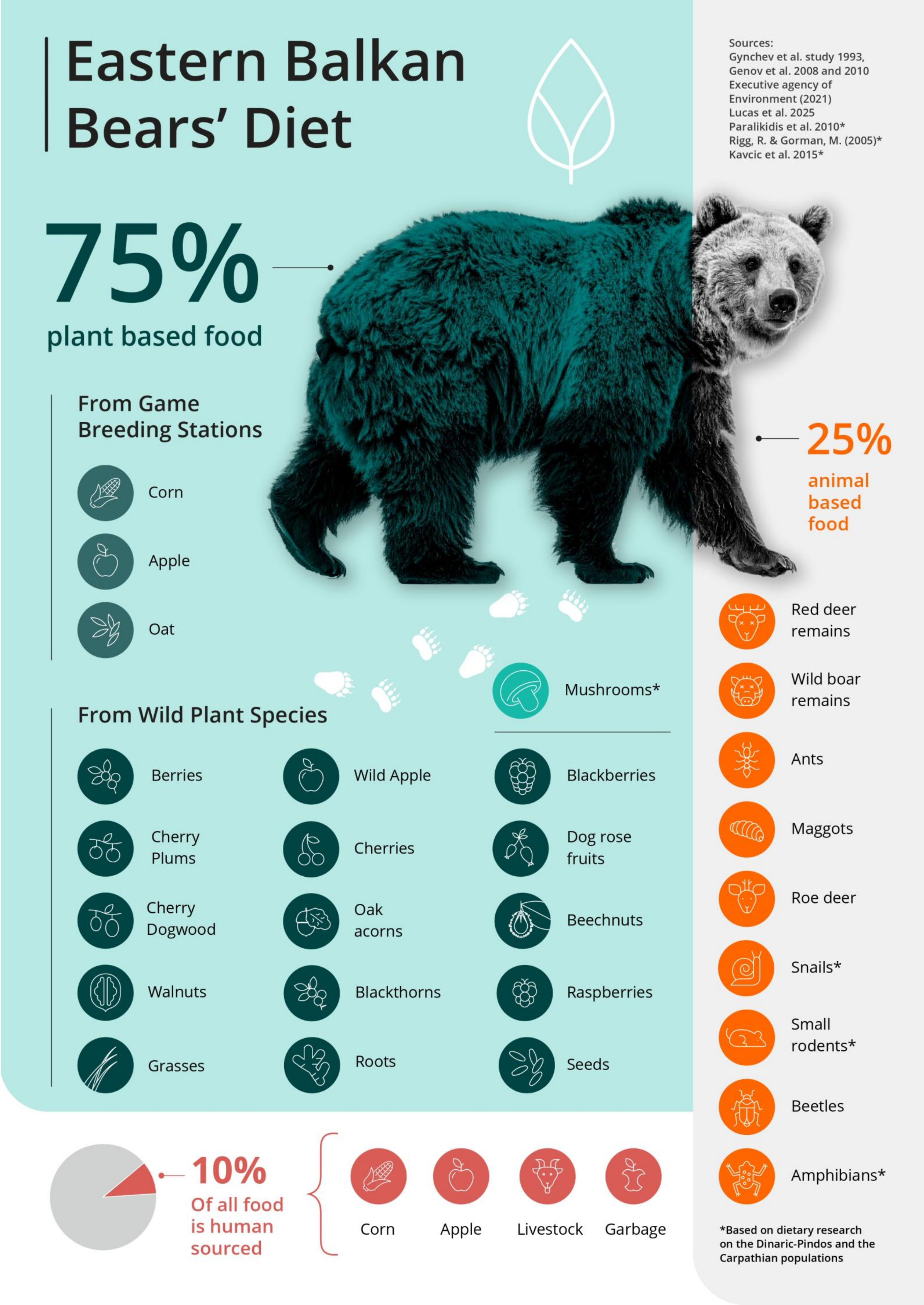
Funded by Interreg Danube Region Programme

