

ASSESSING BEACH ATTENDANCE AND PRACTICES IN A LARGE COASTAL CITY. A CASE STUDY IN MARSEILLE (FRANCE)

Samuel Robert, Marie-Laure Trémélo

Abstract: In large coastal cities, beaches are very important public open spaces. However, except in a few studies investigating interactions between uses and environmental beach quality, beach attendance and practices are generally poorly studied. In this context, this paper deals with a research initiative developed in Marseille (France), in order to: 1) assess beach attendance in summertime, 2) survey users' practices, habits and preferences, and 3) interview municipal beach managers. Between 2016 and 2020, we collected data from 8 am to 8 pm on several summer days, following different time frames (three consecutive days, a full week, and the same weekday in July). We operated in three different beaches, one being studied every year. Attendance was assessed hourly, and practices were evaluated through face to face questionnaires on the field. The results obtained present interesting findings on several aspects. They help to better understand beach attendance as a system within the city at various time scales and throughout different geographical locations. They also help providing guidelines to set up a more ambitious and complete system to monitor beach attendance and practices.

Keywords: Beach attendance; Beach practices; Assessment; Large city; Marseille

Samuel Robert, Avignon University, France, samuel.robert@univ-amu.fr, 0000-0002-3595-5793
Marie-Laure Trémélo, Avignon University, France, marie-laure.tremelo@univ-amu.fr, 0000-0002-4802-7179

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Introduction

In large coastal towns, beaches are of great social importance. They are places for leisure, sport activities and socialising, visited all year round. They provide an opportunity for bathing and contact with the sea, in a sometimes oppressive urban environment that grounds a desire for open spaces. They are an integral part of local culture and contribute to the image of the city. They must therefore fall under public management and policy that is both appropriate to users' expectations and in line with the more general social and ecological issues facing coastal areas today: erosion and sediment depletion [4], environmental pressures [1].

Developing a beach management policy requires data on visitor numbers and user practices [10]. Beach attendance and its variation over time is essential data [2]. For example, it can be used to calibrate cleaning operations, bathing surveillance, public transport services to beaches, and to assess improvements to be made in these fields. It is also necessary to know what users do and how they feel, in order to understand how beaches are used and frequented, to anticipate any problems, to run prevention or communication campaigns and, more generally, to ensure that management evolves in line with users' practices and aspirations. However, such data is rare for beaches in large cities [3]. Until today, this area has not much attracted the attention of local public authorities, who are more concerned with monitoring bathing water quality or struggling erosion. Unlike some seaside resorts, for which this information is more frequent because it is part of the monitoring of their economic performance, few large coastal towns have figures for the number of people visiting their beaches or studies that provide information on the practices, expectations and perceptions of beach users. Given the ecological and social challenges that authorities are currently facing and will continue to face in the future, this is a gap that needs to be filled. How will large cities continue to offer beach areas to all in the context of the climate change and its effects considering beach erosion on the one hand and increasing heat waves, urban heat island on the other?

In this context, we report on an initiative we developed in Marseille (France), with a multidisciplinary observatory dedicated to the study of coastal environment. From 2016 to 2020, we carried out a study on some of the city's beaches to: characterize beach attendance, user practices and preferences, in relation to management methods; understand the functional integration of the beaches into the city; and enable local authorities to take a critical look at their actions.

Materials and Methods

The work was carried out within the framework of the Observatoire Hommes-Milieux Littoral méditerranéen (OHM-LM), set up in 2012 by the French CNRS, of which Marseille is one of the four study sites. The aim of OHM-LM is to observe and analyse social and ecological dynamics within the coastal zone by promoting interdisciplinary works and connections between scientific and local players. It studies the effects of integrated coastal zone management principles on the urban and recreational pressures that have been exerted on the Mediterranean coast for several decades, while taking into account contextual phenomena such as climate

change, loss of biodiversity and globalisation. To this end, four specific coastal objects are targeted for study: beaches, ports, lagoons and coastal protected areas.

Study area

In France, Marseille is a large municipality (240 km²) with a coastline divided into three main sections: a harbour front in the north; an urban and seaside front in the centre-south; and a natural front, part of the Calanques National Park in the far south, to which must be added two archipelagos (figure 1). In 2020, the population is around 870 000 inhab., making it the most populated municipality in a metropolitan area of 1.9 million. Undergoing a transformation of its socio-economic base, the city is attracting more and more tourism and tertiary activities, while the port is in decline with most activities now located in Fos-sur-Mer, some 50 km away.

