

# Informed visitor management in protected areas – lessons learned from Croatian experiences

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Croatia has seen rapid growth of tourist arrivals with record braking 13% in 2017. Main attractions are scenic nature and UNESCO World Heritage Sites (WHS) out of which most prominent ones are Dubrovnik and Plitvice Lakes that came under attention of UNESCO and ICOMOS “reactive missions”. They have been demanded to develop and implement effective management plans that include improvements in monitoring and managing visitors and their impacts. Nevertheless, other nature protected areas in tourism regions are also facing growing pressures that raise concerns with stakeholders. The managing institutions are swiftly becoming aware of the challenges and the need to assess and adapt to the circumstances.

The authors here present an approach that combined efforts of various disciplines with the goal to gather information, produce analysis and derive correlations that can inform visitor management. The goal was to consider the conservation requirements and needs of users, to produce a Study that would inform planning and management processes. Location of this endeavor is Kamenjak protected area (IUCN Category: V) located on the very tip of Istria peninsula, the region known for sun and sea seasonal tourism. Tools used in this process considered carrying capacity discourse within the tourism context and fragile Mediterranean ecology.

Field research employed in this process were:

- visitor survey (satisfaction and crowding perception)
- traffic infrastructure and use surveying with geo-referenced video recording
- on-foot visual and photo surveying of geomorphology and use of the coastline.
- drone areal surveying on altitudes 40-50 m and 400 m (visitor/vehicle spatial distribution and counting)
- manual traffic counting - crosschecking to verify automatic counting system

The study considered carrying capacity parameters in four sections:

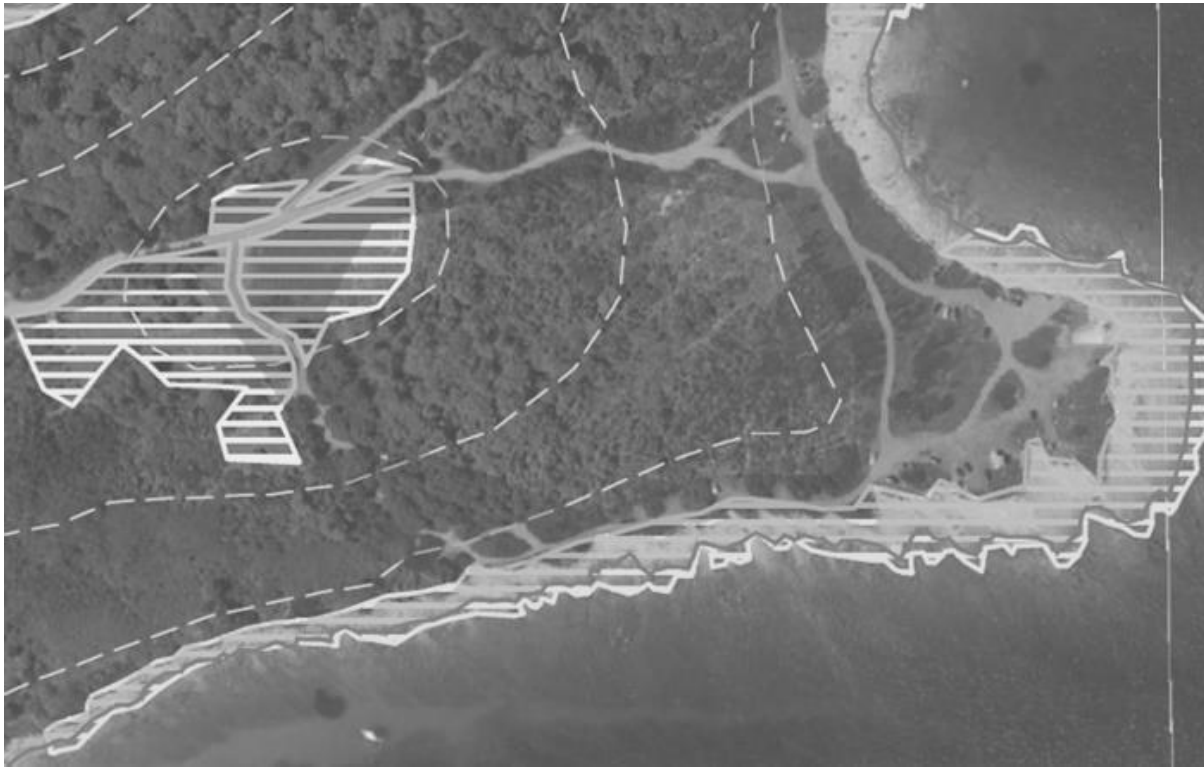
1. Bio-indicator that correlates to one of the most serious pressures was *Scarabaeidae*. They flee dust from traffic, hence disrupting their important role in ecosystems. Unpaved roads network of 22 km is the source of dust emissions that are estimated to effect around 22,7 acres. Due to the type of use and climatological parameters there is also high probability of fires.

