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Being towards death: the path of the waters in Maricá/RJ

Ser para a morte: o caminho das águas em Maricá/RJ

Ser hacia la muerte: el camino de las aguas en Maricá/RJ

Ana Claudia Nunes Alves, PhD in Architecture and Urbanism, Fluminense Federal University.
E-mail: acnunesalves@id.uff.br *http://orcid.org/0000-0002-8399-7664*

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Abstract

The urban sprawl in the municipality of Maricá and the transformation of the landscape undertaken by the increase of large closed subdivisions in formerly rural areas close to the sources of rivers has been aggravating the already deficient water crisis. The main source that supplies the city, the Ubatiba River Basin, with frequent suppressions of native forest, diversion of watercourses, illegal collection and damming, as well as its contamination in the most densely occupied areas by the dumping of sewage without adequate treatment has been causing the death of its waters. Seeking inspiration in Bachelard (1998) and Heródoto (2006), we traced the path of the municipality's waters, from the fresh waters of its sources, passing through the violent waters that bring floods and inundations, to the dead waters that they pass through the airport and flow

into Lagoa de Maricá, an ancient source of wealth and food through fishing. The path to the waters of Maricá thus shows the slow transformation of life into death, whether due to disasters, the death of fish, or the worsening of social and environmental problems.

Keywords: Being-to-death; Hydrography; Ubatiba River Basin; Marica/RJ.

Resumo

A urbanização dispersa no município de Maricá e a transformação da paisagem empreendida pelo incremento de grandes loteamentos fechados em áreas antes rurais próximas a nascentes de rios vem agravando a crise hídrica já deficiente. O principal manancial que abastece a cidade, a Bacia do Rio Ubatiba, com as frequentes supressões de mata nativa, desvio de cursos d'água, coleta e represamento ilegal, bem como sua contaminação nas áreas mais densamente ocupadas pelo despejo de esgoto sem tratamento adequado, vem sofrendo a morte de suas águas. Buscando inspiração em Bachelard (1998) e Heródoto (2006), traçamos o caminho das águas do município, desde as águas doces de suas nascentes, passando pelas águas violentas que trazem as enchentes e inundações, até as águas mortas que passam pelo aeroporto e deságuam na lagoa de Maricá, antiga fonte de riqueza e alimento por meio da pesca. O caminho das águas de Maricá exibe, assim, a lenta transformação da vida em morte, seja pelos desastres, seja pela mortandade de peixes, seja pelo acirramento dos problemas sociais e ambientais.

Palavras-chave: Ser-para-a-morte; Hidrografia; Bacia do Rio Ubatiba; Maricá/RJ.

Resumen

La urbanización dispersa en el municipio de Maricá y la transformación del paisaje emprendida por el aumento de grandes fraccionamientos cerrados en antiguas zonas rurales cercanas a los nacimientos de los ríos ha ido agravando la ya deficiente crisis hídrica. La principal fuente de abastecimiento de la ciudad, la cuenca del río Ubatiba, con frecuentes supresiones de bosque nativo, desvío de cursos de agua, captación ilegal y represamiento, así como su contaminación en las zonas más densamente ocupadas por el vertido de aguas servidas sin tratamiento adecuado ha sido causando la muerte de sus aguas. Inspirándonos en Bachelard (1998) y Heródoto (2006), trazamos el camino de las aguas del municipio, desde las aguas dulces de sus nacimientos, pasando por las aguas violentas que traen crecidas e inundaciones, hasta las aguas muertas. que pasan por el aeropuerto y desembocan en la Lagoa de Maricá, antigua fuente de riqueza y alimento a través de la pesca. El camino a las aguas de Maricá muestra así la lenta transformación de la vida en muerte, ya sea por desastres, por la muerte de los peces o por el agravamiento de los problemas sociales y ambientales.

Palabras clave: Ser-hacia-la-muerte; Hidrografía; Cuenca del río Ubatiba; Marica/RJ.

Introduction

Freshwater sources are responsible for the existence of life, and their pollution is one of the main threats to human health and the environment. As it became increasingly scarce around the planet, drinking water and sanitation were included in the UN Sustainable Development Goals with targets until 2030. In 2021, the Ministry of the Environment (MMA [Ministério do Meio Ambiente]) created the Programa Rios+Limpos (Cleaner Rivers Program), aiming to improve effluent management and basic sanitation.

Because freshwater sources are essential to life, human settlement historically occurred along the paths and ways of water bodies. However, dispersed urbanization, especially in some municipalities such as Maricá in the State of Rio de Janeiro, has been altering geomorphological characteristics, subtracting native vegetation, and releasing untreated effluents in water bodies to implement large residential closed subdivisions in previously rural areas.

Maricá is a municipality with an area of 361.6 km², located in the eastern portion of the Metropolitan Region of Rio de Janeiro, approximately 60 km from the capital. The municipality borders Niterói, São Gonçalo, Itaboraí, and Tanguá, municipalities belonging to the Metropolitan Region, in addition to Saquarema, to the west, which is part of the Lakes Region. The city is connected, both to Niterói, in the Metropolitan Region, and to Cabo Frio, in the Lakes Region, by the Estrada Real de Maricá, inaugurated in 1816, which still exists in many sections parallel to RJ-106, a state highway from the 1950s that runs longitudinally through the municipality.