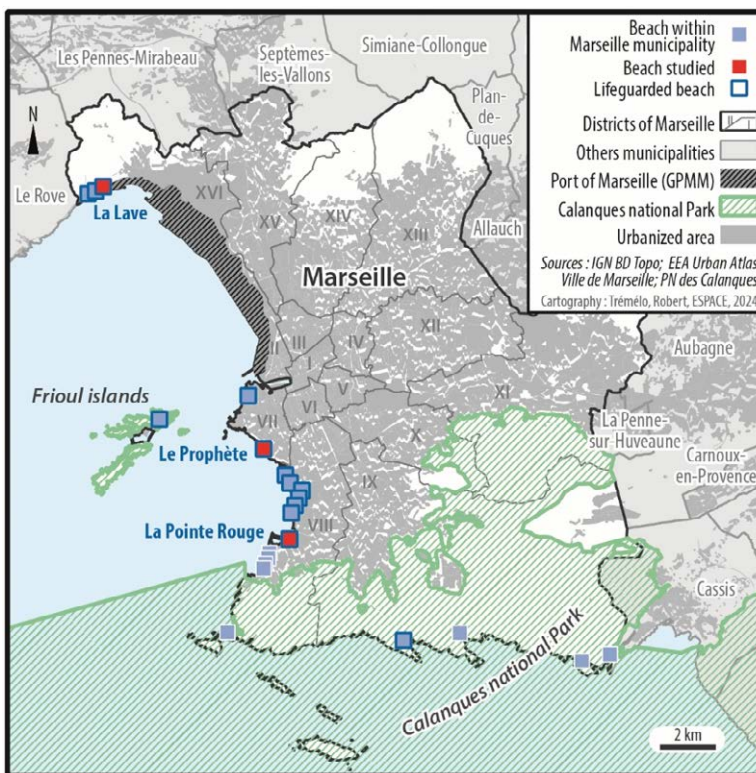


Figure 1 – Location of the 21 beaches of Marseille.

The coastline includes natural pocket beaches and, above all, artificial beaches reclaimed from the sea in the 1980s (Prado beach park and Corbière beach park). Pocket beaches and the beaches of Corbière are sandy, whereas those of the Prado

beach park are made of mixed materials: sand (0.2 to 0.4 mm in diameter), gravel or ‘rice grain’ (3 to 8 mm in diameter) and pebbles (between 20 and 60 mm in diameter). With the exception of the Corbière beach park at the northern end of the territory, beyond the port area, Marseille beaches are all located in the southern half of the city. The total surface area of these beaches is 90,000 m², divided between 21 beaches, 15 of which are managed specifically for the summer season. This runs from 1st June to 31st August, a period of 3 months during which the city's services provide bathing surveillance, public showers, toilets, free lockers, daily monitoring of bathing water quality and, of course, cleaning and rubbish collection. At the end of the season, the service responsible for bathing surveillance provides an overall estimate of the number of people using the beaches, which generally fluctuates around 2 million people, without being more precise.

In the municipal organisation chart, beach management comes under the responsibility of the Department of the Sea. Its political referent is an elected representative who is a deputy mayor of the city, in charge of ‘*marine biodiversity, the management, preservation and development of coastal and island marine areas, beaches and seaside facilities, water sports, sailing and diving, and the development of the tradition of the sea and the open sea*’. Beaches are therefore part of a broad public policy for the coast and the sea. After a ten-year ‘Beach Plan’ launched in 2011, which has helped to upgrade certain beaches (demolition of hard-standing facilities built on the public maritime domain, improved access, etc.), beaches are now being considered in a more global approach, which requires a clear understanding of who uses them, for what purposes and how.

Measuring beach attendance

Assessing the number of beach-goers was carried out on an exploratory basis, as it was not possible to finance a study covering all the city's beaches at any time of the day or year. The focus was therefore on the summer period and on a few representative beaches along the Marseille coastline.

A protocol for counting users was first developed and tested at various sites. It is based on two distinct operations. One consists of counting the number of persons entering and leaving the beach by time slot, which is possible on beaches that are accessible by a compulsory passageway. The other is based on photographic images taken hourly, on which users are then counted using photo-interpretation in the laboratory [7], [8], [9]. The first one allows an accurate assessment of the total number of people present on the site during the day and its variation from one hour to the next. The second one provides a slightly poorer assessment (the number of people on the beach is underestimated, because of masks on the images), but it does allow the number of users in the water to be counted with accuracy.

