

Adaptation Working Group of the Carpathian Convention and adaptation related EU projects

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Carpathians

- Length about 1500 km² , second longest in Europe
- Highest peak is 2655 m
- Area is 190000 km²

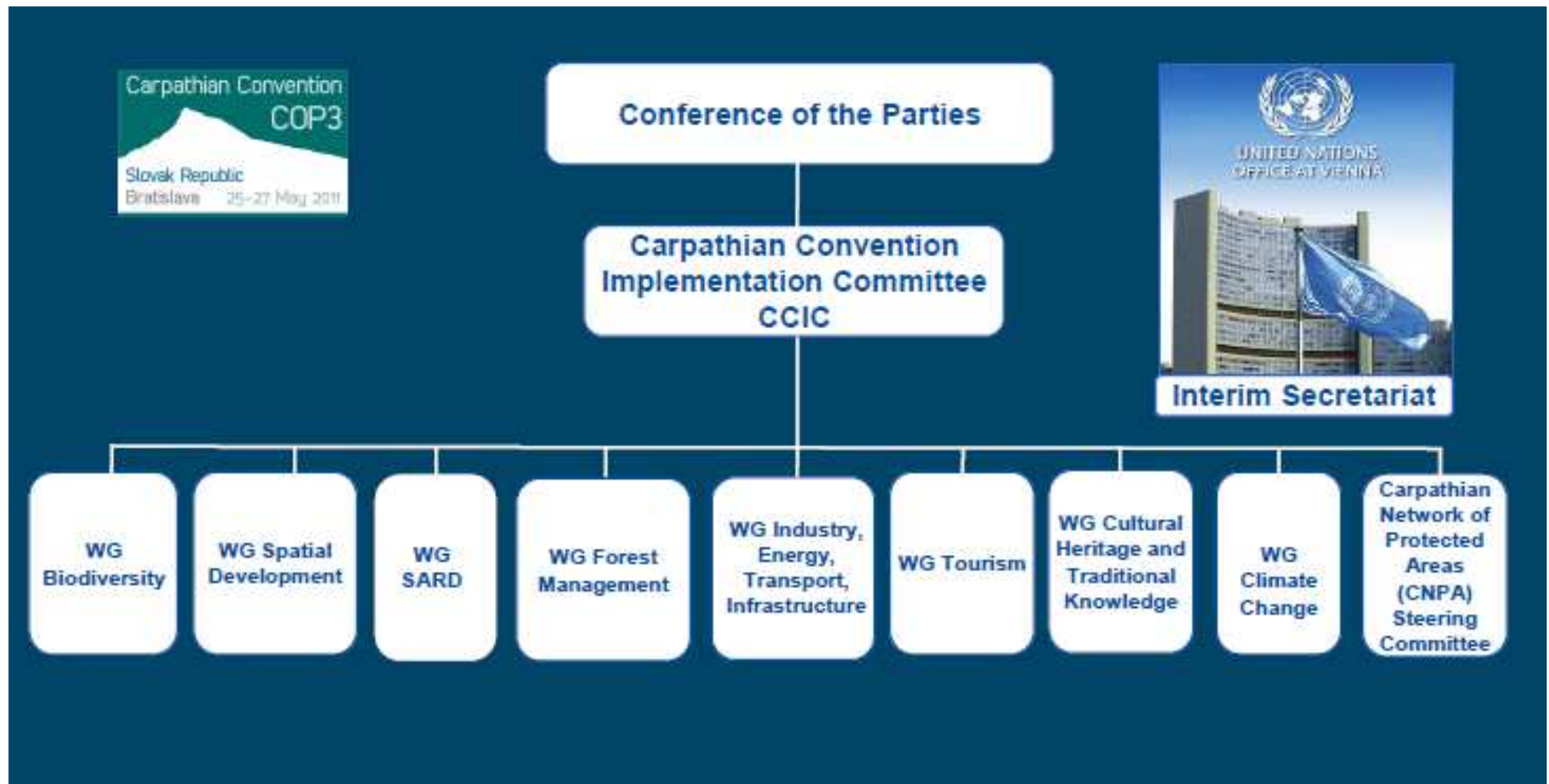
Location



Problems

- Less studied regions
 - Carpathians
 - Southeastern-Europe
- Smaller countries mostly with complex topography
- Specific climatological and meteorological effects:
 - The basin is open to south
 - Could water pillow
 - Summer drying
 - etc.

The Convention as an institution



Climate Change Adaptation WG at Carpathian Convention

- Decision COP3/15 on Climate change of the COP 3 of the Carpathian Convention: a Working Group on Adaptation to Climate Change under the Carpathian Convention has been established

Workplan

- Preparation of strategic agenda on adaptation to climate change in the Carpathians
- Comments and feedbacks to the list of adaptation measures developed within the CARPIVIA and CarpathCC projects
- Develop communication strategy
- Contribution to the establishment of a web based information system on adaptation to climate change for the Carpathians

Eger Group

- Workshop on sharing of experiences on adaptation to climate change in mountain areas, Eger, Hungary, 22 October 2012
- Participation of representatives from Pyrenees, Alps, Carpathians, Balkans, Caucasus, Central Asia
- Main outcome: establishment of a platform for exchange of information and know-how and development of possible common activities
- On Facebook: Eger Working Group

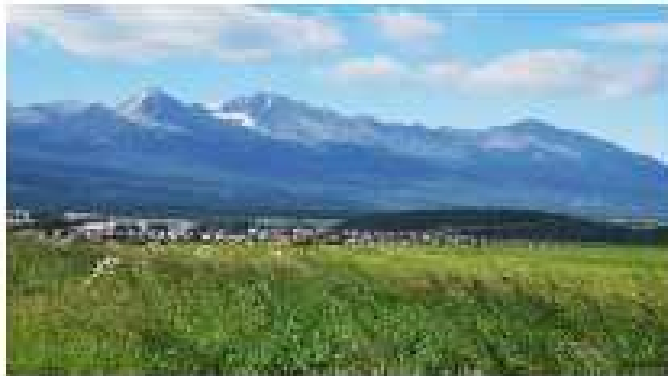


Third Meeting of the Conference of the Parties to the
Framework Convention on the Protection and Sustainable
Development of the Carpathians

UNEP/COP/CONF/003
Original English

Strategic action plan

STRATEGIC ACTION PLAN FOR THE CARPATHIAN AREA



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Recommended actions

- ***More coherent approach in implementation of policies by considering territorial specificities***
 - Coordinate the implementation of sectoral policies
 - consider and apply relevant policies throughout the Carpathians
- ***Stronger territorial cooperation***
 - If appropriate, use of legal instrument that provides responses to management challenges related to the territorial cooperation
 - Increase and reinforce the establishment of proactive multilevel networks between political entities

