

## **Landscape planning and residential growth in water source areas in Presidente Prudente, São Paulo**

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## **Planejamento da paisagem e crescimento habitacional em área de mananciais em Presidente Prudente-SP**

### **RESUMO**

**Objetivo** – Através da análise do uso da terra na sub-bacia do Cedro, na bacia do Alto Anastácio em Presidente Prudente-SP, e do Conjunto Habitacional Ana Jacinta, implantado em área de manancial, este estudo tem como principal objetivo demonstrar como o planejamento e a gestão da paisagem podem ser instrumentos potentes na compreensão territorial do espaço, subsidiando a formulação de políticas públicas mais sensíveis para áreas de crescimento urbano periférico.

**Metodologia** – O presente artigo é resultado dos seguintes procedimentos: aulas teóricas presenciais a respeito do planejamento da paisagem, utilizando-se análise e debate de referencial bibliográfico, do marco legal do Plano Diretor confrontado com as dinâmicas dos vetores de expansão urbana em curso em área de manancial, acompanhadas de análises cartográficas da região de estudo por meio do software Qgis. Prossegue-se com uma análise de campo na área escolhida com o propósito de escuta dos moradores, visando a aproximação de sua valoração afetiva e dos problemas que enfrentam. Ao final, sistematiza-se todos os dados de modo a propor uma série de reflexões, identificando conflitos e evidenciando a urgência de práticas mais coerentes em relação à paisagem, como base para a revisão do marco legal de planejamento e a necessidade de uma gestão descentralizada.

**Originalidade/relevância** – Tem-se discutido crescentemente a urgência do planejamento e gestão da paisagem nos processos de planejamento urbano e gestão pública, especialmente em áreas periféricas e de expansão urbana recente. Este trabalho busca, por meio de uma análise compartilhada, a aproximação de métodos de trabalhos cartográficos e de campo e de escuta de moradores como necessários a uma interpretação da paisagem com vistas a seu diagnóstico e planejamento.

**Resultados** – O texto fomenta a discussão crítica sobre os aspectos implicados em um plano de regulação e gestão da paisagem, gerando produtos cartográficos e uma série de reflexões capazes de auxiliar políticas públicas por parte dos agentes e instituições incumbidas de implementar o ordenamento do território, entes estes que poderiam reconhecer as potencialidades de uma abordagem integrada da análise da paisagem.

**Contribuições teóricas/metodológicas** – O artigo oferece uma aproximação metodológica de modo a subsidiar a elaboração de proposições futuras, a partir de um processo de construção de conhecimento compartilhado por pesquisadores de diversas áreas (arquitetos, geógrafos, educadores, engenheiros ambientais e arquivistas), a fim de demonstrar que a multiplicidade de olhares enriquece as discussões, atestando que iniciativas que seguem esse viés resultam em produtos instigantes, especialmente no que tange ao estudo da paisagem.

**Contribuições sociais e ambientais** - Investigar uma área que é expressão evidente da fragmentação socioespacial, processo que está em curso em diversas cidades brasileiras e propor um posicionamento crítico que considera os aspectos físicos, ambientais e sociais do lugar é um exercício fundamental para a elaboração de políticas públicas que resguardecem o meio ambiente e a qualidade de vida das pessoas, especialmente para os que vivem nas porções mais distantes dos centros urbanos.

**PALAVRAS-CHAVE:** Planejamento da Paisagem. Manancial. Conjunto Habitacional.

## **Landscape Planning and Residential Growth in a Water Source Area in Presidente Prudente-SP**

### **ABSTRACT**

**Objective** – Through the analysis of land use in the Cedro sub-basin, within the Alto Anastácio Basin, Presidente Prudente, SP—an essential water source for the urban supply of Presidente Prudente—and in the Ana Jacinta Housing Complex, this study aims to demonstrate how landscape planning and management can serve as powerful tools for territorial understanding. By providing a comprehensive perspective on these dynamics, the study supports the formulation of more sensitive public policies for areas experiencing peripheral urban growth.

**Methodology** – This article is the result of the following procedures: in-person theoretical classes on landscape planning, using analysis and discussion of bibliographic references, the legal framework of the Master Plan compared with the dynamics of ongoing urban expansion vectors in a water source area, along with cartographic analyses of the study area using QGIS software. This is followed by a field study in the analyzed area, aiming to listen to residents

to understand their emotional valuation of the place and the problems they face. Finally, all data is systematized to propose a series of reflections, identifying conflicts and highlighting the urgency of more sensitive practices regarding the studied landscape as a basis for revising the legal planning framework and the need for decentralized management.

