ENVIRONMENTAL VALUE OF BEACHES FOR THE LOCAL COMMUNITY AND TOURISTS

Scientific paper

Lidija Runko Luttenberger

Abstract
Purpose – Bathing areas represent eternal destination for a man led by his/her pristine tendency for direct contact with nature. However, the sustainability of and the access to this delicate part of the already vulnerable coastal system is endangered by human activities such as shore industrialization, residential development, poor wastewater and stormwater management, soil impermeability, road construction and occupation thereof for private interests. In Croatia, the number, size and natural character of beaches is diminished, while seawater and air in coastal areas is increasingly polluted. The purpose of this paper is to demonstrate that in the case of beaches, the interest of public health, being a pronounced anthropocentric interest, coincides with the interest of maintaining healthy ecosystems and that balance of benefits and damages ensuing from present coastline development may hardly outdo overall rewards provided by healthy beach environment both for the local community and tourists.
Design – The paper reviews beneficial effects of sea water, draws attention to the role of the beach, provides historical overview of urban beaches in Rijeka bay, elaborates pollution and land use threats to coasts and focuses on the challenges to environmental values of beaches in the region.
Methodology –As the problem must be observed in depth and with holistic focus, the author applied qualitative research based on observations, author's own experience, and the reports on previous research concerning in particular the urban beaches of Rijeka bay.
Approach –Research approach is inductive.
Findings – Urban beaches should be expanded both physically and visually to the detriment of non-profitable and polluting time-limited industrial sectors. Also, the construction in coastal hinterland, especially on karst soil, should be the object of particular attention of physical planning activities.
Originality – The research is original as it establishes the relationship between overall quality of the environment and bathing area purpose and elaborates the case of globally significant geographical location.
Keywords beach, bathing area, environmental value, public health, land use threats, tourism

INTRODUCTION

Any coastal city or town in the Mediterranean should have at least one major communal beach or sea bathing area as part of its waterfront. Rijeka, one of the largest cities in Northern Adriatic, having an exceptionally favourable geographical position, is an example where often poorly planned and failing industry devastated the beauty of local coastal landscape. Nowadays the situation is further aggravated primarily by tourist and other developments and by the pollution.

On the other hand, the ocean is the birthplace of life and the medium of an infinitely rich and complex biological activity. The fact that ocean water is also the natural mineral substitute for our internal environment and human plasma, opens the door to a major area of research which is particularly important in the face of the crisis in public health.[1]

The beach is the place where people meet and recreate. Beach environments promote families' health and wellbeing and positive relationship with nature[2]and therefore there should be a public interest for public beaches as opposed to the interest of viewing the beaches as places of pursuing various commercial, very often polluting activities.

The author analyses the origins of threats to mostly urban beaches as places of mass recreation providing significant potential benefit for public health for domestic population and the visitors, and argues that in the case of beaches, the interest of public health, being a pronounced anthropocentric interest, coincides with the interest of maintaining healthy ecosystems.

1. BENEFICIAL EFFECTS OF SEA WATER AND ROLE OF THE BEACH

Writing in the mid-eighteenth century and developing the work of other physicians, the Brighton-based Dr Richard Russell was the most important publicist for the therapeutic benefits of consuming sea water. In 1750 he wrote a Dissertation on the Uses of Sea Water in the Diseases of the Glands. For Russell and many other physicians, the sea had mystical qualities. The sea as saviour was realized and mediated by the development of a small piece of architecture, the bathing machine that was initially entwined with the therapeutic consumption of the sea and for many decades enabled the medical profession and other powerful groups to control the sea-bathing process and the use of the seaside. Despite its seeming insignificance, the bathing machine became the first purpose-designed form of seaside architecture, performing the extraordinary function of taking society to nature, allowing the private individual to consume nature and profit to be made in the process. Doctors detailed the features of the ideal seaside resort. For Russell the model resort should be „neat and tidy“, distant from any sea mouth to ensure high waves and a sufficiently salty sea.[3]