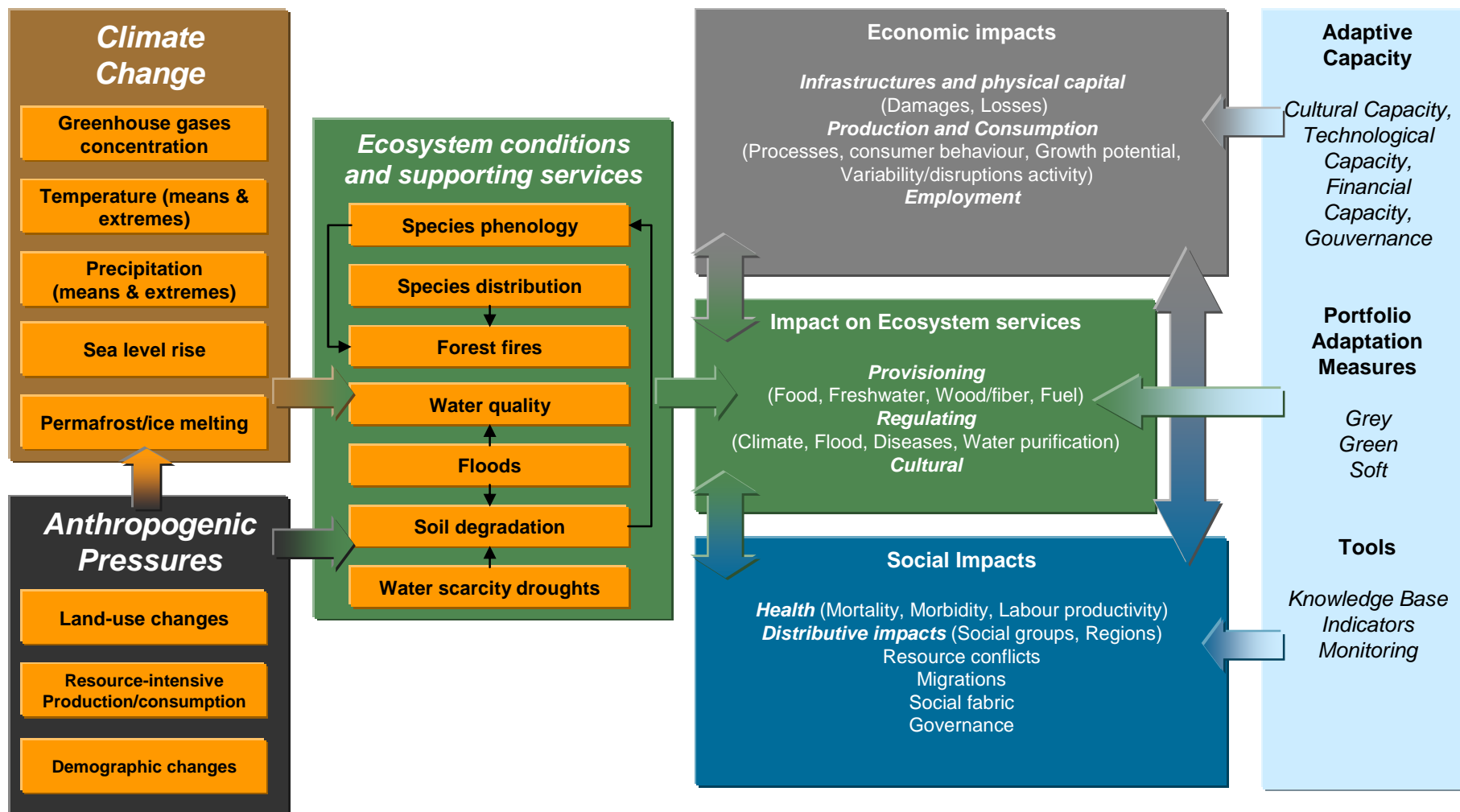
- ***Better coordination and dialogue between relevant actors based on multilevel governance***
 - Develop multi-level governance principles
 - Encourage local and regional authorities to enter into partnerships

Joint Alpine – Carpathian Statement On Adaptation to Climate Change

- *The Alpine and Carpathian countries intend to implement, in the frame of their policies, the following recommendations aimed at preventing and adapting to the (increasing) impacts of climate change*
 - Support research activities on climate change in mountainous areas and its dissemination to the public in order to foster scientific local adaptation strategies and measures
 - Support co-operation among countries in developing climate change adaptation strategies in mountain regions and in implementing already existing ones

Environmental pathway of vulnerability and adaptation

Jacques Delsalle, Evdokia Achilleos, DG Environment, Unit D1 – Protection of Water Resources



Three linked projects

Funded by European Commission

Contributes to preparatory action "Climate of the Carpathian Basin" approved by the European Parliament:

- *Vulnerability of water, ecosystems & ecosystem based production systems to climate change and other man-made pressures*
- *Adaptation measures*, particularly adaptive water management & ecosystem-based approaches

Goals / Outputs:

- Benefit national and regional authorities of Carpathian Region (reports, dedicated websites, summary booklet)
- Support policy proposals (Strategic Agenda on Adaptation to Climate Change in the Carpathian region)
- Contribute to EU Information System on Climate Change Vulnerability and Adaptation (Climate-Adapt)

Three linked projects

:

CARPATCLIM: harmonised gridded climate data in the Carpathian Region
(historic data 1961-2010)

CARPIVIA: service contract for an integrated assessment of vulnerability of
environmental resources and ecosystem-based adaptation measures
(ENV.D.1/SER/2010/0048)

CARPATH-CC: a framework contract for in-depth assessments of knowledge
gaps identified during first year of CARPIVIA (ENV.D.1/FRA/2011/0006)

Ecosystem and ecosystem-based production systems

- Forests / forestry
- Wetlands
- Grasslands (natural and semi-natural)
- Agriculture
- Tourism
- (water resources)

Summary booklet 'Future Imperfect':

