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Tourist Beach Sorts as a classification tool for Integrated Beach Management in Latin America

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Abstract

Integrated beach management is an application of the integrated coastal management framework in a local scale. However, not all beaches must be managed in the same way. Thus, the classification of beaches becomes a key tool for management. On the other hand, integrated tools for beach management are few, most of them being technical and focused on one discipline; a holistic approach is needed. Technical literature shows few classification proposals, focusing on two or three kinds of beaches. This study seeks to propose a new classification of tourist beaches based on an epistemological framework. A review of fourteen references was done and five criteria to classify beaches were assessed. Special focus was put on Latin-American classifications due to the scope of the study. As a result, four tourist beach sorts were determined: intensive, shared, ethnic and conservative beaches. Moreover, a set of stages was designed to choose each sort and was applied on five Colombian beaches. The application shows a great flexibility of the set of stages, classifying the beaches into the four types aforementioned. If beaches are well classified before starting their management, the latter will be better and more accurate. This new tool developed in this paper can be used as a strong advice to beach managers. The first stage to manage any tourist beach will be to classify them in the correct sorts to later move onto the conventional stages, such as description and planning.

1 Background and motivation

Beach management is an application of Integrated Coastal Management in a local scale. Beaches are multifunctional spaces where many human activities are developed (Ariza et al. 2008, Jimenez et al. 2007, Rubio 2003). The main beach characteristics, according to most authors, are their low slope, influence of water movement, soil formed by non-consolidated sediments and interaction among sea, land and air. In contrast, Botero and Diaz (2009) proposed, from a holistic approach, three other remarkable beach features:

1. They are common property.
2. They are highly dynamic energy systems.
3. Tourism is the main coastal activity on them.

Even though beaches are a part of the coast, guidelines for coastal management are too general for effective decision-making in such local spaces (Vallega 1999). Integrated Coastal Management should be adapted to be applied in lower scales, such as a single beach.

Some of the most common tools for beach management are carrying capacity and beach certification schemes. Beach-user density is maybe the most important variable for beach management, as Jimenez et al. (2007) argue. Therefore, control of beachgoers emerges as a relevant issue; carrying capacity is an adequate tool to manage it. At the same time, tourism is the main economic activity on beaches, as noted above. Tourists are highly sensible about litter, water quality and leisure infrastructure among other things, as many authors suggest (Jimenez et al. 2007, Nelson & Botterill 2002, Williams 2004).

Therefore, users' perception is another key variable for beach management (Espejel et al. 2007). Beach certification schemes are tools pointing out this perception to improve beach facilities and environmental quality.

However, information about beach classification as a tool for management is scarce. Since 2000, according to the databases Science Direct and Scielo, 14 papers were published with the keyword 'beach management' and 7 with the keywords 'beach' and 'classification' together; most of these 21 papers were about geomorphology (19%), marine biology (19%) and tourist beaches (19%). In the literature review done in this study, we have found few authors writing about the types of beaches and some of them mix the classification in types with the classification in grades. Several documents propose only two or maximum three kinds of beaches, while others define more than eight or ten different types. This high variability in the quantity makes it difficult to establish a comparison. Finally, none of these authors consider the classification as a tool for management, nor as a mandatory stage previous to plans and programmes for beaches.

As a consequence, we want to propose a complete and simple beach classification tool. Our aim is to offer a simple management tool to get to know the particular features of the beach before designing a coastal development programme. The tool is part of the 'epistemological tools' supported in the integrated management suggested by Vallega's approach (1999). Therefore, tourist beach sorts are not a technical tool, as geographic information systems or environmental economics are, but a tool directed to manage itself, as it will be explained in the following epistemological chapter.

2 Epistemological framework

In order to fully understand this study, its main pillars and core approach will be defined. First, Integrated Coastal Management should be studied from a complex system approach. Vallega (1999) asserts that coasts must be understood as complex systems because they cannot be described exhaustively; the author observes (1999: 20): "They can only be represented in a holistic way, which implies using a model." In addition, Vallega states that sustainable development must be the objective of coastal management, understanding the former as an achievement of the integrity of the ecosystem, social equity and economic efficiency together. Consequently, holism and relevance will be the core principles all analyses should be based on. To sum up, we totally agree with Vallega when he points out: "the major concern of Integrated Coastal Management is not technical, [...it] is epistemological."(1999: 234)

On the other hand, beaches are more than merely ecosystems; they are complex coastal systems. In order to understand a beach as a whole from the general systems theory, the pattern, as a general rule which defines the system, the structure, as components and links of the system, and the processes, as flows within the system and with the external environment, must be described (Ossa 1994). Moreover, the system function should be determined in order to know the direction the system tends to go to and to lead its evolution. Summarizing all previous concepts, many authors argue three main needs covered by beaches (Ariza et al. 2008, Jimenez et al. 2007, Rubio 2003):

1. Recreational uses such as swimming, sun bathing or relaxing.
2. Shore protection from wave energy, mainly infrastructures and landscape.
3. Natural scenery and ecological reservoir with a huge emphasis on conservation.