This protocol was applied to a beach chosen as the reference site for the study: Le Prophète beach (figure 1). Data was collected between 2016 and 2020, i.e. five successive summers, each time for a few days in July. Counts were made between 8 am and 8 pm and photos were taken at 8 am, 9 am, 10 am, and so on until 8 pm, in order to track changes in visitor numbers over a whole day, and to study the variation in numbers over different time span: several days in a row, and from one year to the next at the same day (table 1). In 2017, two other beaches were also

observed simultaneously with Le Prophète beach for three days of the same week: Lave beach, part of the Corbière beach park to the north, and Pointe Rouge beach to the south.

Table 1 – Field work days (data collection for visitor numbers and practices).

Beach	2016	2017	2018	2019	2020
Prophète	3 days 18, 19 and 20 July	7 days 10 to 16 July	1 day 18 July	1 day 17 July	1 day 15 July
Lave		3 days 11, 13 and 15 July			
Pointe-Rouge		3 days 11, 13 and 15 July			

Collecting data on beach goers' practices

In parallel with the evaluation of visitor numbers, a questionnaire was administered to find out who goes to the beach, how and why. Divided into five sections (table 2), it was designed to allow relevant themes to be monitored from one year to the next and to incorporate specific topics in certain years, depending on the opportunities for interdisciplinary research within OHM-LM. For example, Section 2 included questions on sea water quality, the use of toilets and showers facilities in 2016, 2017 and 2018 [11], sunscreen use in 2017 [5], and the return to the beach after the 1st Covid-19 lock-down in 2020 [6].

Table 2 – Questionnaire sections and topics.

Sections	Topics
1- Your relationship with the beach	Frequency of visits; preferred time to come; time spent on site; means of transport used; motivation for coming on the day in question; habit of visiting other beaches
2- Your activities and practices	Usual location on the beach; usual activities; bathing practices; use of sanitary facilities; look at the weather forecast before coming; look at the water quality data sheet; use of sun cream (in 2017); return to the beach after Covid-19 (in 2020)
3- Your perception of the place	Personal assessment of the quality of the beach; Personal assessment of the attendance; Personal assessment of the bathing water quality; Wishes for change in 10 years' time
4- Socio-demographic profile	Gender; Age; Status (resident, tourist, visitor); Place of residence; Professional activity; Accompanying persons
5- Context of the interview	State of the sky when questioning; colour of the beach flag; special remarks

In practical terms, the questionnaire was administered face-to-face by specially trained interviewers, who used paper printed questionnaires. Each day, the survey was announced on the beach by microphone and by a poster displayed next to the lifeguards' booth. Also, interviewers were identifiable thanks to name tags with the logo of the OHM-LM. The sampling strategy consisted of reaching the widest possible range of people present on site, while taking care to maintain a balance in terms of gender, age groups, and number of persons questioned per hour. The aim was not to be statically representative of regular beach goers, who are a population whose socio-demographic make-up is unknown, nor to be representative of the population of the town or adjacent neighbourhood. Beach users were questioned on site from 8:00 am until 8:00 pm and, for each of them, the survey lasted about 15 minutes. During this five-year study, nearly 700 people were surveyed following the same protocol.

Results

The amount and diversity of data produced cannot all be presented here. We will restrict ourselves to mentioning the main lessons that can be drawn from it, while referring to other resources that have already been published.

Beach attendance

Over the observation period, the number of people coming to Le Prophète beach is irregular, but always much higher than the official data from the Health services (1300 users a day as per the beach profile). In 2016 (3 days of counting), the average number of users is 3470 per day. In 2017 (7 days), it is 3060. Subsequently, they are 5514 on 18/07/2018, 2,089 on 17/07/2019 and 1631 on 15/07/2020. There are several reasons for these variations in visitor numbers. First, they vary from day to day, depending on the weather and occasional bathing bans because of bad water quality (like on 15/07/2020). Second, visitor numbers are higher after 14 July, which marks the start of the peak tourist season in France. They are also higher at weekends than during week days and on Wednesdays than on other days of the week. In addition to these general explanations, we noticed that a change in the accessibility to the beach impacted attendance rather seriously after 2018. Before, our counting never fell below 2500 visitors per day. In that period, it was possible to park on the street serving the beach, straddling the pavement on the sea-side. In spring 2019, the street was upgraded to accommodate a cycle lane and one lane of car traffic was lost, making impossible parking on the seaward side. This resulted in a drop in visitor numbers, as reflected on Wednesday 18/07/2019, a sunny day when bathing was not forbidden, and confirmed on Wednesday 17/07/2020, when it was accentuated by the closure of the bathing area from 11 am. In other words, the findings of our assessment are twofold: beach attendance at Le Prophète is underestimated by the authorities, and visitor numbers have fallen as a result of fewer parking facilities nearby.