Marked by incredible biodiversity: large lagoon complex composed of five interconnected lagoons corresponding to about 36% of its territory, coastal massifs, mountainous escarpments, and many native species, in addition to 42 km of coastline facing the Atlantic Ocean. These characteristics make the municipality an attractive place for occupation, both for its landscapes and proximity to the capital for vacation or fixed residence purposes. It is the municipality with the highest population growth in the state recorded in the last IBGE census.

In the 1950s, with the implementation of the Amaral Peixoto Highway (RJ-106) and the removal of the railroad in 1964, land splitting began in large areas along the waterfront, mainly in Itaipuaçu, a neighborhood bordering Itaipu, in Niterói. However, the lots only began to be effectively occupied after the construction of the Rio-Niterói Bridge in 1974 and the inauguration of the Boqueirão Bridge in 1977, which allowed access to the municipality's beaches by people seeking cheaper lots than those found in Saquarema or Cabo Frio for summer vacation purposes.

Due to its proximity to large centers, Maricá attracts residents, becoming a commuter town. That is when the municipality becomes part of the Metropolitan

Region of Rio de Janeiro, but even so, there are few occupied lots. As of 2007, Maricá started receiving 1.85% of oil *royalties* (TCE, 2007) due to the implementation of the Rio de Janeiro Petrochemical Complex (Comperj), currently, the Itaboraí GasLub Hub, which further intensifies the real estate speculation of the subdivisions and increases their urban dispersion, especially in areas of environmental relevance to the municipality, such as those near river springs, belonging to old farms, mountains, and environmental conservation areas.

The water quality of the rivers that make up a watershed is directly related to land use and the degree of control over pollution sources. In urban centers, it is directly related to the eutrophication process,[1] responsible for fish mortality, and associated with many Brazilian cities' precarious sanitary infrastructure.

Hydrographic regions are spatial cutouts adopted by the State to facilitate the planning and management of water resources in state territory. The Hydrographic Region of Guanabara Bay and the Lagoon Systems of Maricá and Jacarepaguá correspond to Hydrographic Region V (RH-V), where most of the state's urban population resides, including most of the population living in subnormal clusters. RH-V partially or entirely covers 17 municipalities, including Niterói, São Gonçalo, Itaboraí, Tanguá, Guapimirim, Magé, Duque de Caxias, Belford Roxo, Mesquita, São João de Meriti and Nilópolis; and partially: Maricá, Rio Bonito, Cachoeiras de Macacu, Petrópolis, Nova Iguaçu and Rio de Janeiro. The map in Figure 2 shows the delimitation of the subcommittees, with the working group responsible for water bodies in Maricá being the Subcommittee on the Maricá-Guarapina Lagoon System.

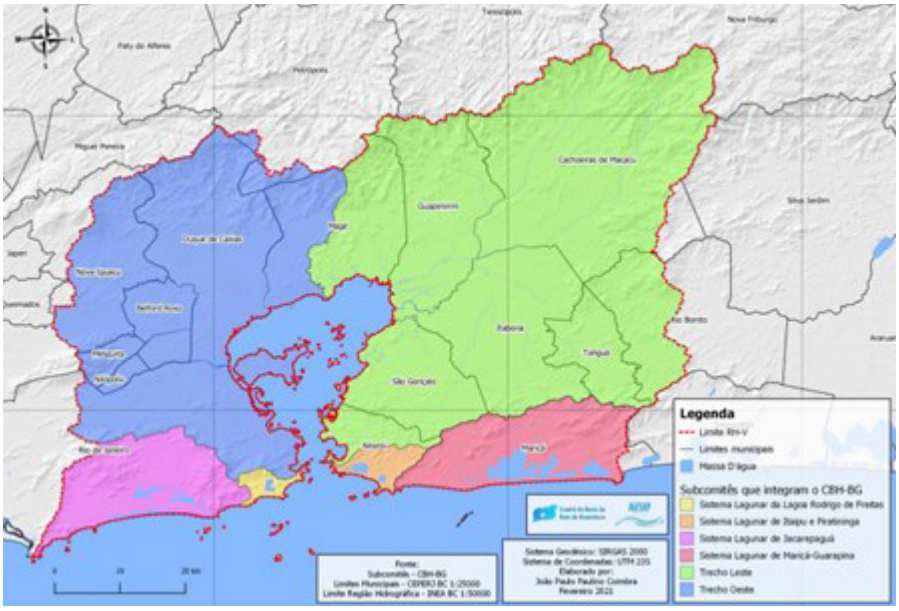

Figure 1: Division of watershed subcommittees of Hydrographic Region V, Guanabara Bay, in Rio de Janeiro. Source: Coimbra, 2021.

1 Eutrophication is the process of pollution of water bodies, such as rivers and lakes, with a reduction in the levels of oxygen dissolved in the water due to the accumulation of nutrients such as phosphorus and nitrogen. This causes the death of several animal and plant species and has a very high impact on aquatic ecosystems.

