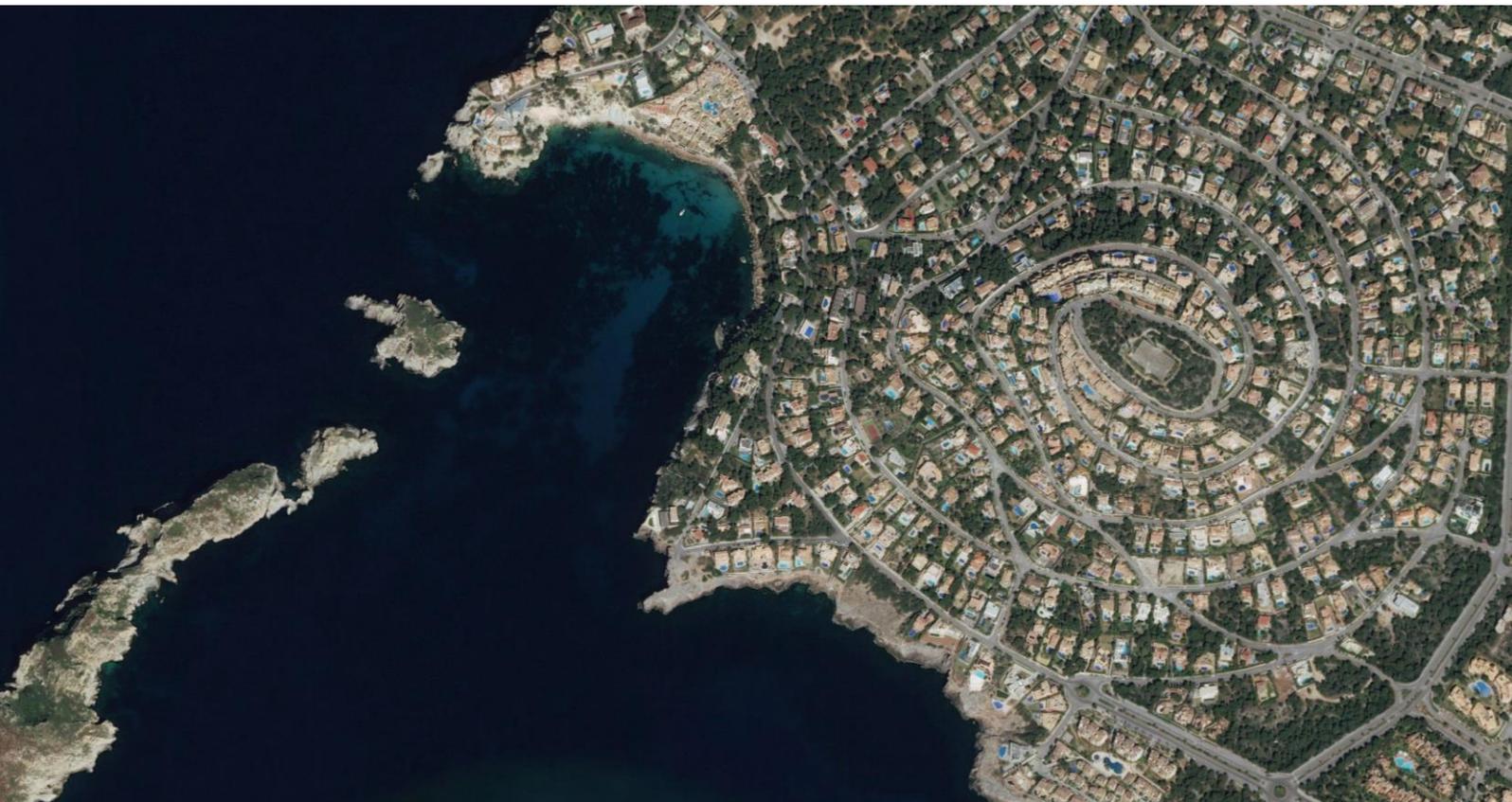


Tourism and the environment

Towards a reporting mechanism in Europe



ANNEX 13. Indicator assessment TOUR07

Spatial impact of tourism facilities (3). Ski resorts



Cover design: ETC/ULS

Cover photo: Coastal urbanisation in Mallorca (Spain), © Bing Maps

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Indicator name: TOUR007 – Spatial impact of tourism facilities (3). Ski resorts

Assessment

Indicator name

TOUR007c - Spatial impact of tourism facilities (3): Land take near ski resorts

Key policy question

Are the spatial impacts from tourism infrastructures being controlled?