**Originality/Relevance** – There has been a growing discussion on the urgency of landscape planning and management in urban planning processes and public administration, especially in peripheral areas and those undergoing recent urban expansion. This study seeks, through a shared analysis, to integrate cartographic and fieldwork methods along with residents' perspectives as essential for interpreting the landscape, aiming at its diagnosis and planning.

**Results** – The study fosters a critical discussion on the aspects involved in a landscape regulation and management plan, generating cartographic products and a series of reflections that can support public policies by the agents and institutions responsible for implementing territorial planning. These entities could recognize the potential of an integrated approach to landscape analysis.

**Theoretical/Methodological Contributions** – The text provides a methodological approach to support the development of future propositions, based on a knowledge-building process shared by researchers from various fields (architects, educators, environmental engineers, and archivists). It aims to demonstrate that the multiplicity of perspectives enriches discussions, proving that initiatives following this approach result in more sensitive outcomes, especially regarding landscape studies.

**Social and Environmental Contributions** – Investigating an area that clearly expresses socio-spatial fragmentation—a process currently unfolding in many Brazilian cities—and proposing a critical stance that considers the physical, environmental, and social aspects of the place is a fundamental exercise for the development of public policies that protect the environment and improve people's quality of life, especially for those living in the most remote areas of urban centers.

**KEYWORDS:** Landscape Planning. Water Source. Housing Complex.

## Planificación del Paisaje y Crecimiento Habitacional en un Área de Manantiales en Presidente Prudente-SP

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### RESUMEN

**Objetivo** – A través del análisis del uso del suelo en la subcuenca del Cedro, Presidente Prudente, SP, dentro de la cuenca del Alto Anastácio— un área fundamental de manantiales para el abastecimiento urbano de Presidente Prudente —y en el Conjunto Habitacional Ana Jacinta, este estudio tiene como objetivo principal demostrar cómo la planificación y gestión del paisaje pueden actuar como herramientas poderosas para la comprensión territorial del espacio. Al ofrecer una perspectiva integral sobre estas dinámicas, el estudio respalda la formulación de políticas públicas más sensibles para áreas en proceso de crecimiento urbano periférico.

**Metodología** – Este artículo es el resultado de los siguientes procedimientos: clases teóricas presenciales sobre la planificación del paisaje, utilizando el análisis y debate de referencias bibliográficas, el marco legal del Plan Director confrontado con las dinámicas de los vectores de expansión urbana en curso en un área de manantial, junto con análisis cartográficos del área de estudio mediante el software QGIS. A continuación, se realiza un estudio de campo en la zona analizada con el propósito de escuchar a los residentes para comprender su valoración afectiva del lugar y los problemas que enfrentan. Finalmente, se sistematizan todos los datos para proponer una serie de reflexiones, identificando conflictos y evidenciando la urgencia de prácticas más sensibles en relación con el paisaje estudiado como base para la revisión del marco legal de planificación y la necesidad de una gestión descentralizada.

**Originalidad/Relevancia** – Se ha discutido cada vez más la urgencia de la planificación y gestión del paisaje en los procesos de planificación urbana y gestión pública, especialmente en áreas periféricas y de reciente expansión urbana. Este estudio busca, a través de un análisis compartido, integrar métodos de trabajo cartográficos y de campo junto con la escucha de los residentes como elementos necesarios para la interpretación del paisaje, con miras a su diagnóstico y planificación.

**Resultados** – El estudio fomenta una discusión crítica sobre los aspectos implicados en un plan de regulación y gestión del paisaje, generando productos cartográficos y una serie de reflexiones que pueden apoyar las políticas públicas por parte de los agentes e instituciones responsables de implementar el ordenamiento territorial. Estas entidades podrían reconocer las potencialidades de un enfoque integrado del análisis del paisaje.

**Contribuciones Teóricas/Metodológicas** – El texto ofrece un enfoque metodológico para respaldar la elaboración de

futuras propostas, a partir de um processo de construção de conhecimento compartilhado por investigadores de diversas áreas (arquitetos, educadores, engenheiros ambientais e archivistas). Su objetivo es demostrar que la multiplicidad de miradas enriquece las discusiones, evidenciando que las iniciativas que siguen este enfoque resultan en productos más sensibles, especialmente en lo que respecta al estudio del paisaje.