Rene Quinton(1867-1925) a French physiologist whose chief scientific work "L'eau de mer, milieu organique" (Ocean water, organic medium) was published in 1904 claimed that there is physical and physiological identity between seawater, the medium for all cellular life, and the internal environment of the organism. Qinton's laws can be summed up best in his profound revelation „We are truly a living marine aquarium“. The 1957 award winning educational science documentary "Hemo the Magnificient" produced and directed by Frank Capra reaches the same conclusion, asserting that "blood is seawater". Quinton in fact asserted that all life emerged from unicellular

[1] Passebecq, A., Soulier, J.-M., „Human plasma and ocean plasma: Comparative study of the therapeutic properties of seawater preparations“, *Ocean Health*, oceanplasma.org, 31.12.2013.
[2] Ashbullby, K.J. et al., „The beach as a setting for families' health promotion: a qualitative study with parents and children living in coastal regions in Southwest England“, *Health and Place*, *23*(2013)138-147.
[3] Gray, F., *Designing the seaside: Architecture, society and nature*, Reaktion Books, London, 2006.

organisms – the ancestors of human cells. Their need for a constant supply of mineral salts was met by the seawater in which they lived. The seawater also facilitated acid-alkaline balance, which was fundamental to the establishment of homeostasis.[4]

Ocean water can therefore be employed in a variety of ways, one of them obviously being thalassotherapy which recommends the use of ocean water in its natural state outdoors, based on the benefits of marine climate.

With sea bathing areas also representing an important social and cultural element, Croatian coast is by its indented character an interesting example of the development of communication with the coast. Those are the places where people meet, acquire experience and create certain behaviour patterns. The bathing culture is practically an unalienable civilisation dimension which any individual may benefit from, just like is the sunlight. Apart from the universally known body culture present in water sports, or in addition to hydro and helio therapeutical qualities, there is another, social determinant of the bathing area – that defines it as the place of equalisation of the poor and gentry, as is the case of carnival. Here, however, the equalization refers to undressing and thus unveils the democratic dimension of bathing area, with human body being the main protagonist of the antic worldview of healthy spirit and body. If the bathing area is furthermore a man-made facility, it assumes a still more intense gravitational force of some town square, the universal social ambience accessible to all.[5]

2. HISTORICAL OVERVIEW OF URBAN BEACHES IN RIJEKA BAY

Ever since the end of 19th century, there were initiatives in Rijeka to create a public sea-bathing area. One of the problems prevailing at the time was that Hungarian province had seized from the city of Rijeka a narrow strip along the coast, which circumstance significantly aggravated the process of securing the permit for exempting coastal belt required for organizing the bathing area. Rijeka's citizens have in fact never relinquished sea bathing as they used nearby beaches at Brajdica established in 1899 and Pećine in the town of Sušak situated just across Rječina river (all established as private) or alternatively numerous beaches in Opatija, but were thus attracted away from the city in favour of Sušak and Opatija. In 1912 the Municipal assembly secured the permit from the Ministry of Economy to set up two communal bathing areas, one smaller at Brgud, near the entry to former Topedo factory – Bagno Nettuno, and another one at Big Pier (Mololongo) – Bagno Quarnero. Municipal government of Sušak in that same year proclaimed Sušak as bathing locality and climate spa. It is important to mention here that the inclusion of Sušak on the list of bathing and spa localities at Croatian littoral commanded for stipulating more precisely the rules concerning land development in the urban area designated for tourism. The 1900 Construction ordinance for countryside in the Kingdoms of Croatia and Slavonia clearly defined the method of constructing country-life villas and the development in

[4] Dittman, R., „Evolutionary development of our internal ocean: Restoring bio-terrain with Quinton marine plasma", *Explore!* Vol 15, November 6, 2006, 1-5.
[5] Kostelac, M., „Socio-kulturološki aspekt kupališta", in *Nadležnost lokalne samouprave na plažama i kupalištima*, Proceedings, Udruga plavo-zelenih Lido, April 2003.

