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Sand, Sun, Sea and Sex with Strangers, the "five S's". Characterizing "cruising" activity and its environmental impacts on a protected coastal dunefield

Leví García-Romero [a,*], Carolina Peña-Alonso [a], Patrick A. Hesp [b], Antonio I. Hernández-Cordero [a], Luis Hernández-Calvento [a]

[a] *Grupo de Geografía Física y Medio Ambiente, Instituto de Oceanografía y Cambio Global, Universidad de Las Palmas de Gran Canaria, Unidad Asociada ULPGC-CSIC, Parque Científico Tecnológico Marino de Taliarte, 35214, Telde, Las Palmas, Spain*

[b] *Beach and Dune Systems (BEADS) Laboratory, College of Science and Engineering, Flinders University, South Australia, 5042, Australia*

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ABSTRACT

"Cruising" is a concept which designates a practice of social interaction that consists of anonymous sexual encounters, mostly among homosexuals, in open and/or closed public spaces. Coastal dunes and beaches are examples of open public spaces where these sexual practices are widely carried out, to the extent that the so-called "Four S's" (Sand, Sun, Sea and Sex) have even been defined in the literature. Abundant studies have addressed the topic of relationships between tourism and sex, but few have analyzed the consequences of these practices on the natural environment, especially when the spaces where these activities take place are protected areas. In this work, the spatial distribution and the environmental impacts of cruising in a protected coastal dune system are characterized and assessed. There is no intention to criticize the actions of some of the LGBTI community. The sex spots (places for sexual encounters) were located and inventoried by fieldwork. The dimensions or internal distribution, as well as the sexual use, geographical position, vegetation cover and attributes, and environmental impacts or lack of management actions were examined and collated in a geographic information system (GIS). The results show that the distribution of the 298 identified sex spots, which occupy an area of 5763.85 m2, is related to the distance to authorized paths in the protected area, to the presence of bushy and dense vegetation, and to stabilized aeolian landforms or ones formed by vegetation (nebkhas). The bigger the sex spot, the higher the number of people who made use of it, the greater the likelihood of it being a low-lying area covered by vegetation, and the larger the amount of waste. The activities developed in these sex spots impact directly on the aeolian landforms and on eight native plant species, three of which are endemic species.

1. Introduction

1.1. Uses of coastal dunes ecosystems

Coastal dunefields and dune systems have significant value for their function as barriers against marine processes, for their ecological functioning and importance (Carter, 1990; Martínez et al., 2013), for their intrinsic values (Hesp, 2000), and the attractive landscapes and the natural elements that form them represent (Miththapala, 2008). These areas have historically been exploited for the extraction of their resources, but in recent decades anthropogenic pressure has increased substantially particularly through urban and port developments, and this has accelerated their degradation and, in some cases, the destruction of their ecosystems (Paskoff, 1993; Nordstrom et al., 2000; Martínez et al., 2013). In the past few decades, coastal dunefields and beaches have been identified as priority destinations for mass tourism worldwide (Krahulik, 2006; Tewksbury, 2008; Hattingh and Spencer, 2017), so that their degradation, in many cases, has been a direct consequence of tourism development, such as has occurred in Europe (Paskoff, 1993; European Environmental Agency, 2006). Such development has included the anthropogenic occupation of water basins or coastal areas that supply sand to sandy beaches, as well as the physical occupation of

* Corresponding author.
E-mail addresses: levi.garcia@ulpgc.es (L. García-Romero), carolina.pena@ulpgc.es (C. Peña-Alonso), patrick.hesp@flinders.edu.au (P.A. Hesp), hernandez.cordero@ulpgc.es (A.I. Hernández-Cordero), luis.hernandez.calvento@ulpgc.es (L. Hernández-Calvento).

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the dune systems themselves, dumping of rubbish, or extraction of aggregates (De Andrés-Díaz and Gracia, 2002; Del Rio and Malvárez, 2017). This results in the loss or unstable functioning of many dune systems worldwide (Nordstrom et al., 2000; Martínez et al., 2013).

1.2. Climate and tourism

Climate is an important criterion for the development of a tourist destination, being decisive in defining how a place is used (Martín, 2005). A warm temperate zone is considered optimal for sun and beach tourism (Lozato-Giotart and Insa, 1990; Burton, 1991; Vera, 1997). Arid coastal environments, as it is the case of Canary Islands, are ideal places for beach and dunes based tourism because the climate is comfortable for year round any activities given the mean annual temperature is between 19° and 21° with only a small yearly variation, and very low rainfall (mean annual between 81 mm and 110 mm) (Hernández-Cordero et al., 2019). These aeolian systems are characterized by a potentially high sedimentary dynamic and a foredune formed by isolated nebkhas and shadow dunes colonized by pioneer vegetation, in this case *Traganum moquinii*, a shrub species (Hernández-Cordero et al., 2019). As a consequence, most of the dunefields comprise free dunes (barchans, barchanoid ridges, transverse dunes) with intervening interdune depressions and deflation plains, which form singular landscapes for tourists from temperate and cold areas (Peña-Alonso et al., 2019a,b).

The predominant type of tourism in the Canary Islands is mass tourism linked to sun and beach (Melián-González et al., 2011), it constitutes most important economic sector in the archipelago (13.7 million tourists in 2018, INE). One of its peculiarities is that it is continuous throughout the year, due to the favorable climate, so there are no rest periods in which the aeolian sedimentary systems or the environment generally can recover from the impacts generated by users (Cabrera-Vega et al., 2013). Also, most of the resorts and tourism infrastructures have been located on the edges of the beaches and dunes, inducing environmental impacts on the aeolian sedimentary processes and dunefield functioning explained by Hernández-Calvento et al. (2014); García-Romero et al. (2016); Hernández-Cordero et al. (2018); Viera-Pérez et al. (2019). This occurs even though all the coastal dunefields in Spain are protected by the February 2013 Spanish Coastal Law. In addition, most of the dune systems of the Canary Islands are environmentally protected by others categories and have status at national and European levels, including Special Areas of Conservation (SAC - Council Directive 79/409/EEC), Special Protection Areas, and Special Protection Areas for Birds (SPA) (SPA - Council Directive, 2009/147/EEC). In addition, they are protected under various regional categories, such as Natural Park or Natural Reserve. Thus, the aeolian beach and dune systems of the Canary Islands are clear examples of the conflicts between development and conservation (García-Romero et al., 2016).

1.3. Gay tourism. Cruising on dunefields

The link between tourism and sex is clearly represented in the specialization of certain destinations, such as the gay-friendly ones. In fact, gay tourism is increasingly seen as a powerful and profitable market segment (Peñaloza, 1996; Jensen-Campbell, 2004; Melián-González et al., 2011). Seidman (2013) indicates that “many individuals can choose to live beyond the closet but they must still live and participate in a world where most institutions maintain heterosexual domination”. This situation is a condition for the free expression of homosexuality, constituting a motivation to travel to places far from the place of residence, leaving behind their social baggage, which affects their social behavior in the destination (McKercher and Bauer, 2003). Studies based on gay tourism indicate that one of the motivations for travelling to a destination is having spontaneous sexual encounters (Want, 2002, Hall and Ryan, 2005; Gibson, 2010; López-López and Van Broeck, 2010), called “cruising” when sexual activity is mainly carried out with total strangers in public spaces (Chauncey, 1994; Andersson, 2012). However, destination places do not always have adequate regulations for tourism (Baumol and Oates, 1993), much less if it is sexual tourism, especially when sex is practiced in public spaces (parks, beaches, among other). Coastal dunefields, as priority destinations for mass tourism, are also a priority destination for specialized gay tourism and, therefore, these sexual practices also occur on some of them. These practices produce some environmental impacts, such as waste and negative effects on the vegetation by cruiser trampling, as described by Gaissad and Audouit (2014) and as occur with other tourist activities. However, until now, few studies have been addressed that specifically identify these environmental impacts. This opens an interesting scientific research scenario linked to the aforementioned conflict between tourist development, gay tourism in particular, and conservation.