<http://www.grida.no/publications/future-imperfect/>

Vulnerability water framework directive

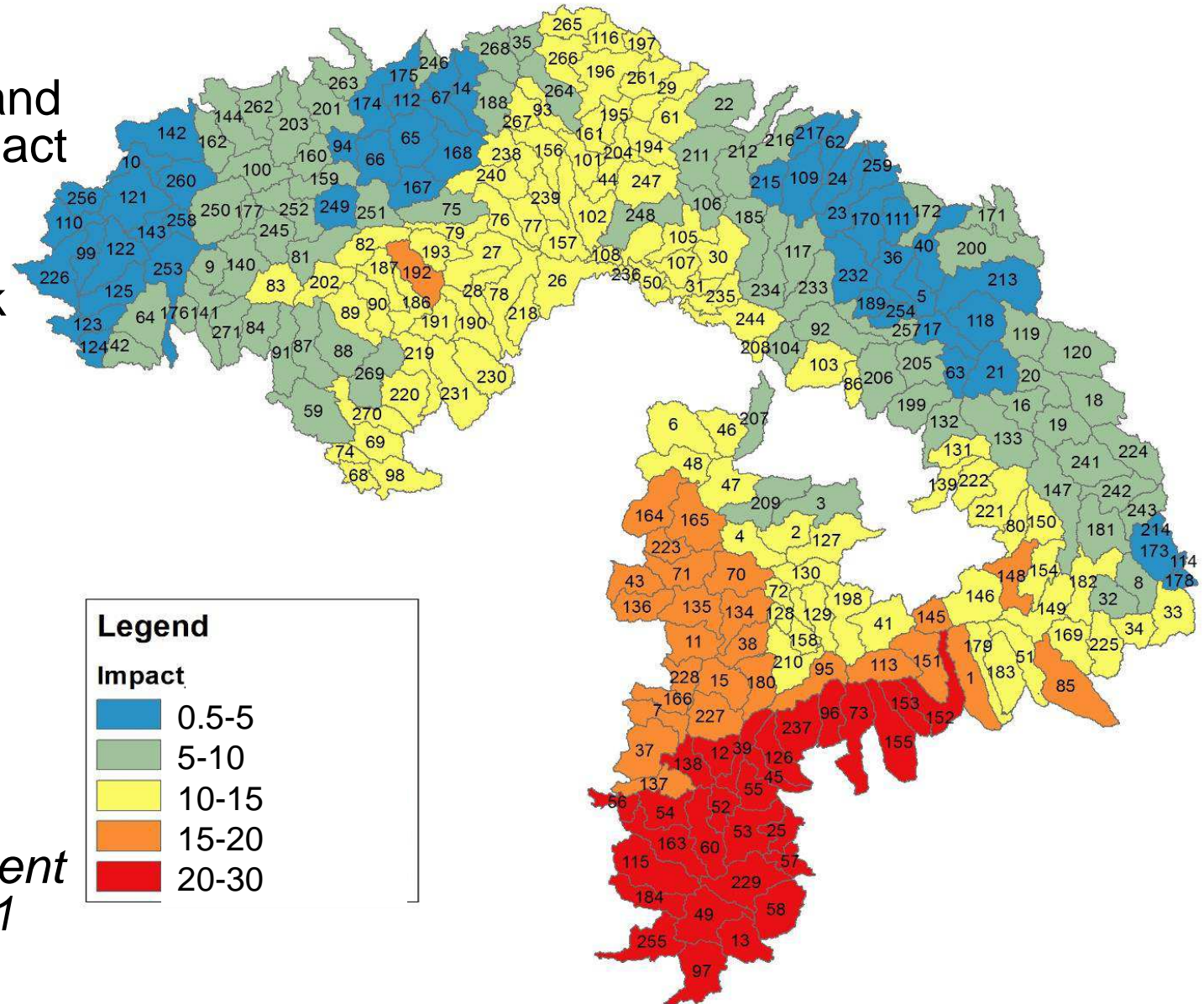
Considering: low flow conditions and temperature impact
>a first simplified identification of water framework directive vulnerability to climate change

-> points at:

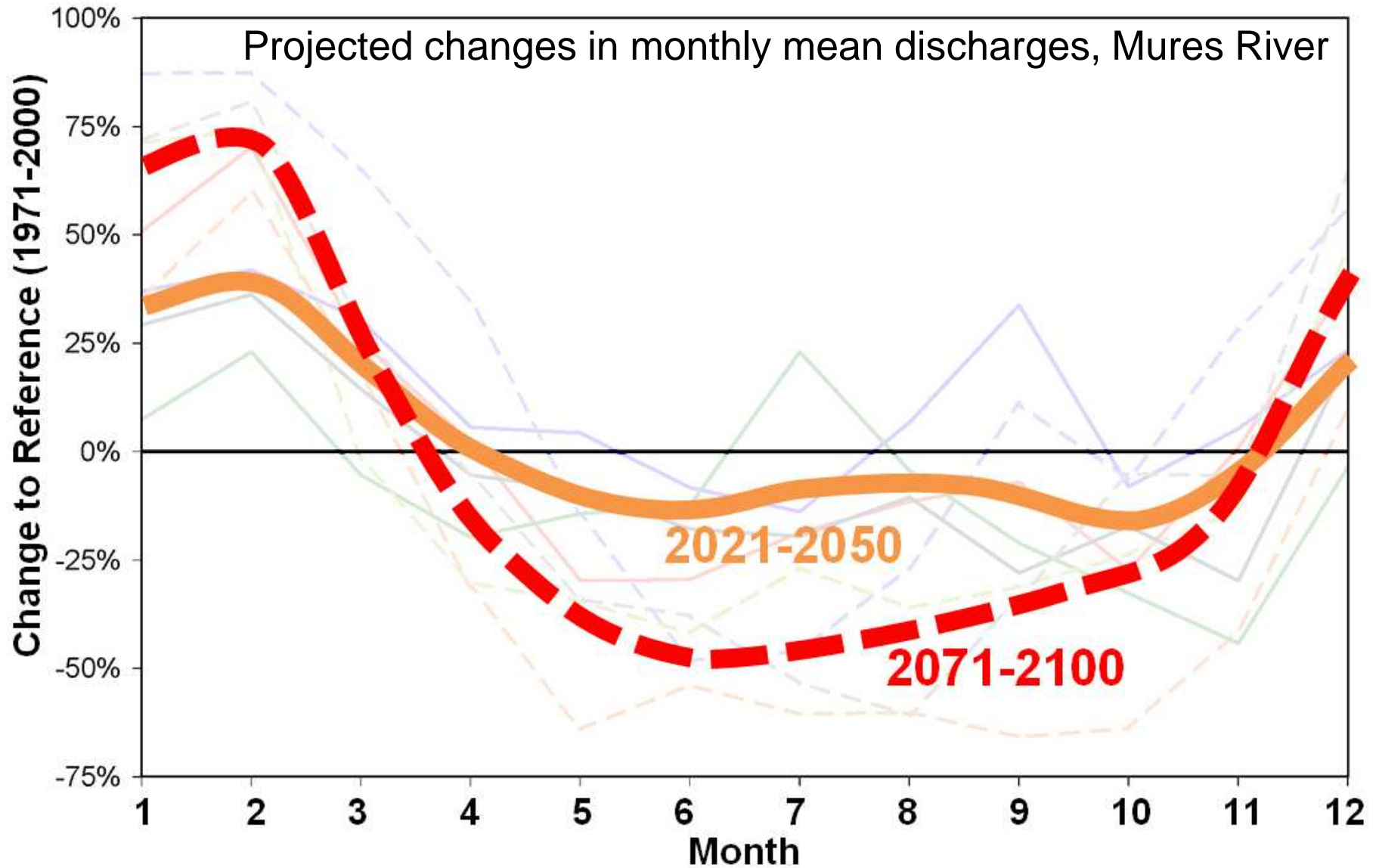
Research / monitoring gaps

Reevaluation classification

system beyond *water management cycle 2016–2021*



Impacts on hydrology



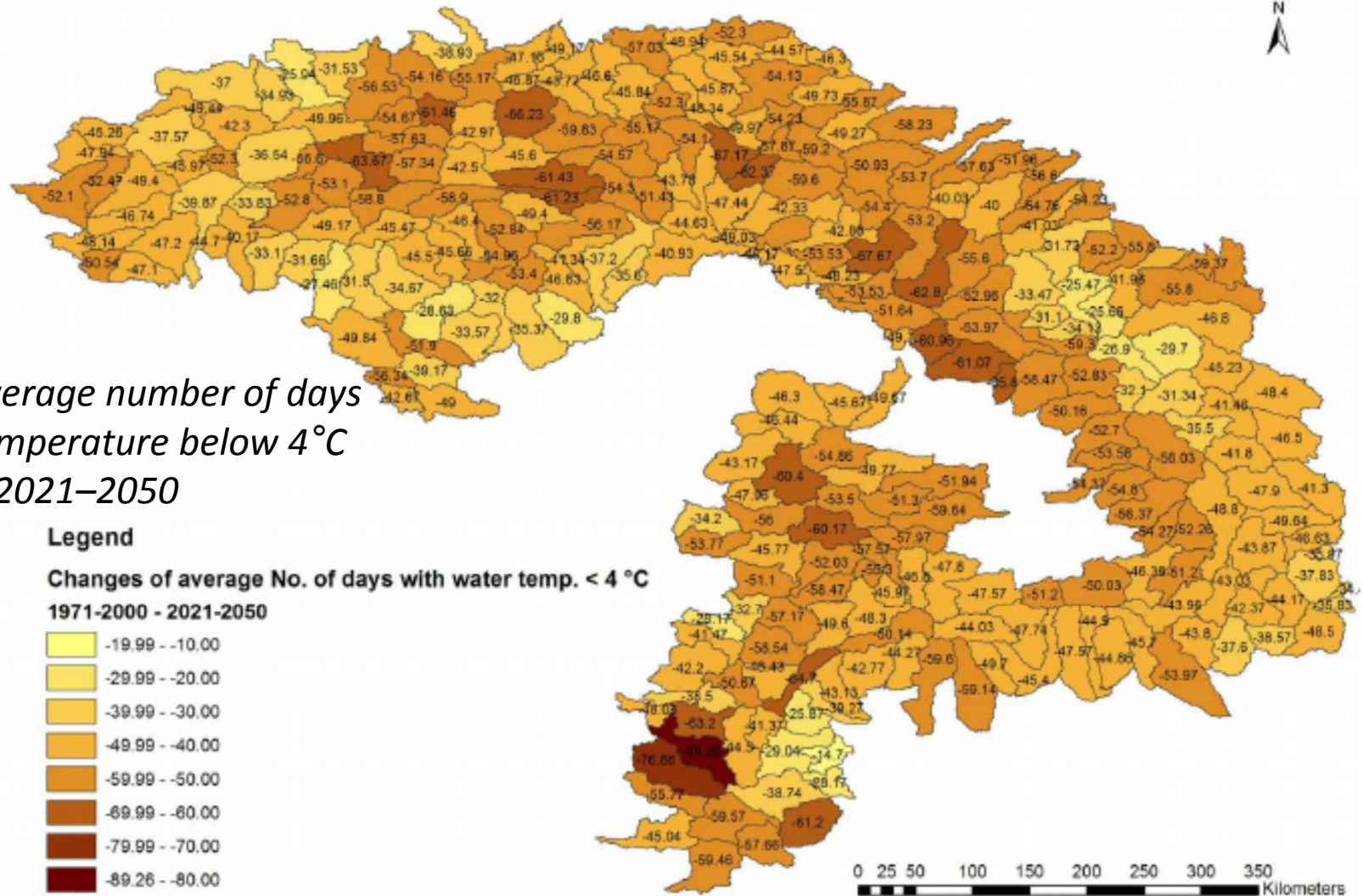
Vulnerability water framework directive

A first step in assessing the most affected river basins in the Carpathian region, in terms of water parameters that are indicative for ecological status (Water Framework Directive).

Parameters:

- Flow conditions (projected change ratio between 1971–2000 & 2021–2050):
 - ○ Increase in average winter precipitation
 - ○ Decrease in precipitation in already dry months
- Thermal conditions (projected change ratio between 1971–2000 & 2021–2050):
 - ○ Change in average annual temperature
 - ○ Number of days with water temp < 4°C

WATER TEMPERATURE CHANGES



*Changes in average number of days
 with water temperature below 4°C
 1971–2000 / 2021–2050*

- Manage roads on the upper catchment areas
- Erosion
- Acceleration of runoff

Mountain roads
in Maramures:



Activities requiring frequent transportations (e.g. hay production) can be reduced, favouring low-transportation land-uses:

- 'natural grazing' (Braakhekke et al., 2005)
- ecotourism

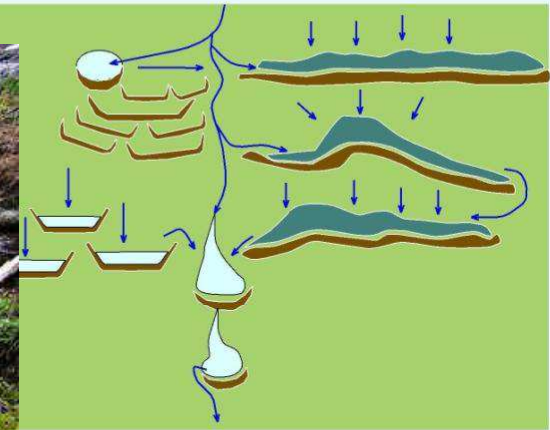
Improving water storage capacities

- Reconsider operation of existing reservoirs
- Rainwater harvesting on slopes

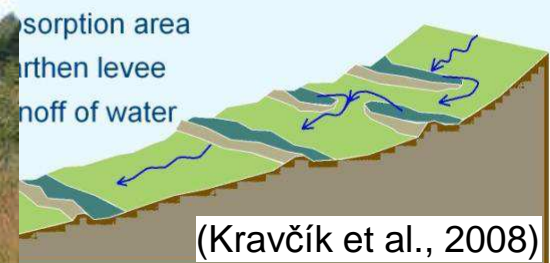
Microstructures for the rainwater harvesting on land

Combination of different rainwater harvesting technologies

Contoured barrages



Experimental rainwater harvesting installations in the Tatra



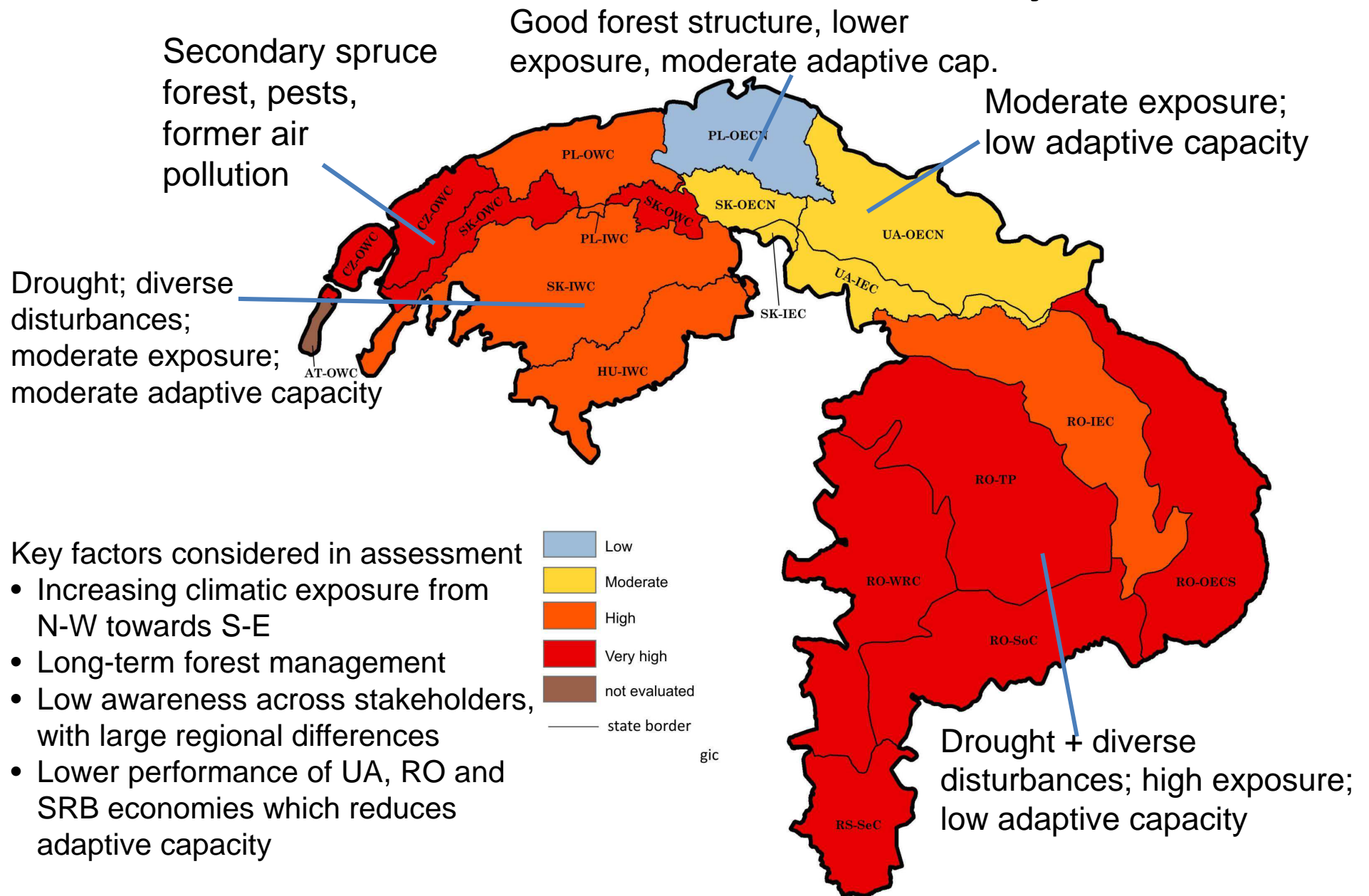
(photos: Kravčik and Kohutiar)