Because of its peculiar characteristics, the Maricá hydrographic network deserves attention. All rivers are born within the municipality's limits and flow into its lagoon complex; the depletion of freshwater sources can effectively threaten life. This is the case of the Ubatiba River Basin, responsible for supplying most of the municipality of Maricá, but which today is polluted and silted up in many of its stretches, causing floods, fish mortality, and parasitic diseases.

The path of the waters in Maricá

> How can we articulate the enduring essence of freshwater's dreamy intuition amidst challenging conditions? The ethereal essence of the water from the sky, the fine rain, and the nurturing flow of springs offer teachings more profound than the vastness of oceans. It is a distortion that has tainted the seas with salt. Salt entered a reverie, the reverie of tenderness, one of the most material and most natural reveries that exists. Natural reverie will always reserve a privilege to fresh water, to water that refreshes, to water that unthirsts (Bachelard, 1998, p. 162).[2]

Interestingly, the landscape of the waters of Maricá exhibits this being-towards-death, where the springs flow into the rivers, which flow into the channels and lagoons, in a closed cycle, where the clear waters located upstream flow to the still waters downstream (Figure 2), to the valleys where human occupation is more present and where water is once again an element of survival and dispute. We do not exist without water, just as we do not exist without movement and oxygenation, so the water paths reflect the paths of dispersed urbanization in the municipality.

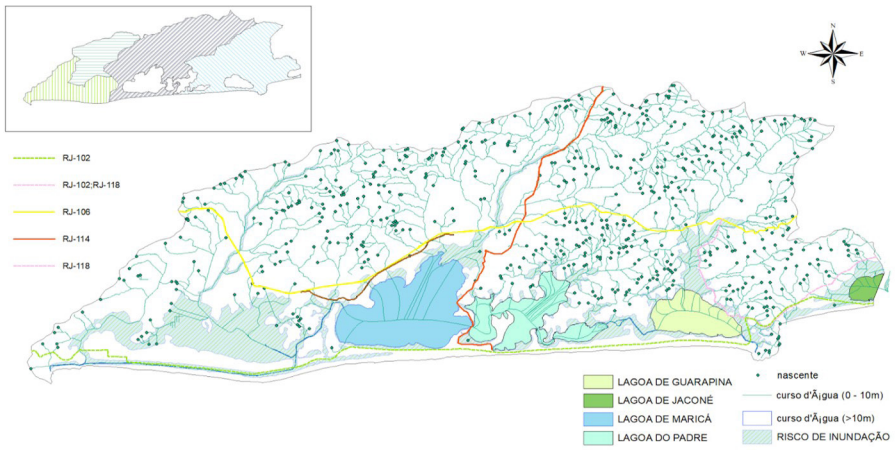

Figure 2: Division into districts, hydrography, areas subject to flooding, and main access roads. Source: Prepared by the author, 2023.

2 Translated by the author from Brazilian Portuguese.

In its political-administrative division, Maricá is composed of four districts, according to the Municipal Organic Law of April 5, 1990: 1st District headquarters-Maricá; 2nd District of Ponta Negra; 3rd District of Inoã; and 4th District of Itaipuaçu, representing, respectively, 40%, 34%, 12% and 14% of the total area. The 1st District – Headquarters – Maricá, the largest in the municipality, is home to 16 of the 38 neighborhoods delimited by the Organic Law: Silvado, Pilar, Condado, Ubatiba, Caxito, Centro de Maricá, Itapeba, Araçatiba, Caju, Jacaroá, Cambori, Retiro, São José do Imbassaí, Barra de Maricá, Zacarias and São Bento da Lagoa. Of these, the first seven are in the Ubatiba River basin domains. It should be noted, however, that in the neighborhood of Araçatiba, drainage is carried out through artificial drainage channels, the main channels being Avenida and Canal do Aeroporto, intended for the drainage of effluents and rainwater.

The districts of Inoã and Itaipuaçu are supplied by the Imunana-Laranjal system. At the same time, the rest of the municipality depends on the Ubatiba River and artesian wells for their drinking water supply, according to the National Water and Sanitation Agency – ANA. The Ubatiba River, about eighteen kilometers long, is the largest in the municipality. It begins in Espraiado Mountain Range, called Silvado, and, together with one of its tributaries, the Caboclo River, is responsible for supplying drinking water to the 1st District Headquarters-Maricá. (Prefeitura de Maricá, 2015).

As to the Imunana-Laranjal System, which is in the eastern portion of Hydrographic Region V, the catchment occurs in the Macacu River, which supplies the municipalities of Itaboraí, Niterói, São Gonçalo, Rio de Janeiro (Paquetá neighborhood) and Maricá (Itaipuaçu and part of Inoã districts). This System undergoes recurring water stresses, which can be further impacted when implementing large urban projects, such as the GasLub Hub in Itaboraí and the construction of the Port of Jaconé, since they tend to increase the demand for infrastructure, further overloading the already deficient water supply and sewage systems in the municipality.