1.4. Maspalomas as a destination for gay tourism

To address this concern, this research focuses on two main questions: i) what are the main elements that articulate the spatial manifestation of this activity? and ii) what are the main environmental impacts that this activity produces? For this purpose, we selected the Dunas de Maspalomas Special Natural Reserve (DMSNR) in Gran Canaria (Canary Islands, Spain), which has four main characteristics making it a suitable laboratory for the development of this study: 1) it is a gay-friendly tourist destination, 2) where cruising is openly practiced, 3) on a dune field, 4) which is also a protected natural area. In fact, as a destination for gay tourism in Europe, Gran Canaria has been described as “the big one” (Fimiani, 2014), welcoming gay tourists from many countries, especially from the UK, USA and Germany (Clift and Forrest, 1999; Melián-González et al., 2011). Organized gay tourism began in Gran Canaria in the 1990s, although gay tourists had been coming to the island for some time before that (Melián-González et al., 2011) as the island's reputation grew in terms of new ideals that were soon linked to respect and tolerance for all cultures and sexual tendencies, allowing gay tourists to live homosexuality in a normalized and free way (Santana-Turégano, 2004). Currently, the 14 tourist complexes that are entirely devoted to gay tourists, as well as numerous others that can be branded as gay-friendly (Fimiani, 2014), contribute to gay tourism amounting to around 15% of the overall tourism activity in Gran Canaria (Gran Canaria Tourist Board). Many of these complexes are located in one of the largest tourist resorts in Spain, Playa del Inglés-Maspalomas (Domínguez-Mujica et al., 2011), the development of which dates back to the late 1960s. This urban-tourist center is located around the Dunas de Maspalomas Special Nature Reserve, where “cruising” is designated an illegal activity but regularly occurs.

1.5. Research aim and application

Given this background, and especially the absence of spatial analyses of the cruising activity and its environmental impacts, the general objective of this research is to characterize the spatial distribution of cruising activity on the DMSNR, as well as to assess through an initial approach the environmental impact of this activity. The three specific objectives, ordered according to the structure of the article, are as follows: i) to understand the characteristics of the places for sexual encounters (sex spots) in respect to natural features (geomorphology and vegetation) and the relationships with other characteristics, such as their dimensions or internal distribution; ii) to define their spatial distribution in relation with other variables (distance to the main entrances to the dunefield, distance to the authorized paths inside the DMSNR, and distance to the main meeting point for gay users in the zone (a beach kiosk named “kiosk 7” on Maspalomas beach); and iii) to understand what other impacts this activity produces within the DMSNR, such as impacts on vegetation. At this point, the authors would like to emphasis that there is no intention to criticize the actions of participants in this sexual community. The ultimate intention of this scientific work is to know detailed aspects of the spatial and environmental dimensions of this activity, which may be useful for the management of this protected area and similar ones. In fact, this work is also applied research through scientific-technical collaboration, since part of the data used for this work has been handed on to the public company Gesplan, S.A, who developed the project "MASDUNAS" (2018–2019; https://masdunas.es), promoted by the Cabildo de Gran Canaria (the Government Institution which manages the island protected areas). Among their objectives is the removal of garbage associated with this activity.

2. Study area and environmental impacts

The Maspalomas dunefield is located south of the island of Gran Canaria (Canary Islands, Spain). Its coastal edge comprises El Inglés beach, to the east, and Maspalomas beach, to the south. The inland area of the transgressive dune system is surrounded by urban-tourist buildings and infrastructures which have altered its aeolian sedimentary dynamics (Hernández-Calvento et al., 2014; García-Romero et al., 2016; Smith et al., 2017) (Fig. 1).

Due to its high natural values, 360.9 ha of this dunefield and its surrounding area (which includes a small lagoon, a minor palm grove and small sectors of urban land) have been legally protected since 1982, and being classified as a Special Natural Reserve since 1994 by the Parliament of the Canary Islands. In addition, the area is listed as a Special Area of Conservation (SAC) in its inland and marine sectors. The regulations that guide the management actions in this site are part of the Director Plan of the DMSNR (Gobierno de Canarias, 2004), which establishes four zones from lowest to highest level of protection: i) special usage zone: constituted by those sectors in which there are pre-existing urban areas and facilities and equipment; ii) general usage zone: constituted by the area that, due to its lower relative quality within the Nature Reserve, allows a greater presence of visitors, being able to serve the location of non-permanent facilities, activities and services; iii) restricted usage zone (most of the dunes area): constituted by that surface of high biological quality and fragile and representative elements, whose conservation means a reduced public use, using pedestrian access means only; and iv) exclusion zone: constituted by that surface with the highest biological quality and containing the most fragile, threatened and representative biotic or abiotic elements. In this last area access is regulated according to scientific or conservation purposes.

These regulations were not approved in time to prevent the main environmental impacts produced in this space, especially as a consequence of the tourist development that has occurred in its surroundings. Thus, the Maspalomas dunefield has been altered by the buildings of El Inglés resorts (Fig. 3 A, C), which modify and alter the wind flows and therefore the sand transport within the dunefield (Hernández-Calvento et al., 2014; Smith et al., 2017). This has induced the alteration of biogeomorphological processes in the inner zone, leeward of the resorts, where a general process of stabilization takes place, with an increase of the vegetation cover (Hernández-Calvento, 2006; Hernández-Cordero et al., 2018; García-Romero et al., 2019).

Other impacts, produced both before the promulgation of the regulations and with the regulations in force are those induced by equipment and users, especially on the beach-foredune sector (Hernández-Calvento et al., 2014; Hernández-Cordero et al., 2017; Viera-Pérez et al., 2019Viera-Pérez et al., 2019), which has led to an increase in fragility (Peña-Alonso et al., 2018). In general terms, all these impacts together have altered the ecological equilibrium that existed in this dunefield before tourism development took place.

In addition, the regulations have failed to prevent the practice of the cruising activity inside the dunefield, the location of which is promoted through various maps published on specialized gay websites.

The first works that dealt with this topic were elaborated from both administrative and academic research (Hernández-Calvento, 2002; Director Plan of the DMSNR Gobierno de Canarias, 2004). In the first of these works some observations related to this activity were exposed, such as the fact that it takes place in specific places (sex spots), normally associated with vegetated landforms, in the stabilized and semi-stabilized areas. Some alterations by the users of these sex spots were described, such as the cutting of branches of arboreal and shrub species to define or enclose the sex spots, and the abandonment of waste in and around these spots. Even though these issues are recognized by the current SNR regulations (Director Plan of the DMSNR, Gobierno de Canarias, 2004), no actions had been developed to control the activity, but only cleaning campaigns of waste have been carried out. In the last year, a more thorough cleaning has been carried out as a part of the cited MASDUNAS project. Some preliminary results of this present research work were provided to the administration that carries out the project in order to facilitate the execution of this in-depth cleaning work, and this information has facilitated the removal of the major portion of the sex spot's structures and their associated waste.

3. Methodology

To carry out the objectives noted above, the methodology is based on data collection through fieldwork, and on the development of spatial

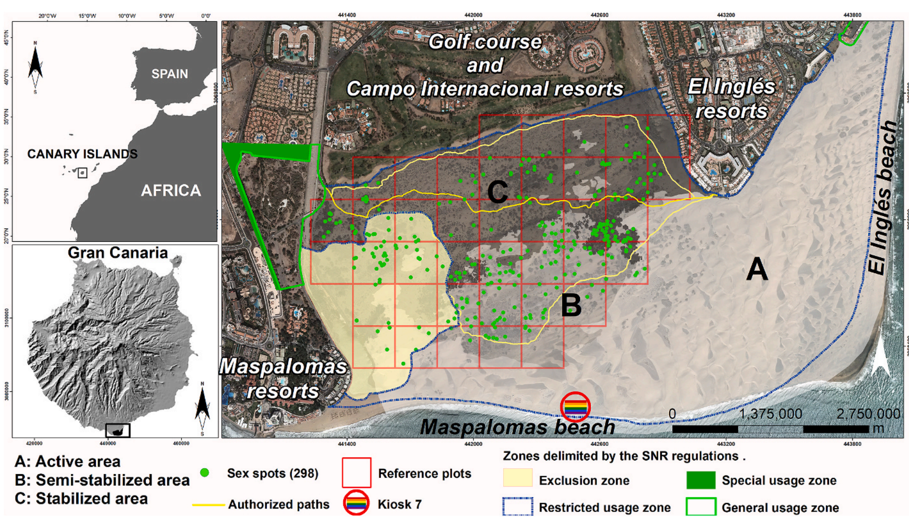

Fig. 1. Study area. Location of the sex spots (green points) on referenced plots used for fieldwork (red array), mainly located in the stabilized (C) and semi-stabilized (B) areas of the dunefield, kiosk 7 (red circle), authorized paths (yellow lines) and usage zones delimited by the DMSNR regulations. (For interpretation of the references to colour in this figure legend, the reader is referred to the Web version of this article.)

and statistical analysis utilizing GIS, in order to elucidate the characteristics of these sex spots, their spatial distribution and the associated environmental impacts.