Key message

Ski resorts and their related infrastructure (slopes, lifts) have a major impact on sensitive mountain environments. The construction of ski slopes and lifts consistently damage the existing high mountain ecosystems and increase the risks for avalanches. At the same time, high mountain ecosystems are protected widely through the Natura 2000 network, which leads to a potential pressure exerted by skiing activities and their infrastructures on protected areas.

On the other hand, skiing is one major pillar of economic development in mountain regions and is concentrated at specific points in the different mountain ranges in Europe exerting pressures on a larger area by the need of new developments to provide needed services. The seasonal increase of population in the skiing resorts also raises questions about resource use, waste and pollution in these areas.

Key assessment

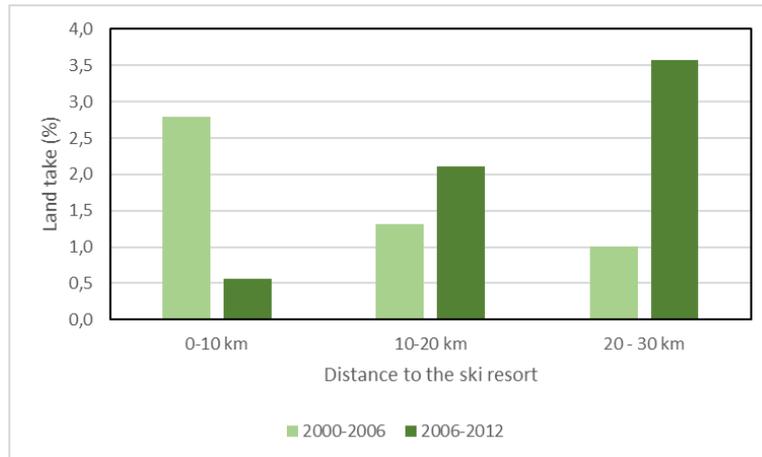
Ski slopes and lifts are concentrated in Europe's high mountain ranges such as the Alps, Pyrenees, Carpathian and Scandinavian mountain ranges, as well as a number of lower mountain ranges over central, eastern and south-eastern Europe, Spain and Italy, as well as the British Islands (see Map 2.16). The French, Swiss, Italian and Austrian Alpine regions stand out, containing the first ten regions in terms of length of ski slopes and lifts per NUTS3 regions.

During the period 2000-2006 about 210 ha in the 30 km vicinity of the ski resorts in the Pyrenees were taken for new developments (including sport infrastructures). This corresponds to an increase of 1.7 % compared to already developed land in 2000. However, the highest land take occurs on the closer region to the ski resorts (10 km service area), while it is progressively decreasing as we move further. This pattern is opposite to the one observed in the next subsequent period (2006-2012): there is a strong decrease on land take in the first 10 km, while increasing by 60% on the 20 km and more than 200% on the further distance (up to 30 km). These changes are also paired with the spatial allocation of new settlements: from 2000-2006 to 2006-2012 there is a move towards lower elevation and more flat areas.

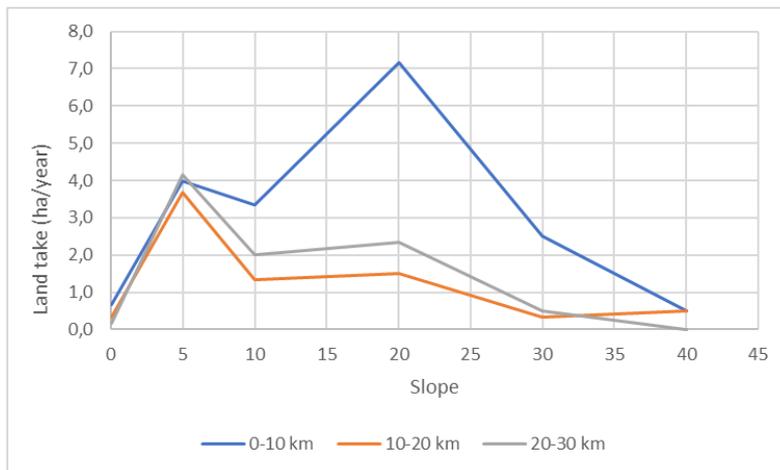
Drivers of land take depend on the distance to the ski resorts, but also change by time. Looking at the first 10 km, diffuse residential areas, followed by commercial areas are relevant on both periods. Main differences between both periods are the decrease on the sport and facilities, and increase on construction sites. These trends show the dynamics of the area and, also, the adaptation of new demands to overcome the seasonality.