According to the Atlas of Public Supply Sources in the state of Rio de Janeiro published by INEA, the population supplied by the Ubatiba River Basin was 40,058 in 2018. At the time, the Institute detected various irregularities along the river's route, such as the transformation of green areas into urban areas, reduced water infiltration into the water table and consequent reduction of water bodies, non-compliance with environmental legislation on the protection of marginal strips, pollution, canalization, detour of watercourses, and de-characterization of the riparian forest.

Figure 3 shows the main closed subdivisions of the municipality by launch date. In it, it is possible to observe that in the districts of Inoã and Itaipuaçu, the urban spot extends mainly around the Nova Cidade neighborhood, characterized as of particular urban interest in the master plan of the municipality, highlighted in purple and extending along the RJ-106 in yellow. In the district headquarters, different typologies are being implemented over time. In the area located in the

northern portion of RJ-106 and along RJ-114, in the neighborhoods of Silvado, Ubatiba, and Caxito, where some of the springs of the municipality are located (highlighted in green in Figure 3), several closed subdivisions aimed at the middle and upper classes with a vast network of leisure infrastructure emerged from the promise of the implementation of the GasLub Hub in Itaboraí.

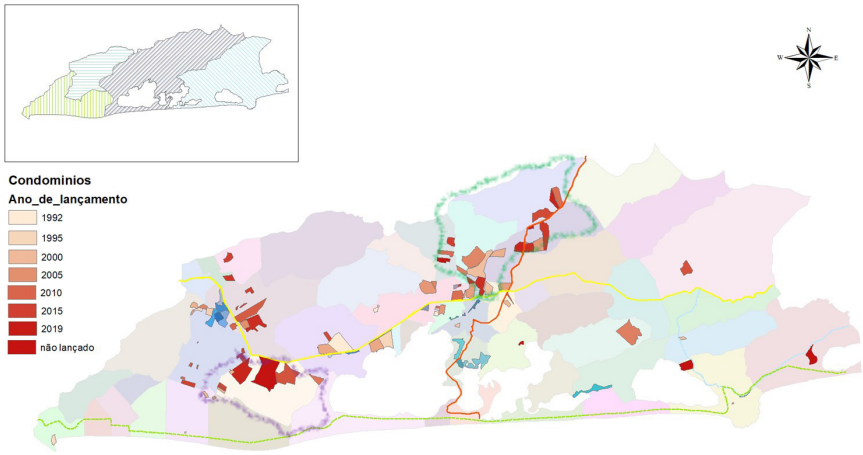

Figure 3: Closed subdivisions by launch year, subnormal clusters, and main access routes. Source: Prepared by the author, 2022.

In this first section, marked in blue in Figure 4, are the springs of the Ubatiba River basin, the freshwater sources. In the section marked in yellow, the occupation densifies; there are subnormal clusters (highlighted in blue on the map) and occupation on the banks of the Ubatiba/Mumbuca River, which causes recurrent floods and landslides in the rainy seasons. In the last stretch, marked in orange, the waters that flow into the Maricá Lagoon are already polluted, generating water contamination and fish mortality.

Figure 4: District headquarters with highlights for the contribution areas of the Ubatiba River. Source: Prepared by the author based on Google Earth, 2021.

The fresh waters

> And when, after long days of travel to reach my homeland, I was able to contemplate my mother's eyes in ecstasy, do you know what I saw? Do you know what I saw?
>
> I saw only tears and tears. However, she smiled happily. But there were so many tears, I wondered if my mother had eyes or mighty rivers on her face? And only then I did understand. My mother carried, serenely in herself, flowing waters. So, tears and tears adorning her face. The color of my mother's eyes was the color of water eyes. Waters of Mother Oxum! Calm rivers, but deep and deceptive for those who contemplate life only from the surface. Yes, Mother Oxum's waters (Evaristo, 2016, p. 19).[3]

Like tears, fresh waters quench thirst and attract the scattered occupation of the closed subdivisions in Maricá. The Ubatiba River originates from the Silvado River and runs through Ubatiba, Caxito, Itapeba, and Centro neighborhoods, ending in the Maricá Lagoon. It belongs to the Ubatiba sub-basin, which includes the Lagarto, Silvado, Retiro, Sapucaia, Camburi, Macaco, and Cachoeira mountain ranges. At the intersection between the Ubatiba and Ludgero rivers, in the section after RJ-106, the river is now called Mumbuca, passing through the entire central area of the consolidated urbanization municipality and ending in the Maricá Lagoon near the municipal airport.

The Mumbuca River, named after a species of tame bee that produces good quality honey, obtained this name because it had clear and fresh waters until the mid-twentieth century, responsible for drinking water throughout the central part of the municipality. In it, families bathed, fishermen supplied their boats with fresh fish, and train passengers stopped to rest, cool off, and drink water. However, each year, with population growth, more irregularities are observed in the spring of the Ubatiba River in private properties of Silvado, where the river passes through with the suppression of the vegetated area, alteration of watercourses, irregular abstraction for consumption, and illegal extraction of sand for use in constructions.