3.1. Fieldwork

Two actions were carried out to collect information in the study area: 1) location of the sex spots (Fig. 1) which are mainly located in the stabilized and semi-stabilized areas of the dunefield (Fig. 1B and C); and 2) collection of information about them. For this, 40 reference plots, with 200 × 200 m sides (Fig. 1, red array) were pre-defined simply for the purpose of organizing the fieldwork and tracking each sex spot because the data were obtained over the course of several days (May 2018).

The fieldwork was carried out in May 2018, during and after the celebration of the Maspalomas Gay Pride festival, an important Gay festival at a European level. The positioning of each sex spot was taken with a GPS Garmin Oregon 400t, covering the reference plots previously marked. Information of each sex spot was collected, including its characteristics, position and use aspects, as well as associated impacts (rubbish and cut vegetation) that are also related to non-environmental management in the DMSNR. In Table 1, the variables and their categories with units of measure are shown as well as the qualitative variables categorized on a scale from 1 to 5, with this code also used for the statistical analysis. The area of each sex spot was calculated as follows: in the case of the circular sex spots, the equation $A = \pi r^2$ was applied (where r is the radius); in the case of the squared sex spots, the equation $A = s^2$ was applied (where s is the side's longitude); and in the case of rectangle or irregular sex spots, the equation $A = s_1 \times s_2$ was applied (where s_1 is the major axis and s_2 is the minor axis).

3.2. Information source and GIS

GIS were used to process the following information source or data: i) the GPS points (Fig. 1, sex spots) were entered into a geographic information system (GIS); ii) a LiDAR flight (point density: 0.5 points/m^2) and an orthophoto (spatial resolution: 0.25 m), both from 2015, the most recent flight covering the entire study area available from the Spanish National Aerial Orthophotography Plan (PNOA, Spanish Government), and downloaded from the Spanish National Geographical Institute (IGN, Spanish Government). These data were used to obtained geomorphological and vegetation variables, and spatial analysis (Figs. 2–5); iii) the authorized paths, as well as the management zones, in shapefile format, were downloaded from the webpage for the Director Plan of the DMSNR (Fig. 3, A); iv) the three main entrances to the dunefield, which join the three authorized paths, were located (El Inglés resorts, the camels station and Maspalomas beach (Fig. 3, B); v) the kiosk 7 of Maspalomas beach was also located by GPS and orthophoto, due to this being the main meeting point for gay users in this beach-dune system (Fig. 4); vi) finally, both orthophotos 1961 and 1987 (Fig. 7) were consulted from the Spatial Data Infrastructure of the Canary Islands Government, managed by the public company Grafcan, S.A. (SDI-Canary Islands Government).

3.3. Geomorphological and vegetation variables

Landforms and vegetation were spatially identified by fieldwork and by orthophotos, through GIS. The landforms were classified into six categories: barchan dunes and sand sheets, nebkhas, stabilized dunes, deflation surfaces, anthropogenic deposits and, finally, sand mining, following Hernández-Cordero et al. (2015) (Fig. 2). In the case of the vegetation, two variables were measured: i) vegetation density was calculated through a procedure proposed by García-Romero et al. (2018), where one obtains a digital vegetation density model (DVDM) using the green band of the orthophoto (2015) as this provides the most information about vegetation cover among the bands in the visible domain (Chuvieco, 2010). Finally, the DVDM was classified into four categories (García-Romero et al., 2018), as follows: 1- low vegetation density, 2- medium vegetation density, 3- high vegetation density, 4- very high vegetation density (Fig. 5, D); ii) vegetation height, was calculated through the differences between a digital surface model (DSM) and a digital elevation model (DEM) both derived from the LiDAR data. Around each sex spot a 4 m buffer (which is the mean diameter coverage of *Tamarix canariensis*, the species with the largest coverage in the study area) was made and the mean vegetation height was calculated inside each buffer, and categorized into 11 classes (from 0 to 0.5 m to

Table 1
Variables collected by fieldwork and their categories or units.

Variables	Code	Categories/units*				
		1	2	3	4	5
Characteristics of the sex spots						
Area*	**area**	m^2				
Major axis*	**mjaxis**	m				
Minor axis*	**mnaxis**	m				
Shape of the sex spot	**shape**	circular	square	rectangular		irregular
Unit or multiple sex spot	**u/mult**	unit				multiple
Quantity of spaces in the sex spot*	**quantity**	number				
Covered by vegetation	**covered**	uncovered		partly covered		covered
Use and position of the sex spots						
Sexual use (when sex was detected)	**use**	NO	Single	homosexual		heterosexual
Number of people inside of the sex spot*	**number_people**	number				
Visibility of the sex spot	**visi**	not visible		partly visible		visible
Materials around the sex spot	**material**	live plants	live/dead plants	dead plants		dead plants/rocks
Altitude where the sex spot is located *	**altitude**	m				
Impacts/Not management actions						
Rubbish	**Rubbish**	NO				YES
Distribution of the rubbish	**distrib_rub**	NO		concentrated		dispersed
Number of rubbish*	**number_rub**	number				
Urination points next to the sex spot	**urinal**	NO				YES
Rubbish bags	**rubbish_bag**	NO				YES
Owner of the rubbish bags	**bag_kind**	management				users
Status of the rubbish bags	**status_bag**	empty	1/4	1/2	3/4	full
Vegetation cut (%)*	**%_veg_cut**	%				
Condoms	**condom**	NO				YES
Others impacts	**others_impac**	NO	extraction	illegal housing	exclusion	illegal WC

* Quantitative.

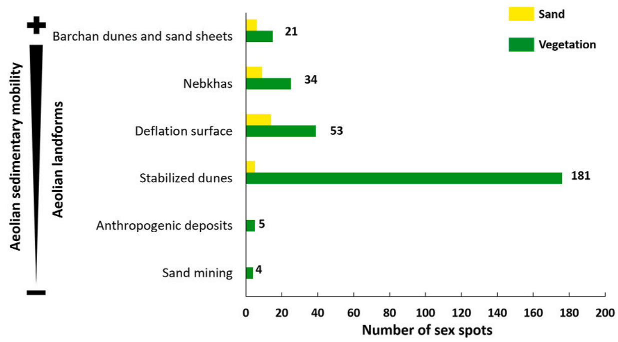

Fig. 2. Number of sex spots located in different aeolian landforms and presence of vegetation. Categories related to landforms are ordered by aeolian sedimentary mobility, from more (above) to less (below). Total number of sex spots per area is indicated at the end of the green/yellow bars (for example: 21). (For interpretation of the references to colour in this figure legend, the reader is referred to the Web version of this article.)

>5 m).

3.4. Spatial analysis

In order to understand if distance is a determining factor in the location of the sex spots, distance analyses were carried out in GIS between the location of the sex spots and: a) the location of the three main entrances to the DMSNR, b) the authorized paths, and c) kiosk 7. A visibility analysis of the sex spots was also carried out through GIS, from the authorized paths, as they are the only legal pathways to walk by the dune system. In this case, two visibility analysis were calculated, the first one using the DEM (using only the terrain, without vegetation), and the second one using the DSM (which includes the height of the vegetation). The height used for observers located on the paths was 1.50 m, as it is the mean height for young people (12–15 years old) in Spain, according to the National Statistical Institute from Spain (INE). This criterion was decided because these are the ages of visitors who visit the DMSNR for environmental educational purposes. The difference between both data provides important information about the role that vegetation plays in this issue.

3.5. Statistical analysis

Some statistical analyses were carried out to know the relationships among the variables measured (Table 1) and shown in Tables 2–4. The relationships shown in Figs. 2–4 are scatter diagrams adjusted with linear or polynomial trends according to the variable measured to explain the spatial distribution of the sex spots. The relationships shown in Tables 2–4 were calculated from bivariate correlations (Pearson test) using SPSS software, where the tables were separated by the variable groups of the sex spots: i) characteristics; ii) use and position; and iii) impacts or not. Also, the relationships between some characteristics with the presence of condoms, as an indicator of recent sexual activity, were analyzed.

