

Orienteering in Tejo Internacional Natural Park



ABSTRACT

The growing demand for rural areas for tourist and recreational purposes, with special focus on areas of higher landscape value, requires the need to reconcile the enjoyment of these areas with the preservation and conservation of natural values. Thus arose the need to develop a methodology of land use management supported by multicriteria spatial analysis tools. To determine the areas with suitability for the practice of active recreational activities, it was used biophysical and socio-economic data, that allowed the characterization of the territory and its use by different stakeholders. On the other hand, it was analyzed information on the specifics of a nature sport in order to identify the constraints and potentials for your practice. As a result we obtained a Suitability Map for Orientation of the Tejo International Natural Park (PNTI) in order to support their sustainable management.



INTRODUCTION

Orientation includes all activity that makes use of a map to decide on the best path to take between two locations. The practitioner attempts to perform a route previously defined and marked on a map, visiting a variable set of checkpoints that are materialized on the ground for beacons.

From the review of literature it appears that the practice of activities identified as Nature Sport are associated with negative effects on the biophysical system (Leung et al., 1987). GFANC (1997) divides the actions associated with recreational activities generating impacts in five categories:

- a) the practice of the activities themselves;
- b) equipment and spaces to support sport activity;
- c) the basic infrastructure;
- d) effects induced indirectly.

Research on the environmental impact of particular orientation has been conducted in two main areas: the trampling of vegetation and disturbance of animals, with particular regard to mammals and birds.

IOF (2005) concluded that, in events with less than 2500 participants, there is a low impact and a rapid recovery of vegetation. However, there are areas where vegetation is more sensitive to impacts. The protection of these areas is usually taken into account, preventing that the carrying capacity is exceeded.

Campos (2001) analyzed the impact on the vegetation of evidence held in the Peneda-Gerês National Park and concluded that the effects have taken on a magnitude and low significance, and rapid recovery of the initial conditions.

With respect to wildlife, the fact that the orientation be classified as an ephemeral activity, causes no significant impact (Liddle, 1997; Parker, 2009).



METHODS

- Identification of areas suitable to practice Orienteering as well as the constraints to the integration of a number of factors using the ArcGIS program [Table 1].
- Rating factors in three levels of suitability, calculated by applying a method of multicriteria spatial analysis - Analytical Hierarchy Process (AHP) [Figure 2]. The methodology divides the problem into hierarchical levels of decision making. After the hierarchy of the problem in each level, the criteria that influence the decision making are compared two by two (pairwise comparison) a square matrix decision, based on a scale of importance the nine numerical values. For this analysis we used the AHP Extension (Marinoni, 2009).
- The Analytical Hierarchical Process (AHP) of the criteria was based on the weighting obtained for all criteria listed in Table 2. The AHP process is completed by determining the relative importance of each criterion and the validation of the consistency of these operations.

Table 1. Matrix synthesis of the environmental impacts of recreational activities.