- Protecting/restoring the infiltration areas



Grassland on the Bükk plateau with a sinkhole in the forefront:

Forests – vulnerability



Forests / Forestry – key impacts

- **Impact depends on** diverse factors, such as tree species, forest structure, elevation
- Lower elevation forests, mainly in south SVK, HUN, ROM, SRB are especially prone to drought and temperature rise
- Increase in extreme rainfall events & deforestation may increase risk of landslides
- Intensifying droughts and windstorms followed by outbreaks of bark beetles and defoliating insect are the main risks; +potential influx of new pest species (e.g. Northern spruce bark beetle throughout ROM)
- **Treeline moving upward, changes in composition**

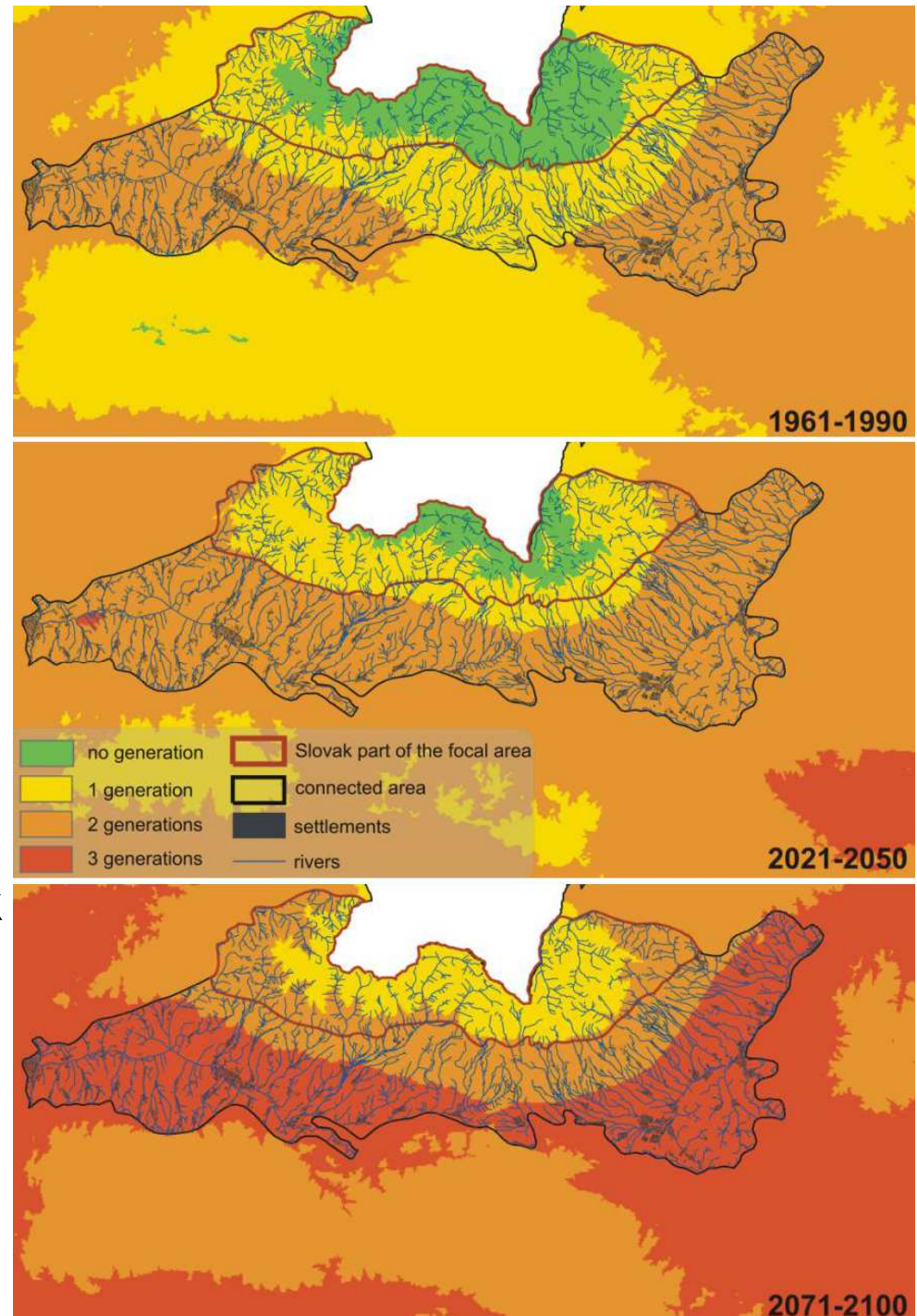


Bükk

Bark beetle infestation in the Tatra:



Projected development of bark beetle in the Tatra:



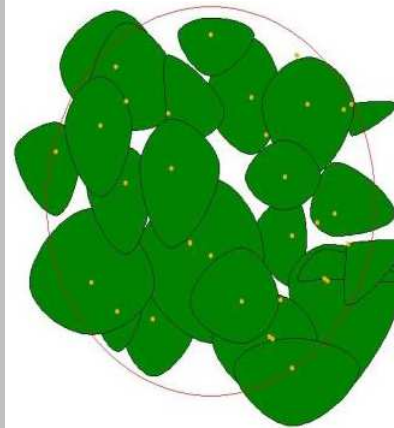
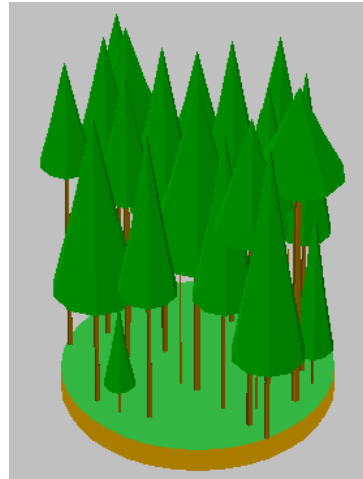
Forests – recommended adaptation

