

The Issue of Coastal Zone Management in Croatia – Beach Managing

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Abstract

Croatia is well known for its sun, clear sea, many islets and peninsulas; these are the key elements in its tourism development. Beaches in Croatia are specific among its touristic resources, in particularly because natural beaches are scarce. In coastal areas, beaches are mostly rocky or artificial; this makes natural beaches even more important.

This paper analyzes beach management in Croatia, and gives beach definition by content and classification.

The aim of paper is emphasizing the necessity for the sustainable management of coastal areas, especially beaches.

The authors advocate a systematic approach through stable legislation and public institutions and suggest activities to be undertaken in order to improve the system of efficient beach management, by introducing quality criteria (efficiency level), including business communication. They underline the necessity of implementing a Decision Support System (DSS), as a solution for making beach management more efficient, together with the use of Geographic Information Systems (GIS), and beach registration and evaluation (Beach Area Registration and Evaluation, BARE).

Key words: Beach management, Decision Support System, Geographic Information System, BARE, sustainable development.

Topic Groups: Economics and business, Research methods

Introduction

Public management has specific characteristics and organization in any society and thus in Croatian transitional society as well.

Therefore, it is important to create a new model of public management, especially in coastal area management and beach management. Logically, this model should be realized in accordance with society needs, based on modern methodology and the principles of sustainable development. In order to achieve these goals it is necessary to educate the management, gather sufficient information in order to establish a relevant data base, (beach cadastre), classify beaches, evaluate and monitor them.

1 The Legal Frame for Beach Management in Croatia

In Croatia there is currently only one institution that governs coastal areas, including beaches. That's the department for sea and earth protection of the Ministry of environment. When it was first established, it was the first of its kind in the Mediterranean. The department was not conceived as a leading national body for beach management, it operates on administrative level. Its principal tasks are:

- Coordination of sea quality measurements,
- Propositions for improving the condition of coastal areas and waters,
- Preparation of evaluating and proposing measures for removal of on- and offshore pollution,
- Participating actively in Mediterranean Action Plan (MAP) in Croatia.

The Legal frame for coastal area management in Croatia is characterized by divided jurisdictions regarding on - and offshore management and the lack of special legal form dealing with managing coastal areas as a whole. The most important laws on this are: The law on physical planning and construction (NN 2007), the law on nature protection (NN 2005), the law on environment protection (NN 2007) and the

law on islands (NN 1999). The remaining regulations important in coastal area management are connected with local physical development plans. These are included in Strategic physical regulations of Croatia and Physical planning programme of Croatia (1999), as well as regional physical plans, all relevant for particular area development. Beside the law on physical planning and construction two other regulations are important for beach management: The regulation on the quality of the sea for bathing (NN 2008) and the law on maritime domain and sea harbors (NN 2003). It can be pointed out that these regulations treat beaches as public goods available for everyone under same conditions. This should be kept in mind especially regarding the use of instruments for improved beach management such as charging beach entrance.

2 Theory

The beaches are a part of the maritime domain; this means they cannot, under any circumstance, be private property. However they can be given in concession. Concession for a shorter period of up to 5 years is given by a Council for concessions formed locally as a part of maritime domain management. Concession however, is a legal right that, either partially or totally, excludes the public use of such beaches.

2.1 Definition and division of beaches

In Croatian legal literature there are very few documents dealing with beaches, as an integral part of the maritime domain and the seaside as well (Capar, 2000). Nowadays, the coastal areas and thus beaches as well, are particularly endangered by:

- Ever increasing industrialization,
- Ever increasing number of apartment buildings and tourism development,
- (Il)legal devastation of the coast by constructing concrete piers.