On September 21, 2021, journalist Felipe Lucena of Diário do Rio warned of the worsening water crisis in Maricá:

> The water crisis has worsened in Maricá due to the drought and the consequent low level of the Ubatiba River, where Cedae (Companhia Estadual de Águas e Esgotos [State Water and Sewage Company]) draws water for treatment and distribution in Maricá. The Company reported that the system

3 Translated by the author from original in Brazilian Portuguese.

> is operating at 30% of production capacity and supplying treated water to part of the city. As a result, the supply is reduced to the neighborhoods of Centro, Barra de Maricá, Itapeba, Boqueirão, Jacaroá, Flamengo, Nova Metrópole, Caxito, Ubatiba, Mombuca, Araçatiba, Divinéa, Caju, Nova Metrópole, and Colinas (Diário do Rio, 2021).

It is also of concern the authorization by INEA in the granting of wells, as in the case of ZRC Empreendimentos Imobiliários Ltda, owner of the high-standard gated community Privilége Golf Club located in the neighborhood of Espraiado; Kamal Brasil Empreendimentos Imobiliários e Participações Ltda, the owner of the also high-standard gated community Gan Éden, located in Silvado and Viação Nossa Senhora do Amparo Ltda, located in Centro, all in locations supplied by the Ubatiba River Basin.

One of the old promises to improve water shortages is the extension of the supply network through the capture in Tanguá and the construction of the Bananal Water Treatment Plant (WTP), connecting it to the Flamengo WTP, which would increase the supply capacity of the network by Águas do Rio.

The violent waters

In Herodotus's story, Xerxes, King of Persia, after resolving to wage war with Greece, drills a hole in Mount Athos,[4] opening a communication channel by sea.

> Soon after, he ordered the construction of a bridge over this channel. For the construction of this bridge, the Persian sovereign had linen and byblos rigging prepared. [...] It happened, however, that as soon as the bridge was finished, a terrible storm arose, breaking the ropes and tearing the ships apart. [...] Knowing what had happened, Xerxes, indignant, had three hundred lashes applied to the Hellespont and cast a pair of chains there. I have heard that he also commanded the executioners to mark the waters with a red-hot iron, but what is certain is that, together with the lashes, he commanded one of the executioners to utter this barbarous and senseless speech: "Treacherous wave, your lord punishes you because you have offended him without him having given you cause

4 Athos is a great and famous mountain, inhabited by men, and stretching far out into the sea. Where the mountain ends towards the mainland it forms a peninsula, and in this place, there is a neck of land about twelve furlongs. Across the whole extent whereof, from the sea of the Acanthians to that over against Torone, is a level plain, broken only by a few low hills. Here, upon this isthmus where Athos ends, is Sand, a Greek city. On the previous expedition, Athos had caused the loss of most of the units in the Persian fleet, sacrificing large numbers of lives.

> for it. King Xerxes will pass you whether you like it or not. It is with good reason that no one offers you sacrifices, since you are a traitorous and vile river" (Heródoto, 2006, p. 524–529).[5]

As in Herodotus (2006), the construction of the Ponta Negra channel seems to have called the storms and floods that followed in the municipality of Maricá. The raging waters resume the urbanized spaces and bring a trail of destruction.

The climate of Maricá is characterized as tropical Aw, with the rainy season in summer and the dry season in winter, with temperatures ranging between 23 and 28°C in summer and between 20 and 24°C in winter. Thus, in January, February, March, and December, rainfall usually exceeds 100 mm, according to the historical average of 20 years, as stated by Climatempo data.

However, disaster cases in the municipality have been increasing, with six occurrences recorded in 2018, 30 in 2019, 51 in 2020, and 24 in 2021, according to a report published by the Civil Defense of the Municipality. As the floods and landslides are recurrent in the municipality, 2022 Decree No. 813 of February 11, 2022, was established. Contingency Plan for Civil Defense and Protection aims to develop criteria for risk assessment of socioenvironmental disasters to minimize the impacts of emergencies and accelerate assistance to victims.

In it, 145 points of risk related to gravitational mass movement (landslides) were identified, of which 45 have a very high risk, according to national criteria established by the IPT Institute for Technological Research. Most of these are located in the first and second districts where the landscape transformations are observed by anthropic action such as slope cuts, deforestation, sewage disposal in pits or sinks without adequate treatment, garbage disposal, lack of road drainage system, and others.

In the locations north of RJ-106, which were previously rural, it is observed in the mapping of land use and land cover in Figure 5, with emphasis on the region through which the Ubatiba River Basin passes, the gradual replacement of vegetated areas by pastures or new closed subdivisions with suppression of the forest and alteration of the existing topography. Therefore, the effects of dispersed urbanization in the municipality are present in the form of social and environmental impacts with an increase in the number of occurrences of floods and landslides.