4. Results and discussion

298 sex spots were located in the DMSNR and their information was collected, tabulated and introduced into a GIS together with the other additional information previously mentioned. Below, first report the results relating to the characteristics of the sex spots with respect to the natural issues (geomorphology and vegetation), and the relationships among other characteristics.

4.1. Main characteristics of the sex spots in relation to the dunefield geomorphology and the vegetation cover and density

Fig. 2 shows the number of sex spots and their location on the aeolian landforms, distinguishing between those located on vegetated and those on unvegetated plots. In the first one (green bars), the sex spots are located in areas where tall vegetation dominates, while in the second one (yellow bars), the sex spots are located on bare sand. In these ones, vegetation around the sex spot is normally cut to construct shelters, similar to nests (Fig. 6, A). In barchan dunes and sand sheets (category with greater sedimentary mobility), there are 21 sex spots and more than a half of them are located under vegetation. In nebkhas, 34 sex spots were located, more than half also located under vegetation. 53 sex spots (17%) are located in deflation surfaces, and 181 (60.74%) are in stabilized dune areas, practically all of them under vegetation. In areas with anthropogenic deposits and sand mining, the number of sex spots is insignificant and only 9 sex spots were found.

These results demonstrate a relationship between sex spot locations and vegetated aeolian landforms, and therefore less sedimentary mobility. It is clear that the users of the sex spots prefer the stabilized dunes where vegetation dominates, which could imply they are using such areas due to protection from aeolian sand transport, as well as comfort, since the vegetation provides shadow, and/or for greater privacy (although it is a public place and space), since vegetation prevents users from being as easily seen from other places within the DMSNR.

4.2. Relationships between sex spots aspects and their spatial distribution

Table 2 shows relationships between variables related to characteristics of the sex spots and their location. The major axis relates to the number of people (positive), as well as to the material used to build the sex spots (positive) and their altitude (negative). The first relationship indicates that cruising activity requires wide areas to be optimality developed. The second one can be interpreted as this activity also needs materials to better protect the sex spots from being able to be viewed by others, such as dead vegetation or rocks. Finally, the most spacious sex spots cannot be on higher aeolian landforms, perhaps due to the sand instability, the greater effort required to ascend the dunes, and the relative complete lack of privacy. Thus, the spots trend to be located on lower altitude, more stable places, such as the alluvial terraces that outcrop in the deflation surfaces (dune slacks). The minor axis has the same relationships as the major axis but is also related to sex use (positive). This one relationship could be explained such that the higher the minor axis is, the higher the number of persons practicing different sexual option acts (homosexual or heterosexual) can be accommodated. The relationship between the unitary or multiple use of the sex spots and the sexual use is negative, but with the number of people is positive. These results are interpreted as follow, when the sex spot is unitary, a

Table 2
Relationships between variables of the characteristics of the sex spots with sexual use, number of people, material and altitude (only variables with relationships are shown).

Variables		use	number_people	material	altitude
mjaxis	P		.194 (**)	.129 (*)	-.224 (**)
	Sig.		0.001	0.026	0
mnaxis	P	.193 (**)	.458 (**)	.123 (*)	-.194 (**)
	Sig.	0.001	0	0.034	0.001
u/mult	P	-.158 (**)	.173 (**)		
	Sig.	0.006	0.003		
quantity	P	.165 (**)	.295 (**)		
	Sig.	0.004	0		
Veg cover	P			-.214 (**)	
	Sig.			0	

P: Pearson correlation. Sig: Significance level. **The correlation is significant at 0.01 level (bilateral). *The correlation is significant at 0.05 level (bilateral).

single use is usually detected, increasing the number of people when multiple sex spots are detected. The quantity of spaces in the sex spots also has relationships with the use of sex spot and with the number of people (both positive), because as the number of spaces increases, normal use is homosexual or heterosexual, also increasing the number of users. Finally, a relationship between degree of vegetation cover of the sex spots and the materials used to build these sex spots is detected (live plants). This is explained by the fact that as the degree of vegetation cover by live plants increases, only live plants are used.

These results demonstrate that the sex spots are mainly located in stabilized aeolian landforms or formed by vegetation (nebkhas). Cruising is therefore practiced in vegetated areas because it is often used to cover or limit sex spots. And also, the bigger the sex spots are, the more homosexual persons use the place. However, if these results are related to the previous ones, it shows that although cruisers use areas protected by vegetation for their comfort, shadow and/or privacy, there is no problem to be seen among themselves because they can share the same sex spot.

4.3. Assessing the accesibility within the DMSNR as a key of sex spots distribution

4.3.1. Distances to the main entrances

Fig. 3A shows a digital euclidean distance model from the main entrances to the study area (El Inglés resorts, the camels station and Maspalomas beach) to each sex spot. The relationship (Fig. 3B) between the location of the sex spots and the distance to these entrances, from a linear trend, is very low ($R^2 = 0.1973$). However, up to 500–600 m distance from the entrances, the trend is that the number of sex spots increases with distance from the entrances, but at ~500–600 m the tendency is to see a decrease in the number of sex spots as the distance continues growing, acquiring a polynomial trend ($R^2 = 0.768$). This demonstrates that there is a clear relationship between the location of the sex spots and the location of the entrances in the first 500–600 m (from the entrances in the urban area to the center of the study area). Users likely look for relatively remote areas in the dunefield to practice sex activities, in places away from other users closer to the beach, who visit the area for recreational reasons, such as to contemplate the landscape (from El Inglés resorts), camel rides, or to enjoy the beach. Past ~500–600 m, the effort required to proceed further is obviously greater, and most individuals probably feel they are far enough away from the main beach-going crowds that this distance is sufficient.

4.3.2. Distances to the authorized paths

Fig. 3C shows a digital euclidean distance model from the authorized paths within the DMSNR to the sex spots. In this case, the relationship between the number of the sex spots and this distance classified every 100 m has a linear trend ($R^2 = 0.8012$), where the number of sex spots increases as the distance decreases. Nevertheless, the distances are different depending on the paths, as the sex spots are preferably located closer to the southern entrance (172 sex spots), than to the others (center path: 95; north path: 31; Fig. 3D and E; $R^2 = 0.9972$). This behavior can be explained due to the southern path being closer to the sea/beach, which is one of the primary attractions of sexual activity (Crick, 1989), and because this south path is connected to kiosk 7, which is a recognized meeting point for gays.

