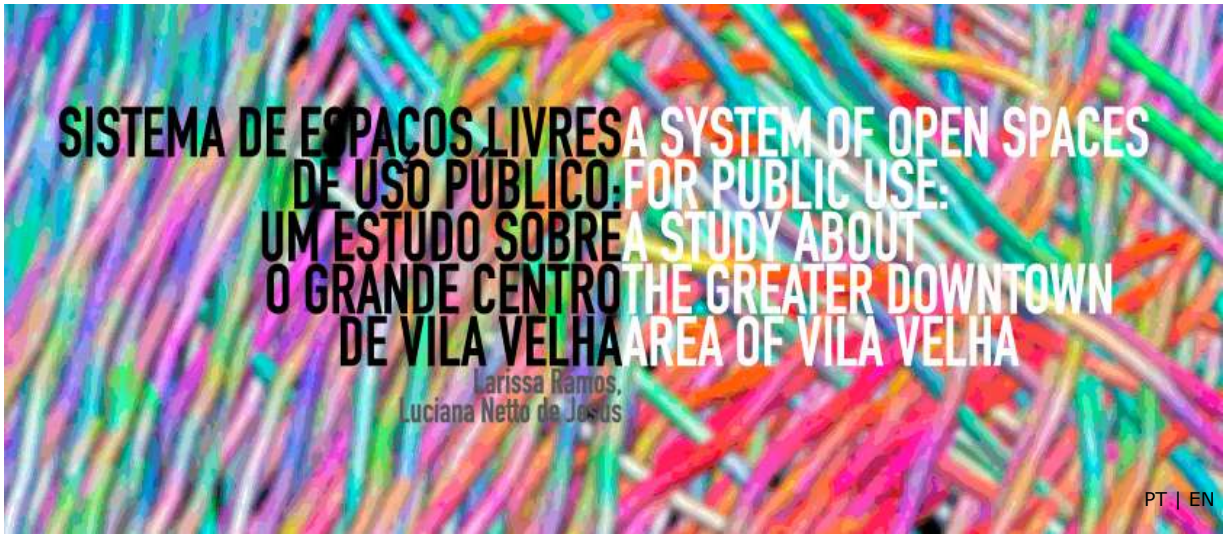
V 14
issn 2175-974x | ano 2017 year
semestre 01 semester

(cc) BY-NC



Larissa Andara Ramos is architect and urban planner, Doctor in Technology and Project for Environmental Quality in Architecture and City. Professor of Architecture and Urbanism course at Vila Velha University. She is member of research group ArqCidade. She studies environmental quality of buildings and cities, alternative construction technologies, social interest housing, urban infrastructure and environment.

Luciana Netto de Jesus is architect and urban planner, Doctor in Civil Engineering. Professor at Vila Velha University. She is member of research group ArqCidade. She studies architecture and city management and performance, sustainable diagnosis and strategies, environmental analysis and energetic efficiency of buildings.

How to quote this text: Ramos, L. A. and Jesus, L. N. A system of open spaces for public use: a study about the Greater Downtown Area of Vila Velha, ES. V!RUS, 14. [online] Available at: <http://www.nomads.usp.br/virus/_virus14/?sec=4&item=10&lang=en>. [Accessed: 04 July 2017].

Abstract

In the relationship between the built environment and the natural environment, spaces for circulation and permanence in the open air are fundamental to achieve a high quality of life. Public space systems are essential for urban vitality and socio-cultural enrichment, as they favor living and sharing experiences, increasing the sense of belonging. Besides weaving the city, the integration of several actors through a systemic network can order and structure the urban environment. This study presents a mapping of the system of free spaces for public use in the city of Vila Velha, ES, Brazil cutting out Region 01 – Greater Downtown Area, in order to analyze it in the urban setting. For mapping, we used the ArcGIS software program, Municipal Master Plan, as well as analyses performed through Google Earth images and site visits. As a result, we noticed a poor distribution of the squares among the neighborhoods of the Region studied. Concerning green areas, most have restricted access, concentrated in areas of marked relief and permanent preservation. This study is expected to contribute to future interventions in the system of free spaces for public use in the city of Vila Velha, ES, Brazil.

Keywords: Free spaces for public use; Green areas; Urban quality.

1 Introduction

Studies on the quality of life of the resident population in the cities have assumed significant proportions. The relationships between the built environment and the natural environment, the circulation spaces, pleasant outdoor spaces and the green areas of the city are fundamental to achieve a high quality of life.

The urbanization process generates pressures in the use and occupation of the urban soil, imposing the replacement of natural areas by built centers. The structural changes suffered by cities, due to disorderly urbanization, generate environmental and social problems that, consequently, affect the quality of life and health of the population.

The scenario related to the modification of natural environments, from densification of buildings, the concentration of industries, the opening of roads, soil waterproofing, the reduction of green areas and other impactful actions of urban land use, changes the environmental comfort in the cities. Such modifications are responsible for altering the local microclimate and the quality of air, generating noise pollution, increase in temperatures and energy consumption.

In addition to the effects on the population health, social consequences are also evidenced. The denseness of the city and the lack of living spaces end up generating a society without interlocutors, affecting interrelations and dialogue, an essential means to discuss and weave a city. According to Tardin (2010, p. 8), "a system is seen as a set of elements capable of establishing interrelations that are physical, functional, and relative to the landscape experience, as well as open and intricate with each other, with their environment, and with the people who experience it ". Thus, in the urban landscape, the recognition of free spaces as a system proves to be fundamental to restructure and order the urban space.