Up to a point, this work focuses on beaches functioning as supporters of the first need, i.e. the recreational ones.

As the last epistemological milestone for understanding this work, the external environment of beaches must be addressed. Even though beaches are part of a coast, they are coasts in themselves; therefore, beaches are affected by the same external factors as any coast. In other words, Vallega's approach (1999) should be mentioned again for the three main compounds of external coastal

environment: natural cycles, legal framework and decision making system. Another compound is related to globalization, supporting the multiple effects that global processes have on coastal areas, from economic activities to social disruptions due to increasing migration flows. As a conclusion, beaches are not isolated units; hence, their external environment must be included in any beach management action.

3 Methods

First of all, a general review of the literature was done within the epistemological framework defined above. Thirteen technical references about beach management were reviewed (Espejel et al. 2007, ICN 2002, Jimenez et al. 2007, Micallef & Williams 2004, Moraes 2007, Morgan 1999, Nelson & Botterill 2002, Nelson et al. 2000, Tudor & Williams 2006, Williams 2004, Williams & Davies 1999, Williams & Morgan 1995, Williams et al. 2002) to analyse how their authors classify tourist beaches and similarities among them. Besides, a comparison table with each reference, its beach classification and its scope was done. In the classification's row, the kind of beaches quoted by each author was literally included without taking into account the number of quotations, the context of the quotation or the aim of the paper. The objective of this 'nude classification' was to highlight only the kind of beach. Finally, the place or country of the study referred to and origin of the authors were included in the scope's row (Table 1).

Table 1: Kinds of beaches according to the technical literature reviewed

Reference	Kinds of beaches (Classification)	Scope
Williams & Morgan (1995)	Resort beaches and less developed (rural) beaches Resort and undeveloped beaches	UK
Morgan (1999)	Resort and rural beaches	UK
Williams & Davies (1999)	Resort beaches and less developed (rural) beaches	UK
Nelson et al. (2000)	Resort and rural beaches 'beach with no facilities' and 'beach at a large resort'	UK
Nelson & Botterill (2002)	Rural, urban and traditional beaches Remote beaches	UK
Williams et al. (2002)	Resort beaches	UK
ICN (2002)	Urban, semi-urban, semi-natural and natural beaches	Portugal
Williams (2004)	Resort and rural beaches	UK
Micallef & Williams (2004)	Resort and non-resort beaches	Malta-UK
Tudor & Williams (2006)	Resort, urban, village and rural beaches	UK
Espejel et al. (2007)	Recreational beaches (general framework) Arid, tempered and tropical beaches	Mexico
Jimenez et al. (2007)	Urban and semi-urban beaches Natural beaches Recreational beaches (general framework)	Europe

Furthermore, five tourist beach sort criteria were defined to create a classification of tourist beaches. Initially, the main beach features were defined according to the epistemological framework, focusing on the external environment influence. Later on, the beach structure and links were determined through relational analysis, emerging the most relevant elements and connections; this task was led by the beach recreational use. The resulted criteria are more suitable to the Latin-American context because most information was taken from the Colombian reality (Botero et al. 2008), then compared

with Cuban conditions and finally validated with six beach quality awards in Latin America (Cabrera et al. 2006, Dandon 2005, ECOPLAYAS 2007, ICONTEC 2007, MTD 2003, SEMARNAT 2006). In the end, the reviewed technical literature was used to compare each criterion with the kind of beaches found.

Afterwards, four tourist beach sorts were established on the basis of the five criteria aforementioned. First, the beach patrons were defined from the most common beach uses in Europe and Latin America, according to the technical literature reviewed. Second, these patrons were prioritized, according to the sustainable development principles argued by Vallega (1999) and applied on a model beach; stemming from this task, several types of beaches emerged. Third, a matrix with the first criterion and the four most relevant sorts was done, allotting into it the importance of each criterion for each type. The importance was quantified from three to one according to the beach features highlighted by each criterion, three being the highest and one the lowest.