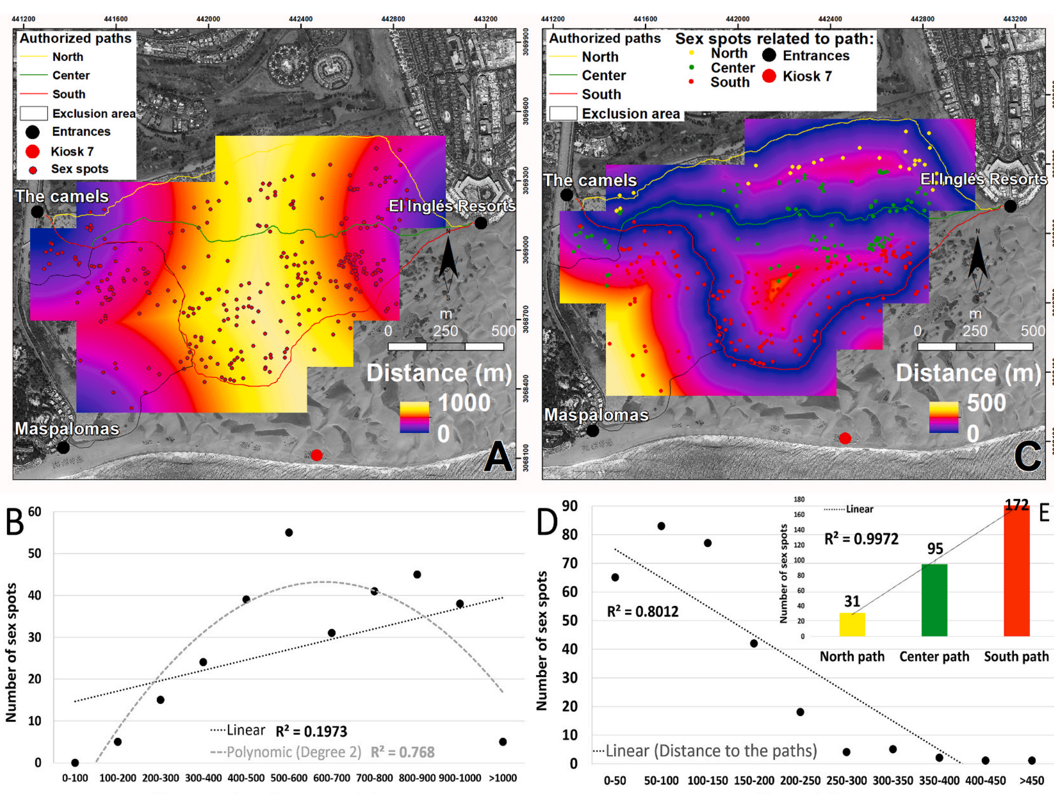

Fig. 3. Relationships between the number of sex spots and the distances classified every 100 m to the main entrances and every 50 m to the authorized paths. A. Euclidean distance model from the entrances (El Inglés resorts, the camels station and Maspalomas), blue is closer to the entrances. B. Relationship between the number of sex spots and the distance to the entrances. C. Euclidean distance model from the authorized paths and classification of the sex spots by the nearest authorized path (red: south path, green: center path, yellow: north path), blue is closer to the paths. D. Relationship between the number of sex spots and the distance to the authorized paths. E. Relationship between the number of sex spots and their proximity to each path (north to south of the dunefield). (For interpretation of the references to colour in this figure legend, the reader is referred to the Web version of this article.)

4.3.3. Distance to kiosk 7

The relationship between the distribution of sex spots and the distance to kiosk 7 has been analyzed to see if this kiosk has any effect on the distribution of the sex spots. Even though there is no authorized path which connects this kiosk with the inner dune systems, it is normal for users to cross the dune system using the southern path and then access the kiosk 7 by some route from there. Fig. 4A shows the sex spots (green points) and the euclidean distance model classified every 300 m. The sex spots where condoms (black points) were found have also been identified, as they can be used as an indicator of recent sexual activity. However, although a priori relationship could be established, Fig. 4B shows that the relationship between the distribution of sex spots and the presence of condoms is not relevant (R^2: 0.5834 and R^2: 0.4486 respectively), because the number of sex spots close to kiosk 7 is small, and the first sex spots and condoms are detected practically 300 m away. Then the trend is polynomial because the largest number of sex spots and sex spots with condoms increases in the most stabilized and vegetated areas. In order to understand this better, it would be necessary to carry out social studies on the perception and preferences of the users of kiosk 7 to practice cruising.

This group of results shows that authorized paths are the factor that best explains the distribution of sex spots in the DMSNR. It is apparent that access through the DMSNR entrances or through kiosk 7 are not important for the distribution of the spots. The behavior observed, in general, in respect to the distance from the paths is totally opposite to the relationship analyzed with respect to the entrances, as this latter factor could be related to a privacy reason. On the one hand, cruising people are trying to go unnoticed and on the other hand to not have conflicts with other users (not cruisers) of this place (Santos, 2002; Dóniz-Páez, 2015). The closeness to the path could be understood as an exposure reason to the users who walk through the authorized paths looking for a person or persons with whom to have anonymous sexual encounters, as Gaissad and Audouit (2014) already detected. Therefore, two stages could be observed before sexual encounters through the sex spots distribution, the first one is related to the isolation to the users (not cruisers) of the space to avoid conflicts, and a second stage of exposure between cruisers to flirt. These behaviors that links tourism and sexual activity (Hughes, 1997; Black, 2000) is also related with the concepts “liminality”, defined as “a temporarily constrained, socially tolerated period of wish fulfillment, a form of fantasy enactment that is normally denied to people in their everyday environments” by Ryan and Kinder (1996).

Finally, the third group of results are related to the other impacts that this activity produces within the DMSNR. For this, a visibility analysis from the authorized paths was performed. Data about the rubbish and other waste (including cut vegetation) was also analyzed.

4.4. Visibility analysis

Other impacts that this activity produces within the DMSNR are related with the visibility of sex spots from the authorized paths (Fig. 5) for 1.5 m tall observers. Fig. 5A shows that if the study area had low/null vegetation cover, 180 sex spots (60.4%) were visible from the authorized paths, and 118 sex spots (39.6%) were not visible. However, when adding the vegetation cover (Fig. 5B), the terms are reversed so that 116 (38.92%) sex spots are visible, and 182 (61.07%) sex spots are not visible. These results vary as the observers height increase, as visibility of sex spots increases with observer height.

In line with these results, it seems that the distribution of the sex spots relates not only to the distance to the entrances or to the paths, but also to the presence or not of vegetation, which reinforces the observations made by fieldwork, outlined in section 4.1.

As explained in the study area section, the vegetation cover has increased as a consequence of the impact induced by the building of the El Inglés resorts on the aeolian sedimentary transport (Hernández-Calvento et al., 2014; Smith et al., 2017), and these results could therefore be interpreted as a consequence of this impact also. In short, it seems that the environmental changes in Maspalomas, induced by the tourism and large scale infrastructure development, could have benefited the development of the cruising activity.

Fig. 5. C shows polynomial trends in the relationship between the number of sex spots and the vegetation height, and the higher the vegetation, the less sex spots can be viewed (R^2: 0.9701). The highest number of sex spots not visible currently would be viewed if vegetation height was between 1 and 3 m (R^2: 0.6695), such as shrub species. With respect to the vegetation density (Fig. 5D), the number of non-visible sex spots increases when the density also increases (linear trend, R^2: 0.9125), however, the visible sex spots trend is not clear (R^2: 0.1521). The vegetation could provide comfort (e.g. shade) and protection against aeolian processes, and extreme weather conditions. Otherwise, given the generally low vegetation cover, the number of sex spots and therefore the cruising activity has been limited by the natural aeolian sedimentary processes of the Maspalomas dune system.

4.5. Direct and indirect impacts

The direct impacts generated around the sex spots can be observed in several ways, such as the impacts on the vegetation, the abandonment of waste or the presence of urinal and defecation locations (examples in Fig. 6). In general, data from the fieldwork allow us to calculate that a total area of 5763.85 m^2 (0.58 ha) has been altered to build the 298 sex spots identified, inhibiting the biogeomorphological processes that characterize the DMSNR. The almost constant presence of people means that the dominant processes are human-induced processes such as stepping on the plants, removing the plants and the sand, creating ‘nests’

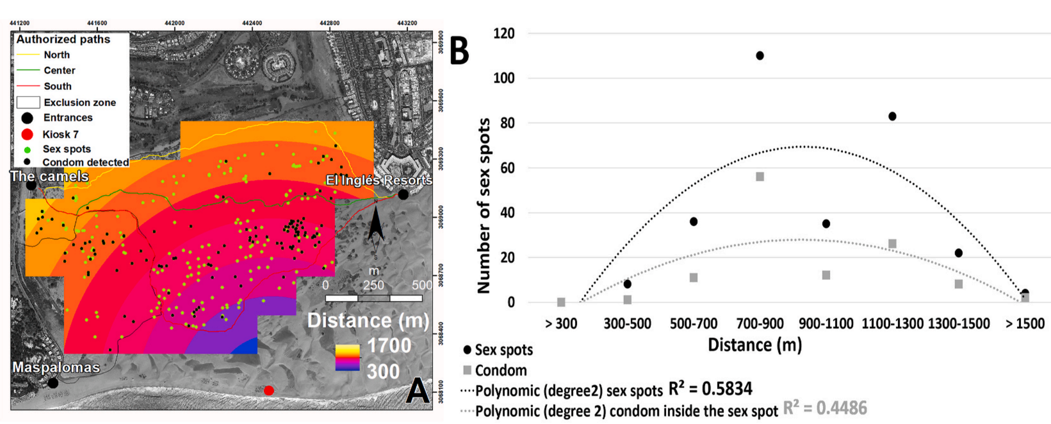

Fig. 4. Relationship between distribution of sex spots and sex spots with condoms and distance to kiosk 7.