According to leading Croatian dictionary (Anic, 1998) the beach is *"the area next to a river, lake or sea suitable for bathing"*. The beaches by the rivers or lakes

are different than sea-beaches especially because they can be owned privately, which is not the case with sea-beaches, as they are always a part of maritime domain. The maritime domain is a public good, therefore it is not, and it cannot be a matter of commercial transaction, *res extra commercium* (Kundih 2005). Bathing area is, according to Anic (Anic 1998), “*a place on the shore suitable for bathing*”. Although the definitions of the beach and bathing area are similar, it is logical to conclude that the beach is a wider term than bathing area. A beach can exist even without a bathing area, whereas it would be hardly conceivable to imagine a bathing area without a beach. All sorts of different definitions of beaches can be found in different physical plans as there are no clear regulations on this matter. It is possible to divide beach by types in the following criteria:

- The way of formation
 - Natural – the beaches that evolved naturally, without any influence by man.
 - Artificial – the beaches that were made or formed by man in order to fit in the natural surroundings.
- The degree of beach adaptation
 - Non-adapted – natural or artificial beaches that have no beach equipment that people who are on the beach might use.
 - Semi-adapted – those beaches who have some beach equipment that that people who are on the beach might use.
 - Fully-adapted – those beaches who have such equipment as: w.c.s, showers, cabins, deck-chairs, sunshades, various sports equipment, bars and restaurants, slot-machines, recreation areas, children playgrounds, adequate approach to sea, adequate seafloor cleared of sharp objects for up to 2m of depth, buoys marking the sea part of the beach, buoys marking the vessel access for small boats, scooters, rowboats, pedal boats, *etc.*, defined and marked anchorage points, protective subsurface nets, *etc.*
- The beach purpose
 - Opened – these beaches are open to everyone and no permit or entrance ticket has to be obtained to access them.
 - Semi – closed - the access is granted only to a certain group of people, or only a certain group of people has to pay the entrance fee. For instance, *hotel or spa beaches* are designed for hotel guests or patients, nudist beaches are for nudists. Access to these beaches can be granted even to others, providing they pay the entrance fee or bath naked. If the basis is entrance fee, then it does not buy you entrance permit, it buys the possibility to use special services which can be obtained only there. For instance, supervised by a certified physician you can have a healing mud-bath or on a hotel beach you can enjoy the services of a hotel bar or beach equipment such as sunshades, deck-chairs, which belong to hotel guests as a part of the service guests, are offered. *Or they can be beaches for handicapped persons.*
 - Closed – access to such beaches is granted to an exclusive number of persons. No other person can use them under any circumstance. It could be asked ourselves why there are exceptions to the rule that beaches are common good. There are two reasons. Restricted access can exist for reasons of public safety (i.e. defensive reasons) such as restriction of access to Brijuni archipelago. Brijuni islands will some day be an exclusive tourist resort and perhaps these security reasons will cease to exist. Except for security reasons the beaches can be closed for all users for reasons of public interest. Here such beaches which cannot be accessed except via private property must be excluded. Theoretically, such beaches can be accessed from sea or air; thus they would be semi – closed. Private owners who have access should be charged extra local tax by the local authorities for having such a property.
- Beach access
 - Beach access from land and sea - easy access.
 - Beach access from sea only – no land access due to rock formation or thick vegetation – characteristic for Croatian islands.
- Possibility of vehicle access
 - Access possible for land vehicles – cars, motor-bikes, bicycles.

- Access possible by boats - in general this should be the case for every beach. Not all beaches have the possibility to accommodate boats on shore or buoy, but in most cases, at least anchorage is possible.
- Access possible for pedestrians only – some beaches are virtually inaccessible by any means of transport. Only capable pedestrians access such beaches; this doesn't mean they are less valuable than other beaches.

2.2 Classification and evaluation of beaches

In the former paragraph the beaches were divided according to all possible criteria and then classified and evaluated. The authors suggest such a classification which would take into consideration the similarities of the Mediterranean countries, but also their particularities.