● Total budget: 2.764.000 euro
● Duration: 01.2024 - 06.2026

https://interreg-danube.eu/projects/forestconnect

Interreg Danube Region
Co-funded by the European Union
ForestConnect

Bear diet



Interreg Danube Region
Co-funded by the European Union
ForestConnect

Common challenge

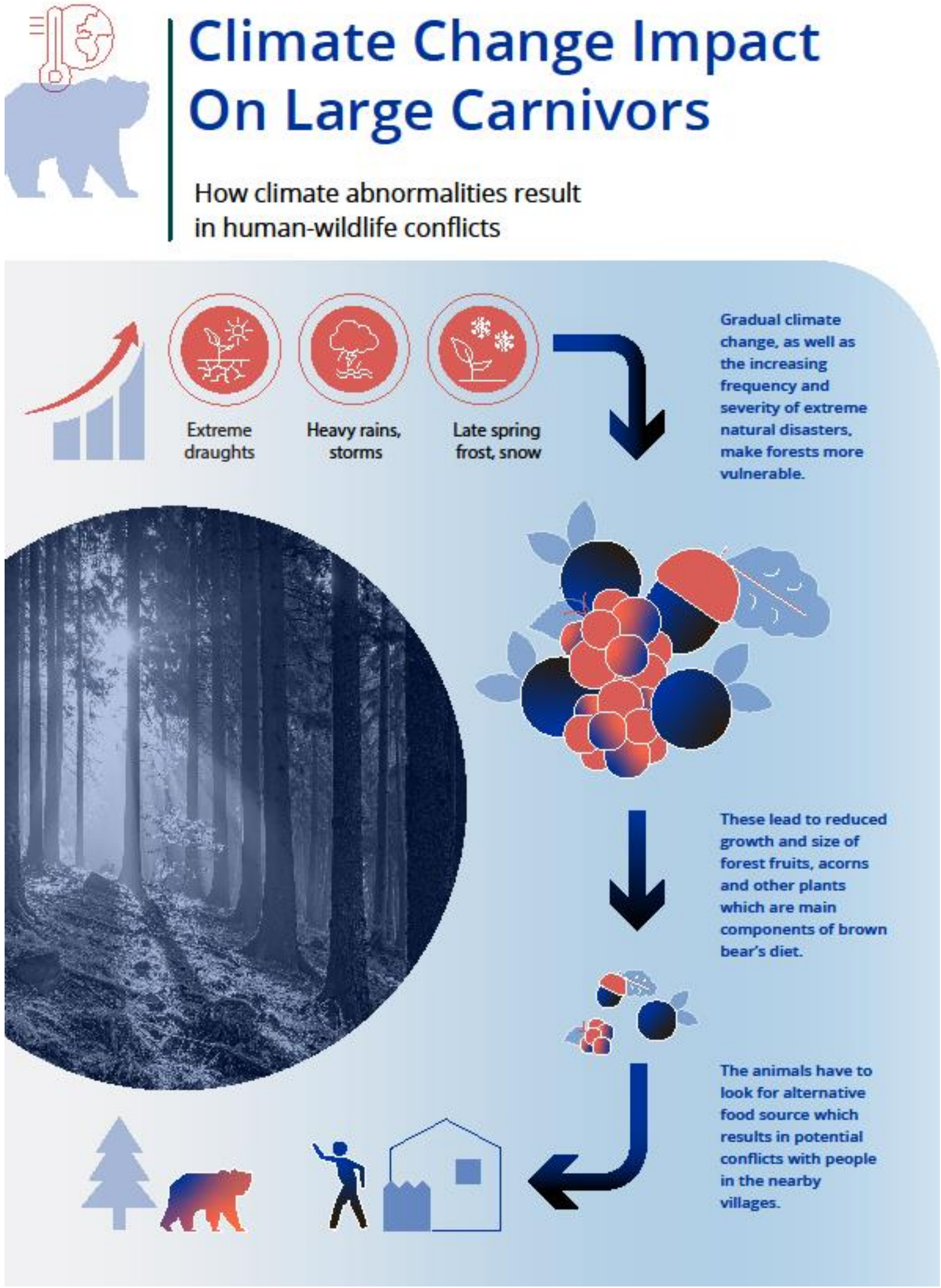
Impact of climate change on large carnivores

Summer temperatures:
+2°C to +5°C expected increase by 2085.

Winter temperatures: +2°C to +5°C expected increase.

Summer precipitation:
Droughts in
Southern Europe.

Storms and wildfires:
Expected to increase in frequency and intensity.