Besides the drop in the attendance, the hourly count of users shows that daily visitor numbers vary following a bimodal pattern that persists over the observation period. In general, the number of people rises until it reaches an initial peak in the

late morning (11 am), then falls back slightly until 2 pm, before rising again to reach a main peak at around 5 pm (figure 2). This is a familiar pattern, already observed elsewhere thanks to other studies [2], [10].

However, deviations from the bimodal model are frequent, depending on weather conditions, festive events in the city, or the closure of bathing areas due to accidental pollution. Results also show that, on the same day, the model may not apply to all the city's beaches. In 2017, the counts carried out simultaneously at Le Prophète, La Lave and Pointe-Rouge showed that the number of users did not vary in the same way, particularly at La Lave (figure 3).

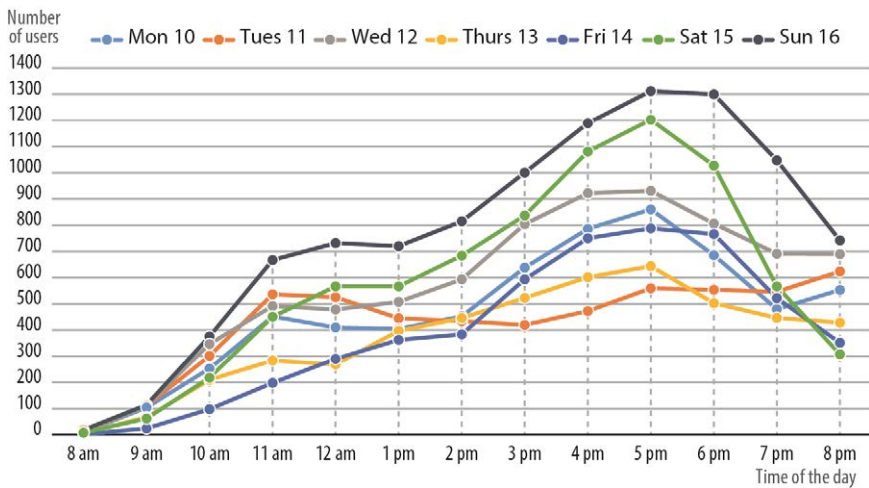


Figure 2 – Beach attendance at Prophète beach between 10 July and 16 July, 2016.

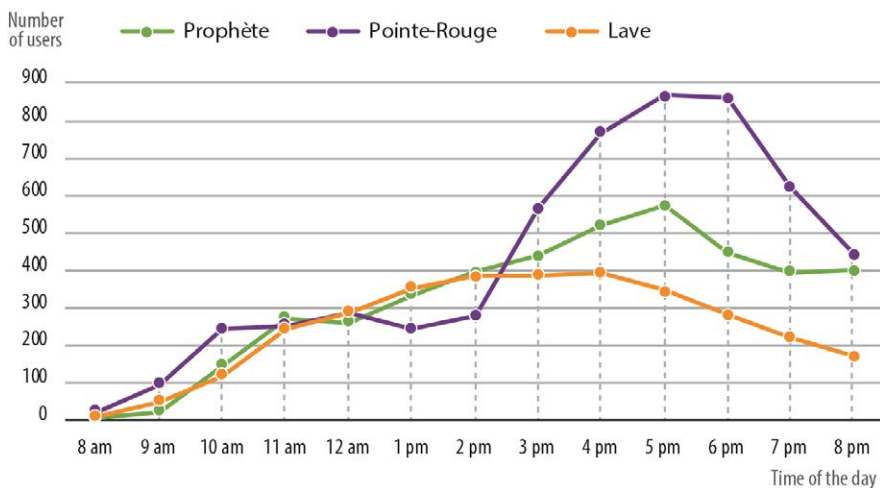


Figure 3 – Beach attendance at Prophète, Lave and Pointe Rouge beaches on 13 July, 2017.

