

## MONITORING MOUNTAIN GRASSLAND TO SUSTAIN WILD HERBIVORES

*Combined use of Earth observation data and empirical models support the management of wild herbivores and biodiversity of the Gran Paradiso National Park, in Italy.*

### The challenge

High-altitude grasslands, essential for the sustainment of mountain herbivores, are semi-natural habitats resulting from agro-pastoral activities and represent more than 30% of the surface in Gran Paradiso National Park.

The abandonment of traditional management practices, together with climate change, are altering their plant composition and growth, leading to tree encroachment, affecting the net ecosystem CO<sub>2</sub> exchange and causing a decrease in biodiversity.

All such changes can seriously affect both the traditional landscapes and wild animal populations, also reducing the attractiveness of the park for sustainable tourism.

Detailed surveys are necessary but extremely difficult in remote areas covered with snow for a large part of the year.

### The space based solution

The H2020 project ECOPOTENTIAL assessed the status of mountain grasslands in Gran Paradiso National Park by investigating the ongoing and expected changes in rainfall, plant productivity, biodiversity and carbon cycling in meadows under different climatic, environmental and land-use regimes, using in situ data, models and climatic projections, and deriving plant productivity, snow cover, surface temperature, as well as changes in land cover from MODIS, Landsat and Copernicus Sentinel 2 data.

The park managers and the scientific staff can now rely on Earth observation derived data, elaborated using several models and algorithms, to programme and optimise field surveys and management actions.

Remote sensing derived data like vegetal biomass growth, weekly updated snow cover maps and identification of anticipation of green-up inform empirical models on the dynamics of large herbivore populations that can be used by the park technical staff to understand criticalities affecting population trends.

### Benefits to Citizens

The use of Earth observation products has led to a deeper knowledge of the park's territory, enabling better management of the park and the optimisation of its resources. This has also resulted in a reduction in the cost of on-site monitoring and targeting management intervention, resulting in a more efficient use of public economical resources.

In particular, maps of land use change can be used for planning interventions in the management of forest encroachment as well as in informing the management plan of the park and taking decisions regarding permitting.



High altitude grasslands at the Nivolet Plain (Gran Paradiso National Park).  
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Thematic Area



**BIODIVERSITY AND ENVIRONMENTAL PROTECTION**

Region of Application



**VALLE D'AOSTA and PIEMONTE**

Sentinel mission used



S2

Copernicus Service used



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Usage Maturity Level

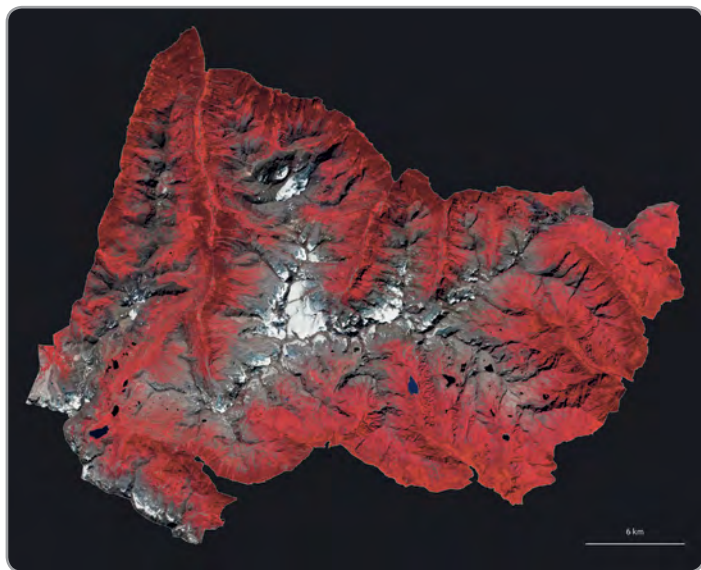


4

The array of available data, also combined with population dynamics and distribution models, allows more effective monitoring of the park's biodiversity and herbivores' survival. Overall, more effective knowledge-informed decisions can be taken, allowing an improvement of conservation of the natural landscape and animal populations that also sustain ecological tourism in the Park, whose mission is to protect species and habitats, contributing to the implementation of the EU biodiversity strategy, and to preserve important ecosystem services such as water and climate regulation.

## Outlook to the future

Protected areas need multiple monitoring tools, combined with ecological and biogeochemical modelling and data analysis. The ECOPOTENTIAL project is currently working with 24 protected areas across Europe and beyond in improving the use of Earth observation for the management of protected areas. ECOPOTENTIAL



Copernicus Sentinel-2 false colour image of Gran Paradiso National Park. Red and brown areas correspond to forest and prairies (acquired on 23/07/2016).

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Credit: Contains modified Copernicus Sentinel data [2016]

“The use of Sentinel data has improved the control and management of high altitude grasslands providing plenty of information for remote areas.”

**Ramona Viterbi**  
*Gran Paradiso National Park*

is developing an open on-line platform linked to the information system of the international Group on Earth Observations, which will host remote sensing derived data, ecological models and tools targeted to protected areas, that can also be used by non-experts in remote sensing technologies.

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Mariasilvia Giamberini<sup>1</sup>, Antonello Provenzale<sup>1</sup>, Simona Imperio<sup>2</sup>, Iliaria Baneschi<sup>1</sup>, Ramona Viterbi<sup>3</sup>

1. National Research Council of Italy, IGG-CNR, Italy
  2. Italian National Institute for Environmental Protection and Research, Italy
  3. Gran Paradiso National Park, Italy
- Email: [giamberini@igg.cnr.it](mailto:giamberini@igg.cnr.it)

## ABOUT COPERNICUS4REGIONS

This Copernicus User Story is extracted from the publication “**The Ever Growing use of Copernicus across Europe's Regions: a selection of 99 user stories by local and regional authorities**”, 2018, Edited by NEREUS, the European Space Agency and the European Commission.

The model cases focus on local and regional authorities who successfully applied Copernicus data in 8 major public policy domains. The views expressed in the Copernicus User Stories are those of the Authors and can in no way be taken to reflect the official opinion of the European Space Agency or of the European Commission.

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