bathing areas. Under said document, each owner must among other things maintain park around the house, the fence wall facing the road must be stone-made with iron grill, and the walls facing adjacent buildings must be greened with ivy and evergreen plants.[6]

It should be pointed out that Sušak has throughout the history of its endeavours to set up the bathing area relied on private entities and was the victim of reckless urban policy and incautious issuing of construction permits. The result was appropriation of part of the coastline endowed by par excellence beauty – Pećine, and banning free access to the sea.[7] Such "seaside owners" considered the construction of seaside promenade unjustifiable and unfeasible. It was in fact never built so we are to these days left the legacy of consequences of the conflicting interests between the municipality and private owners by having no appropriate seaside promenade in Sušak, as opposed to nearby Opatija where urban planning had been implemented in a manner that public seaside walkway had the priority with regard to privatization of the coast. In the same manner the attempts to establish public sea bathing area had the same fate, until 1926 when new Municipal bathing area is constructed at Delta, a natural alluvion of Rječina river flowing between Rijeka and Sušak. The regulation of Rječina river soon demonstrated its problematic character, as the waste from burnt coal accumulated at river mouth and thus diverted water in direction of the beach. After the Second Word War, port and industrial surrounding made Delta less attractive for bathing, which then remained the point of social gatherings and sport events.[8]The inhabitants of Sušak and Fiume were bound by the now so inaccessible Rijeka sea. It was located precisely at the site which is now occupied by the wastewater treatment plant.[9]

Speaking further of present times, the integral area of Delta is split space-wise by the construction of fast city road. By way of World Bank loan the Port Authority intends to embark upon the project of modernization of Rijeka port, although the development of Delta is an utopia, that being the area where according to Bralić least construction is feasible considering entire area of the city. Delta represents significant urban identity for both Sušak and Rijeka. The area of Delta should render possible also in future development of the city the continuity of attractive, open, green, landscape and visual values which connect it with its natural indent, majestic Rječina canal whose watercourse supplies mountain air from Rijeka continental hinterland. Delta should therefore remain unbuilt, but regulated urban area. It should probably become a big urban park which would stretch from the very seashore, so the space could be used for leisure, walking and recreation[10], sea bathing included.

As for the disappearance of historical seaside facilities in Rijeka, big Secession style pile-dwelling structures of aforementioned Bagno Quarner bathing areas located on the port jetty were demolished, as well as the 1932 hydrodrome at Riva, a city seafront. In spite of general complaints that Hungarians had cut off access to the sea for Rijeka's inhabitants by building port warehouse facilities by the very shore, the then new state,

[6] Matejčić, R., *Kako čitati grad: Rijeka jučer, danas*, Naklada Kvarner, Rijeka, 2013.
[7] Lozzi Barković, J., „Kupalište i Hotel Jadran", *Sušačka revija*, 14/15, 1996.
[8] Lozzi Barković, J., „Javna gradska kupališta Sušaka", *Sušačka revija*, 16, 1996.
[9] Valerjev, N., „Gradsko kupalište na Delti", *Sušačka revija*, 10/11, 1995.
[10] Bralić, V., „Projekti uređenja Delte", *Sušačka revija*, 74/75, 2011.

Yugoslavia, acted alike by building its major port, so that instead of the old burnt Hungarian grain silo it erected by the end of Sixties as much as 2 new bigger and higher silos inconcrete. Demolitions of historical buildings in Rijeka case are most often the result of construction of roads. On top of that, megalomaniacal development in disproportionate scale denies the as-built historical status, that having been proven by Hungarians at the beginning of 20th century, and it is precisely what we ourselves are doing now at the beginning of 21st century. By planned demolition we build disproportional complex of commercial-entertainment-garage glass complex.[11]