Last but not least, a set of stages was defined to aid beach managers to classify their beaches. Initially, four check points were developed within pertinence analysis, understanding the pertinence as an integrated coastal management guideline from the complex system approach (Vallega 1999). Later, a classification procedure was done based on four groups of features to check on the beach: restricted aspects, beach-user density, distance to populated areas, and infrastructure and service restrictions. The quantities and restrictions were taken from a project in Colombia which proposed a qualification and certification system for tourist beaches (Botero et al. 2008). Therefore, the set of stages was applied to five beaches in this country to calibrate the model.

4 Results

The first result was the beach classification chart, stemming from the technical bibliography review. Most references came from the United Kingdom's authors or study cases, being almost three quarters of the scope areas; Europe had 11 out of 13 references and 2 were from American authors. Moreover, two general classifications were found in the five scope areas: the first one, used in the UK and Malta, focused on resort and rural or non-resort beaches; the second one, used in Portugal, Brazil and Spain, had three kinds of beaches in common (urban, semi-urban and natural/rural). The reference from Mexico must be highlighted, because it had no particular beach classification in the paper, having always been quoted as recreational beaches, although once its beaches were named as arid, tempered and tropical.

The most detailed classification of beaches was done by the Instituto da Conservação da Natureza (ICN 2002) in Portugal, cataloguing five types of beaches: urban, semi-urban, semi-natural, natural and restricted. Moreover, ICN determined each kind of beach according to three main criteria: distance from populated areas, natural carrying capacity and beach-user density. Finally, ICN proposed a matrix that related each kind of beach to some aspects of itself such as roads, pedestrian accesses, facilities, water use planning, environmental quality, lifeguards and first aids.

After the technical review, the following five criteria were defined to produce the tourist beach sorts (Table 2):

1. Beach quality depends on beach-user density (BUD).
2. Beach services and infrastructure depend on the kind of tourism.
3. Each kind of beach has a specific code of conduct.
4. Each kind of beach is affected by coastal activities and uses placed on it.
5. The distance from populated areas has influence on the kind of beach.

Finally, out of these five criteria four Tourist Beach Sorts (TBS) were defined: intensive, shared, ethnic and conservative. The TBS were described as follows:

Intensive beaches are focused on the leisure experiences of the tourists. Their main features are high beach-user density, long high tourist season, strong infrastructure and facilities, and wide tourist services. The beaches classified in this sort are located near or within big populated towns or resort areas.

Shared beaches are those with two or more simultaneous coastal activities, tourism being one of them. The presence of infrastructure used by other coastal activities is their most important characteristic. In this TBS, tourism is not the unique or the most important activity on the beach.

Ethnic beaches are situated in indigenous or strongly traditional areas. This kind of beaches is characterised by an infrastructure built with traditional architecture and materials; tourist information is also given in the local language; they are normally located in small villages and the local community is strongly involved in the economic beach structure. Tourists who visit these beaches should be interested in the local culture and customs.

Conservative beaches are focused on environmental quality and protection of high natural values. This TBS is characterised by low beach-user densities, minimum tourist services and infrastructure, a long distance to big populated areas and beachgoers with a high environmental awareness. Although conservative beaches can be located in protected areas, this sort was originally intended for beaches without special environmental protection.

Table 2: Importance of each criterion for Tourist Beach Sorts

Criteria		Tourist Beach Sorts			
		Intensive	Shared	Ethnic	Conservative
1	Beach quality depends on beach-user density	3	1	2	2
2	Beach services and infrastructure depend on the kind of tourism	2	1	3	2
3	Each kind of beach has a specific code of conduct	1	2	2	2
4	Each kind of beach is affected by coastal activities and uses placed on it	1	3	2	2
5	The distance from populated areas has influence on the kind of beach	1	1	2	3

Afterwards, four check points were defined to help decision-makers classifying beaches. The first check point contains three restricted aspects, each one represented by a question (Table 3). If one of these three answers is affirmative, the beach will be classified directly in the use related to the aspect; if all answers are negative, it must go to the second stage. The second check point contains the rank of beach-user density (BUD), according to each TBS; the BUD value on the beach should be compared with the minimum BUD allowed for each sort, classifying the beach in this minimum (Table 4). The third check point contains a matrix relating distance in kilometres to the size of the populated areas; the beach sort is achieved by the cross point between rows and columns (Table 5). Finally, the fourth check point is composed by five questions. If one of them is negative, the related TBS is denied, guaranteeing that the beach achieves some minimum standards to be classified in that TBS (Table 6). The complete set of stages is shown in Figure 1.

Table 3: First check point: restricted aspects

Restricted Aspects	
Ra1	Is there more than 30 % of the beach area occupied by other coastal activity?
Ra2	Is the beach situated in an indigenous area or near traditional communities?
Ra3	Are there seagrass meadows or coral reefs less than 2 m deep?