2. Visitor surveying was conducted with credible statistical sample in the pre season and high season on predesigned key locations, and enabled analysis for different types and intensities of use. Findings indicate that dust is perceived as significant or serious problem (36%), moderate to high crowding was noted by 69% and number of cars are prime irritation factors. Analysis of the survey data disclosed a level at which crowding irritation starts to increase. Also, findings informed management that more information on NATURA 2000 network is needed and that main road needs urgent improvement.

3. Traffic analysis of motor vehicles, pedestrians and bicycles disclosed key issues that lead to the design of eight models based on the five parameters: type of main road, parking, public transport, pedestrians and cyclists – providing variety of options and simulations for decision

makers and planners based on the best practices of traffic infrastructure design in protected areas.

4. Spatial parameters were determined by analyzing state of the landscape and the practice in contrast to the prescribed use in the formal planning documentation. Detailed cartographic representations for 345 hectares were produced that determined collisions between planned and actual spatial use.



Cartographic representations were employed to transparently represent the conflicts between planned protection and use: protected coastal and meadow ecosystems (light horizontal lines) versus intensive use via cars, bikes, and pedestrians (solid fill areas). Source: Grgurevic and partners ltd. archive, 2016.

Intensive use zones, key pressures and resulting conflicts were defined in high precision due to detailed field investigations, enabling determination of limits in accordance to existing spatial planning documentation and other regulations and standards. Subsequently high season monitoring of intensities show that:

- visitors per acre use is higher than protected area standards hence more in range of recreation areas.
- bathing area use (5 to 15 m<sup>2</sup> per person) is higher than the regional government prescribed (20 m<sup>2</sup> per person).

Conclusions made from this process were that visitor management studies should be adaptable to the site-specific factors of the protected area. They should also be interdisciplinary as much as possible in order to allow for useful correlations to be made. The following was derived as the checklist of key approaches/methods, topics, and focuses:

- review of existing research and monitoring of species and habitats and seeking out correlations with anthropogenic pressures that, as clear as possible, identify the visitation impact

- an analysis of the attractions and resources with special focus on potential interpretation for visitor education/informing
- traffic system analysis (stationary traffic, pedestrians, cyclists, boats, traffic counters, etc.)
- analysis of spatial planning documentation, spatial indicators and standards
- visitor surveying (structure, satisfaction, consumption, etc.)
- understanding trends in tourism and analyzing the tourism environment / context
- accurate insight into the spatial-time distribution of visitors (daily, weekly, seasonal, especially densities for key sites)
- impacts on nature resources and heritage, i.e. conservation goals and standards
- existing and potential conflicts of use (visiting/tourism vs. protection concepts)
- correlation of visitor satisfaction indicators and resource degradation
- determining site-specific (micro-location) standards for environmentally sustainable use
- insight into the visitor management (frameworks) and the possibility of their application on the specific site
- importance of overviews, simulations, options-scenarios and suggestions of visitor management techniques
- determining how to monitor critical indicators
- introducing the principles of green accounting and analyzing the ecosystem services
- assessing the possibility of introducing green infrastructure
- seeking out “natural allies” (small scale traditional farming, bird-watching, all-level education, etc.)

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