At the very core of original development of the nearby Opatija riviera situated in Rijeka bay, and of its balneal architecture, was a tendency that coastal features, and thus also the bathing areas, should follow evolutionary growth of Opatija as fashionable cure site, with the aim of ensuring appropriate development along the coastline that is harmonized with the rest of urbanized space. Municipal government allowed the construction for private needs along the coast, adhering to the law on construction in coastal belt, which prevents built objects to be less than 3 metre distance from the promenade. An example of intriguing architectonic undertaking among the buildings for private bathing needs is the bathing pavilion of Schewegel family which differed from prefabricated timber construction which was prevailing at the time. The pavilion in terms of material, appearance and colour perfectly fits challenges of the site, bathing needs and link of lungomare walkway with natural profile of the cliffs.[12]

Major public bathing areas in Opatija were Angiolinabad, Slatinabad, Lido, Quitta (Arkade), Tomaševac, Tivoli (Ičići), and Črnikovica (Volosko). Slatinabad, located at the mouth of watershed of torrents coming down from the mountain very early had frequent problem of contamination by Vrutki canal, the smell of decaying flora and fauna at the bathing area shallows, enhanced by summer heat, kitchen waste from the restaurant situated in the row of Slatinabad shops, and troubles with drainage canals of Slatina cab services. In the seventies metal raft battered down wooden plateau of old Slatinabad, after which the remains of concrete skeleton were mine blasted. The project which involved a lot of infilling, laying concrete for sun bathing areas and shrinking of a natural beach and its sea bottom was already in stand-by. Arkade beach ceded the way to Admiral Hotel in 1980, while the saddest and most violent disappearance is that of Jadran bathing area which was destroyed by fire in 1989. There remained a construction plateau only. Following mentioned events, local population moved to the remaining bathing sites, particularly to ancillary small concrete patches along coastal cliffs, the areas of underutilized hotel beaches, and smaller ports and boat berths. Whoever has the possibility, choses to drive to the beaches in nearby coastal villages or distant natural beaches on the islands.

Panoramic chronological analysis of Opatija bathing areas therefore reveals lost dimension of visual littoralization imposed by bathing capacities. Original architecture of Opatija bathing areas was the fruit of expert deliberation of the designers who in an intriguing manner conceived the development along Opatija seaside promenade. Lost

[11] Glavočić, D., „Sva riječka rušenja“, *Sušačka revija*, 74/75, 2011.
[12] *Povijest opatijskih kupališta*, Udruga Plavo zelenih Lido, Opatija, 2005.

artefacts of wooden structures, especially of Angiolina, Čnikovica and Slatina bathing areas, and finally of Arkade and Tomaševac beaches constitute a apart of rich urban history and invaluable element of collective memory of the city. Those bespeak that coastal interventions should be approached in a manner that is appropriate with regard to continuity of construction in open maritime demesne, while adhering to delicate articulation with architecture of the space.[13]The viability of delicate coastal system depends precisely on ecological mind as backbone of evolutionary option of a man and his subsistence within global and coastal ecological community.[14]

3. POLLUTION AND LAND USE THREATS TO COASTS AND BEACHES

Rijeka bay is located between western part of Krk island, Istrian peninsula and northern part of Croatian Littoral. Sea depth of the bay ensures safe navigation for Cape-size ships so major Croatian port developed there, along with significant tourist destinations. It is a submerged part of Dinaric karst which constitutes one of the two most valuable karst phenomena on the globe and the largest continuous karst area in Europe.

Coasts and beaches are exposed to a number of threats, some of which are listed in table 1.

Dominant tourist development model in Croatia are greenfield investments, combined on the other hand with big box retailing at inappropriate locations within or near city centres, very often just uphill the precious steep coastlines, thus exerting pressure from above with regard to wastewaters, stormwater, and microclimate change.[15]

The table lists local effects. However, widespread effect caused by accumulated local sources is pollution that harms the entire food chain, all the way to humans, as well as the greenhouse gas emissions resulting in ocean acidification.