**Contribuciones Sociales y Ambientales** - Investigar un área que es una expresión evidente de la fragmentación socioespacial, un proceso en curso en varias ciudades brasileñas, y proponer una postura crítica que considere los aspectos físicos, ambientales y sociales del lugar es un ejercicio fundamental para la elaboración de políticas públicas que protejan el medio ambiente y la calidad de vida de las personas, especialmente para aquellos que viven en las zonas más alejadas de los centros urbanos.

**PALABRAS CLAVE:** Planificación del Paisaje. Manantial. Conjunto Habitacional.

#### GRAPHIC SUMMARY



## 1 INTRODUCTION

The landscape is an essential tool for understanding the relationships between society and territory, the living conditions of the populations that inhabit it, and ecological dynamics, directly influencing the formulation of public policies and urban planning strategies. Thus,

The landscape is both form and perception, as well as culture in its anthropological sense and social representation; it is both the social construction of space and ecological dynamics, it is both history and memory and experience. (...) an educational process in the understanding and interpretation of the dynamics of social construction of space and coexistence, which are contradictory and conflicting conditions in dispute in the construction of human space (Sandeville Jr., 2024, p. 02).

For Besse (2018), the landscape “is a movement, or rather a set of beings and diverse movements, a set of metamorphoses” (p. 33-35, author’s translation)<sup>1</sup>, in which “forms transform into others, displacing known references, both in the visible world and in our own developing organisms and thoughts” (p.52-53, author’s translation)<sup>2</sup>. This perspective highlights that understanding the landscape requires attention to continuous transformations and multiple scales, an essential condition for strategic territorial planning.

Thus, understanding the landscape in its complexity, both as a social construct and an ecological phenomenon, allows for more effective territorial planning and management strategies. Landscape analysis and management are fundamental tools for developing integrated planning initiatives, promoting strategic and sustainable land use and occupation. Such actions enable public policies capable of addressing environmental conservation, rural and urban land use, infrastructure and service demands, income generation, and the pressure of economic activities, especially those linked to land use reconfiguration processes (Sandeville Jr., 2024).

The literature reinforces the importance of territorial planning to mitigate impacts negatives and ensure balanced urban development. Pellegrino (2000) highlights that:

The constant challenges in planning, designing, and managing an area are not limited to having a broad spatial and temporal view of the area, but also to addressing the main social and environmental issues present. Water supply, transportation and circulation, biodiversity, landscape resources, cultural and community relations, agriculture, and many others are essential factors to consider. For all plans to adequately address these issues, a broad range of specific technical knowledge must be acquired (Pellegrino, 2000, p. 171).

The effort to understand the landscape planning process by observing the different ways in which the cultural and natural landscape is constructed highlights the need for multi-scale and transdisciplinary spatial analysis that identifies strategic points in conservation areas and in more vulnerable areas, as well as those most susceptible to impacts, generating territorial

<sup>1</sup> In the original: “‘est un mouvement’, ou plutôt un ‘assemblage d’être et de mouvements divers’, ‘un ensemble de métamorphoses’”.

<sup>2</sup> In the original: “‘formes passent dans d’autres formes, déplaçant les repères connus ; cette idée concerne aussi bien les formes visibles du monde que nos propres organismes et pensées, en développement”.



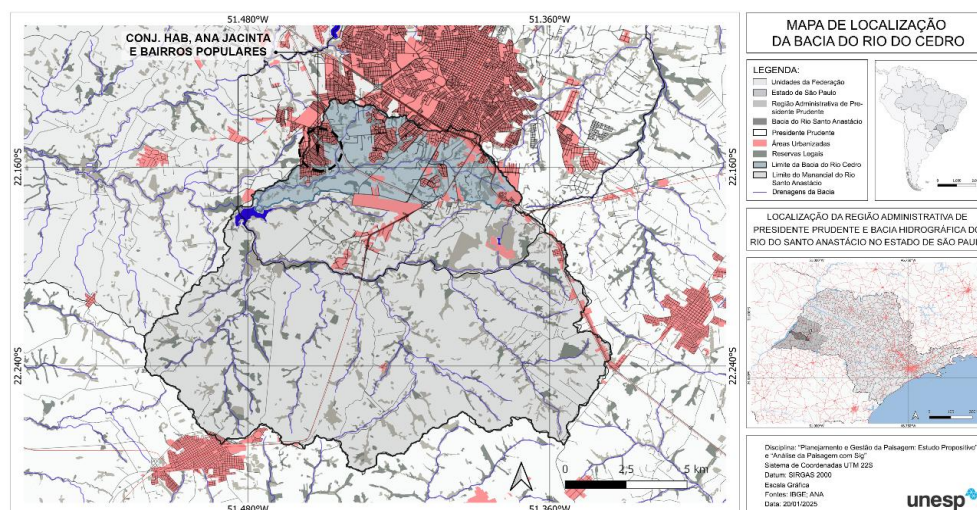
planning anchored in the understanding of the socio-environmental dynamics of the landscape (Pellegrino, 2000; Santos, 2004).