Alex (2011, p. 126) points out that "social interaction in public space is closely related to opportunities for access and use". The author understands that these are spaces of sociability and the exercise of coexistence, and therefore must be seen as a whole set of forms assumed by social practices.

Therefore, public spaces should allow for social integration and be inviting to all kinds of human activities (from leisure, sports activities, contemplation and socio-political discussions). Such areas favor integration, the development of social activities and urban vitality, and many of them are considered "lungs", helping oxygenation and renewal of the air. The microclimatic condition of these spaces is also a determinant element for their qualification, which can interfere with the frequency and use of space.

Public spaces can take many forms and sizes, covering places designated for everyday use. The word "public" indicates that these spaces are open and accessible to all people (Alex, 2011). Besides serving as spaces for recreational and leisure activities, such spaces also guarantee important arena for meetings, demonstrations and political protests (Gehl, 2014).

Thus, considering the above notions, open spaces encompass public spaces such as squares, parks, streets, urban beaches as well as a private land without constructions and voids with or without a potential for social areas. Among these spaces, squares and urban parks stand out as elements of fundamental importance for the quality of life.

Besides the importance of free spaces for the city, vegetation is considered an important and necessary component in this system. Givoni (1998) points out that green areas have characteristics that differ from built-up areas, such as high evaporation rate, low capacity and thermal conductivity and low albedo because the reflection of solar radiation is small. Green areas can play various roles, from values on the environmental conditions to potential recreation and highlight in the urban landscape.

It is also worth mentioning that the amount of urban vegetation has been measured through indicators that express the area of the green area per inhabitant (GAI = Green Areas Index). The Brazilian Society of Urban Arborization recommends a minimum of 15 m² of green area per inhabitant (SBAU, 1996). Stockholm, for example, is one of the cities with the highest index of green areas in the world, with about 86 m² of green space for each inhabitant. Also, 90% of the population has access to green areas within a radius of 300 meters from their residences (Programa Cidades Sustentáveis, 2012), thus allowing the surrounding population, in an average time interval of 3 to 4 minutes of walking distance, to easily access these areas.

In the city of Vila Velha, in State of Espirito Santo, Brazil (municipality used in this study), there is a lack of public spaces that interact with the population. The lack of urban planning, population densification and the urbanization process of the city resulted in the replacement of natural environments by built spaces. In this sense, this article is intended to present a survey of the system of public spaces existing in the municipality of Vila Velha, ES, especially in Region 01 - Greater Downtown Area, to identify and classify them within the urban setting.

2 Material and Method

Bibliographies review referring to public spaces and green areas were necessary for the accomplishment of this study so as to contextualize and conceptualize the studied areas. The identification of areas was carried out using satellite images and geographic data provided by the Google Earth program, comparing the information presented in Law 4.575/2007, Municipal Master Plan of Vila Velha.

After the identification of the free spaces for public use, a digital cartographic base was developed in the ArcGIS software program of satellite geoprocessing with accurate identification labels. The 'Interactive Map' of the Brazilian Institute of Geography and Statistics (IBGE) was also used, where it is possible to access population-based data, based on the 2010 Census (IBGE, 2010).

The mapped areas were identified according to Mendonça (2015), who classifies public spaces in three groups: Public spaces of environmental balance; Public spaces of social practices; and potential free spaces. With the areas identified and mapped, it was possible to perform general analyses and comparisons between the information collected, considering the cutout of Region 1 - Greater Downtown Area.

3 Systems of free spaces for public use of Region 1: theGreater Downtown Area

Considered the oldest city in the State of Espírito Santo, Vila Velha is also the second most populous one. It is bordered to the North by the municipality of Vitória; to the South, by the municipality of Guarapari; to the East, by the Atlantic Ocean, and to the West, by the municipalities of Viana and Cariacica. For its best organization, it has five administrative regions (Fig. 1) and, according to the 2010 Census, it has 414,586 inhabitants and a territorial area of 209,965 km2 (IBGE, 2010).

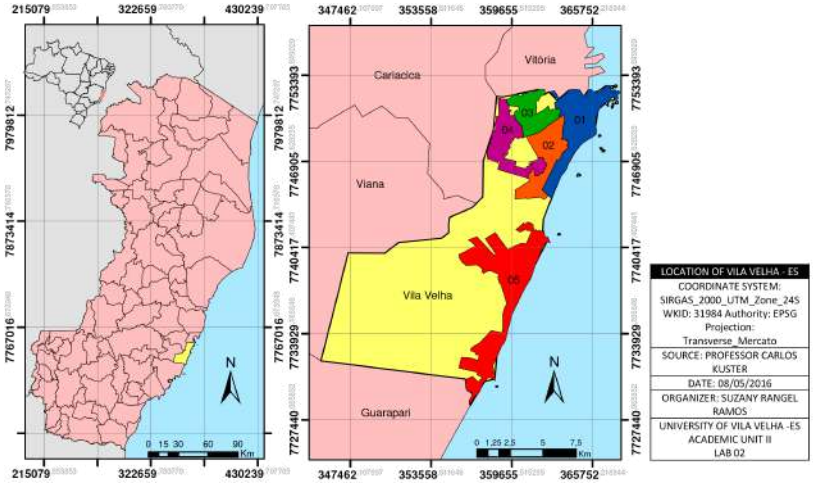


Fig. 1: Location of the Municipality of Vila Velha and its administrative regions, ES, Brazil. Source: Image generated by ArcGIS, based on Law 4707/2008, modified by the authors, 2016.