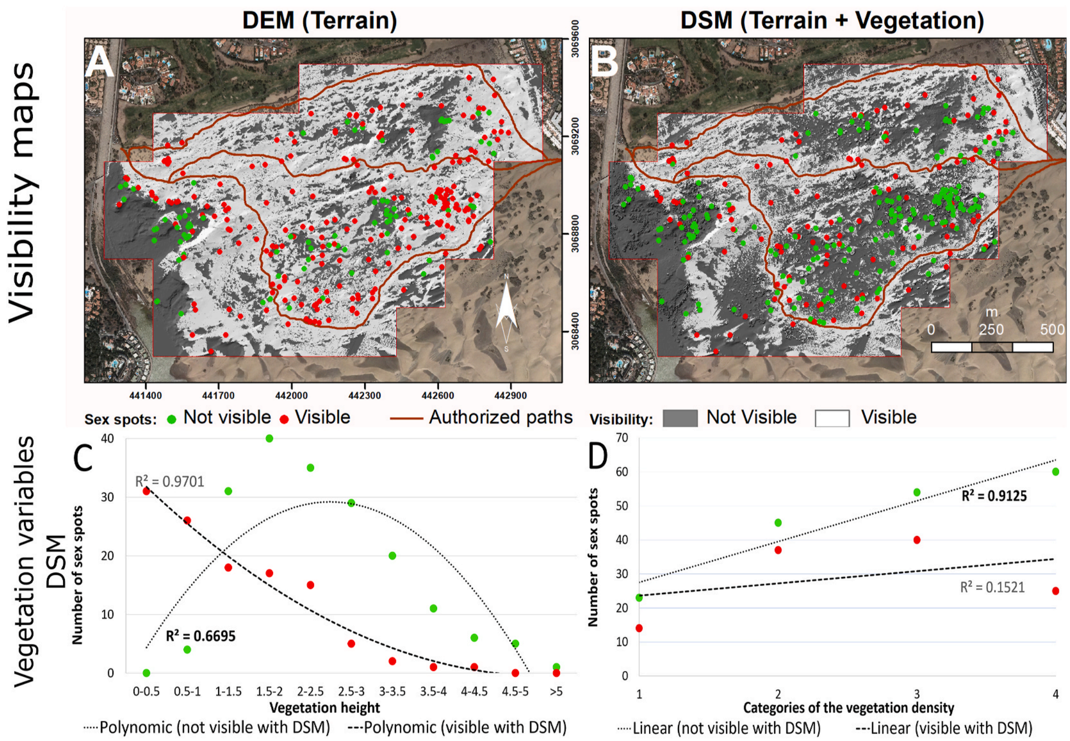

Fig. 5. Visibility analysis of sex spots from paths. A. DEM (only terrain, without vegetation). B. DSM (with vegetation). C. Relationship between sex spots visibility and the vegetation height. D. Relationship between sex spots visibility and categories of vegetation density (1: low vegetation density, 2: medium vegetation density, 3: high vegetation density, 4: very high vegetation density).

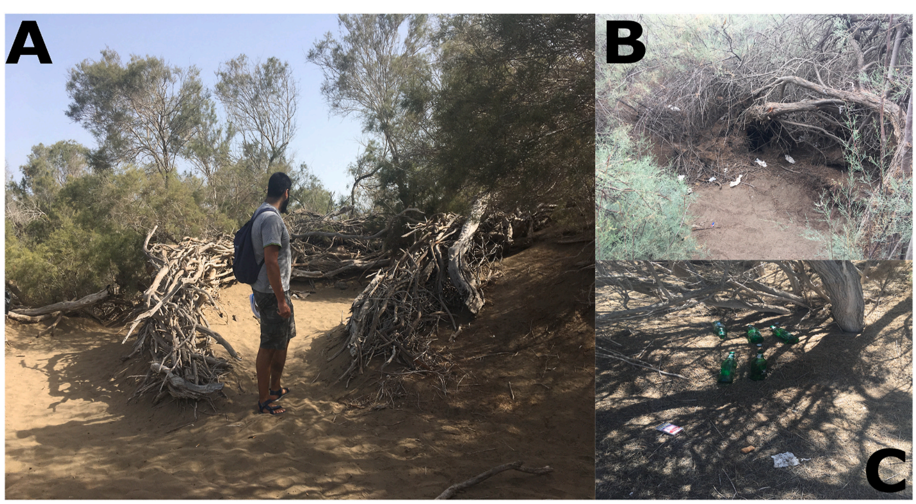

Fig. 6. Cut vegetation and waste associated with the cruising activity in the sex spots. A. Sex spot example built using native (protected) vegetation cut down to build a 'nest' B. Toilet spot next to a sex spot and waste. C. Waste inside a sex spot.

using the native vegetation, or depositing waste. Vegetation is normally used to delimit the borders of the sex spots, and this is torn from the surrounding areas. The species most affected are *Tamarix canariensis* and *Launaea arborescens* by 96.97% and 12.08%, respectively. Plant communities formed by these two plants species occupy the second and third largest surface area in the dune system, respectively (Hernández-Cordero et al., 2015a). Plants such as Canary Islands endemic species (*Phoenix canariensis, Schizogyne glaberrima* and *Plocama pendula*), canarian-northeafrican endemic species (*Suaeda mollis*), mediterranean species (*Lycium intricatum*), widely distributed species (*Juncus acutus*), and exotic species (*Opuntia dillenii* and *Nicotiana glauca*) are also affected to a lesser extent.

In the sex spots a total of 18 types of waste were also detected. The most representative (in proportional order) are cigarette butts, torn/cut vegetation, toilet paper and wipes, condoms, fruit peel, cans and feces. In general terms, the main impacts are related to the biggest, rectangular or irregular sex spots, which are used by several people and have more than one sex use practices. Table 3 shows relationships between variables related to the environmental impact and characteristics of the sex spots (location and morphology). The distribution and amount of the rubbish inside the sex spots is only related to altitude (negative), which could be explained because the sex spots are non-visible and cruisers are not pressured to pick up waste. The amount of rubbish is also related to the area, major axis, minor axis and shape of the sex spots (positive), as

Table 3
Relationships between environmental impact variables and characteristics of the sex spots (location and morphology).

Variables		Visi	material	altitude	area	mjaxis	mnaxis	shape	u/mult	quantit	covered
distrib_rub	P			-.146*							9
	Sig.			0.012							
number_rub	P	-.151**		-.245**	.362**	.460**	.400**	.172**	.346**	.405**	.168**
	Sig.	0.009		0	0	0	0	0.003	0	0	0.004
urinal	P				-.151**	-.179**	-.144*	-.129*		-.144*	
	Sig.				0.009	0.002	0.013	0.026		0.013	
rubbish_bag	P				-.199**	-.226**	-.160**		.183**	-.250**	
	Sig.				0.001	0	0.006		0.001	0	
bag_kind	P				.147*	.175**	.130*		-.131*	.198**	
	Sig.				0.011	0.002	0.025		0.023	0.001	
status_bag	P				.197**	.241**	.150**		.174**	.257**	
	Sig.				0.001	0	0.009		0.003	0	
%_veg_cut	P		.749**	-.220**		.145*	.147*	-.137*			-.213**
	Sig.		0	0		0.012	0.011	0.018			0
others_impac	P		-.149**	.180**							
	Sig.		0.01	0.002							

P: Pearson correlation. Sig: Significance level. **The correlation is significant at 0.01 level (bilateral). *The correlation is significant at 0.05 level (bilateral).

the amount of rubbish obviously increases in the larger sex spots. Finally, the amount of rubbish increases when sex spots are multiples or when the quantity of spaces in the sex spots increases and are also very covered by vegetation. It may be that people occupying low visibility sex spots results in those people feeling less obligation to remove rubbish because it is not visible.

The presence of urinal and defecation spots close to the sex spots is related to area, major axis, minor axis and sex spot shape (negative), so urinal/defecation spots are more common when sex spots are bigger, rectangular or irregular. Urinals are detected *inside* the sex spots when a significant number of spaces in the sex spots are present. Rubbish bags appear inside the biggest sex spots characterized by being divided into multiple sex spots inside. In these cases, the rubbish bags are provided by the DMSNR management, the opposite of what happens with the rubbish bags found inside the small sex spots, which are normally provided by users (brought from supermarkets, shops, etc.). With respect to the bag status, when sex spots are bigger (area, major axis and minor axis) or there are many sex spots inside (multiple) a larger sex spot area, the trend is that the plastic bags are full. The impact related to percentage of cut vegetation is detected in bigger sex spots where dead vegetation or rocks delimiting the spots is common, and they are located at low altitudes in the landscape. The higher the percentage of cut vegetation, the lower the percent cover of live vegetation. Other impacts such as those on exclusion area, illegal WC and others are related to high altitude and materials used such as live vegetation or live/dead vegetation.