As mentioned earlier, the ocean, with a pH of 8.2 is the cradle of life on Earth. Ecosystems and their life-creating powers thrive in an alkaline environment. Yet much of our environment - indoors as well as outdoors - has reached a high level of acidity. Our excessive use of fossil fuels and the massive volume of carbon dioxide pumped into the atmosphere every day render the air very acidic.[16] After absorbing a large portion of carbon dioxide released by human activities, the oceans are becoming acid. If it weren't for the oceans, the level of carbon dioxide in the atmosphere would be much higher - gilled marine animals may find it hard to breathe and calcium carbonate shells may dissolve.[17]Therefore, in parallel with climate change we get acidic ocean.

[13] Ibid
[14] Kostelac, M., „Socio-kulturološki aspekt kupališta“, in *Nadležnost lokalne samouprave na plažama i kupalištima*, Proceedings, Udruga plavo-zelenih Lido, April 2003.
[15] Runko Luttenberger, L., „Interactions between the society and the environment in ecological engineering of Croatian water and waste management sector“, *Strojarstvo*, Vol 54(1)2012, 91-104.
[16] Pauli, G., *The blue economy*, Paradigm Publications, Taos, 2010.
[17] *Threats to oceans and coasts*, WWF, www.panda.org, 5.1.2014.

Table 1: **Threats to coastal and balneal areas**

Coastline urbanization	• impervious surfaces such as roads, driveways, parking lots, roof tops, sidewalks • Increased volume, duration and intensity of urban runoff • Additional transportation of nonpoint source pollutants affecting water quality • Decrease in groundwater recharge • Bacteria and other pathogens carried in stormwater contaminate coastal waters and beaches • Urban climate distortion • Deforestation (reduced biodiversity, release of greenhouse gas emissions, disrupted water cycles, increased soil erosion, disrupted livelihoods, loss of green infrastructure networks) • Increased pressure on municipal utilities
Coastline industrialization	• Air, sea, soil pollution • Impaired public health in coastal communities • Destruction of primary resource for tourism – landscape, beaches, health environment • Industrial chemicals
Shipping	• Air pollution from burning low-quality marine fuel and sea pollution (including dumping of rubbish, ballast water, oily waste) • Impaired public health in coastal communities • Groundings • Anchor damage
Road transport near the coast	• Air, water, soil pollution • Substantial infrastructure taking up unspoiled land • Soil erosion • Impervious surfaces • Congestion pollution problems • Splitting communities and ecosystems
Pollution from municipal utilities	• Great quantities of solid waste landfilled on porous karst terrain • Wastewater discharged into the sea • High consumption of potable water for waste transport • Pollution of water, the sea, soil and air
Power generation sources	• Air, water, soil, the sea pollution • Public health degraded and impaired by using non-renewable sources and obsolete technologies • Centralized systems entailing damages caused by siting and transport
Squeezing of bathing areas	• By coastline industrialization, urbanization, construction of marinas, obstructing the view
Beach area pollution	• Discharges of sewage from unregulated uphill sources, from treatment plants, and of polluted runoff
Infilling and laying concrete on natural beaches	• Destruction of natural sea bottom at the beach that is otherwise beneficial for humans and marine ecosystems

4. CHALLENGES TO ENVIRONMENTAL VALUES OFTHE BEACHES

It is evident that throughout the history of balneal culture, the conflicts between private and public interest resulted in the difficulty to set up and maintain the beach area, in reducing it, in intervening in its original aspect, in pollution, and closure of bathing places.