According to Municipal Law no. 4707/2008 (Vila Velha, 2008), Region 01 - Greater Downtown Area (identified in Fig. 1 in blue and shown in Fig. 2 below) covers 18 (eighteen) neighborhoods of the city of Vila Velha, ES. It was chosen as a cut of this research because it has great importance in the cultural, economic and political axis of the municipality. It is also a densely populated regional and attracts large numbers of people every day due to the concentration of services, institutions and commerce.

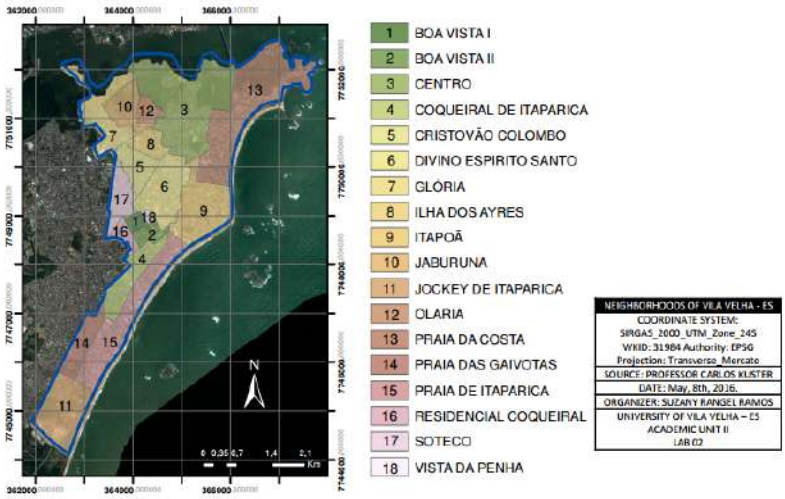


Fig. 2. Identification of the neighborhoods of Region 01 - Greater Downtown Area. Source: Image generated by ArcGIS, based on Law 4707/2008, modified by the authors, 2016.

According to the Vila Velha Municipal Master Plan (Vila Velha, 2007), Region 01 is made up of Priority Occupancy Zones (ZOP), Environmental and Cultural Protection Zones (ZEPAC) and Zones of Special Environmental Interest (ZEIA). (Convento da Penha Convent, Historical Site of Prainha, Morro do Moreno Hill (Fig. 3) and the waterfront of the beaches of Costa, Itapuã and Itaparica (Fig. 4).

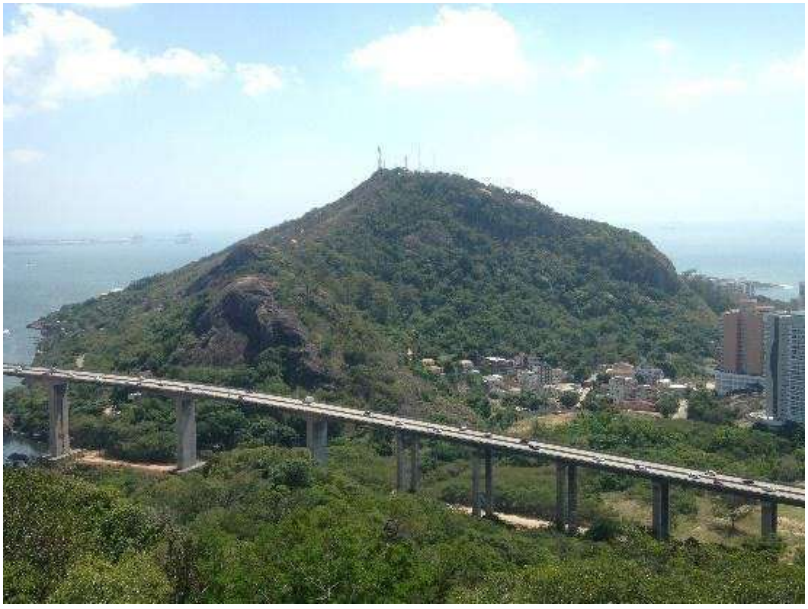


Fig. 3. Moreno Hill. Source: Photo by Suzany Ramos, 2016.

Fig. 4. Itaparica Beach. Source: Photo by Suzany Ramos, 2016.

3.1 Free spaces of public use for social practices of Region 1: the Greater Downtown Area

According to Mendonça (2015), free spaces of public use for social practices are those intended to leisure, recreational and sports activities. This group includes squares, urban parks, stretches of urbanized seafront (boardwalk), residual spaces associated with the road network and the sand strip of beaches.

Concerning public use spaces for social practices, in all of Region 1, we identified only one park, the urbanized seafront, and 21 squares, these being unevenly distributed and located mainly in the neighborhoods with the highest income per capita.

As a way of identifying the regions and the number of people that use public spaces for social practices in each of them, a radius of 300 meters, considered as an area of influence, was inserted from the perimeter of each square, so that the population contemplated by these spaces could be identified. Figure 5 illustrates the free spaces for public use for social practices of Region 1 and their radius range.

Fig. 5. Mapping of free spaces for public use for social practices of Region 1 - Greater Downtown Area and areas of coverage. Source: Image generated by ArcGIS, modified by the authors, 2016.

