



Scheuchzer's cottongrass (*Eriophorum scheuchzeri*) grows on the shore of alpine glacial lakes and marshlands at the Nivolet plain, announcing the arrival of autumn.

Gran Paradiso National Park

ITALY

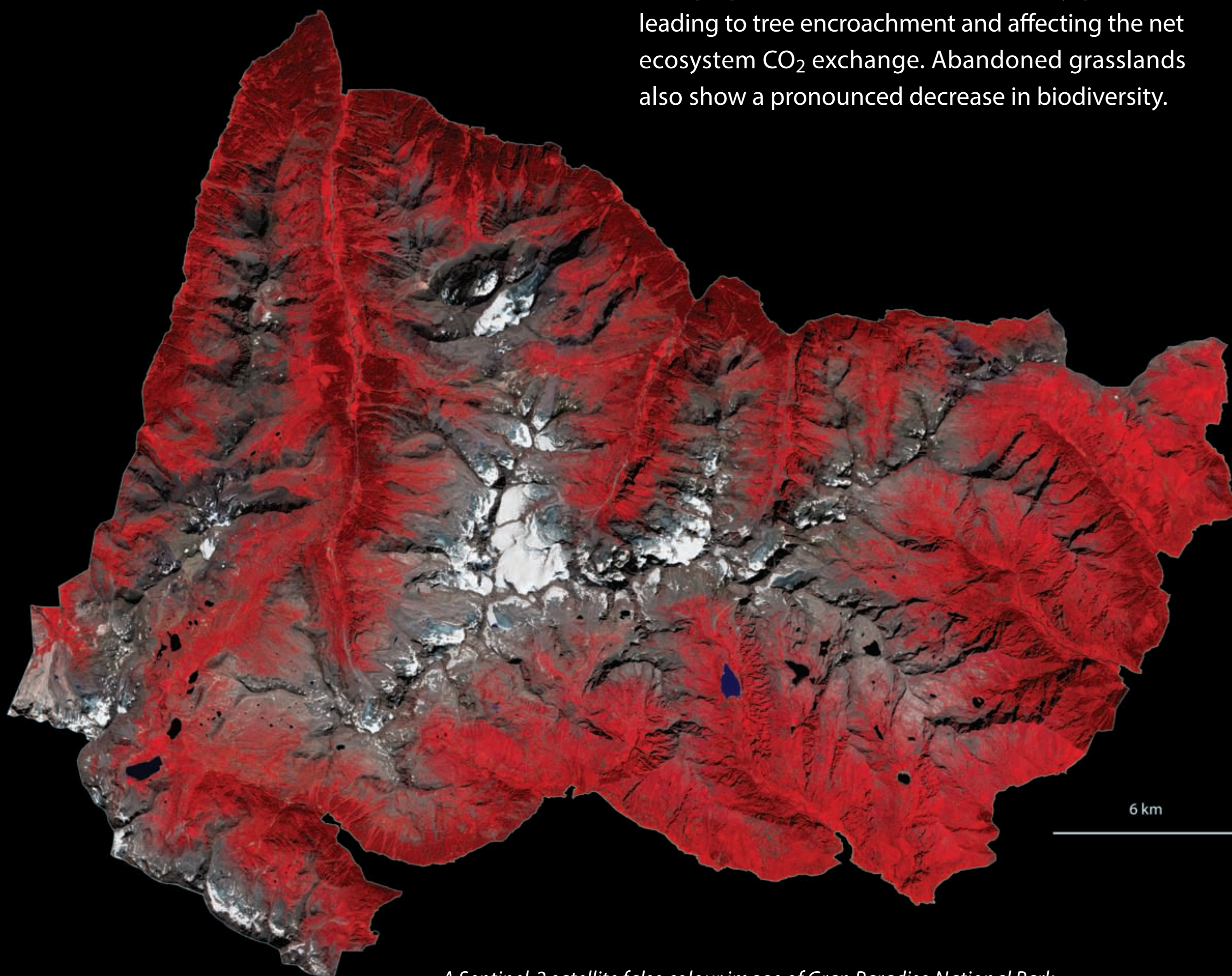
The Gran Paradiso National Park covers about 700 km² and ranges from 800 to 4,000 metres above sea level. The oldest national park in Italy, it contains deciduous and evergreen forests, grasslands, glaciers and high-altitude environments. The park hosts the original surviving population of the charismatic Alpine ibex (*Capra ibex*), as well as other specialized herbivores such as the Alpine chamois and the Alpine marmot. It

borders the Vanoise National Park in France, creating a large international protected area in the heart of the south-western Alps.

Mountain grasslands, essential to large herbivores, are semi-natural habitats that are, to an extent, the result of agropastoral activities. The abandonment of traditional management practices is therefore changing the plant composition of many grasslands, leading to tree encroachment and affecting the net ecosystem CO₂ exchange. Abandoned grasslands also show a pronounced decrease in biodiversity.

Climate change is an additional risk factor. As changes in snow- and rainfall can alter the soil water available to plants, a steep decline in specialized montane plant species is expected in the next decades. Owing to increasing temperatures and decreasing snow cover, plants are also likely to green up earlier, which can pose a threat to large herbivores as nutritious grasses must be available in late summer to successfully wean their juveniles. All such changes could seriously affect both the traditional landscapes and wild animal populations, reducing the attractiveness of the park for sustainable tourism activities.

ECOPOTENTIAL is working to assess the status of the mountain grasslands in the Gran Paradiso National Park by investigating the ongoing and expected changes in rainfall, plant productivity, biodiversity and carbon cycling in meadows under different climatic and land-use regimes. Special attention is being paid to the changes affecting the Earth Critical Zone, the layer between the undisturbed rocky matrix below and the top of the vegetation above that represents the life support system for all terrestrial organisms.



A Sentinel-2 satellite false colour image of Gran Paradiso National Park acquired on 23 August 2016. Red and brown areas correspond to active vegetation (forest and prairies) while grey and white areas correspond to rocky and snow covered land.

Produced from ESA remote sensing data (Sentinel-2). False colour – 23 August 2016. Image processed by CREA for ECOPOTENTIAL.



Measuring the fluxes of carbon dioxide helps to understand the cycling of elements between soil, living organisms and the atmosphere in alpine grasslands.



The chamois (*Rupicapra rupicapra*) is the most abundant ungulate in the park.



The Nivolet plain was formed by glacial erosion from the quaternary period. It is the highest alpine grassland in the Alps (2,700 meters above sea level). Several glacial lakes contribute to the beauty of this landscape and make it a favourite spot for hikers.



Mid-altitude valleys have been abandoned by shepherds, and tree encroachment is taking place. In some valleys, traditional mowing is being reintroduced and regulated.