All these developments have been at expenses of pastures and mosaics in both periods. Pastures are important mountain landscapes that contribute to biodiversity and C sequestration. Therefore, new developments close to ski resorts exert a high pressure on these systems.

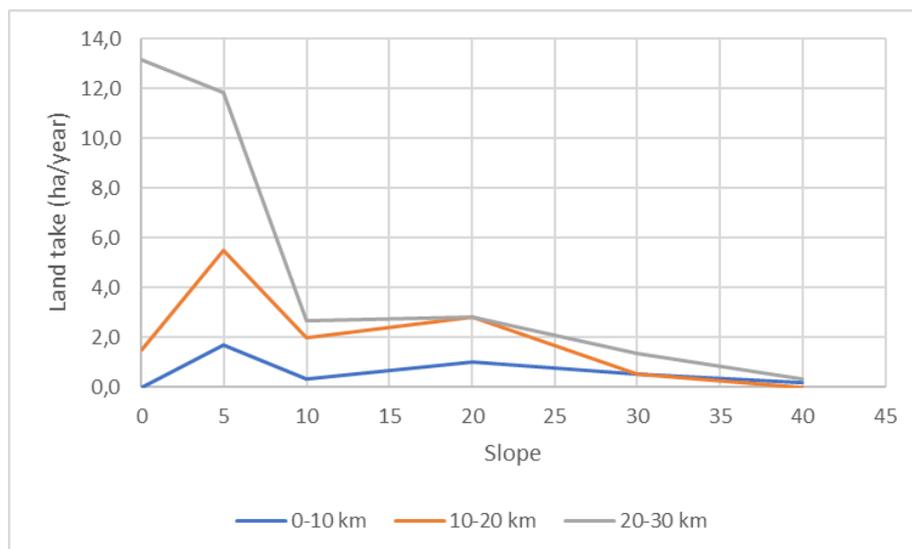
Land take as percentage of artificial land at the beginning of each period. Pyrenees



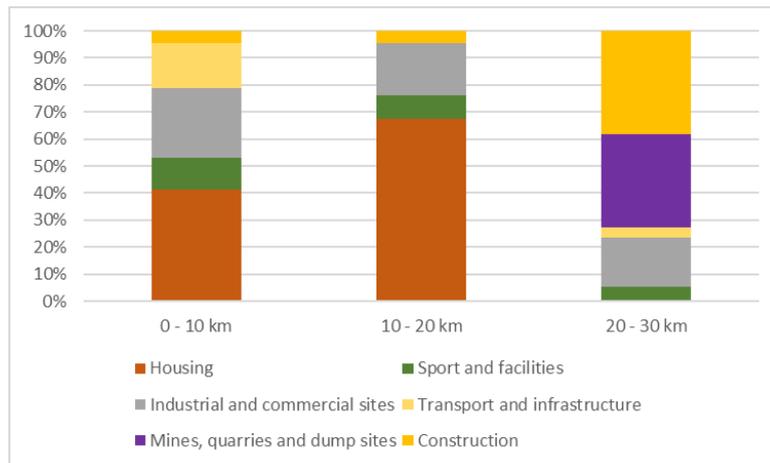
Distribution of land take by slope and distance to ski resorts. 2000-2006. Pyrenees



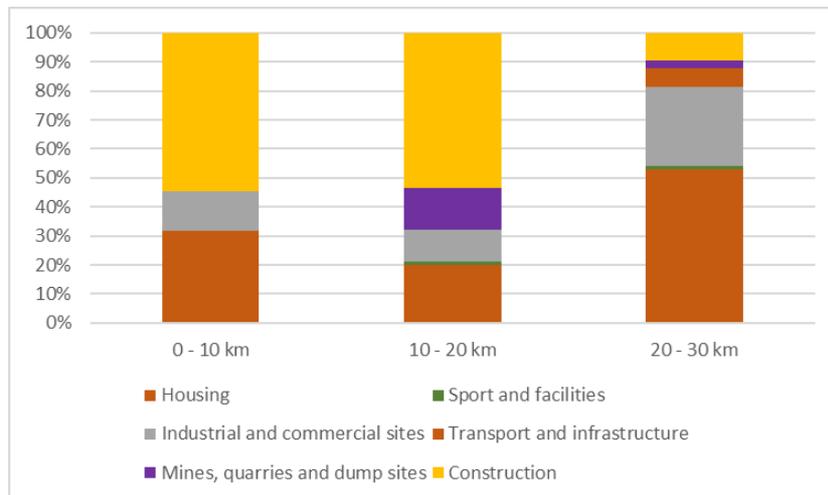
Distribution of land take (ha/year) by slope and distance to ski resorts. 2006-2012. Pyrenees