Considering the scope of a radius of 300 meters, it was possible to verify that only 37.7% of the population of Region 1 can access squares. The areas highlighted in gray in Figure 5 (areas outside the scope range) show that a large part of the population of Region 1 (62.3%) does not have access to the squares, considering the radius of 300 meters. We can also observe the total absence of public spaces for social practices in 6 (six) neighborhoods, located northwest of the Region studied and considered as needy (shown in pink in Fig. 5). It is also worth mentioning a greater concentration of free spaces for social practices in neighborhoods with consolidated infrastructure and valued by the real estate market because they are close to the seafront.

Most public spaces for social practices are found in the Center, bringing together four squares and a large free area called "Parque da Prainha", which, despite receiving park nomenclature, is, in fact, a large open space, uncovered and arid, with a lack of equipment, infrastructure, and furniture. We perceive thus a sparse distribution and a fragmentation of the free spaces for social practices among the Region's neighborhoods. While some neighborhoods have 4 (four) squares, others do not have any, reflecting the inequality of investments. Figure 6 highlights the poor distribution of squares in Region 1.

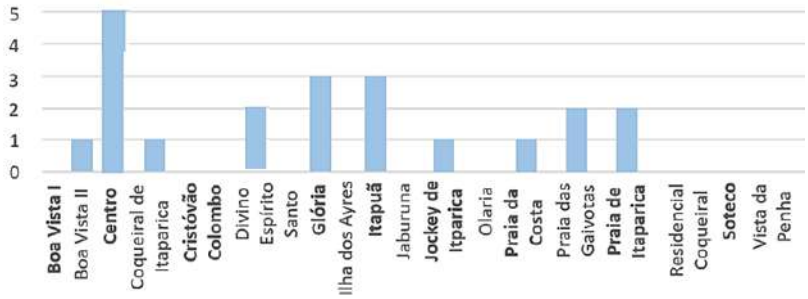


Fig. 6: Distribution of squares per neighborhood - Region 1 - Greater Downtown Area. Source: Image generated by Excel from data collected in the research, 2016.

Such sparse distribution reflects the lack of a systemic view of public spaces, so that some areas are privileged to the detriment of others, and they are not related to each other. An integrated view of the city where several actors could weave the space would allow a better distribution of the spaces of conviviality. It is observed that this systemic view, in Region 1, occurs only in the neighborhood and not at the city level. As a result, neighborhoods with more public spaces allow better the conviviality among users, thus strengthening dialogue and popular participation in urban planning decisions.

The analyses of free spaces for public use for social practices focused the squares characterization as they are free spaces of greater accessibility within the urban network, and most of the green areas are found in areas with high slope and difficult access.

The Region squares have local scope and diverse uses. Those of the Center, for example, do not have recreational facilities, but they are wooden squares (as shown in Fig. 7), aimed at resting, and their users are mostly elderlies and neighborhood residents. The squares of the neighborhoods near the seafront (such as Benedito Marques Lima Square, located in the neighborhood of Praia de Gaivotas - Fig. 8) have a recreational equipment, such as sports courts, playgrounds and popular gyms, as well as nightlife. In both squares, it can be seen that the socioeconomic profile of local users influences the type of infrastructure and equipment available. It should be noted that most of the squares have local coverage, inserted in residential contexts, with frequent use at night and on weekends. Only those squares of the Center, because they are located in places with different purposes (commercial, institutional and services), have greater daytime movement and public coverage.

Fig. 7: Otavio Araújo Square, located in the Center. Source: Photo by Suzany Ramos, 2016. Source: Photo by Suzany Ramos, 2016.

Fig. 8: Benedito Lima Square, Praia de Gaivotas. Source: Photo by Suzany Ramos, 2016.

According to the manual "Public spaces: diagnosis and project methodology" (Gatti, 2013) some characteristics define public space conditions so as to identify its problems and potentialities for future adaptations and investments. Regarding the infrastructure, we analyzed: the presence of lighting, bus stops, taxi stands, garbage dumps, policing stations and concerns with accessibility and universal design. As attractions and living were identified shaded areas, rest space, sports field or court, popular and elderlies gym, eating area and playgrounds.

In order to represent the squares analyses, radar-type charts were used (Fig. 9 and 10) allowing to interpret data, assigning for each parameter a scale ranging from 0 to 1. For both "Infrastructure" analysis and analysis of Elements of "Attraction and Experience", six parameters were used, which generated charts in hexagonal format. In the radar-type charts, the closer to the end of the polygon, the higher the value assigned and the closer to the center, the lower the value. An ideal situation would be for the results to reach the shape of the hexagon in its entirety.

Figure 9 represents a synthesis of the basic infrastructures for their quality. It is noticed that most of the squares are lacking in policing and access to public or private transportation. Due to the lack of security in most squares, there was frequent use by homeless and drug users. All Regional squares have lighting and trash cans. Despite recent improvements, only 50% of them have accessibility for people with disabilities or reduced mobility.