Practices

A large proportion of beach users are residents of Marseille (table 3). They most often live near the beach surveyed, where they say they are "regulars" and where they mainly go in the company of other people and by car. Although the peak is in the afternoon, they say they prefer to come in the morning. Most often, the time they spend at the beach rarely exceeds half a day.

Table 3 – A few data on beach goers' profile and practices (questionnaire 2017).

	Resident %	Regular %	Accompanied %	Come by car %	Half a day %
Prophète	71	60	73	49	29
Lave	87	73	76	74	48
Pointe-Rouge	58	51	78	57	33

If they are used to come to the beach where they were interviewed, users like to go to other beaches in the city, in particular the large beaches of the Prado beach park (figure 4). However, the Corbières beach park, in the more working-class northern districts, is less attractive.

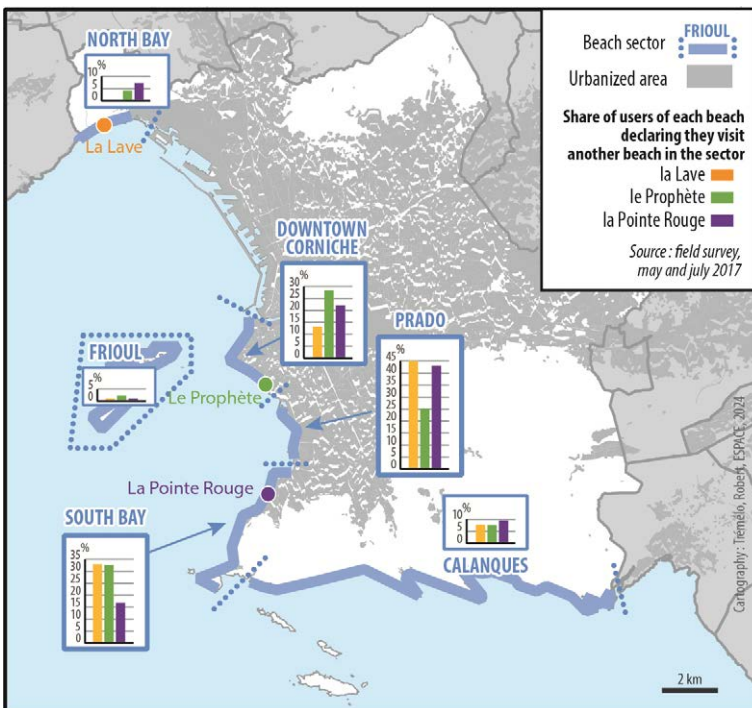


Figure 4 – Other beaches of Marseille where beach goers also go (by geographic sectors).

Outside Marseille, the other beaches most visited are located in a relative vicinity, outlining a distance effect: La Lave users tend to visit beaches in neighbouring communes to the north. Pointe-Rouge users tend to go to beaches in neighbouring communes to the south (figure 5).

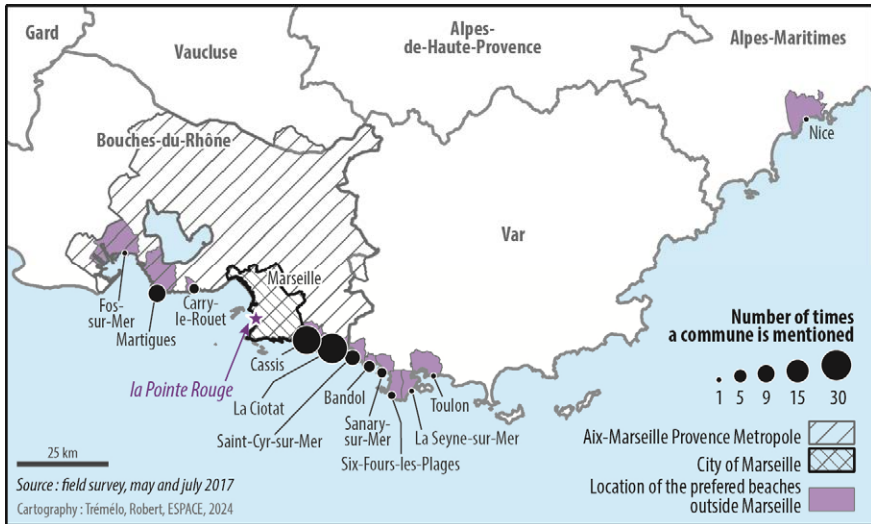


Figure 5 – Beaches outside Marseille attended by users interviewed at Pointe Rouge beach.