The presence of condoms inside the sex spots has been used as a direct indicator of recent sexual activity. Condoms were identified in 38.92% of the sex spots, with varying quantities between different sex spots. Table 4 shows that condoms occur in highest numbers in the largest sex spots because those spots have the greatest area, major axis and minor axis but with square or circular shapes. Also condoms are detected when the quantity of spaces for sex increases. In addition, when there is rubbish dispersed and the amount of rubbish increases, normally the condoms are found as part of the rubbish. However, the condoms are often associated with sex spots that have a rubbish bag. It is common to find the garbage bags full when condoms are detected. Rubbish bags were not emptied in this study to determine what articles were placed in the bags. Finally, condoms are in non-visible sex spots which occur in low altitude locations and in high density vegetation. This coincides with the results shown in Fig. 5 and Tables 2 and 3

Within the exclusion zone, which has greater restrictions due to its high environmental value, there are 56 sex spots, and in the restricted use zone there are 242 sex spots, where there are also environmental restrictions and values. In the case of the exclusion zone, the low number of sex spots can probably be explained by the smaller number of people who can access this place (access is 'not allowed', although obviously still occurs), and therefore it can increase intimacy for sexual encounters. In general, the direct impacts confirm the idea that these are public spaces which have effectively become privatized through the cruising activity. This activity is characterized by the occupation of spaces to install sex spots, the construction of fences and 'nests' to enclose them with nearby vegetation, the dumping of waste, urination and defecation, and the generation of a large network of unauthorized paths across the DMSNR (Fig. 7). This last impact has been also detected in other areas, as Gaissad and Audouit (2014) detected a net of paths with narrow shapes (20–30 cm wide), produced by the constant trampling of cruisers looking for others with whom to have sexual encounters. In our case, despite the legal conservation status and apparent 'protection' of the majority of the dunefield, cruisers seem to have acquired (or merely appropriated) rights for sexual encounters in an environmentally protected public space. In this regard, it is notable that the Reserve was originally set up not only to protect one of the few still naturally functioning transgressive dunefields in Europe, but also as an educational resource where school children, teachers, and University students, as well as visitors, in general, could utilize the environment for education and learning. These activities have been completely suppressed into the Reserve, by the development of the gay cruising activities due to interactions and social encounters considered inappropriate by educators, parents and teachers.

Table 4
Relationships between the variable *condoms* and other variables.

	mjaxis	**mnaxis**	**shape**	**quantity**	**rubbish**	**distrib_rub**	**number_rub**
P	.196 (**)	.151 (**)	-.137 (*)	.175 (**)	.124 (*)	.134 (*)	.376 (**)
Sig.	0.001	0.009	0.018	0.002	0.033	0.021	0
	rubbish_bag	**bag_kind**	**status_bag**	**visibility**	**altitude**	**area**	**vege_dens**
P	-.200 (**)	.154 (**)	.198 (**)	-.207 (**)	-.143 (*)	.160 (**)	183 (**)
Sig.	0.001	0.008	0.001	0	0.014	0.006	0.001

P: Pearson correlation. Sig: Significance level. **The correlation is significant at 0.01 level (bilateral). *The correlation is significant at 0.05 level (bilateral).

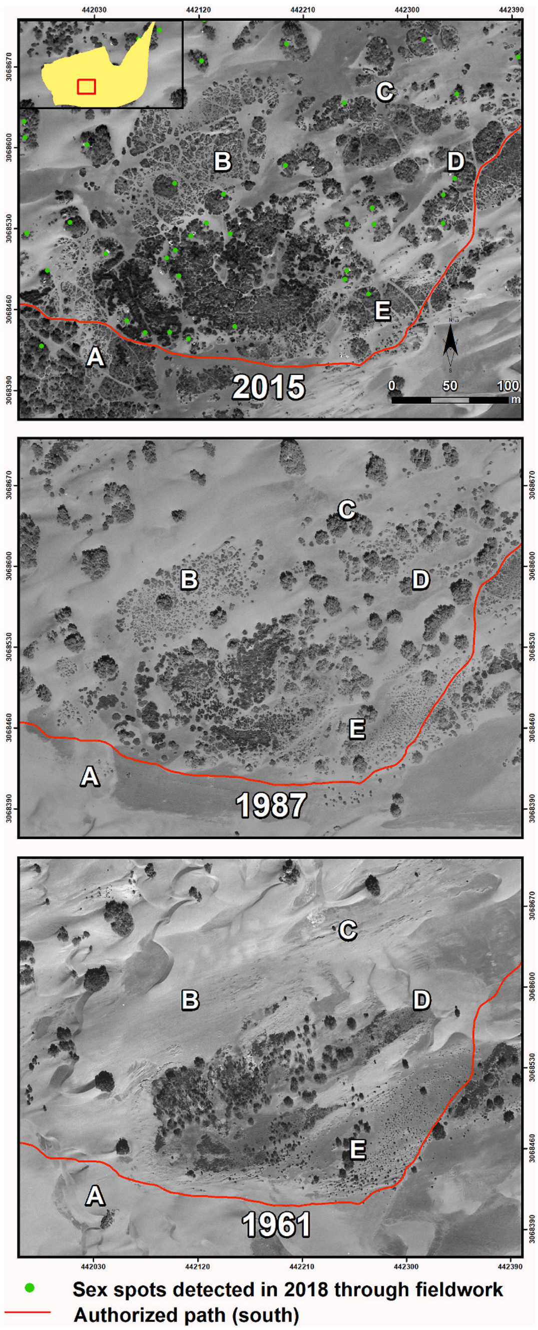

Fig. 7. Increased net of unauthorized paths and environmental changes in an area within the dunefield. 2015. Net of small and narrow unauthorized paths formed through continual trampling for access to the sex spots. 1987. Status of the dunefield (note there are no unauthorized paths). 1961. Status of the dunefield before the tourism development. A, B, C, D and E. Zones where the increases in unauthorized paths can be well observed. Sources: 2015 orthophoto from PNOA (Spanish Government), and 1961 y 1987 orthophotos from SDI-Canary Islands Government.

4.6. General discussion

4.6.1. Origin of the cruising activity in maspalomas dunefield

The origin of the cruising activity in Gran Canaria could be explained by merged environmental and social factors, which are finally related to the four S's (Crick, 1989). First, because Maspalomas is an arid dune system, and in general coastal dune systems, especially the warm ones, have the first three S's (Sand, Sun and Sea) for long periods throughout the year. Furthermore, this dune system is located in the Canary archipelago which has been exploited for tourism since the 1960's. This large visitors influx, together with the remoteness of the Canary Islands from the origin of tourists arriving in Gran Canaria, could be the reason why it has become an preferred destination for the fourth and fifth S's, i. e. Sex with Stranger, as facilitating situations of "liminality" (Ryan and Kinder, 1996) associated with the practice of anonymous sex, concept defined above.

The cruising activity has also likely increased as a direct result of the environmental changes associated with the urbanization and development around the Maspalomas dunefield. According to Hernández-Calvento et al. (2014) and Smith et al. (2017), the Maspalomas dunefield has been altered by the building of the El Inglés resorts (Fig. 3 A, C) which modified the local wind flow and therefore the sand transport. This has induced an alteration of the biogeomorphological processes, such as an increase in the vegetation cover, and the consequent stabilization of the dunes leeward of the resorts (Hernández-Cordero et al., 2015, 2017; García-Romero et al., 2019) (Fig. 7). In addition, one of the vegetation species which have colonized the dunes in this stabilization process is arboreal (*Tamarix canariensis*), forming groves that favor sexual practices in a more intimate places or simply to mark the territory.

In short, these two factors, the increase in vegetation cover and the change in the vegetation species, have likely lead to an increase in areas favorable for the development of cruising, and therefore in a greater degree of sex activities, also forming a net of small and narrow unauthorized paths through continual trampling for access to the sex spots (Fig. 7).