- Promote (transnational) **sustainable forest management** enabling natural processes (concepts like close-to-nature-forestry, reduced clear-cutting). Progressive implementation forestry plans, e.g. after extreme event
- Erosion control measures (close to villages) in relation to logging & rains
- **Monitoring**: Supporting and harmonizing regional and European forest monitoring schemes, including newly emerging pests and pathogens, changes in species distribution
- **Preservation** of large-scale, not fragmented green areas, incl corridors and network of areas with non-intervention management
- **Financial support programme** to promote and encourage the introduction of locally adapted tree species in the lowlands (mainly oak)
- Increase awareness on the importance of **integrated watershed management** and effects of forests on water retention and drinking water
- **Example**: Maintenance alluvial forests: 1,018 EUR/ha for 2 year period

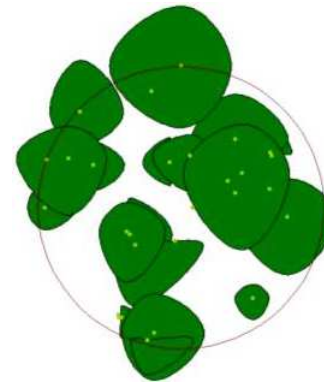
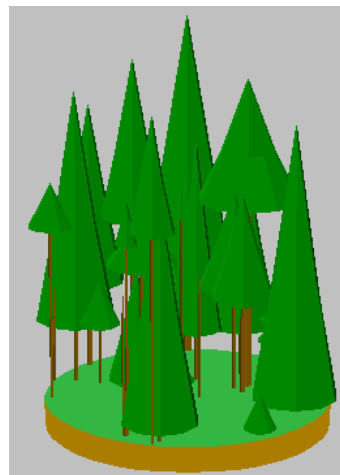
in Divici Pojejena (ROM)

- Adaptation of structure

Simple vertical structure and regular horizontal tree distribution of non natural, low resistance stand



Diversified vertical and cluster-like horizontal tree distribution of natural, high resistance stand



Adaptation of forest composition

Replacing spruce with resistant species:

Bükk: beech

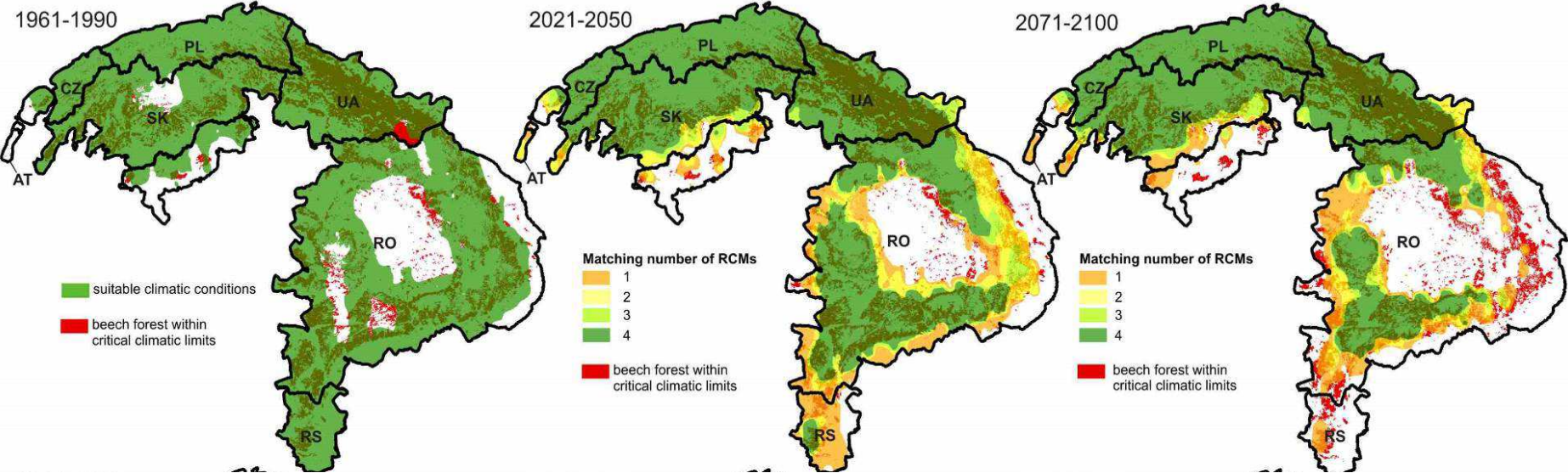
Tatra: white fir

Rodna-Maramures:
larch, fir, mountain
sycamore

Beech saplings planted on spruce area
after bark beetle infestation: Bükk



Example: Projected reduction area suitable for beech



Adaptation of management context

The proposed landuse adaptation measures can hardly be implemented without modifying the management context.

Compensation schemes:

Forests: Payments for Ecosystem Services (PES)

Agricultural lands: High Nature Value farming (HNV)

Alternative economic activities: tourism and ecotourism!



Grasslands – key impacts

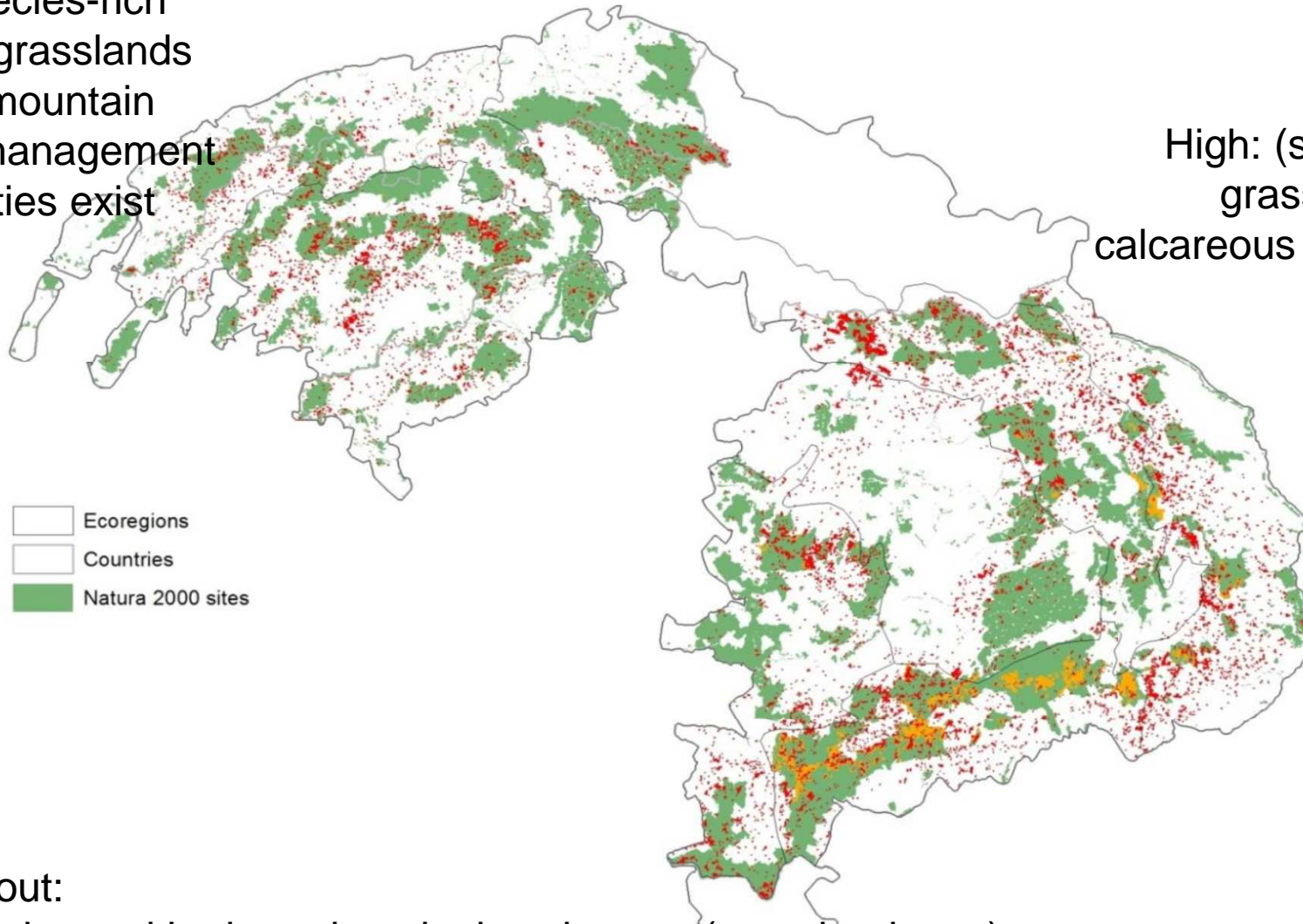
- Grasslands are of high biodiversity value, often direct result of hundreds of years of traditional management and animal husbandry
- General deterioration of grasslands due to other threats (abandonment) making grasslands more susceptible to climate change
- Habitat loss and fragmentation due to species migration and upward shifting treeline