It is logical to conclude that the beaches can be divided by different criteria, but, before doing so, it is needed to classify them primarily assessing how useful to customers and how well equipped they are. Categories can be formed (A, B, C, D, *etc.* ...) or one, two or three stars like in hotels and other touristic facilities. To determine beach types or quality, it is important to apply standards, introduced by the guidelines for capacity assessment in Mediterranean coastal touristic areas (PPA/CRA, 1997) such as:

- beach length - ... meters per person
- nudist beach length - ... meters per person
- length of the riding course - ... meters per rider
- length of coach course - ... meters per coach
- length of bicycle course - ... meters per bicycle rider
- length of the jogging track - ... meters per person
- length of the promenade - ... meters per person
- rowing space - ... acres per rowing boat
- Sailing space - ... acres per sailing boat or surfboard.

It is easy to agree with authors who advocate the criteria of the European Blue flag as an example of

excellent ecology and economy in tourism concept. Those four criteria are:

- shore and water quality,
- education in ecology and public information,
- beach management and
- Safety and beach services.

Beach evaluation procedures and awards (Blue flag or similar) are usually focused on one or only few elements interesting for their users, either they totally disregard the nature and requirements of different beach types.

In order to make beach assessment in Croatia more applicable and realistic the authors propose the basic criteria for beach evaluation:

- safety,
- sea quality,
- equipment,
- location and surroundings (city beach, beach on an island, *etc.* ...), and
- Organized waste disposal.

The field research has so far shown that tourists in Croatia find, among all criteria, these criteria the most important ones.

Acknowledging similarities and differences of the Mediterranean countries, the proposed criteria for beach evaluation are applicable to other countries.

3 Beach Management – Different Approaches

By definition, beach management “aims for improving or at least maintaining the recreational resource and, as a mean of beach preservation, provides content for people who use beaches”. In this context, proper beach management can be considered as an efficient use of ever more valuable national resource (in social, economic and ecologic respect) primarily used for recreation. It can also lead to stimulation of international tourism, improvement of local recreational facilities, and improvement of surrounding settlements. On the other hand, beach management can be defined as a process of nature preservation, beach maintenance,

public goods protection, with financial means at hand. This definition is the reflection of the importance of the sustainable management that provides for efficient use of this ever more valuable natural, social and economic resource. One can state that beach management deals with social, economic, ecologic and technical issues that affect the sediment dynamics.

The beach is of primary interest for most tourists. This fact is particularly important in domestic literature and pointed out by numerous authors. Then beaches bring tourists, i.e. the money. For instance, the city of Houston points out that the city of Miami Beach spends 70 million \$ for heaping up beaches, that make the revenue of 2 billion \$ per year from foreign tourists. One similar example is the Micaloff survey, where he and his co-authors claim that heaping up sand on St. George beach (Island of Malta) will raise the value of the nearby public goods by 13% and the surrounding hotels by 1%. Translated into money language that's a 6 million \$ increase. A calculation in the US has it, that the beaches alone could make 170 billion \$ per year. Furthermore, gross income from beach and recreational tourism is estimated to be around 637 million \$ or 57% of the gross income from tourism and recreation on the shores of New South Wales. Spain is one of the most important tourist destinations in the Mediterranean and in the whole world. In 2003 tourism accounted for 11,4% of the Spanish GDP, with growing tendency. Taking into consideration that the predominant tourist concept in Spain is still Sun, Sea and Sand, it can be concluded that beaches are among the most important resources of that country. Beach tourism in Spain accounts for approximately 74% of foreign tourism. The same conclusion can be made for Croatia.

The great importance people attribute to beaches is reflected in increased urbanization of such areas; nowadays over 70% of the world population lives in coastal areas. In Auckland region, in New Zealand, beaches are considered to contribute the most to life quality, whereas traffic and tourism in the US are the largest economic branches that employ the majority of people and make the most profit. Beaches are the most important factor in both. As the possibilities for

vacation increased beach surroundings have influenced the public evaluation of coastal recreation, where such places are considered to safe for all age groups (individual visits by children and adults, couples, families, foreigners and locals).