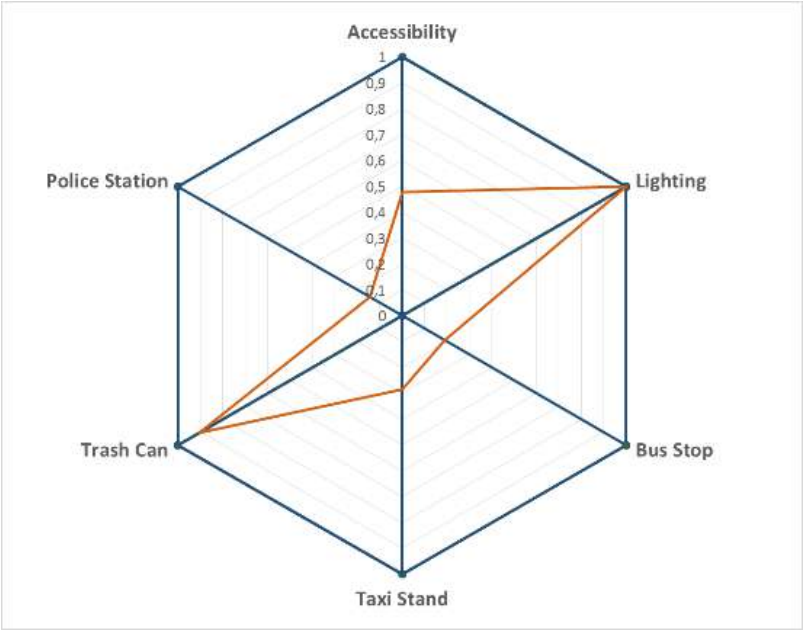


Fig. 9. Infrastructure of the squares of Region 1 - Greater Downtown Area. Source: Radar chart generated by Excel from data collected in the research, 2016.

Concerning attractions and living (Fig. 10), in all squares resting spaces were found, and 85% of them dispose of places for eating, with benches and tables. However, most of them are devoid of afforestation, a fundamental element to provide greater thermal comfort and environmental and urban quality. Some squares offer attractive equipment for collective use, such as sports courts, playgrounds and elderlies gyms, the latter being a characteristic feature of the new square models.

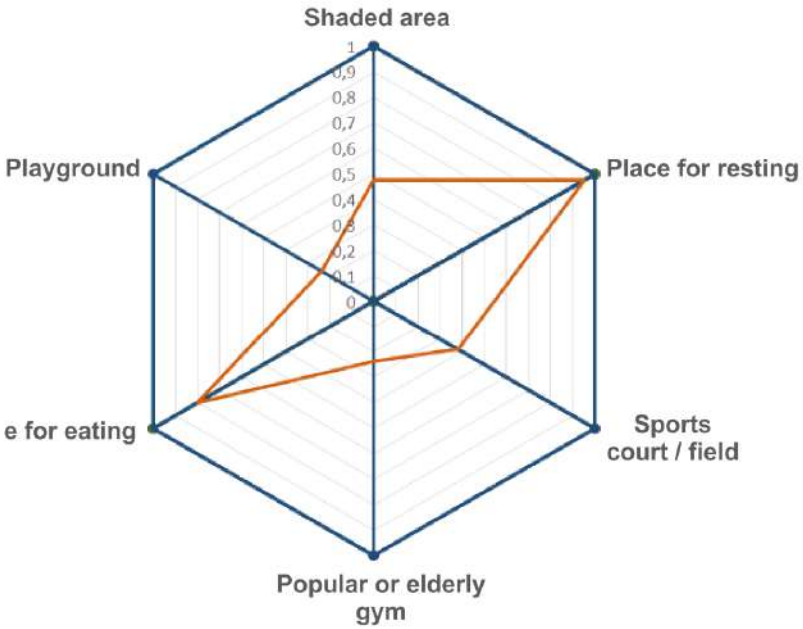


Fig. 10. Elements of Attraction and Living of the squares of Region 1 - Greater Downtown Area. Source: Radar chart generated by Excel from data collected in the research, 2016.

3.2 Free public spaces of environmental balance of Region 1 - Greater Downtown Area

Public use spaces considered of environmental balance by Mendonça (2015) comprise the areas covered by significant vegetation, including conservation units and other areas of landscape-environmental value.

While mapping public spaces of environmental balance, Special Zones of Environmental Interest (ZEIAs) and some private lands with predominant vegetation were considered. The ZEIAs represent the Permanent Preservation Areas (PPAs) located in a prominent relief, close to Vitória Bay, to oceanic islands and Restinga vegetation along the coast (identified in Fig. 11, in green).

Green areas of landscape potential (AVPP) are large private green areas with potential for transformation into a public park due to preserved extensive green area. Some private spaces have been identified and mapped as AVPP because they have a considerable area covered with vegetation, with a large number of trees. These areas, although private, constitute small green spaces that are beneficial to the urban environment, which can be preserved, with significant environmental value and potential for transformation into free spaces for public use. We also mapped the trees of public roads that provide shade (identified in Fig. 11, in yellow).