		ACCIONES											
Participantes de la actividad	Votación	Presencia de personas en el evento (número de asistencias)	Eficacia en la realización de actividades	Eficacia en la realización de actividades	Clasificación de las personas en el evento	Clasificación de las personas en el evento	Deposición de las personas en el evento	Módulos de las acciones					
								Manejo de la información	Manejo de la información	Manejo de la información	Manejo de la información	Manejo de la información	Manejo de la información
Pedagogía	Expansión	-1.1	0	-1.1	-1.1	0	-1.1	-1.1	-1.1	0	-1.1	0	-1.1
Química	Química	-1.1	-1.1	-1.1	-1.1	-1.1	-1.1	-1.1	-1.1	-1.1	-1.1	-1.1	-1.1
Historia	Historia	0	0	0	0	-1.1	-1.1	0	0	0	-1.1	0	-1.1
Biología	Biología	-1.1	0	0	0	0	0	0	0	0	-1.1	0	-1.1
Matemáticas	Matemáticas	-1.1	0	-1.1	-1.1	0	-1.1	-1.1	-1.1	-1.1	-1.1	-1.1	-1.1
Arte	Arte	-1.1	0	-1.1	-1.1	0	-1.1	-1.1	-1.1	-1.1	-1.1	-1.1	-1.1
Deportes	Deportes	-1.1	0	-1.1	-1.1	0	-1.1	-1.1	-1.1	-1.1	-1.1	-1.1	-1.1
Idiomas	Idiomas	-1.1	0	-1.1	-1.1	0	-1.1	-1.1	-1.1	-1.1	-1.1	-1.1	-1.1
Informática	Informática	-1.1	0	-1.1	-1.1	0	-1.1	-1.1	-1.1	-1.1	-1.1	-1.1	-1.1
Psicología	Psicología	-1.1	0	-1.1	-1.1	0	-1.1	-1.1	-1.1	-1.1	-1.1	-1.1	-1.1
Geografía	Geografía	-1.1	0	-1.1	-1.1	0	-1.1	-1.1	-1.1	-1.1	-1.1	-1.1	-1.1
Religión	Religión	-1.1	0	-1.1	-1.1	0	-1.1	-1.1	-1.1	-1.1	-1.1	-1.1	-1.1
Política	Política	-1.1	0	-1.1	-1.1	0	-1.1	-1.1	-1.1	-1.1	-1.1	-1.1	-1.1
Legislación	Legislación	-1.1	0	-1.1	-1.1	0	-1.1	-1.1	-1.1	-1.1	-1.1	-1.1	-1.1
Medio Ambiente	Medio Ambiente	-1.1	0	-1.1	-1.1	0	-1.1	-1.1	-1.1	-1.1	-1.1	-1.1	-1.1
Seguridad	Seguridad	-1.1	0	-1.1	-1.1	0	-1.1	-1.1	-1.1	-1.1	-1.1	-1.1	-1.1
Salud	Salud	-1.1	0	-1.1	-1.1	0	-1.1	-1.1	-1.1	-1.1	-1.1	-1.1	-1.1
Trabajo	Trabajo	-1.1	0	-1.1	-1.1	0	-1.1	-1.1	-1.1	-1.1	-1.1	-1.1	-1.1
Comunicación	Comunicación	-1.1	0	-1.1	-1.1	0	-1.1	-1.1	-1.1	-1.1	-1.1	-1.1	-1.1
Transporte	Transporte	-1.1	0	-1.1	-1.1	0	-1.1	-1.1	-1.1	-1.1	-1.1	-1.1	-1.1
Defensa	Defensa	-1.1	0	-1.1	-1.1	0	-1.1	-1.1	-1.1	-1.1	-1.1	-1.1	-1.1
Relaciones	Relaciones	-1.1	0	-1.1	-1.1	0	-1.1	-1.1	-1.1	-1.1	-1.1	-1.1	-1.1
Administración	Administración	-1.1	0	-1.1	-1.1	0	-1.1	-1.1	-1.1	-1.1	-1.1	-1.1	-1.1
Finanzas	Finanzas	-1.1	0	-1.1	-1.1	0	-1.1	-1.1	-1.1	-1.1	-1.1	-1.1	-1.1
Marketing	Marketing	-1.1	0	-1.1	-1.1	0	-1.1	-1.1	-1.1	-1.1	-1.1	-1.1	-1.1
Recursos Humanos	Recursos Humanos	-1.1	0	-1.1	-1.1	0	-1.1	-1.1	-1.1	-1.1	-1.1	-1.1	-1.1
Proyectos	Proyectos	-1.1	0	-1.1	-1.1	0	-1.1	-1.1	-1.1	-1.1	-1.1	-1.1	-1.1
Investigación	Investigación	-1.1	0	-1.1	-1.1	0	-1.1	-1.1	-1.1	-1.1	-1.1	-1.1	-1.1
Comercio Exterior	Comercio Exterior	-1.1	0	-1.1	-1.1	0	-1.1	-1.1	-1.1	-1.1	-1.1	-1.1	-1.1
Industria	Industria	-1.1	0	-1.1	-1.1	0	-1.1	-1.1	-1.1	-1.1	-1.1	-1.1	-1.1

Legenda: Signif. (C) Negativa (C)		Duración: Temperatura (C) Presencia (P)		Módulos: Signif. (C) Negativa (C)	
0	Imperceptible	0	Imperceptible	0	Imperceptible
1	1	1	1	1	1
2	2	2	2	2	2
3	3	3	3	3	3
4	4	4	4	4	4
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100	100	100	100	100	100

Source: Cardoso and Quinta-Nova (2008).