Grasslands - vulnerability

Low: species-rich
Nardus grasslands
in (sub)mountain
areas, management
possibilities exist

High: (sub)alpine
grasslands on
calcareous substrate



Throughout:

- depends on altitude and geologic substrate (grassland type)
- land use change/abandonment (red), natural grassland (yellow)

Grasslands—recommended adaptation

Implement agri-environment measures & Natura 2000 management plans

Diversify species and breeds of crops and animals

Manage through grazing, mowing, not abandonment, mulching, fertilization

Adaptation measures can only be successful when also striving for an economically viable country side.

Example Restoration of degraded grasslands with high biodiversity value and preserving existing small grasslands and pastures

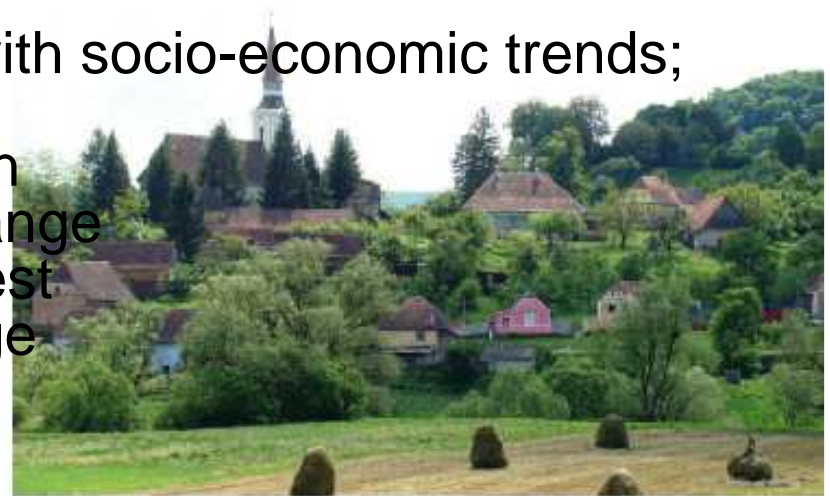
(Bükk, Hungary. Natura 2000, Habitat Directive Site)

- Removing invasive trees (acacia): 1,702 EUR/ha
- Manual clearance of bushes and scrubs: 1,361 EUR/ha
- Crashing of stalk in the soil: 340 EUR/ha
- Mechanical mowing: 477 EUR/ha (to be maintained by users)
- Costs of planting fruit trees: 4.29 EUR/tree
- Purchasing area: 1,702 EUR/ha

Benefits: Fruits, grasslands, water regulation.

Agriculture—key impacts/vulnerability

- Feasible at higher altitudes
- In parts of the Carpathians maize and wheat yields projected to decline, whilst sunflower and soya yields might increase due to higher temperatures and migration of these crops' northern limit
- Shift spring planting towards winter crops possible (winter wheat)
- Pest incidence expected to rise
- Productivity losses due to drought, groundwater depletion, and extreme weather events
- **Vulnerability** strongly interlinked with socio-economic trends; traditional mixed agro-ecosystems may disappear through combination of land abandonment, land use change and increased advancement of forest area, encouraged by climate change



Tarnava Mare

Agriculture - adaptation

- Small-scale traditional farms, which are an important economic activity in the Carpathian region, deliver multiple ecosystem services and should be supported.
- Agro-environment programmes are critical to maintain and enhance biodiversity and viability of semi-natural grasslands and mixed agro-ecosystems.
- **Example:** Stimulation of high nature farming in Romania. Farmers can voluntarily enter into a five year agreement and receive payments set at 124 EUR/ha in return for adhering to a specified set of management requirements. At present this measure cannot be implemented at case location as property rights are unresolved, especially for grasslands used for common grazing.

