Geophysical Research Abstracts
Vol. 12, EGU2010-849, 2010
EGU General Assembly 2010

GIS-based analysis of tourist impact in mid-mountain protected natural area, Gorce National Park, Poland

Aleksandra Tomczyk
Institute of Geoecology and Geoinformation, Adam Mickiewicz University, Poznan, Poland (alto@amu.edu.pl)

Many of the middle mountain areas are especially valuable due to high bio- and geo-diversity. Therefore, this areas are often protected by law in form of National or Landscape Park, as well as Natura 2000 Network. Moreover, mountain areas usually attract significant amount of tourist. Hence, environment is subject to combination of different forces including human impact (tourism, forest management, pasture) as well as natural processes. Usually areas with low environmental resiliency are, simultaneously, very valuable from ecological point of view and attractive as tourist regions.

Hiking, biking and horse riding on the tourist trails are one of the basic forms of exploration of protected areas. Apart from a tourist function, trails have a significant ecological role – they limit walking to prepared paths and prevent dispersing of visitors. Thus the terrains, which for ecological reasons have to be excluded from direct human impact, are isolated. On the other hand using of tourist trials can have negative effect on the environment. The most important manifestation of this type of impacts is destroying of plant cover by trampling and running over. It leads to expose of a bare soil and, in consequence, to initialize and accelerate of natural erosion process. Improperly using of tourist trails and forest roads may lead to develop of gullies and significant degradation of environment. Hence, reasonable management of tourist activities, forestry and pasture is necessary for sustainable development in the mid-mountain areas. Study of tourist impact together with the assessment of susceptibility of the environment to degradation can be very helpful for planning and conservation activities. Analysis of spatial data within geographic information system (GIS) supply a very useful tool for estimating, modeling and establishing the relationships between tourist impact and environmental resiliency. This study presents implementation of the GIS analysis within one of the Polish mountainous protected areas: Gorce National Park (GPN). Data for the study came from two main sources:
A) existing materials – topographic and thematic maps, DEM, orthophotos
B) field acquired data – the following variables were recorded along the tourist trails and roads: (1) trail width (width of trampled vegetation cover); (2) trail incision; (3) surface type; (4) vegetation communities; (5) infrastructure; (6) level of impact (from minimal to serve impact); (7) other indicator of tourist activity like litters, “informal” tracks etc.

Results. In case of Gorce National Park environmental vulnerability is mostly controlled by topographic factors (i.e. slope and aspect) and in less degree by vegetation cover and soil types. The most vulnerable areas concentrate in the north part of the Park, in the zone of hillslopes. Valley floors and upper parts of the ridges are more resistant to degradation, mainly due to lower value of slopes. The highest potential tourist capacity is along the main ridges of Gorce Mountains. Also meadows and pastures are highly resistant to tourist impact. Although overall environmental susceptibility in Gorce National Park is rather low, a lot of roads and trails lead through less resistant areas. In consequence, they have substantial impact on environment and cause severe degradation of plant communities and soil cover. Data delivered by this study can be helpful for Park managers to promote some areas which are more resilient and, in such a way, to better protect of vulnerable parts of Parks. Activities causing heavier impact (i.e. horse riding, biking) would be rather allowed in more resistant parts of park. Also some of the forest roads should be not used for timber carting, because heavy tractors cause large impact on ground and should not be used in prone areas.