Maricá, according to the 2020 IBGE census, was the municipality that grew the most in the State of Rio de Janeiro. Associated with this, there has been an increase in rainfall in recent years and, with the rise in construction, landslides and floods have also increased. In April 2022, for instance, local news reported rates greater than 200 mm, reaching 261.39 mm in Itapeba and 227.34 mm in Espraiado. With

5 Translated by the author from Brazilian Portuguese edition.

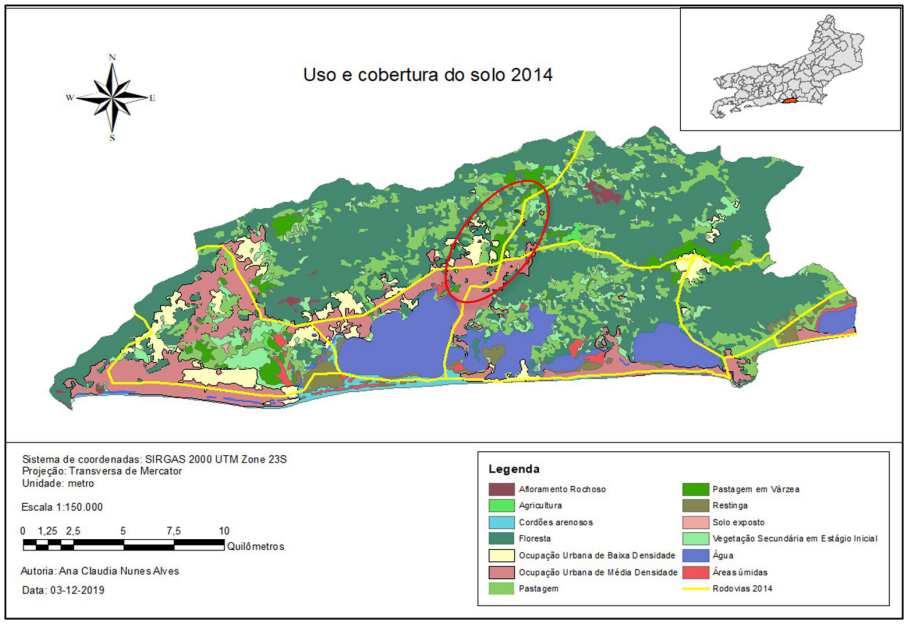

Figure 5: Map of land use and land cover based on 2014 data highlighted in red for the Ubatiba River Basin, through which the Mumbuca River flows. Source: Prepared by the author, 2019.

records of 296 calls in the municipal Civil Defense, 32 affected neighborhoods, and 14 landslides, it was found that the neighborhoods of Condado, Itapeba, and Centro were the most affected; that is, the more urbanized areas along the course of the Mumbuca River.

The dead waters

> We cannot bathe twice in the same river because already, in his inmost recesses, the human being shares the destiny of flowing water. Water is truly the transitory element. It is the essential ontological metamorphosis between fire and earth. The being dedicated into the water is a being in vertigo. He dies every minute; something of his substance is constantly falling away. Daily death is not fire's exuberant form of death, piercing heaven with its arrows; daily death is the death of water. Water always flows, falls, and ends in horizontal death (Bachelard, 1998, p. 6-7).[6]

Public supply does not exceed 20% of the municipality's demand, being restricted only to the 1st District headquarters, but still in a very nascent way. This forces people to resort to other forms of water catchment, with extraction by wells being the predominant form.

6 Translated by the author from Brazilian Portuguese edition.

The changes in the quality of the waters along the Ubatiba River Basin, which runs through the center of the municipality and flows into the Maricá Lagoon, have significantly contributed to this receiving water body becoming an extensive reservoir of water unsuitable for several fundamental purposes, that is, the waters become increasingly turbid, slow and dead, as they approach the most urbanized locations.

The municipality's sewage system has been replaced, from septic tank - sinkhole to septic tank - network in the district headquarters, through which the Mumbuca River passes, already polluted and silted. This system is considered susceptible to risks to human health, especially when the site does not have a regular supply of water for consumption, which may cause groundwater contamination by the absorption of sewage in the soil.

In addition, seasonally, the issue is intensified by the considerable increase in tourism in the peak season. The demand for infrastructure has been increasing with the construction of large urban projects such as the Port of Jaconé, located in the district of Ponta Negra, which aims to flow the production of petrochemicals produced by Petrobras in Itaboraí to the Port of Santos and the *Maraey Resort*, designed to occupy the Environmental Protection Area (APA [Área de Proteção Ambiental]) of Maricá, in the district headquarters.

Jaconé, a coastal neighborhood that divides the municipalities of Maricá and Saquarema, is considered to have geological value due to the existence of *beach rocks,* rock formations restricted to intertidal regions on the shoreface, which are used for studies on evolution, sea level variations, and coastal erosion. The *beach rocks* of Maricá, aged between 1,000 and 5,000 BCE, were cataloged by Charles Darwin when he studied on the Brazilian coast in 1832.

APA Maricá (Figure 6) is a state conservation unit created through the efforts of several civil society entities, the local and scientific community, and instituted by State Decree No. 7.230 of January 23, 1984, maintaining private property. The area comprises the Restinga (Fazenda São Bento da Lagoa), Ilha Cardosa, Ponta do Fundão, and Morro do Mololó. Near the sea, a double sandy strip covered by dunes is still well preserved with typical Restinga vegetation, which protects the coast against the erosive action of the sea, which is so violent on this coast. The Sectoral Master Plan of the Maricá Restinga Area established by Municipal Law No. 2,331 of May 25, 2010, divided the occupation of the territory into three zones: Wildlife Preservation Zone – ZPVS; Wildlife Conservation Zone – ZCVS and Controlled Occupation Zone – ZOC, the latter allowing the expansion of urban areas, which favors their degradation.