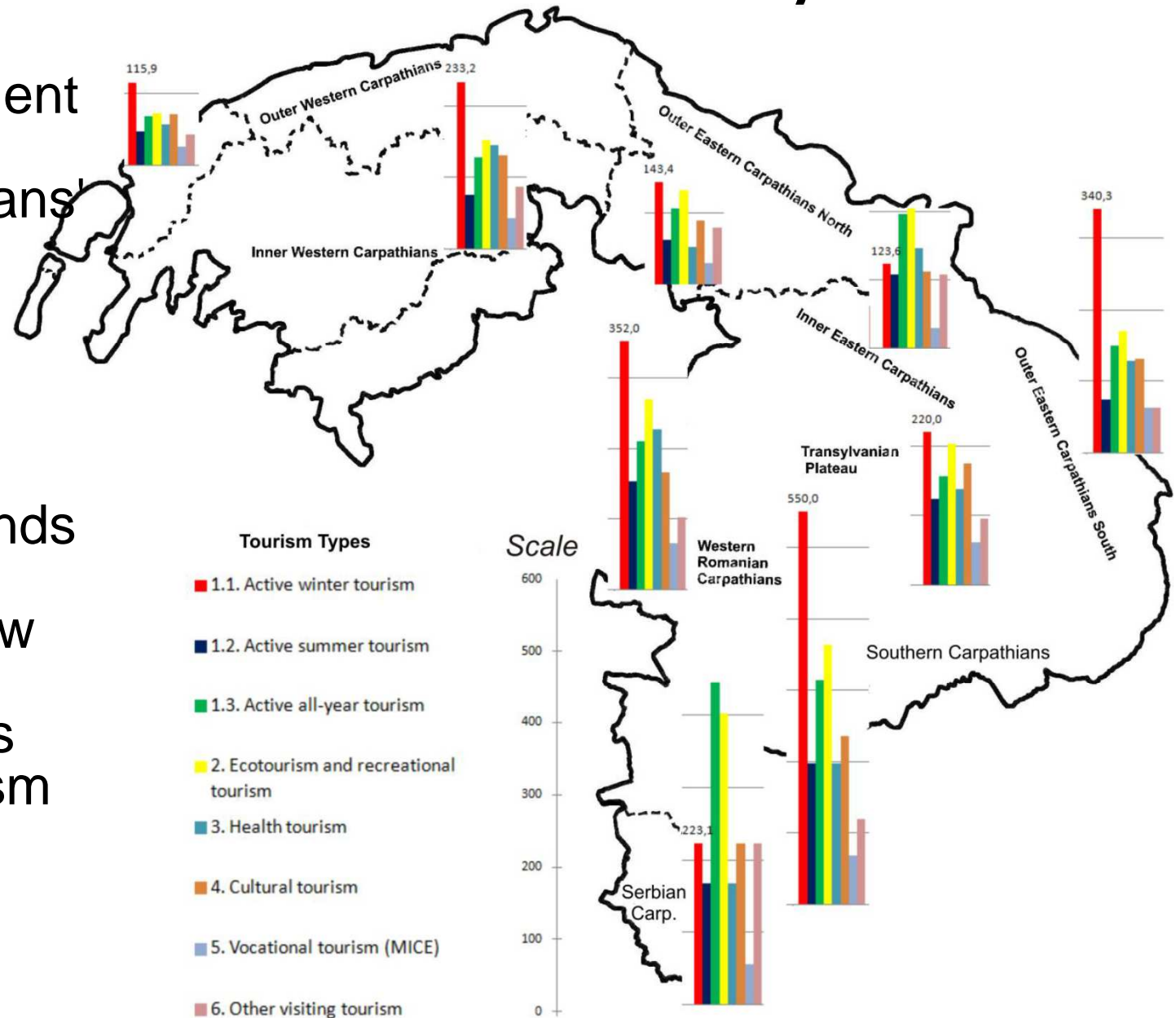
Tourism – key impacts

- Positive and negative impacts from climate change. Ecotourism, summer tourism, health tourism and vocational tourism can be positively influenced by climate change. Rising temperatures can bring more tourists to the mountains. On the other hand, the possibilities of winter sport will become more limited.
- Climate change can bring 60-75.000 additional tourists per year with 9,6-12 million EUR additional revenue for the region (only c.a. 1% of the total revenue from tourism)

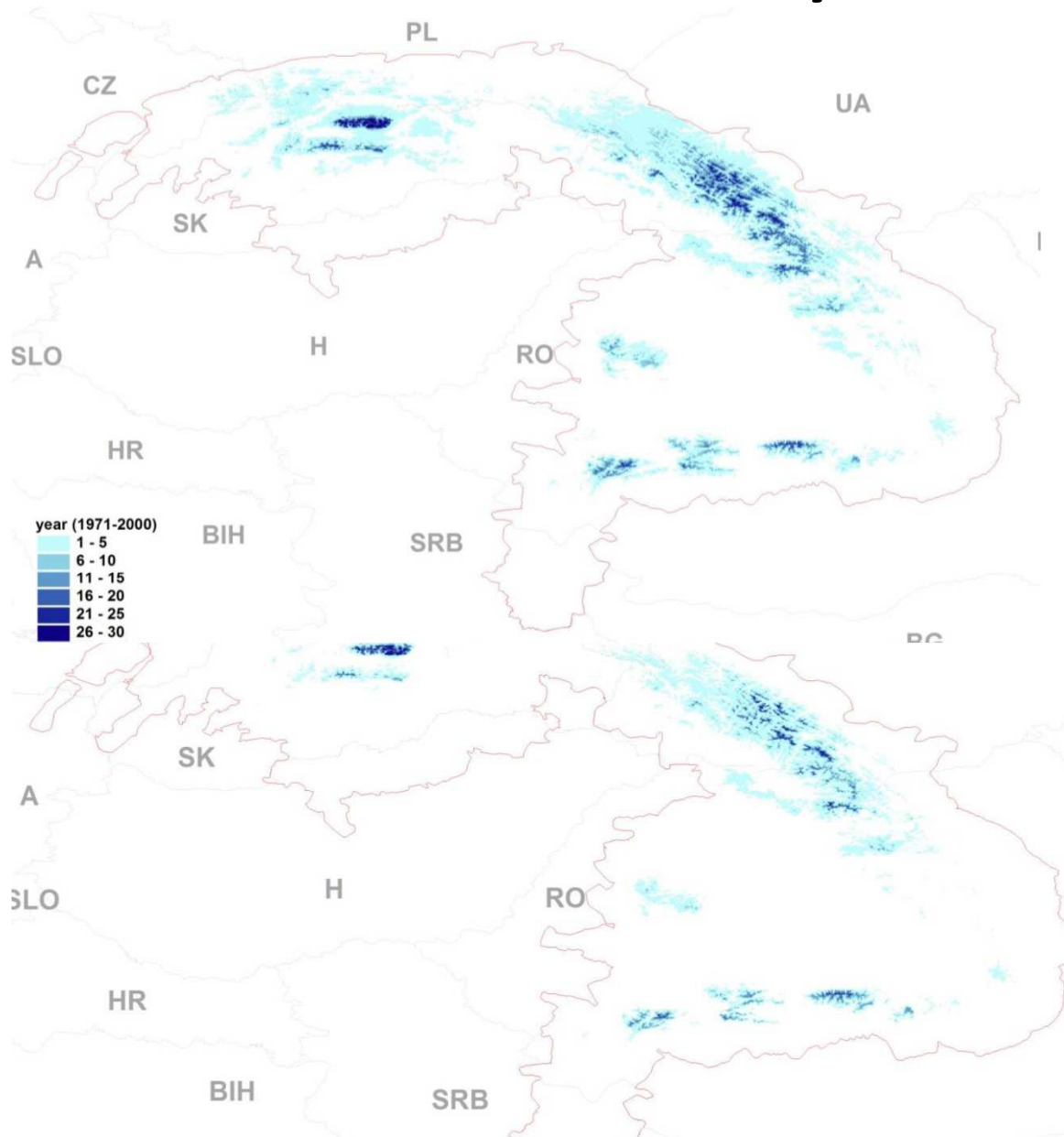
Tourism - vulnerability

Southeast-Northwest gradient of vulnerability: South-Carpathians tourism most vulnerable

As tourism is diversified, only part of visitors depends on snow availability. Snow cover/depth change has less impact on tourism turnover than



Vulnerability winter tourism



Composite indicator:

Ski resort economically viable if:

7 out of 10 winters snow cover at least 30 cm on at least 100 days between 1 Dec - 15 April

locations viable resorts:
period 1971 - 2000 (up),
period 2021 - 2050 (down)

Thank you ! Further information

- **Booklet 'FUTURE IMPERFECT'** on climate change & adaptation in Carpathian region (COP UNFCCC & Carpathian Convention)
<http://www.grida.no/publications/future-imperfect/>
- Strategic Agenda on Adaptation for Carpathian Convention
www.carpatclim-eu.org
www.carpivia.eu
www.carpathcc.eu