When it is talking of the award system it is important to mention the significance of the European Blue flag in Croatia. In 2005 80 beaches were awarded the Blue flag, and in 2009 as much as 115. These beaches were promoted as the beaches with highest safety ecological and tourist standards. However, the Blue flag beaches were not always the cleanest, safest and with best sea-water quality. For instance the beach Laguna in northern Croatia has the Blue flag, but the water quality checked in several occasions in 2005 was graded orange/red (EU scale), and in 2009 it was satisfactory.

Beach awards are used for promotional purposes around the world, but it can be only guess how well the users are informed. A survey in the resorts of Barry i Weston-super-Mare in Great Britain showed that, although the users consider such awards important for beach selection (72% of total of 700 participants in the survey), only 18,6% of the users fully understand what the flag on the beach (Blue flag, for instance) really represents, and as much as 16,9% beach users in Wales thought it was a warning sign. On the basis of the first-hand experience formed in 2005/2006 field survey the authors concluded that neither locals nor tourists were aware of the meaning of that flag on the beach. There are no measurable data to support this theory, and therefore in 2009 additional field survey was conducted.

4 Methods and Findings

The efficient beach management should and must be one of the key factors of the economic growth and development in Croatia, which is currently not the case for a number of reasons. Resource management in the coastal area by awarding concessions means they will be used in a sustainable way (Kovacic *et al.*, 2009). In that respect it is clearly that the need for Decision Support System (DSS) increases, as it offers solutions for increase in functionality of all the subsystems on operative level (middle management) in this area (Kovacic *et al.*, 2008). Highly dynamic surroundings sets pace for creation of an open system capable of accepting the quick changes in spatial and other data, the system of resource evaluation and adapt quickly to changes in management policy. Understandably, the needed for connecting systems applied in the area, i.e. Geographic Information Systems (GIS), and the methodology of multi-criteria analysis.

4.1 Cartographic presentation sea-beaches profile in the Primorsko Goranska County

In order to establish a cartographic profile of the beaches in the Croatian Adriatic in 2009 the regional Institute for sustainable development defined the goals and activities to realize the task at hand. The purpose of this project was to point out to beaches and their great significance for Croatia and tourism as the leading economy branch. The goal of the research was to establish a database on beach resources in order to establish the value of every single beach, its possibilities and limits to be able to manage it sustainably. It is important to use database more and more in order to determine how to use beaches. Defined activities are:

- existing data analysis,
- processing the data on on sea-quality,
- creating data model for cartographic profile of beaches,
- determining beach boundaries where sea samples are taken,
- creating the foundation for field research of beaches,

- gathering information from municipal services on possible pollution (pumps, drains, waste dumps),
- field work, gathering and processing data obtained on site,
- creating the GIS database,
- Creating the cartographic profile of the beaches.

While gathering data it was used the existing beach studies (surface, type and other), field recordings were made, and it is gathered data from local authorities following the specified model. Then it was established GIS database containing beach charts; it is a solution in the graphic profile display.

Project methodology in Primorsko – Goranska County proved successful regardless of the time and money spent. Based on defining beach boundaries, all beaches subject to water sampling were checked and visited, all of this was made according to the specified data model. It was visited 180 beaches, listed 1722 buildings, and established a photography database (2745 photos). Then it was asked local municipal services to provide information on possible pollution (pumps, drains, waste water quantity, safety flow valves). Once it was obtained all data it is possible to create a GIS database containing the following data:

- 95 possible polluters
- 134 drains
- 155 flow
- 128 anchorage buoys
- Overall length of beaches - 84.4 km
- Surface of beaches on shore - 163 acres

These processed data will be taken over for further processing by The Institute for oceanography and fishing, a national Institution in Croatia. There, a unified database for Croatian Adriatic will be made.

It is conclude that the survey Cartographic profile display of beaches in Primorsko – goranska County enabled us to, for the first time ever, for the beaches subject to research:

- Define beach surface,
- Determine and record all the beach buildings.

As it is continue this research project in 2010 it is expect to:

- Complete the established database with sea quality readings –
- Transfer the data to the Ministry for sea database
- Make the study Cartographic profile of beaches in Primorsko – goranska county.

