Combining indicators for recreational beach assessment: the case of the "Beach Plan Scheme" in South West France

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Natural beaches are highly attractive sites and recreational management has now become a major component of both development plans and conservation programs on the coastline. Faced with the various aspects of recreation, managers must now deal with a huge amount of information. In this respect, multivariate analysis (MA) has recently appeared as a promising tool to support the decision-making process (Monz and Twardock 2010). Yet MA approaches have often failed to integrate the economic dimensions of a problem. Up to now, the economics of outdoor recreation has tended to fall within the scope of standard microeconomic theory (Loomis and Walsh 1997). As both of these approaches provide valuable information, there may be substantial gains from combining them properly. This presentation illustrates this type of combination: first, we compare a classification of sites, based on a multivariate analysis and cost values provided by an economic approach; second, we apply the results of this combination to test the economic efficiency of various beach management strategies as defined in the "Beach Plan" program for the Aquitaine Coastline, in the South West of France. This program was devised and launched in the early 1980's by the French government authorities and recently updated by a consortium of several public agencies. It currently includes 91 "natural" beaches (urban beaches are excluded from the plan) along a 250 km-long area. Some of the beaches are on lakesides.

Comparing multivariate analysis and cost assessment

A set of 27 variables was selected to describe the sites. Such variables corresponded to the following themes: environment of the site, natural hazards, physical alterations and environmental management, level of use, quality of services and transport access. The variables were qualitative and were assessed with the help of experts, on a case-by-case basis. We adopted a conventional strategy, close to that of Leung and Marion (1999). This consisted of a multiple correspondence analysis (MCA), followed by a hierarchical ascendant classification (HAC). Of our 27 variables, 13 were kept for the MCA (the others were considered as illustrative variables). The results of the multiple correspondence analyses gave us some indications on data structure. The first factor (10.51% of inertia) was mainly defined by the contrast between sites with a low level of use and management deficiencies, on the one hand (negative values), and sites with a good level of services and a high level of use, on the other. Factor 2 distinguished sites in terms of their environmental management and emphasized the importance of land reservation operations. The cluster analysis was then performed to classify individuals into homogeneous groups. The best classification identifies four clusters: (1) beaches located in a natural environment and thus providing large natural areas with a high level of use yet few facilities; (2) beaches located in the vicinity of more densely populated areas, where many facilities are substitutes for natural spaces and high levels of use are still the rule; (3) smaller sites with management problems; (4) "wild" sites where security remains a key problem despite the low level of use.

The cost analysis followed an engineering approach because data were not sufficient to allow for statistical analysis. Costs data were obtained by interviewing managers and main variables were chosen to reflect micro-economic theory. Such approaches have already been used in recreation (Loomis et Walsh 1997) and other natural spaces management studies, particularly for cost efficiency analysis (Escobedo, Wagner et al. 2007). To limit selection bias, we included as much diversity as possible and considered a four-year time period. Three main operations were considered: bathing supervision, beach clean-up, and the management of natural areas (dune forests) and of recreational facilities. Each of them exhibited specific cost properties. On this basis, 40 values for annual beach operating costs (including capital costs whenever relevant) were estimated. Applied to the four former classes, mean recreational costs were set at €47K for beaches included in class 4, €137K for beaches included in class 3, €146K for beaches in class 2 and €210K for beaches in class 1. The highest value for a single site was €385K and the total annual cost of the whole sample was estimated at 13 million Euros. Cost structures also varied among the four classes.

Testing the cost efficiency of the "Beach Plan" program

In 2010, the updating of the "Beach Plan" scheme set new objectives which in turn led to a new classification of beaches (partly inspired by the cluster analysis). Four classes were defined: "recreation extended", "recreation and nature", "nature" and "lakeside". Each of them was accompanied by an updated management standard that in turn would impact recreational costs. The simulated mean costs varied from €55K for "lakeside" beaches to €222K for "recreation extended" beaches. Each of the 91 existing beaches was distributed according to the new classes. The "incremental cost" was then defined as the cost for a beach manager to move from the current classification to the (prescribed) new one. For 18 sites, the incremental costs were negative. This implied that savings could occur by a better allocation of management effort (at least partly). The incremental costs were null in 21 cases and positive for the 52 others. Following a least costs rule, a total costs curve was defined. This

curve showed that 66 sites could be included in the new "Beach Plan" without any (overall) budget variation. In the present case, the last sites to be included were those that had initially belonged to class 4 (wild beaches). Conclusions differ significantly when other criteria are taken into account. For instance, meeting the "no social costs" criterion, which implies treating sites with human security risks or environmental damage first, would result in a total costs curves defined entirely in the first quadrant where several increasing phases alternate with several decreasing ones. Here, the implementation of the new plan induces positive outlays from the first step. In comparison, aggregation on a cost per visits principle would induce smaller changes.

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