The vast majority of users say they go swimming every time they come to the beach, and half of them prefer to stay close to the water. Water quality is very important to them (between 87 % and 93 % of respondents), but very few consult the sheets displaying the water quality measurements from health services. They are also very sensitive to the quality of the beach itself, but curiously relatively few use the public toilets (around half of respondents).

Representations

Overall, users like the beach they use to go (figure 6). They highlight its "pleasant" (*agréable*, in French), "family" (*familial*) and "friendly" (*convivialité*, *sympathique*) nature. Above all, they see it as a place where people can socialise, pleasant and even attractive. However, depending on the location, they also point to negative aspects that could be improved. Cleanliness, for example, is frequently mentioned at Le Prophète, less at Pointe-Rouge and La Lave. Too much attendance was mentioned at La Lave and Pointe-Rouge, but not at Le Prophète. When asked how they would like to see these beaches evolve in the future, respondents tend to favour maintaining the current situation ("that nothing changes, that everything stays as it is"), apart from improving cleanliness. They are attached to the public character of the beach and its socially mixed attendance.



Figure 6 – The three words most often used to describe beaches

Discussion

The approach developed on the beaches of Marseille provides an insight into the system of beach use in a large city. However, there are still shortcomings and new developments should be encouraged.

Extend to other beaches and other times of the year

While the data produced is instructive, it remains insufficient for a number of reasons. Firstly, given the great diversity of the city's beaches, it would be necessary to study other sites, in particular the large beaches of the Prado beach park, which are very popular and conducive to outdoor sporting activities, and the pocket beaches to the south of Pointe-Rouge, which are very popular with young adults but also very impacted by erosion. Observations and counts should also be carried out outside the summer season, particularly in the spring and after the summer when, on fine days, beaches sometimes receive very high numbers of visitors. Similarly, it would be interesting to look at the number of people in the evenings and during the early part of the night, which is relatively high during the summer period and about which nothing is known. Finally, with a view to gaining an overall understanding of the beach visitor system, it would also be advisable to explore the possibilities of automated counting. Although various attempts have been made in the recent past, the municipality has never shown much willingness to go down this route and the experiments have proved rather pitiful.

Data appropriation by managing authorities

Today, one of the challenges of this initiative is its appropriation by the management authorities. Developed under the terms of an agreement, the research team's work has been accompanied and partly financially supported by the Department of the Sea. Presentations and discussions took place both at the design and at the feedback stages, and the data produced has all been made available, as has the published work. However, capitalisation of the knowledge acquired is questionable. There was a failure to pass on the information produced when there was a change of contact person following a turnover within the institution, at both political and technical levels. It is also difficult to grasp how the city takes advantage of the knowledge produced, both in its daily actions and in the design of its coastal management policy for the benefit of residents. Recent discussions with the have highlighted these difficulties and identified a new area for collaboration. This would involve organising workshops between researchers and local authority staff to work on the operational use of the data produced, on the one hand, and to identify new areas for research and development, on the other.

Studying beach use from inside the city

In terms of research, and more particularly to understand how beaches fit into the socio-ecosystem of such a large coastal city, the study of beach use and practices would require complementary or even alternative approaches. In addition to looking at the beach itself, it would be interesting to explore the use of the beach from the city. The aim would be to assess how often and how easy or difficult it is to get to the beach from different parts of the city. This could also lead to the search for privileged relationships between neighbourhoods and beaches, which would not simply be a question of spatial proximity. From the perspective of an inclusive city, where the sea can be seen as a common, the question of who goes to the beach versus who doesn't remains wide open. This raises questions about how people access the coastline by public transport, how they see the coastline and beaches, and the different forms of attachment they have to places.

Conclusion

Assessing beach use and describing beach practices in a large city is a huge undertaking. It requires a considerable collection of data, which is not easy to organise. The approach undertaken in Marseille, exploratory in its design, has made it possible to acquire some basic knowledge and to characterise certain aspects of the relationship between users and the beach. It is also likely to lead to the development of a roadmap for a more comprehensive and ambitious observation of the beach attendance system in this city, provided that the authorities in charge of the beaches agree to support it.

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