4.2 The results of the research by using beach registration and evaluation approach

By using beach registration and evaluation approach (Bathing Area Registration and Evaluation System, BARE) during 2005 and 2006 it was rated a large number of Croatian beaches, but this work is far from over. We expect to, when this cartographic project is over, database at hand will have an entry for every single beach. BARE methodology is fairly new and since 2001 it is being applied ever more in the wider European/Mediterranean area. The center for regional priority activities (PAP/RAC) in Split, as an integral part of their shore management programme, conducted a research in 2004 by using the BARE methodology in several Mediterranean countries such as Croatia, Malta, Tunisia, Turkey and Spain.

In Croatian research, it was evaluated the beaches in Splitsko-dalmatinska and Dubrovačko-neretvanska counties, in coordination with Sunce society. PAP/RAC is just beginning to define the guidelines to for application of the BARE evaluation system, which could be applied in the entire Mediterranean region. BARE methodology classifies every beach in one of five possible categories: *remote* (wild beaches with hardly an access), *rural* (beaches outside populated areas), *village* (in smaller settlements), *urban* (in towns) and *resort* (these beaches are en essential part of a tourist resort). All the evaluation criteria cannot be applied to all beach types, to be more precise, *rural* and *remote* beaches are evaluated on the basis of sea quality, attractive environment, beach cleanliness, whereas are apply, all criteria for all other beach types. Taking these criteria and beach types into consideration, a single beach is rated on the scale from one to five stars. BARE

technique was used to analyze some beaches, in order to adjust it to Croatian particularities, and in order to advise this method for evaluation of Croatian beaches.

The BARE method suggests beach evaluation based on five different criteria and marked applicable for, in descending order: safety aspects, sea quality, beach content, environmental value and waste disposal. According to this method it was evaluated and analyzed five different beach types, and they were rated accordingly and respectively. Project was conducted in two phases. In the first one (July – October 2005) it was rated beaches in Zadarska, Ličko-senjska, Primorsko-goranska and Istarska counties. In the second phase (June – September 2006) it was rated beaches in Šibensko-kninska, Splitsko-dalmatinska and Dubrovačko-neretvanska counties.

BARE beach evaluation method actually gives an insight to the necessary measures which have to undertake in order to improve the not so satisfying parts of beaches and in order to ensure the efficient beach management.

The cartographic display is a logical continuation of the classification and evaluation process, since it enables evaluation of the beaches in following phases as a part of beach management.

4.3 Proposals for beach classification and evaluation

The fact is that Croatia is a country with more than a thousand islands; therefore, island beaches have a special significance and value. This is why the authors suggest two main categories for beaches in Croatia:

- island (island beaches), divided into four categories: remote, rural, village & resort and
- Mainland (beaches in coastal areas, as a part of the mainland), divided into 5 BARE categories.

There are no larger settlements on islands; therefore there is no need to classify island beaches into urban category.

Although there is a will to unify beach classification and evaluation in the Mediterranean region, the authors feel that geographic diversities should be respected. This is why authors propose that in Croatia the evaluation method should be based on five specific criteria and grades. The evaluation system is different than the BARE system, and is also applicable to other countries with large number of islands (particularly Greece as a country with the most islands). According to their significance they are:

- safety,
- sea-water quality,
- beach equipment,
- accommodation and environment (shore, island, etc.) and
- Cleanliness (organized waste disposal).

The proposed classification and evaluation enables sustainable management of beach resources and makes decision-making process easier.

5 Discussion

Beach management in Croatia is performed by local authorities that, more or less successfully, understand development depends on ever increasing tourist demands. The function of beach management and decision making is definitely important, but in Croatia public institutions is not very efficient due to a large number of hierarchy levels. In Croatia management is fairly traditional, which means that informational are usually kept on higher levels, and the jurisdiction is not precisely defined. Formal matters are often given priority and practical problems are put aside. There is also a problem of crucial influence by influential local individuals. The increasing tourist demand for naturally attractive destinations with quality offer ask for unified approach in beach management. It is a fact that this approach is present in all less developed countries and particularly in the transition ones.