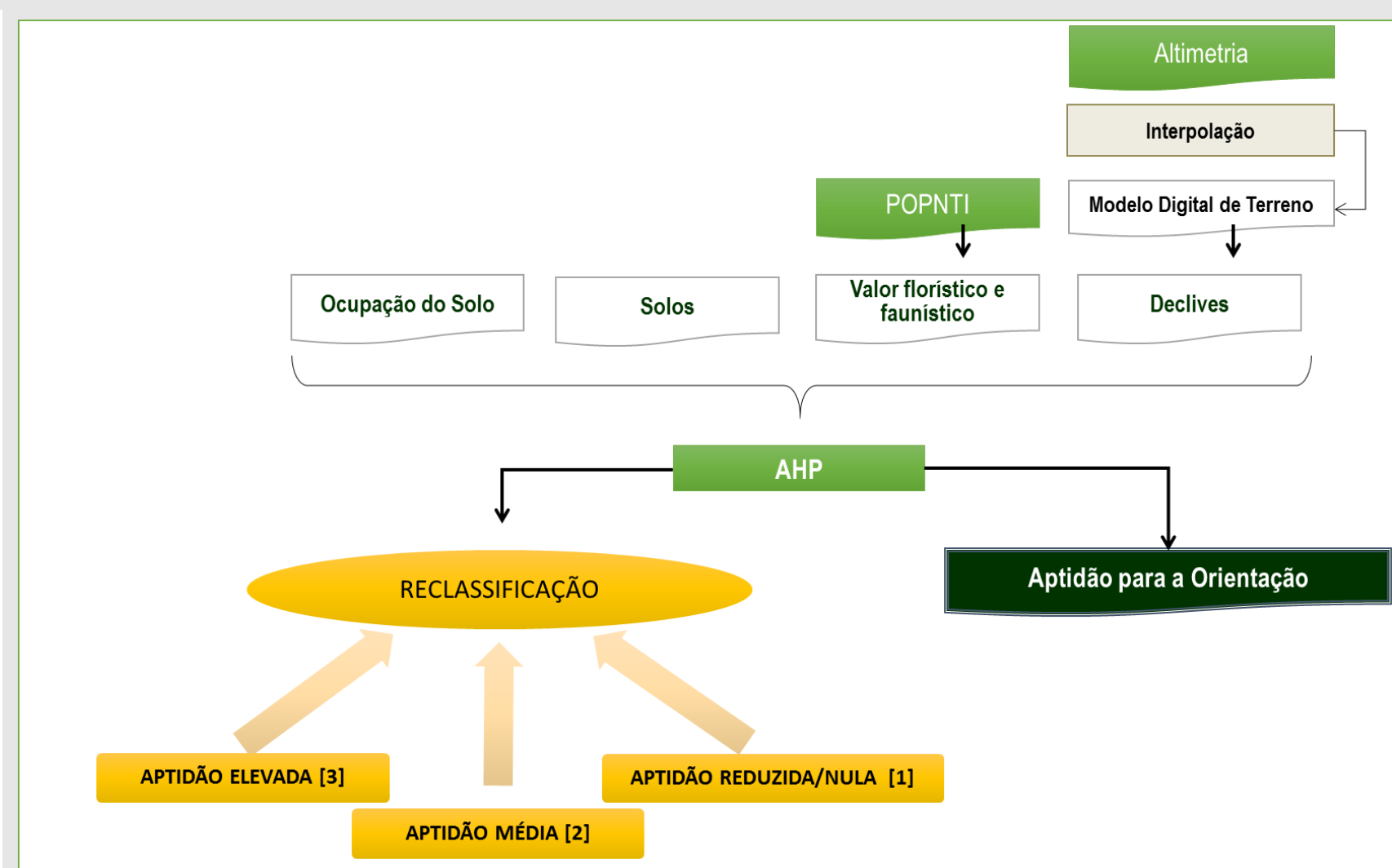


Figure 2. Method Scheme

Table 2. Criteria considered in the AHP

Criteria	Description
Slope	The influence of slope as a constraint for the sport's practice
Conservation Status	Constraint of using areas inside PNTI with higher value for conserving animal and plant species.
Soils	Different soil types have different responses to trampling.
Land Use	Vegetation vulnerability to trampling (crops and habitats) and the interest to practice Orienteering.