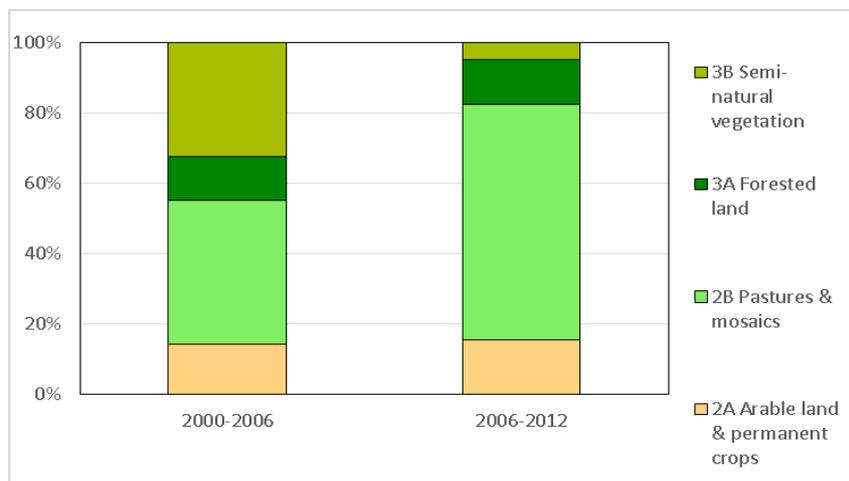
Drivers of land take (2000-2006) in the three buffers delineated around the ski resorts. The figure shows the distribution of new uses of the land taken during the period 2000-2006. Pyrenees



Drivers of land take (2006-2012) in the three buffers delineated around the ski resorts. The figure shows the distribution of new uses of the land taken during the period 2000-2006. Pyrenees



Relative contribution of land-cover categories to the land taken in the period 2000-2006 and 2006-2012 on the Pyrenees (ski resorts accessible at a maximum distance of 30 km)



Specifications

Indicator definition

Length of ski lifts per km².

Land take (as percentage of initial artificial areas) at 10, 20 and 30 km distance of ski resorts.

DPSIR

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Rationale

The length of slopes and lifts is an indication of the physical impact and intensity of use of the skiing resorts. The longer the slopes the higher the fragmentation of habitats and the risks of avalanches. The longer the lift lines, the higher the amount of sealing of land and the infrastructures needed for construction. Mountain areas include very sensitive systems. Ski resorts and associated economic activity need to be carefully planned to minimise the impact on such systems.

Policy context

Habitat Directive.

Regional development funds (Alpine Space Programme, Caparthian Convention).

Conservation of habitats.

Regional sustainable development.

Methodology for indicator calculation

There is no Pan-European layer for ski slopes, lifts or areas. Data on ski runs and lifts are extracted and filtered from OpenStreetMap (OSM) data. The lines related to ski runs and lifts are tagged accordingly in the OSM files. The different line features can be summarized and overlaid with the EEA Reference grid to map the length of ski slopes and lifts per square kilometre. For the ski area, the convex hull of the line features is calculated and taken as polygon of the ski area. Three service areas have been delineated around the limits of the ski resorts: 0-10 km, 10-20 km, and 20-30 km. Each service area includes a region that could access a ski resort within a maximum distance taking the existing roads. For each service area land take has been calculated based on the changes of Corine Land Cover (CLC) for periods 2000-2006 and 2006-2012.

Data specifications

Data source: OpenStreetMap.

Data sets uncertainties

Being OpenStreetMap a voluntary mapping effort, the completeness and correctness of the dataset cannot be ensured completely. Not all ski areas may have been mapped in OSM, especially in remote mountain areas.

Ownership and contacts

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