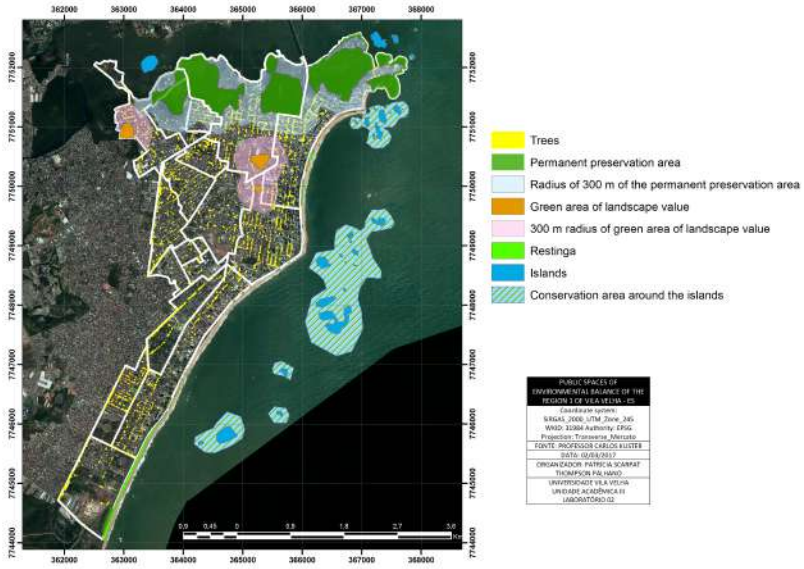


Fig. 11. Mapping of free areas of environmental balance of the Region 1 - Greater Downtown Area Source: Image generated by ArqGIS from data collected in the research, 2016.

After mapping areas around permanent preservation areas and green areas of landscape value, a radius of 300 meters was outlined in order to identify the influence and distribution of the resident population in the vicinity, benefited by the presence of such areas.

As already mentioned, the green area index (GAI) indicates the amount of green area (m²) per capita. In this study, the mapping of green areas generated several GAIs, combining different scenarios of green areas, as shown in Table 1. This variation in green area indexes was caused by the lack of consensus among the authors about which of these spaces should be considered for calculating the GAI. Thus, Table 1 represents the combination used for each calculation, with GAI 1 being the index that considers all green areas mapped; GAI 2 considers only the Areas of Permanent Preservation (APP); GAI 3, the APPs and the afforestation of the roads; GAI 4, only the roads afforestation; GAI 5 considers the Green Areas of Landscape Value (AVPP) and the afforestation of the roads and GAI 6, only the AVPPs.

Green area index (GAI)	GAI m²/inhab.	APP	Roadway trees / canopy area (m2)	Green area of landscape value (AVPP) (m²)
GAI 1	16,97	X	X	X
GAI 2	14,28	X		
GAI 3	15,42	X	X	
GAI 4	1,15		X	
GAI 5	1,95		X	X
GAI 6	0,80			X

Tab. 1: Combination for calculation of green area indices. Source: Image generated by Excel from data collected in the research, 2016.

Considering all mapped green areas, the region index (GAI 1) is 16.97 m²/inhab. Although this index is above the minimum recommended by the SBAU (which is 15 m²/inhab.), it has been found that most of these spaces are made up of permanent preservation units and, therefore, are restricted access areas, with inadequate infrastructure and social vulnerability, besides being concentrated spaces.

Indexes show that, apart from permanent preservation areas, there are no significant public green spaces in the neighborhoods. This finding also allows us to conclude that Public Authorities tend to maintain as many green spaces as required by the law, not bothering to create new green spaces distributed by neighborhoods to improve the residents quality of life regarding environmental and leisure aspects.

If held per neighborhood (Tab. 02), it is possible to observe that the GAI of the regions adjacent to the APPs (Downtown, Glória, Jaburuna and Praia da Costa) reach more satisfactory values, while those farthest from the preservation areas have indices close to zero. For example, the Boa Vista I and Boa Vista II neighborhoods have, respectively, GAI 1 of 0.38 and 0.35 m²/inhab, while in the Center this index reaches 141.25 m²/inhab.

Neighborhoods	Área (m²)	Population (hab)	GAI (m²/inhab)
Boa Vista I	91.190	3.143	0,38
Boa Vista II	207.862	3.515	0,35
Centro	2.563.492	7.880	141,25
Coqueiral de Itaparica	787.687	13.696	0,90
Cristóvão Colombo	494.169	6.835	0,75
Divino Espírito Santo	1.248.045	8.031	0,75
Glória	781.946	7.900	17,12
Ilha dos Ayres	356.167	3.691	1,71
Itapuã	1.075.374	22.808	1,89
Jaburuna	627.049	5.836	28,45
Jockey de Itaparica	1.272.120	2.393	13,05
Olaria	244.920	1.596	4,33
Praia da Costa	2.715.610	31.083	28,61
Praia das Gaivotas	324.022	6.282	1,82
Praia de Itaparica	1.600.313	11.648	5,18
Residencial Coqueiral	218.365	1.554	0,62
Soteco	481.072	8.189	1,17
Vista da Penha	45.125	1.199	0,41
TOTAL REGIONAL 01	15.134.528	147.279	16,97

Tab. 2. Distribution of green areas by neighborhood of Region 01 - Greater Downtown Area. Source: Table generated by Excel from data collected in the research, 2016.

The impact of the APPs is keen on the calculation of GAI. Considering all mapped green areas, the index is 16.97m²/inhab. (GAI 1), but considering only the permanent preservation areas, the index is 14.28 m²/inhab. (GAI 2). Without APP, the index drops to 1.95m²/inhab (GAI 5), as per Table 1.

In addition to the shaded areas provided by trees along public roads, the index (GAI 4) is only 1.15m²/inhab. This figure evidences the precariousness of the urban afforestation distributed across the neighborhoods. It is evident the greater scarcity of trees in places of the Region that are dominated by the real estate market, through the verticalization process, and higher concentration where there is a predominance of single-family homes.