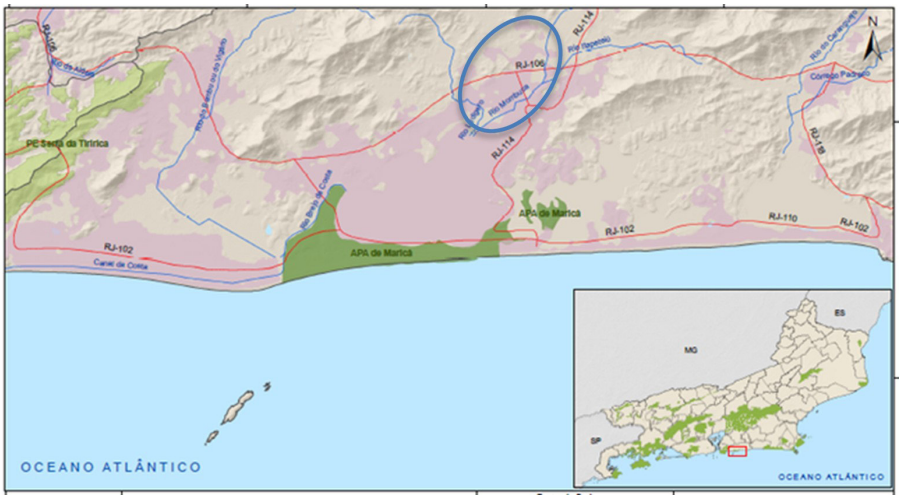

Figure 6: Map of APA Maricá and hydrography emphasizing the Ludigero and Mumbuca Rivers, located in the district headquarters that flow out to the Maricá Lagoon. Source: Coimbra, 2021.

This area, currently owned by the company Iniciativas e Desenvolvimento Imobiliário - IDB Brasil, is still under intense legal dispute with an installment project for the construction of a tourist-residential complex for the upper class entitled *Paradise Lifestyle Maraey* (Figure 7) with an exclusive club and privatization of APA Maricá, with subsequent closure of the beachfront and a considerable increase in the demand for drinking water and basic sanitation, that is, overloading the current infrastructure and accelerating the lagoon's degradation process.

Figure 7: Maraey masterplan with demarcation of the Zacarias fishing community area. Source: Environmental Impact Report of Fazenda São Bento da Lagoa, INEA, 2013.

In addition to the environmental issues involved, social and cultural impacts should also be considered, as the APA of Maricá is home to two traditional communities: the village that houses indigenous people of the Guarani Mbyá Mata Verde Bonita - Tekoa Ka 'Aguy Ovy Porã ethnic group, located in the neighborhood of São José do Imbassaí, and the village of traditional fishermen who have inhabited Zacarias for more than 300 years, both living on the natural resources of the Restinga and the lagoon and constituting fragments of the ancestral and identity memory of the

municipality, known for its twig fishing, subject to the gentrification process that the enterprise can start.

Regarding the environmental quality of the Maricá-Guarapina Lagoon System, the monitoring carried out in the Municipal Sanitation Plan points out that the Channel within Maricá Airport, the Buriche Channel, the Itaipuaçu Channel, the Caranguejo River, the Ludigero River, and the Mambuca River are degraded, with evidence of organic matter discharge in their contributing rivers. All are classified as Poor in the most urbanized areas of the territory (Coimbra, 2021).

The issue of poor sanitation is one of the significant challenges of HR-V[3] as it is one of the main problems related to the pollution of its water resources. As evidenced in the Strategic Plan for Integrated Urban Development of the Metropolitan Region of Rio de Janeiro, it is not uncommon for degraded and lifeless urban rivers to be confused with sewer ditches, losing their quality as a resource (Rio de Janeiro, 2018).

> Running water is destined to numb, to become heavy. All living water is almost dying. Now, in Dynamic Poetry, things are not what they are but what they become. In images, they become what they become in our reverie, in our endless fantasies. To contemplate water is to drain oneself, dissolve oneself and die (Bachelard, 1998, p. 49).[7]

In the reflection of the still waters, the being faces death, the mortality of fish caused by the frequent low oxygenation of the waters in the lagoons of Maricá and the reduction of the water mirror each year remind us of the becoming towards death, not a death from which one finds possibilities, but an impersonal, silent and covert: death by asphyxiation. According to Bachelard (1998), the works of Edgar Allan Poe and Heraclitus of Ephesus have in common a hydric becoming that is a becoming towards death. The clear waters turn dark, drinking from the darkness along their course, lower, and slower.

> On August 28, a cold winter morning, the lagoon was found to be covered in dead fish. When the sun had finished dissipating, the mist and its rays multiplied the silver reverberations all over the surface as if this were no more than a huge, shattered mirror; the fishermen were sure that the specter of hunger had begun to prowl (Mello; Vogel, 2017, p. 25).