Table 4: Second check point: beach-user density

Beach-user Density			
Intensive (I)	Shared (S)	Ethnic (E)	Conservative (C)
> 5m²/user	> 15 m²/user	> 20 m²/user	> 30 m²/user

Table 5: Third check point: distance from populated areas

Distance vs. Population				
	Inhabitants	A < 20 km	B 20-50 km	C > 50 km
1	< 5,000	I-S-E	E-C	E-C
2	5,000-50,000	I-S	I-S	E-C
3	> 50,000	I-S	I-S	I-S-E

Table 6: Fourth check point: services and infrastructure restrictions

Services and Infrastructure	
Si1	Are cleaning services done manually?
Si2	Is the infrastructure built with environmentally friendly architecture and materials?
Si3	Is the infrastructure built with traditional architecture and materials?
Si4	Is the tourist and safety information written including the native language?
Si5	Is the tourist and safety information written in at least two languages?

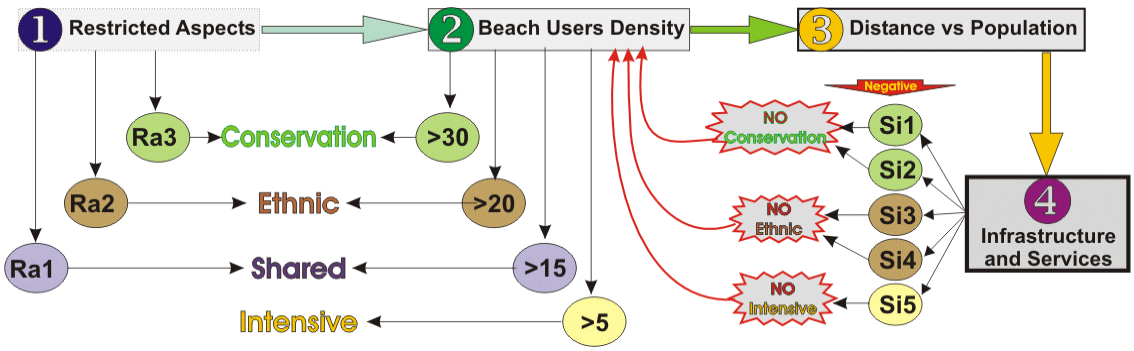

Figure 1: Set of stages to classify beaches in TBS

Application on five Colombian beaches

As a calibration of the model, five beaches on the Caribbean coast of Colombia were classified, using the TBS classification and the set of stages described above. The natural, social and economic characteristics of each beach had been taken from the project "Determinación de un sistema de calificación y certificación de playas turísticas" developed by the University of Magdalena (Colombia). The calibration focused more on the TBS obtained and the set of stages functioning than on the classification results as follows:

The first beach was El Rodadero, classified as an **intensive beach** (Table 7) due to non-restricted aspects, its BDU being above 5 m^2/user, being in a city greater than 50.000 inhabitants and nearer than 20 km, besides fulfilling the services and infrastructure requirements for intensive beaches (Table 6, Si5 positive).

The second beach was Taganga, which is located in a fishermen's village with more than 50 % of the beach used for fishery (mooring boats, unloading fish, cleaning nets, etc.). Consequently, the beach was classified as **shared** from the first check point because there is another coastal activity differing from tourism and its beach use proportion is over 30 % (Table 3, Ra1). The last three check points were not considered due to the prevalence order of each stage (Table 7).

The third beach, called Bahía Concha, was situated in a natural park; hence, its natural conditions were fairly important. This area had sea grass meadows and coral reefs; therefore, it was classified as a **conservative beach** according to the first check point (Table 3, Ra3). In fact, the second and third check points were not considered, only the fourth one about checking services and infrastructure restrictions, which was affirmative, thus cataloguing the beach as conservative.

The fourth beach classified was Riohacha, which had no restricted aspects, its BDU was above 5 m^2/user and it was located in a city greater than 50.000 inhabitants. Until the third check point, Riohacha beach was classified as intensive, but in the last check point it did not pass the Si5 check point (services and infrastructure restriction, Table 6). Therefore, it could not be classified as intensive. To solve the classification, stages two (beach-user density) and three (Distance vs. Population) were checked again looking for another sort; however, the result was the same. Finally, Riohacha was classified as **intensive beach**, but with a warning for its managers to improve its services and infrastructure.

The last beach was Cabo de La Vela located in an indigenous area of the Wayuu community, more than 100 km from the next town bigger than 5.000 inhabitants. Consequently, it was classified directly as an ethnic sort; however, this beach also had vast seagrass meadows. Therefore, Cabo de La Vela should be classified as conservative, too. Indeed, the second check point was applied to solve this divergence, the BDU being higher than the minimum necessary to be classified as conservative. However, the third and fourth check points were negative for the conservative sort; hence, Cabo de La Vela beach was confirmed as **ethnic**.

