



## **The Important Role of Ecological Connectivity for Adaptation to Climate Change Impacts in the Alps**

### **A statement by the Platform “Ecological Network” of the Alpine Convention**

#### **Climate change in alpine-ecosystems**

Climate is one of the most important abiotic factors influencing ecosystems, and alpine systems are in particular sensitive to climate change. The prevailing populations of plants and animals are highly adapted to site characteristics. Other than lowlands, alpine systems - due to their topography - have many sites with a specific microclimate. This is one of the reasons for the high biodiversity, but also for the vulnerability towards climatic change. In the European Alps, temperatures increased by 2 °C in the last hundred years - twice the global average. As a result suitable habitats are reduced and species are forced to move to higher altitudes where temperatures are more conducive to their survival.

#### **Impacts of habitat shifts on species**

Shifts in habitat ranges can induce a range expansion for some species, for others it means a range reduction or a movement into less hospitable habitats or increased competition. Some species will have nowhere to move as they are already at the extreme margin of their habitat. In many cases movements will confront species with geographical obstructions or man-made barriers, which will need to be overcome. For numerous species, the climate of their habitat - or different habitats they use over the year - influences key stages of their annual life cycle, such as migration, blooming, and mating. The changing climate conditions can lead to mismatches in the timing of life cycle events, making growth or survival more difficult or even impossible.

#### **Consequences of biodiversity loss for alpine-ecosystems and their services**

A loss of biodiversity in the Alps, as induced by climate change, decreases the resilience of the entire ecosystem. A high number of species - as species are considered a major component part of the system - ensures the functionality of the ecosystem. Its multi-functionality can be achieved by supporting and regulating ecosystem services (such as pollination, pest, flood, and erosion control), which also provide for cultural, recreational and aesthetic ecosystem services. Furthermore, the direct and indirect effect of climate change also interacts with other stressors, which cause only minor impacts when acting alone, but their cumulative impact may lead to dramatic ecological changes intensified by the loss of biodiversity.

#### **Ecological connectivity – a necessary response to climate change in the Alps**

In order to increase ecosystem resilience and to avoid species extinction, it is crucial to provide plant and animal species with sufficient space and favorable conditions to shift their areas of occurrence. As natural colonization by species is the result of dispersal movements of individuals from a neighboring population, such a process could be promoted by providing habitat and habitat connectivity.

The pan-alpine ecological network aims to interlink existing protected areas - as main areas for species conservation - and to improve the permeability of the landscape matrix, by creating natural elements in a landscape in the form of corridors or stepping stones. As these measures enhance the colonizing capacity of alpine species, which are sensitive to climate change, they are key element to climate change adaptation.

### **Necessity of a trans-sectorial approach**

The main artificial barriers to ecological connectivity are settlements and transport infrastructures. Land use for other purposes such as agriculture, energy production or distribution, or tourism can also hinder the movement of animal and plant species. An integrated spatial planning is thus needed to provide suitable corridors for the fauna and flora between protected areas.

Creating a coherent network of existing protected areas, embedded in a multifunctional landscape allowing mutual support, can only be effective when implemented at a multinational level throughout the entire mountain range.