This great fish mortality occurred in the Maricá Lagoon in 1975, but this phenomenon, as well as floods and landslides, is recurrent in Maricá and the other lagoons of the Rio de Janeiro coast. According to Mello and Vogel (2017), these lagoons, formed by cooptation, are doomed to disappear. Lamego (1948) has already pointed out this in his studies on the evolutionary cycle of Rio de Janeiro lagoons.

7 Translated by the author from Brazilian Portuguese edition.

At the time, the fishermen attributed the closure of the emergency bar to an opening between the lagoon and the waterfront to renew the waters from time to time. In addition, the construction of the Ponta Negra channel in the 1940s would have, according to the fishermen of Zacarias, harmed the presence of fish in the Maricá Lagoon (Mello; Vogel, 2017).

In this text, the author reports that the sediments brought by the rivers that flow into the lagoons transform their waters from salty into brackish and that the bars serve both to control the water level in the lagoons and to allow the entry of juvenile fish and shrimp into them. This oxygenation would be necessary to maintain water quality, but that has not been enough due to the accumulation of *in natura* effluents discharged along the Ubatiba River hydrographic basin.

With the creation of Sanemar, a mixed economy company currently managing the municipality's sanitation through Decree No. 198 of August 17, 2018. Since then, several watercourses have had their path changed to give way to the new sanitation network's pipes, which worries environmental scholars due to the risk of groundwater contamination since most of the municipality's drinking water is supplied through the individual catchment system by an artesian well.

In 2015, when the Municipal Sanitation Plan of Maricá was prepared, in the diagnosis made by the company Conen, the report pointed out that only 57% of the population was supplied with drinking water. The 2010 IBGE census indicated that 74% of this supply was provided by a spring or artesian well on the property and only 19% through the general network of Cedae; currently, Águas do Rio. As the most recent census data were not disclosed and no significant improvements or expansions of the supply network were made, it is believed that these numbers can still be considered as a basis for studies.

Discussion

The advancement of dispersed urbanization in Maricá, as well as in other medium-sized coastal cities in Brazil, is closely related to the improvement in access conditions through the construction of highways, implementation of large urban projects, as well as exploration of ideals around sustainability, and enjoyment of the landscape as attractions of the occupation.

In the Coastal Lowlands Region, of which Maricá has already been a part, notably in the municipalities of Cabo Frio, São Pedro D'Aldeia, and Araruama, as well as in Maricá, the 1950s marked the beginning of land parceling in subdivisions for summer vacation purposes, where the most valued areas were those around the edges of beaches and lagoons. These, without adequate water supply and sanitation infrastructure, as they were occupied seasonally, did not impact

the environment as much, despite the inconvenience to which tourists were subject. It was common to see lines of people purchasing gallons of mineral water in supermarkets, endless traffic jams to access the beaches, and other uncomfortable conditions.

However, after the 1990s, to solve the financial crisis left in the previous decade to attract residents, the urban and environmental legislation of Maricá, as well as that of other municipalities, became more flexible, encouraging the subdivision of land into gated communities, where the entrepreneur or even the condominium, after being instituted, were in charge of the urban infrastructure. Then, there is an explosion of subdivisions and gated communities in previously vegetated places without water supply, sewage, and drainage infrastructure.

Thus, these problems seen in the municipality of Maricá are similar to those found in the municipalities of São Pedro D'Aldeia, Araruama, and Cabo Frio, where human occupation around beaches and lagoons directly impacts the environmental conditions of its lagoons and rivers, as well as reducing the fishing production from this region that supplies the state.

Final Considerations

The reduction of the water mirror of the municipality's rivers and lagoons, the contamination of its waters, and the consequent mortality of fish have been increasingly transforming the path of fresh waters into paths to death. Death of fish, starvation, parasitic diseases, and misery.

The municipal master plan and municipal and state environmental legislation have, over the last two decades, made the occupation of vegetated areas more flexible and approved the implementation of closed subdivisions near river springs, on the edge of the lagoon, and in the APA of Maricá. Since all rivers of Maricá are born and flow in the limits of the municipality, and the vegetation of the Restinga works to stabilize the dunes and maintain the existing watercourses, to allow the construction in these places is to trace the path of the waters towards their death, which has already been verified in the reduction of the water mirror and fish mortality.

In addition to the limitation of the water system, due to its characteristics of natural conformation, anthropic use, especially in the areas of springs north of RJ-106, such as the neighborhoods Spar, Silvado, and Espraiado, is of concern due to the recurrent suppression of riparian forest, alteration of watercourses, irregular collection of drinking water and discharge of effluents without proper treatment.

Along with environmental problems, social issues are worsening due to the lack of employment opportunities and income for traditional fishermen who migrate to other branches of activity, especially tourism and construction.

Urban growth without coherent and comprehensive environmental planning aggravates existing urban infrastructure problems, especially those related to drinking water supply, rainwater drainage, and basic sanitation. To mitigate these damages, urban management instruments, such as the municipal master plan, the sanitation plan, and the natural disaster contingency plan, should be articulated and aligned with current municipal and state environmental legislation.

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