Interreg Danube Region
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Pilot field actions for habitat adaptation

27,7 ha planted with 10 different fruit-bearing species on 21 sites in 6 countries

63,5 ha of improved mosaic conditions through mowing, removal of shrubs and other activities on 23 sites in 6 countries


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Pilot area and Intervention sites

Cross-border cooperation in 23 Intervention sites in 9 pilot areas – transnational ecocorridors with low anthropogenic disturbance

Zapadna Stara planina (BG)
Stara planina NP (SR)
Carpathian Biosphere Reserve (UA)
Apuseni NP (RO)
Strambu Baiut (RO)
Slovenski Raj NP (SK)
Biogradska gora NP (MN)
Durmitor NP (MN)
Prokletije NP (MN)

Adaptation Measures
Planting of forest fruit tree species

Only native and site-specific species.

Species selected according to their climate suitability!

Sorbus aucuparia (rowan, European mountain ash)

Sorbus torminalis (Wild service tree) and *Sorbus domestica* (Service tree)

Malus sylvestris (European crab apple)

Pyrus communis (Wild pear)

Prunus avium (Wild cherry)

Prunus mahaleb (Mahaleb Cherry)

Prunus cerasifera (Cherry plum)

Prunus spinosa (Blackthorn)

Crataegus monogyna (Common hawthorn) and *Crataegus pentagyna* (Black hawthorn)

Rosa canina (Dog Rose)

Rubus caesius (European dewberry, wild blackberry)

Corylus avellana (Common hazel) and *Corylus colurna* (Turkish hazel)

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Adaptation Measures
Habitat maintenance & restoration

Restoring degraded meadows and open habitats through Cleaning & Mowing
Aims:
- Maintenance of a mosaic of habitats, important for biodiversity.
- Improving habitat suitability for other species in the LCs food chain (grazing opportunities for ungulates).
- Indirectly securing the food needs of LCs.

Cleaning overgrown areas that contain fruit species
- remnants of old orchards, wild fruiting trees.
- Dense vegetation was removed to increase light access and remove competition from other species.
- The crowns of existing fruit trees have been pruned to enhance fruiting.

Pilot site in Chershovitsa, Bulgaria, with applied cleaning measures.

Example from Montenegro

- Areas degraded due to wildfire
- Aim: Restoring the habitat and revitalising the area.

Selective cutting

- Marking and cutting dry, burned or fallen trees.
- All cut trees will be used in the pilot area
  - to create **terraces to stop soil erosion**
  - to accumulate soil and promote the new growth of vegetation.


Pilot sites Horolac and Hridsko lake in Montenegro, before and after cutting measures.

Example from Slovakia

- Aim: **Prevent overgrowth in meadows with high plant biodiversity** and maintain mosaic habitats.
- This traditional mowing technique - implemented as part of the Hand mowing festival in the NP Slovensky Raj.
- **Volunteers and local communities were engaged** in piloting measures with traditional hand scythes.
- Awareness raised for the importance of **traditional agroforestry practices** for sustainable management of habitats.

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Main recommendations

Always plant a **variety** of fruit-bearing species to reduce risk of crop failure.

Combine species from different fruiting periods for seasonal diversity

Regular **maintenance** is key feature

Terrace construction using retained timber as a too for erosion control and creation of regeneration microsites under steep, fire-affected conditions.

Challenges	Lessons learnt
Administrative delays	start earlier and allow additional timeframe for each action, be flexible and creative
Unpredictable weather	always prepare plan B
Finding saplings	capacity is needed not only for planting, but also for seed collection, storage and germination, search for and use local knowledge (most in elderly people), be flexible, search for unexpected allies
Harsh terrain and difficult access	Choose good equipment
Equipment failure	Take feasibility into consideration when choosing the sites

Thank you your attention!