4.6.2. Consolidation of the cruising activity in the maspalomas dunefield

The cruising activity has been developed and consolidated because the environmental policy and management in the study area has not been effective. Gay tourism is a very profitable commercial activity (Peñaloza, 1996; Pritchard et al., 1998; Russell, 2001), although it would be necessary to conduct socio-ecological studies in greater detail to determine if gay tourists who practice cruising are also socio-ecologically profitable. The results show that at least they are not ecologically profitable, not forgetting that cruising is also practiced by members of others sex-oriented communities (Tewksbury, 1996; Bullock, 2004).

This activity as described above is illegal because the cruising public indulging in sexual activities in the dunefield do not comply with the regulations of the Director Plan of DMSNR. However, the sensitivity of any future management actions carried out must be conducted in an integrated manner, not only for the environmental implications, but also because of the social factors. The sexual dimension of this activity, as occurs in society in general, can remain submerged when considering a taboo, complicating the agreement between management agents involved and the approach to effective management. The truth is that on the one hand, it seems that cruisers have acquired rights to practice cruising in this public space, "privatizing" the exclusion and restricted usage zones, where the environmental education (a permitted use) is now disabled.

4.6.3. Application of this research to environmental management

As indicated above, this is applied research driven by a scientific-technical collaboration within the framework of the Project called "MASDUNAS" (https://masdunas.es), which is funded by the Cabildo de Gran Canaria (institution of Government). The Cabildo de Gran Canaria and the public company Gesplan S.A, who implemented the project, provided us with cleaning campaign information on removed and associated waste at sex spots for this paper. Table 5 shows the sex spots removed through the "MASDUNAS" project per month between September 2018 and July 2019, where 159 sex spots were removed. 1244.49 m^3 of broken and dry vegetation killed by cruisers were removed as part of this process/project.

Table 5
Sex spots and vegetation broken/dry removed in the cleaning campaign through "MASDUNAS" project.

	sep-18	oct-18	nov-18	dec-19	jan-19	feb-19	mar-19	apr-19	may-19	jun-19	jul-19
sp_removed	36	21	0	0	16	36	33	11	6	0	0
vol_vege_sp	251.77	148.23	0.00	0.00	160.67	174.54	219.91	79.88	41.84	112.13	55.52

Sp_removed: sex spots removed per month. Vol_vege_sp: vegetation volume (broken and dry by cruisers) in the cleaning from sex spots per month (m^3).

4.6.4. Perspectives from this research

Maspalomas is not the only dune space that registers this type of activities in the world (Fig. 8, source: https://www.gays-cruising.com), however, given the nature of the study and the complexity of a socio-ecological analysis of the processes that trigger it, these types of events have been little studied. For this reason, more in-depth studies are needed that examine global patterns of the effect of cruising on dune systems with environmental protection since it endangers the enjoyment of these ecosystems for future generations. It is likely that this future research, when carried out in climatic zones other than arid ones (the case of Maspalomas), will provide results which will probably change in terms of the intensity of this activity, and therefore, the distribution patterns and their environmental impacts. In addition, it is also important to highlight how the environmental state of the space affects the user experience and what are the main inconsistencies from the socio-economic point of view in the long term, which depend directly from the environmental management measures taken.

5. Conclusions

This research considers how the sexual activity of "cruising" operates spatially in a coastal aeolian beach and dunefield system with environmental protection, namely the Dunas de Maspalomas Special Natural Reserve. At this site, the 5 "S's" (Sand, Sun, Sea and Sex with Strangers) have been detected as merged factors which constitute a significant attraction for European and world sex tourism. Therefore, this work analyzed the spatial distribution of places for the sexual encounters (sex spots), identifying a total of 298 such places which amounted to an affected surface area of 5763.85 m2 (0.58 ha). Based on this research, the following characteristics and correlations in the dunefield were detected:

(i) the authorized entrances to the Reserve are not as important as the authorized paths, which have the role of guiding the users through the dune field;
(ii) sex spots are usually close to the authorized paths;
(iii) sex spots are mainly located in stabilized aeolian landforms (nebkhas and stabilized dunes), or in deflation surfaces where live or cut vegetation is utilized for protection, cover, and/or enclosure;
(iv) non-visible sex spots are characterized by a higher plant density and a vegetation height of between 1 and 3 m, while more visible sex spots are mainly in areas with low vegetation height;
(v) the larger sex spots are mainly located in non-visible places, in stable (relatively non-mobile) areas of low elevation with high vegetation density;
(vi) the larger the sex spot, the greater the number of people that use it, the more rubbish present, the higher the presence of condoms, and the greater the proportion of full garbage bags, not always replaced with new ones;
(vii) the larger the sex spot, the higher the percentage of cut vegetation, and the greater the evidence of sediment remobilization and illegal toilets;
(viii) as a direct impact on the vegetation, 10 species are affected, 8 of which are native and 3 of which are species endemic to the Canary Islands;
(ix) the development of cruising in the Reserve is a consequence of the paralysis of the aeolian sedimentary dynamics, induced by urban development in its environment;
(x) the development and expansion of the cruising activity and sex spots has led to the complete abandonment of environmental educational uses in the dunefield, one of the original primary activities the Reserve was established for.

In short, the spatial distribution of the cruising activity on the Reserve is related to: i) anthropogenic factors, such as the entrances to

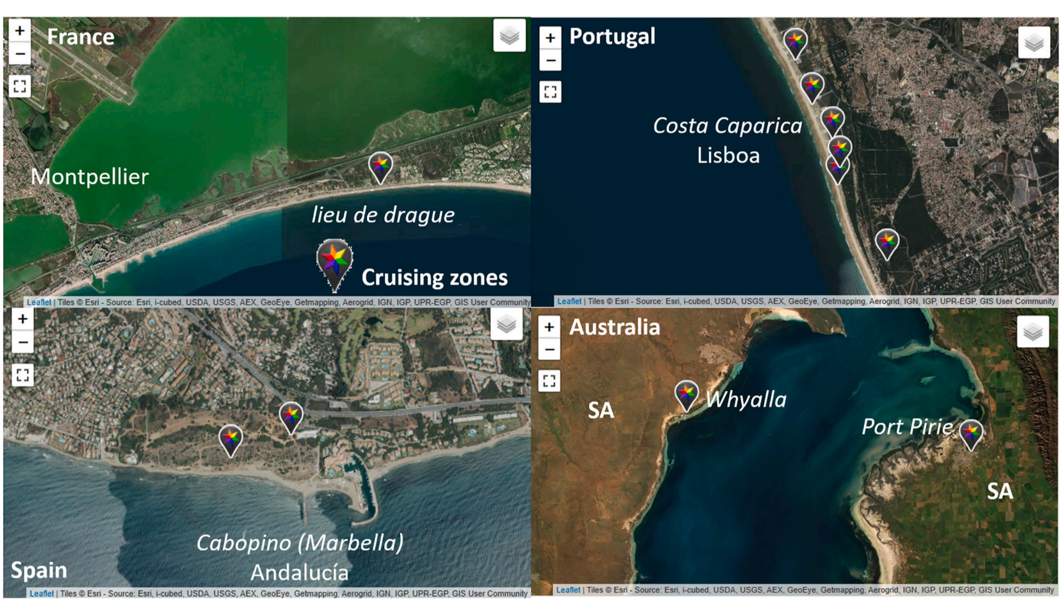

Fig. 8. Cruising zone examples on coastal dunes around the world. Source: https://www.gays-cruising.com.

the Reserve and the authorized paths; ii) natural factors, such as aeolian landforms and vegetation; iii) other complex processes, such as the fixation of the aeolian landforms and the vegetation growth, induced by urban development. This activity produces direct impacts on the aeolian landforms and on the vegetation, as well as on the environment in general through the generation of waste and illegal toilet spots. Despite the fact that the activity is illegal in the Reserve, the lack of control so far by the managing administrations has facilitated its development and contributed to cruisers acquiring so-called 'rights' to practice cruising, thereby effectively "privatizing" a public space and increasing the development of the aforementioned impacts, as well as other indirect impacts such as the inhibition of environmental education within the Reserve.

The scientific-technical collaboration of this research has contributed to the establishment of cleaning campaigns in the "MASDUNAS" project, through the provision of information related to the location of the sex spots and the amount and type of waste being generated. Through this collaboration, we will continue to provide more specific information (data with a larger spatio-temporal scale) about the effects on vegetation (cut down and urinated on), remobilization and other changes to the aeolian landforms, waste and its distribution patterns, the effects of trampling by cruisers, as well as about the important social impacts of the cruising activity.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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