RESULTS

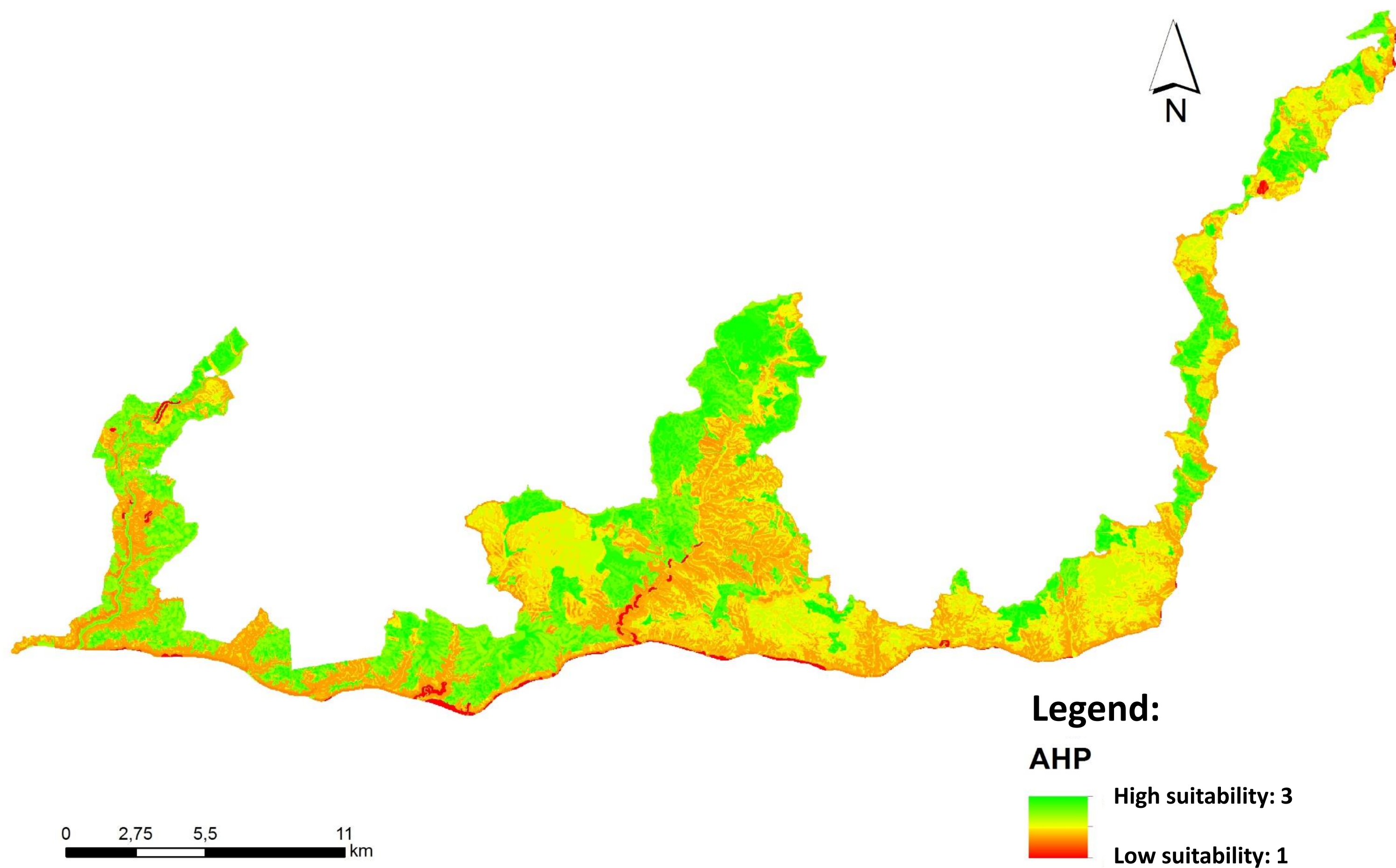


Figure 3. Suitability Map for Orienteering practice in Tejo Internacional Nature Park

- The map of suitability for Orienteering practice in PNTI highlights areas with biophysical characteristics and legal constraints, being a tool to support their sustainable management.