Maria Kachamakova

mkachamakova@wwf.bg

Interreg
Danube Region

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the European Union

ForestConnect

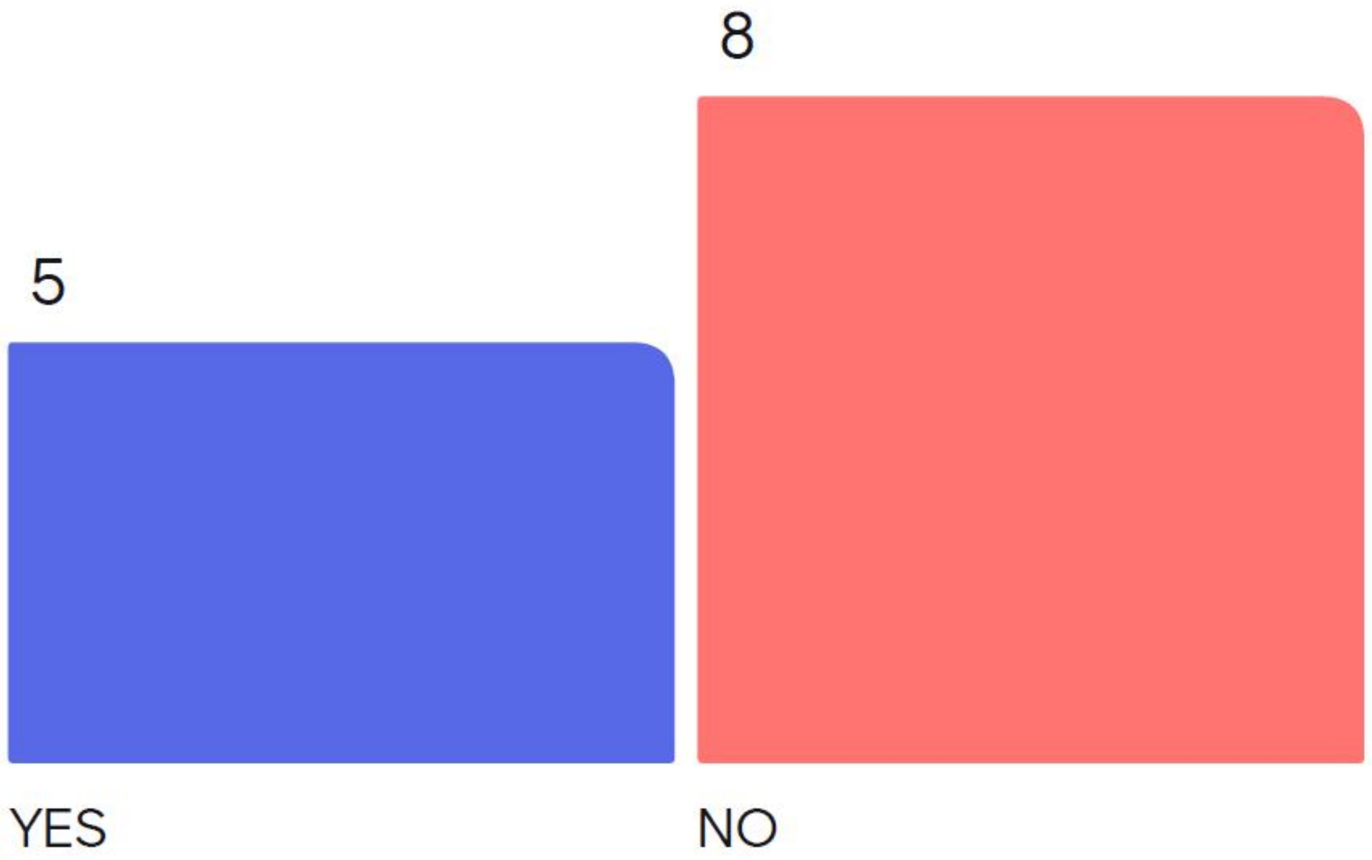
Mentimeter

Type in menti.com

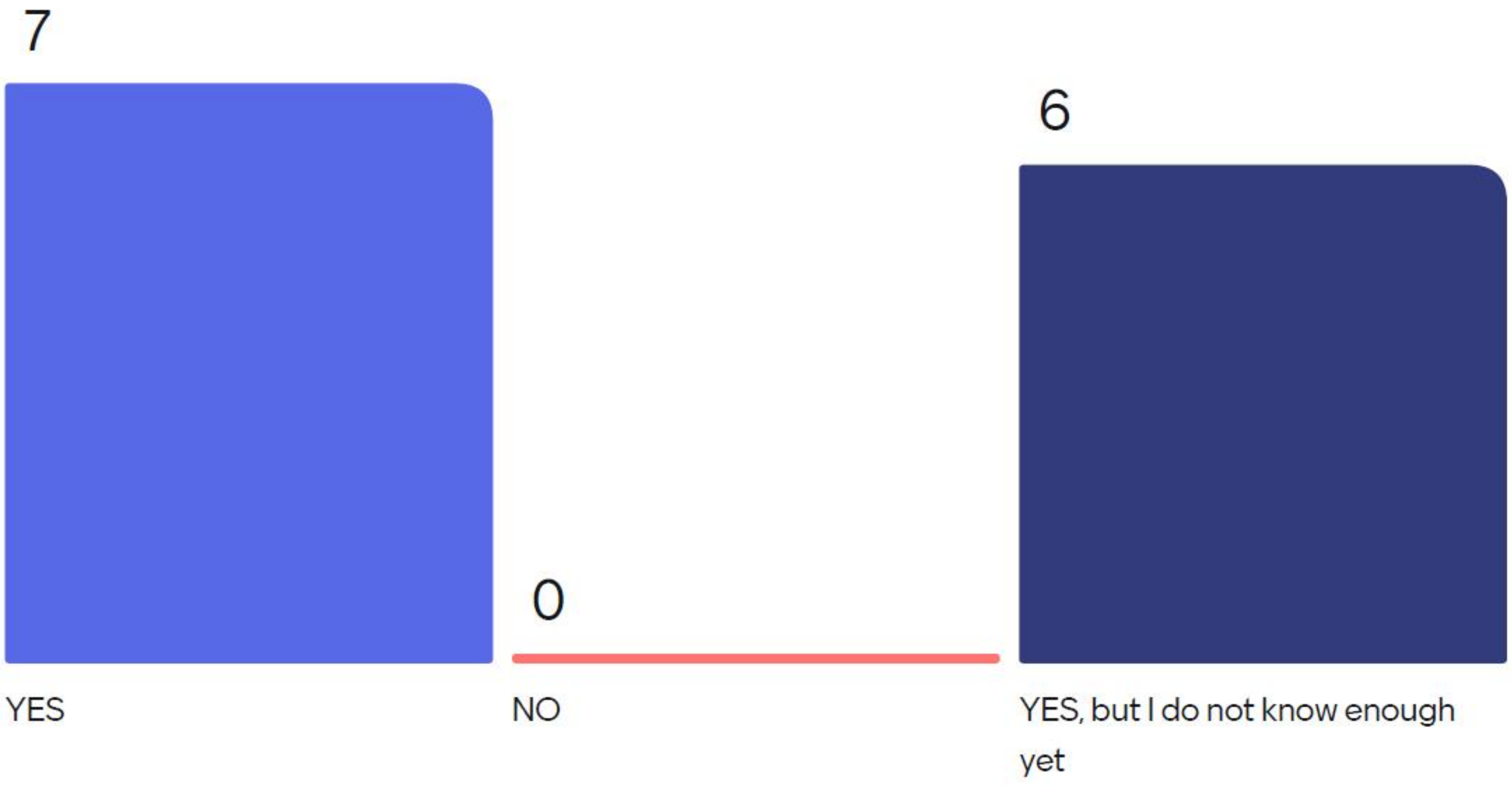
Code 1657 1632

NATURA CONNECT

Have you used climate change metrics in protected area planning and management?



Do you intend to use climate change metrics for protected area planning and management in the future?



Mentimeter

What additional information or capacity on **climate risk assessments** would help you to adapt your park or region more effectively?

- Data on species vulnerability
- maybe lonks to the available resources and also probably some trainings how to use them
- Better understanding on how species and nature types will be affected
- endemic species requirements/ ecology
- Analysis how the species can react on climate change
- manstraming
- mainstreaming in other sectors again :)
- Resources (staff and money) time for cooperation cross borders, access to research resultat etc

What additional information or capacity on **climate risk assessments** would help you to adapt your park or region more effectively?

People's willingness to accept change

Mentimeter

What are your main gaps and challenges for implementing **climate change adaptation measures** in your park or region?

Sometimes process is time consuming

Lack of time and expertise

Sometimes not much you can do to reduce climate change

good example case studies and advocacy

knowlegde, stuff and also legislative restrictions in PAs, but mainly lack of financial resources

Finances, so that state can look at long term nature manegment

Knowledge gap but also lack of scientific background of authorities respinsible for protection planning

interregional cooperation

What are your main gaps and challenges for implementing **climate change adaptation measures** in your park or region?

Resources, collaboration crossborders and managers - researchers

Summary

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Next steps

- **Recording, presentations and post-workshop** briefing will be made accessible on the NaturaConnect website. Participants will be informed!
- **NaturaConnect Learning Platform** https://tinyurl.com/ENA-NC
- **Webinar** *'Shaping Tomorrow's Landscapes: Land-Use Futures in the Danube–Carpathian Region*', 23 April 2026, 10:00-11:15 CET

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Share your feedback with us!

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