A tool for visitor management in protected areas.
20 TOURIST PLACES

That need to be protected

Millions of visits per year
The overcrowding of tourist destinations
Where are the limits?

Venice 30,000 tourists/day
60,000 inhabitants

Barcelona 12.6 M tourists/year
The concept of tourist carrying capacity

The World Tourism Organization (WTO) proposes the following definition:

"The maximum number of people who can visit a tourist destination at the same time, without causing destruction of the physical, economic, socio-cultural environment and an unacceptable decrease in the quality of visitor satisfaction".

This definition has a series of components / dimensions: ecological-environmental, cultural, economic, psychological (resident and tourist) that make its practical application difficult.
Our tourist destinations are the protected areas

What is a protected area?

“A clearly defined, recognized, dedicated and managed geographical space, through legal means or other types of effective means to achieve the long-term conservation of nature and its ecosystem services and their associated cultural values” (IUCN, 2008)

OBJECTIVES

1º CONSERVATION

2º SOCIOECONOMIC DEVELOPMENT

3º PUBLIC USE: (Management of tourists / visitors)
How many visitors receive the protected areas?

The set of global protected areas receives 8,000 M visits / year

National Parks of the United States: 300 M / year

National Parks Canada: 282 M / year

In the United Kingdom, the Peak District National Park is one of the most visited national parks in the world, 12 M / year
Visitors on natural protected areas.

Total number of visits / year received by **Spanish protected areas**: at least 30 million. Slight growth in recent years.

The **15 national parks** currently receive about 15 M / year.
It causes serious management problems for those responsible for these spaces:

- Impacts on natural and cultural resources
- The increase in the influx of visitors to protected areas and poor planning
- Impacts on the culture of the local population
- Dissatisfaction of the visitors
- Sorting problems due to the use of space between different users

* Sorting problems due to the use of space between different users
The concept of carrying capacity for public use:

“The maximum level of visitors that a given area can support with the least ecological impact and the highest possible level of satisfaction during the visit”.

MULTIPLE APPLICATIONS....

- Natural heritage:
  - Protected areas (system of public use)
    * Walking trails
    * Beaches
    * Gorges
    * Diving...

- Cultural heritage:
  * The Alhambra
The concept of carrying capacity

In order to estimate the overall value of the carrying capacity, the physical, ecological and psychological carrying capacity is analyzed individually.

**Physical carrying capacity**, number of visitors that a specific area can accommodate according to their own physical characteristics (dimensions, difficulty of transit, etc.) and of the host facilities linked to it (trails, parking, recreational areas, viewpoints, etc.).

In the case of TRAILS, the methodology of Cifuentes (1992; 1999) is applied:

\[ \sum \left( \frac{DT \cdot TT}{DG \cdot TV} \right) \cdot PG \]

Where,

- **DT**: total distance of the trail.
- **DG**: recommended average distance between groups (40 m).
- **TT**: daily visit slot (about 8 h).
- **TV**: average time dedicated to the visit.
- **PG**: average number of people per group.
Moncayo Natural Park

Path of ascent to the Peak of the Moncayo (problems of erosion in main footpath, secondary footpaths and damages to the vegetation)

Examples of application to specific cases
Applying the formula: \[ \sum \left( \frac{DT}{DG} \right) \left( \frac{TT}{TV} \right) PG \]

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\[
\left( \frac{5.500 \text{ m}}{40 \text{ m}} \times \frac{8 \text{ h}}{3 \text{ h}} \right) \times \frac{3}{2} \times 3.15 \text{ people / group} = 576 \text{ people day}
\]
Carrying capacity of the Gorge of Masca (Tenerife Island)

The gorge runs very fitted between high cliffs, with a unevenness of 600 m. and a length of about 4,661 m.

The gorge is used by 2,000 people per day.
Carrying capacity of the Gorge of Masca (Tenerife Island)
In relation to the calculation of the daily physical carrying capacity of the Gorge of Masca, the data applied in the formula:

$$\Sigma \left( \frac{\text{V}}{\text{PG} \cdot \text{DG} \cdot \text{TV}} \right)$$

When entering the data for the Gorge of Masca in the previous formula, a value of daily physical carrying capacity of about **242 people/day** results. This value was exceeded in **75% of the sampled days**.
The concept of carrying capacity, determined by the Ecological carrying capacity, sets the maximum number of visitors above which critical and/or irreversible impacts begin to appear that the natural ecosystem cannot restore (resilience).
Natural Monument "Beach of the Cathedrals"
Maximum of 20,000 people / day

Regulation based on our methodology
For the year 2015: 4,800 people / day
The concept of carrying capacity

The numbers on the perception of overcrowding are obtained by crossing the survey data (% too many people and many people), with the real censuses carried out on people or vehicles, in those same points (correlation analysis).

To obtain the approximate data of psychological carrying capacity, the formula of the regression line is replaced by the % of people who perceive "too many people" and "many people in certain places", obtaining the Y value indicated by this maximum value of visitors. In this case (Moncayo trail) = **185 visits / day**.
Carrying capacity of the Gorge of Masca (Tenerife Island)

In the case of Gorge of Masca, there is a positive correlation ($R^2 = 0.617$) between the percentage of people who say that there were "many people in all places + many people in certain places" with the number of people counted during those same days in the censuses carried out every half hour.

$$y = 0.0011x - 0.0655$$

$R^2 = 0.617$

The percentage of people who think they have met "many people in all places + many people in certain places" is 25%, we can determine the psychological reception capacity of the Gorge of Masca around about **286 people per day**.
In summary

These values have to be interpreted as reference values and never as a magical or static number, but must be revised, since the impacts caused by visitors are very variable and there are several factors that determine them:

- Profile of visitors, time spent in space, seasonality of the visit.
- Number of members of the groups
- Type of activity, intensity, spatial distribution and mobility in the territory
- Activity intensity
- Fragility of the medium and ability to absorb impacts (resilience)

In addition, this global value will make sense as long as it is accompanied by sufficient management measures, and a plan to monitor the environmental and social variables that guarantee its application.
THANK YOU

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