The author focuses attention on the following environmental aspects associated with Croatian beaches:

- Medical tourism which Croatia wants to promote is dependent in the firsts place on healthy environment. It is not enough to have authentically beautiful coast or the sea or forest if the air, water and soil are polluted. Medical tourism does not only involve built sanatoriums with baths, apparatuses, physicians and other expert personnel, but primarily open space, and if we speak about seaside sanatoriums, the beaches, sunbathing spaces and promenades.
- Medicinal products based on seawater, pools built along the coast (in Croatia subsidized by national development bank and the ministry responsible for tourism[18]) or artificially conditioned air in impermeable living spaces[19]may not by themselves ensure healthy living. Those could possibly convey a message that benefits of the sea and/or bathing are granted also without actual presence of clean sea or air.
- Policy makers are not always aware of the value of sunbathing and sea bathing and of inexpensive and healthy recreation for population and tourists.
- Croatia often promotes the policy of greenfield-type investments in historical urbanized areas, i.e. building as if the site has not been previously developed and designated for some purpose, and without any regard for coastal or land use to date and its cultural and historical value.
- With coastal zones being a „hinge“ between maritime and terrestrial development, marine spatial planning in Croatia[20]should be integrated with environmental impact assessment.
- The so-called improvements of old beaches and bathing areas often involve infilling and laying concrete, and not the reconstruction of original structures and preservation of natural beach and its sea bottom. Concreting of coastline and beaches is comparable with prevailing approach to rivers that are through regulation and canalization deprived of their natural bed.[21]

[18] *Programme concerning tourist industry competitiveness*, Ministry of Tourism, 2014, www.mint.hr/UserDocsImages/140228-KTG14P1.pdf

[19] Luttenberger, A., „Pravni aspekti sigurnosti kakvoće zraka u klimatiziranim prostorima“, Zbornik radova *Zdrava klimatizacija uspješan turizam*, Fakultet za menadžment u turizmu i ugostiteljstvu, Opatija, 2012, 63-70.

[20] Runko Luttenberger, L., „Izazovi morskog prostornog planiranja*“, III. Savjetovanje o morskoj tehnologiji - Third Conference on Marine Technology*, Hrvatska akademija znanosti i umjetnosi - Znanstveno vijeće za pomorstvo - Sekcija za morsku tehnologiju, Rijeka, 2010, 84-93.

[21] Luttenberger, A., „Pravni aspekti sigurnosti kakvoće zraka u klimatiziranim prostorima“, Zbornik radova *Zdrava klimatizacija uspješan turizam*, Fakultet za menadžment u turizmu i ugostiteljstvu, Opatija, 2012, 63-70.

- Applied measures for improving the quality of seawater by collecting and treating wastewaters in author's opinion do not ensure desired results. Wastewater systems are mainly centralized, with insufficiently developed secondary network and low level of treatment, discharges and pumping facilities are situated at attractive coastal sites (in some cases at beaches themselves). Decentralized wastewater systems integrating nutrients and energy recovery and water reuse should be employed.[22]Such systems are also less vulnerable to climate change contingencies.
- Natural beaches constitute precious elements of the ecosystems along with rivers, lakes, karst, forests, mountains, marshes, etc. which should be accorded legal standing, the interests whereof may be represented by their guardians or the citizens (Runko Luttenberger and Luttenberger, 2012).[23]

CONCLUSION

For preserving the health of local inhabitants as wellbeing of highest category, and for the benefit of health tourism associated therewith, since visitors want to experience whatever is beneficial for local population, it is of utmost importance to:

a. maintain high quality of all environmental components,
b. revitalize historical and open new beaches in urban areas,
c. resolve the conflict between the beach and industrial waterside in favour of the former.

Preserving of quality beaches and bathing areas is in the interest of humans and ecosystems. Urban beaches should be expanded both physically and visually to the detriment of non-profitable and polluting time-limited industrial sectors. In order to preserve the quality of the sea and beaches, the construction in coastal hinterland, especially on karst soil, should be the object of particular attention of physical planning. Historical beaches should be restored to the state as originally conceived in order to achieve the harmony between architecture and landscape which had been paid particular heed.

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Lidija Runko Luttenberger, PhD, BSc(Eng), Scientific Associate
Komunalac d.o.o.
Jurdani 50b, 51213 Jurdani, Croatia
Tel.: +385 51 505 208
Fax: +385 51 505 298
E-mail: lidija.luttenberger@komunalac-opatija.hr