5.1 The current situation and measures for efficiency increase

Efficiency in Croatian public governance can be described the plutocratic system making simple things complex, lacking the use of up-to-date informational technologies, no elaborate human resource management where professional competence gives ground to political influence. It is easy to conclude that changes are necessary and that expert skills as well as skilled workers in public offices should be more appreciated. Human resources, if applied properly, are the key condition for application of high technology and up-to-date working methods and techniques.

The efficiency of beach management as an integral part of the maritime domain depends on skills and education of both management and workers as well as on the professionals in public offices. This requirement for the management means that they will be the key of the communication process and informational technologies. The main question for most of international experts is how to determine the best management strategy for different beach types (linear, pocket, resort, urban, village, rural and remote) as well as how to include user preferences and priorities in effective management plans (Williams *et al.*, 2009). It is logical to conclude that the management is expected to:

- Quit the traditional way of thinking and enable the management to become an intelligent organization based on the intellectual capital (Kovacic *et al.*, 2008), thus encouraging development and defining individual goals:
 - Economic – the systematic evaluation of on- and offshore resources on the basis of sustainable development that makes the use of maritime domain more efficient
 - Social – the increase in coastal population standard of living with special regard to the aspect of space organization and population needs
 - Ecologic – the sustainable development of on- and offshore resources, where these should be used in a rational manner and protected fully and in all phases; this implies integral approach;

the volume and dynamics of the productive and consuming activities should match the volume and dynamics in the on- and offshore environment

- Seek to archive efficient on- and offshore management as a specific goal, particularly by applying the functional and organizational model based on the up-to-date decision-making theories and feasible models based on modern informational platforms.

Contrary to legal procedures that usually prolong procedures, efficient decision-making includes optimum decisions in optimal timeframe. By using rational decision methods, understandable procedures and clearly displayed cause-consequence relations, it is possible to make an optimal decision in the shortest possible time (Brajdić, 1998). Taking too long to solve a problem can cause multiple negative effects on the whole system, primarily lower income, poor management performance, stagnation and slower development.

In some areas of public service on regional levels a positive change in management can be seen, bringing public benefit. This is particularly important because of the size and significance of the maritime domain and beaches in Croatia. Maritime domain and beaches are highly significant resources; they are to be managed properly in order to create a greater good for the society as a result of team work and efficient management (Kovacic *et al.*, 2008).

This request should be the main guideline for beach management not only in Croatia but in all other countries that have on their disposal this highly valuable resource.

5.2 Sustainable beach management

Sustainable beach management asks for clearly defined short-term goals within long-term goals of the sustainable development. The main goals of the sustainable beach management in Croatia can be summed up as follows:

- The possibility of safe and pleasant bathing for both visitors and locals,
- Maximum capacity of persons should never be exceeded,

- Clean sea and bathing environment,
- The pollution and littering on and around the beach should be kept at minimum,
- Establish the ecological capacity limit,
- Establish the social capacity limit.
- Place adequate recreational facilities on all beaches as well as meet sanitary requirements.

On regional level it is important to define an action plan for managing beach resources actively. In order to apply it is necessary to establish an agency specialized in beach management. This action plan for development of the sustainable beach management takes place in a shorter period of time, three years. With this plan the goals set for sustainable beach management, this is also a contribution to the long-term goals of the sustainable tourism in Croatia. The agency is responsible for definition and implementation of the beach management strategy. It looks after all the facilities in the beach area and establishes the adequate economic criteria for beach use. The agency should employ two people full time to begin with, 5 employees maximum. During the season the agency can employ seasonal workers, mainly for beach maintenance. The authors recommend the agency should be a public institution. However, in the long run, the agency should work off government budget on free market. The basic concept of the action plan can be summed up as follows:

- Establishing one single state-owned agency for beach management,
- Broadening of the existing beach capacity with the aim of servicing the increasing number of beach users in the region and their need for safe and comfortable stay on the beaches,
- Limiting (putting under control) beach users on the beaches,
- Improving sanitary and recreational facilities on the beaches.