Another relevant point is the radius range of the areas of environmental balance. Figure 11 also shows a spot in the surroundings of APPs, which indicates a 300-meter radius from its boundary. This radius covers a little percentage of the Region population, indicating the need to insert new green areas distributed more evenly among the area's neighborhoods. Examples of this are green areas of landscape potential (AVPP), which, although private, benefit the urban environment. The areas of landscape potential alone generate a GAI of 0.80 m²/inhab. (GAI 6).

3.3 Potential free spaces of Region 01 - Greater Downtown Area

For the identification of potential free spaces, we used the Manual "Public spaces: project diagnosis and methodology", which contains important information about methods for analysis of potential open spaces (Gatti, 2013).

Potential lands were identified by comparing the areas not covered by the mapping of public spaces for social practices and environmental balance and its coverage areas, considering the radius of influence of 300 meters, and filling the inadequate spaces, according to Figures 12 and 13. For areas intended for social practices, we mapped potencies with an area greater than 400.00 m², following the minimum parameters by square footage of public spaces. We refer to studies by Jacobs (2000) and Alexander; Ishikawa and Silverstein (1977), who advocate the idea of small squares for strengthening urban vitality on a neighborhood scale.

Some of the mapped lands were identified as a priority. Its selection was based on the analysis of the radius of 300 meters away from public spaces for social practice (shown in Fig. 12 in yellow). Those outside the scope of existing and mapped open public spaces for social practice were considered priority areas (shown in Fig. 12 in red).

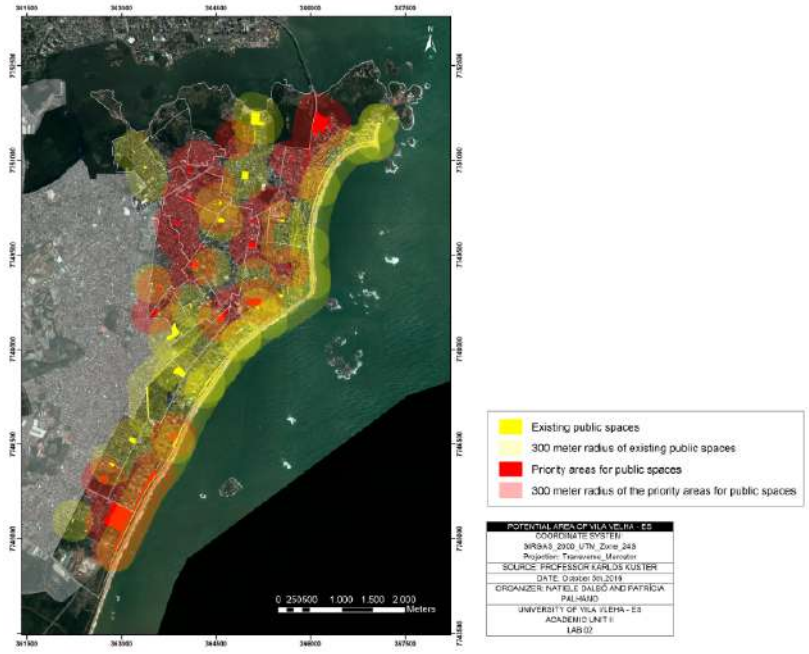


Fig. 12: Mapping of open spaces for social practice and potential spaces of Region 1. Source: Image generated by ArqGIS from data collected in the research, 2016.

We did the same for the areas of environmental balance. Those lacking in green areas were identified and, from each distinguished space, radiuses of 300 meters were also established in their surroundings. The potential spaces that have been mapped are found in areas aiming to fill these spaces lacking environmental balance spaces.

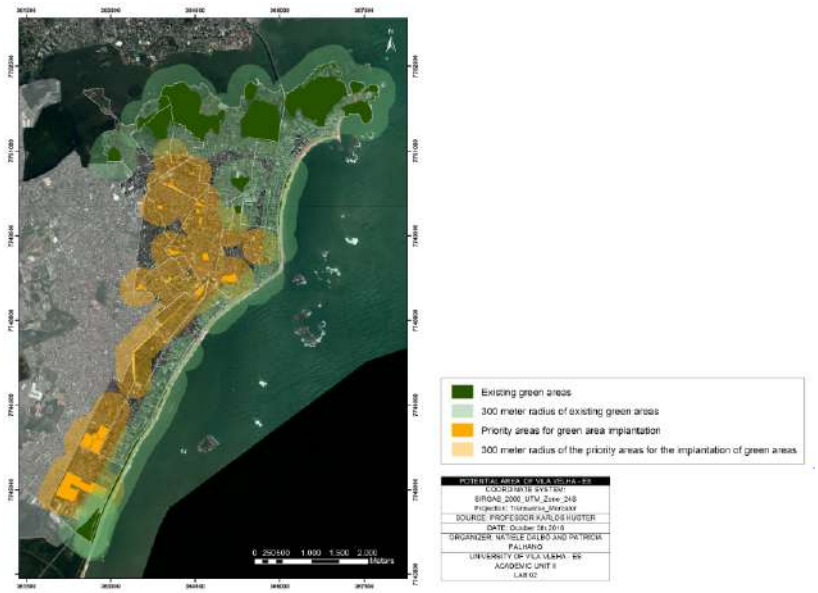


Fig. 13. Mapping of open spaces of environmental balance and potential spaces of Region 1. Source: Image generated by ArqGIS from data collected in the research, 2016.