Table 7: Classification of five Caribbean beaches in Colombia

Beach's Name	Tourism Beach Sorts (set of stages)										
	Ra1	Ra2	Ra3	BUD	DvsP	Si1	Si2	Si3	Si4	Si5	TBS
El Rodadero	NO	NO	NO	8	A3	-	-	-	-	YES	Intensive
Taganga	YES	NO	NO	-	-	-	-	-	-	-	Shared
Bahia Concha	NO	NO	YES	-	-	YES	YES	-	-	-	Conservation
Riohacha	NO	NO	NO	17	A3	-	-	-	-	NO	Intensive*
Cabo de La Vela	NO	YES	YES	46	A1	YES	NO	YES	YES	-	Ethnic

Tourist area of Taganga Beach	0,28

5 Discussion

The information about beach classification was scarce; therefore, the number of countries studied by this research was low. Indeed, more than half of the references came from the United Kingdom. Others were from Portugal, Malta, Mexico, Brazil and Spain. Therefore, all references from the UK were counted as only one to reduce its influence. Additionally, the beach types in the UK and Malta's references were presumably based on beach tourist infrastructure, while the classification used in other scope areas was based on territorial issues or land planning categories. Even though the link is not evident, the kind of beaches proposed by the literature seems to be tools directed at the management.

Regarding the first hypothesis, the local scale was found to be a key issue in beach management. The beach sort criteria defined in the methodology could prove this statement. The first beach sort criterion states that 'beach quality depends on beach-user density (BUD)' (Jimenez et al. 2007, Micallef & Williams 2004); indeed, the BUD is a key variable which allows effective planning of services, rearranging or optimizing beach accesses and reliable carrying capacity forecasting, all of them being local issues. Moreover, several authors (Nelson & Botterill 2002, Nelson at al. 2000) have highlighted the need to avoid the temptation to add excessive facilities to pristine beaches to attract more commercial (conventional) tourism; it may prove the sort of criterion that 'beach services and infrastructure depend on the type of tourism'. Additionally, the review of several beach quality awards shows the code of conduct as the most common requirement to inform beachgoers about particular features and hazards on the beach (Botero et al. 2008), supporting the criterion that 'each kind of beach has a specific code of conduct'. Furthermore, some literature on coastal management has regarded conflicts among coastal activities, mainly because several uses can be situated in the same area along the coast (Barragan 2003, Cicin-Sain & Knecht 1998, Kay & Alder 2005). As a result, the criterion that states 'the kind of beach is affected by coastal activities and uses placed on it' is proved. Finally, Nelson and Botterill (2002) show a quite clear relation between rural beaches and the distance to urban centres; meanwhile, Tudor and Williams (2006) include a reference about the effect caused on beaches due to the closeness to populated areas. These arguments seem to support the criterion 'the distance from populated areas has influence on the kind of beach'.

On the other hand, each tourism beach sort seems to have a key variable crucial for its management. First, the beach-user density is the key variable for intensive beaches, while distance from populated areas is for conservative ones. Additionally, the key variable for shared beaches is the interaction between tourism and other coastal activities, but for ethnic beaches it is the human interaction affecting the culture. In short, the conservative and ethnic beach sorts appear to be the most sensible tourism beach sorts, as shown in Table 2, where all their criteria are of medium or high importance. It seems that ethnic and conservative beaches are more affected by the decision-making process and beach managers should be more careful about it.

Equally important, the set of stages to classify beaches has multiple outputs, but only one is the most suitable. Running the model, there are four possible outputs: first, a unique sort passes all check points affirmatively; second, when more than one BTS is possible, the sort with more affirmative check points would be chosen; third, if the result is ambiguous, i.e. it contains different sorts in each stage, the sort selection follows the order of stages; fourth, the last check point restricts the sort obtained in the three previous check points, but it cannot classify it as another sort. In that case the beach would be classified in the selected sort, but adding management recommendations. To sum up, in the motivation (Chapter 1) it was addressed that classification is a tool for management. Hence, its application should lead beach managers to accurate decision-making.

Finally, the application task done in Colombia for calibrating the model is a quite clear example for the usefulness of tourism beach sorts. First, the task shows the simplicity of the tool use, guaranteeing its easy understanding by decision-makers. Moreover, all tourism beach sorts were found on five Colombian beaches, providing the best classification pathways. Even though the calibration process

was successful for Colombian beaches, the application of this tool in other countries may need to be adapted to fit national realities.

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