Theoretical and practical use of experiences of researchers from all countries is in the centre of this plan.

5.3 The application of decision support and informational system

The trend of decentralization currently means that resource management is passed onto counties/towns, a large number of current and future resource users, different levels of political system, the increasing number of information of disputable value, more detailed information, especially in physical planning (Favro, Kovacic, 2005), the need to optimize the system of financing, *etc.* speak in favor of implementation of the system for support in decision-making. The preceding experiences gathered by researchers showed that processes of resource evaluation (rating, search for compromise solutions, establishing priority systems for a certain activity) in complex systems belong to the sphere of multi-criteria decision-making. The experience shows that systematic analysis of these complex systems such as costal areas and its characteristics, prove they belong to the class of poorly structured issues; making it fundamental to use the methodology of multi-criteria decision-making. The physical aspects of natural and other resources advocate the use of GIS model in management process and DSS in the process of beach resources management. The cartographic display of beach profiles is the optimal beginning of the implementation of these methods.

All further studies and efforts contribute to new understandings and ideas and good practice. Experience exchange among world researchers is necessary to avoid incorrect approaches and to accept good solu-

tions. Use of modern methodology is necessary for all counties. Developed countries should provide this and to help countries that can't do it on their own because they don't have necessary knowledge or they don't dispose of sufficient funds.

Conclusion

The growing demand on the tourist market for destinations abundant in natural beauty and the large number of attractive destinations demand that public services take an integral approach to beach management. On the basis of scientific research in this field it is expected that such an approach with corresponding methodology can contribute to a more realistic process of resource evaluation, and more efficient resource management. As an integral part of the natural resource management, environment protection and sustainable development, and particularly in beach management, it is necessary, along with the use GIS, to use remote research, digital photogrammetric and internet technology and adequate database organization for data storing. The management managing the beach resources has the outstanding responsibility toward resources they are entrusted with since these require integral approach. The proposed beach classification and rating by using DSS can help the management in decisions on beach concessions, and particularly in beach management.

References

- Anic, V. (1998). Rječnik hrvatskoga jezika, Treće, prošireno izdanje, Novi Liber, Zagreb, 768.
- Capar, R. (2000). Trebaju li nam propisi o plažama, Pomorski zbornik br. 38, Rijeka.
- Brajdic, I. (1998). Modeli odlučivanja, Sveučilište u Rijeci, Hotelijerski fakultet, Opatija.
- Favro, S., Kovacic, M. (2005.): Physical Plans in Managing Sea and Coastal Area, 25th International Conference on Organizational Science Development: "Change management", Portoroz, p. 1049–1058.
- Kovačić, M.; Gržetić, Z.; Seršić, V. (2008). Role and Importance of Public Administration Management with the Purpose of Integral Management of Maritime Estate. // 27th International Conference on Organizational Science Development. "Knowledge for Sustainable Development" 27, Portorož, 1197–1202.

- Kovacic, M.; Sersic, V.; Mladineo, N. (2009). Managing Maritime Domain in Croatia – Problems of Implementing the New Concessions Act, *Pomorstvo*, god. 23, No. 2, 649–666.
- Kundih, B. (2005). Hrvatsko pomorsko dobro u teoriji i praksi, Hrvatski hidrografski institut, Split.
- Pravilnik o uslovima koje moraju ispunjavati uređena i izgrađena kupališta (Sl. Republike Crne Gore, br. 63/02-vidjeti i na www.morskodobro.com/orgplaza.php).
- PPA/CRA. (1997). Smjernice za procjenu prihvatnog kapaciteta sredozemnih obalnih područja za turizam, Centar regionalnih aktivnosti Programa prioritetnih aktivnosti, Split.
- Williams, A.; Micallef, A. (2009). *Beach Management: Principle & Practice*, Earthscan Publications Ltd., London, U.K.