Given the maps, we can observe that priority lands, highlighted in yellow in Figure 13, are significant to balance the presence of environmental balance spaces and contribute to the improvement of the quality of the population's urban life. We believe that potential land, which does not yet have green areas, can be worked on by the municipality to create parks or squares, with abundant vegetation and permeability, also for social and recreational activities.

4 Conclusion

In the mapping of free spaces for social practices, there is a lack and distribution of squares. Most of them are found in neighborhoods with better infrastructure. The inadequate allocation of these spaces also occurs among the districts of the Region, reflecting the inequality of investments. In the squares analyzed in this study, it was also possible to identify that there is an absence of furniture and leisure equipment to contemplate all age groups.

Through the mapping of areas of environmental balance, the study also shows that green areas have specific characteristics and, therefore, different locations. These spaces do not serve the Region's population homogeneously, since they are concentrated especially near coastal areas and in areas of marked relief, on the banks of the Bay of Vitória. In the other neighborhoods, there are few green spaces, and throughout the region road afforestation is poor.

Within the area studied there is no systemic view of existing public spaces. These areas are compartmentalized in the neighborhoods, with local influences, not encompassing the entire population of the Region, and there is no marked

relationship between green areas and free spaces for identified social practices. This figure confirms Tardin (2010), according to whom, part of the Brazilian municipalities produces areas that tend not to be related to each other, reflecting an unfavorable relationship between urban and biophysical systems.

We envision a city with its free spaces integrated and connected and not fragmented and segregated in small spaces located in neighborhoods. In this sense, potential open spaces are of great importance for modifying this feature. The presence of potential free land can, through investments, make up for the lack of open spaces for public use. It can also contribute to the integration of parcels and, consequently, improve the quality of urban life of the population of the entire municipality.

The community participation is fundamental throughout the process. Public policies can only be successful when formulated through joint participation among residents, politicians, academics, and planners, based on the opinion of citizens. It is suggested, among other guidelines, the development of a municipal urban afforestation plan; the implementation of new public spaces on potential land; and contracts with private companies to provide maintenance services for existing public spaces.

It is also recommended to deepen the studies aimed at creating public policies seeking to develop a network of public spaces for the municipality, in an integrated and interconnected way, with a diversity of use, with areas for social and environmental interaction for local public, but also spaces of regional, municipal and even metropolitan scope.

5 Acknowledgements

The authors of this paper are grateful to the University of Vila Velha (UVV) and the National Foundation for the Development of Private Higher Education (FUNADESP) for their support, and the undergraduate students Natiele Dalbó, Patricia Palhano, Suzany Ramos and Ohanna Ferri for their contribution in this study.

References

Alex, Sun. *Projeto da Praça: Convívio e Exclusão no Espaço Público***.** São Paulo: Editora Senac São Paulo, 2ª Edição, 2011.

Alexander, C., Ishikawa, S. and Silverstein, M., 1977. *A pattern language*. New York: Oxford University Press.

Gatti, S., 2013. Coordination of the Program Solutions for Cities. *Espaços Públicos. Diagnóstico e metodologia de projeto*. São Paulo: ABCP. Available at: <http://www.solucoesparacidades.com.br/wp-content/uploads/2013/11/Manual%20de%20espacos%20publicos.pdf> [Accessed 17 April 2017].

Gehl, J., 2014. *Cidade para Pessoas*. São Paulo: Perspectiva.

Givoni, B., 1998. *Climate considerations in building and urban design.* New York: John Wiley & Sons.

Google, s.d. *Google Earth website*. Available at: <http://earth.google.com/> [Accessed 12 March 2016].

IBGE, 2010. Instituto Brasileiro de Geografia e Estatística. *CENSO DEMOGRÁFICO 2010.* Características da população e dos domicílios: resultados do universo. Rio de Janeiro: IBGE.

Jacobs, J., 2000. *Morte e vida de grandes cidades.* São Paulo: Martins Fontes.

Mendonça, E. M. S., 2015. A importância metropolitana do sistema de espaços livres da região de Vitória – ES – Brasil. In: *EURO ELECS 2015*, Guimarães, Portugal, 2015.

Programa Cidades Sustentáveis, 2012. *Metas de Sustentabilidade para os Municípios Brasileiros (Indicadores e Referências).* Rede Social Brasileira por Cidades Justas e Sustentáveis ; Instituto Ethos de Empresas e Responsabilidade Social

SBAU, 1996. Sociedade Brasileira de Arborização Urbana. Carta de Londrina e Ibiporã. *Boletim Informativo*, 3(5), p.3.

Tardin, R., 2010. Ordenação Sistêmica da Paisagem. In: *Encontro Nacional de Pós-Graduação e Pesquisa em Arquitetura e Urbanismo*, 1st, Rio de Janeiro: PROURB.

Vila Velha, 2007. Lei nº 4.575 de 26 de novembro de 2007. *Plano Diretor Municipal de Vila Velha*. Prefeitura Municipal de Vila Velha. Prefeitura Municipal de Vila Velha-ES.

Vila Velha, 2008. Lei nº 4.707 de 10 de setembro de 2008. *Institucionalização dos bairros nas Regiões Administrativas, os limites e a denominação dos mesmos e os critérios para organização e criação de bairros, no perímetro urbano do Município.* Vila Velha: Prefeitura Municipal.