This exchange of knowledge is essential for developing environmental planning aligned with real-world circumstances. This allows strategies to be adapted to local conditions, promoting integrated and sustainable environmental management. Therefore, to address environmental vulnerabilities, integrated studies and analyses of their elements, such as relief, soil, climate, and land use and occupation, are crucial. It also requires understanding the historical and cultural processes of their configuration and listening to those who inhabit these landscapes. These findings can inform environmental planning and decision-making by managers, and beyond the academic scope of this article, necessarily anchored in participatory processes (Avritzer, 2010).

The municipality of Presidente Prudente requires a landscape planning and management process due to actions that induce fragmented and sprawling urban development and, in the case discussed here, conflict with the protected area and water source. This process is common to other cities, often resulting in the implementation of "subdivisions that do not meet the requirements of urban legislation (minimum lot size, minimum road width, definition of green areas and institutional use, incorporation of minimum infrastructure, etc.)" (Sposito, 2004, p. 122).

The combined action of public authorities and private developers, unrelated to ecological and landscape planning, is evident in the case of the Manancial do Alto Anastácio reservoir, popularly known as the "Represa da Companhia Industrial de Conservas Alimentícias (CICA)" (Food Canning Industrial Company Dam). During the administration of Mayor Paulo Constantino (1989–1992), the Ana Jacinta Housing Complex was built in this area without analyzing the potential environmental impacts that could arise. The project involved the construction of 2,500 homes in an area far from the urban fabric (Figure 1), with the aim of mitigating the municipality's housing deficit indicators (Vieira, 2019).

Figure 01 – Map – Location of the Cedro River Basin



Source: Prepared by the authors (2025).

Through the analysis of land use in the Alto Anastácio Basin and the Ana Jacinta Housing Complex, located in Presidente Prudente-SP, this study's main objective is to demonstrate how landscape planning and management can be instruments powerful tools for understanding territorial space, supporting the formulation of more sensitive public policies for peripheral urban growth areas. The aim is to foster critical debate regarding landscape investigation mechanisms and how such procedures can be applied in everyday life, through the proposal of a critical reflection that considers political, social, and environmental aspects in the development of public policies and urban planning.

The theoretical framework was presented and discussed in face-to-face classes, in the disciplines "Landscape Planning and Management: Propositional Study" and "Landscape Analysis with GIS", which adopted a common area with previous surveys carried out by the responsible teachers, including a first field involving both disciplines. In addition, it is essential to highlight the contributions of the "Cities Workshop" of the Brazilian National Research Council CNPq/MCTI Project Nº. 10/2023 "Urbanization Processes and Configuration of the Landscapes of the Central-West of São Paulo and its Territorial Networks"<sup>3</sup>.

The course "Landscape Planning and Management" produced a series of approaches, combining procedures that included a bibliographic review of landscape concepts (Sandeville Jr. 2004, 2005; Meneses, 2002) and models and practices for its planning and management (Bertrand, 2004; Metzger, 2001; Santos, 2004; McHarg 2000). The course proposed an experimental format for collective and horizontal work, from which this article derives. During the research process, we debated and discussed documentary sources, participatory management manuals, dissertations and theses, and conducted a historical-documentary survey, using periodicals from the "Jornal O Imparcial" newspaper in Presidente Prudente as sources. We also analyzed the urban planning legislation of the municipality of Presidente Prudente, particularly Complementary Law No. 230/2018, which establishes the Municipal Master Plan. The cartographic basis of this plan (2018) was compared with that of the 2008 Master Plan (Complementary Law No. 151/2008). This analysis focused on investigating how the aforementioned legal framework specifies and characterizes the study region, serving as a subsidy to identify latent socio-environmental obstacles.

The development of the cartographic products focused on environmental, social, and economic aspects relevant to understanding the dynamics and interactions within the Ana Jacinta Housing Complex. The free and open source software QGIS (Quantum GIS) was used, which allows for the visualization, editing, and analysis of georeferenced data and supported the cartographic production presented in this study. The shapefile data entered and processed in the software were obtained from the Environmental Database and Information (BdiA-IBGE), the National Water Agency (ANA), and the Brazilian Institute of Geography and Statistics (IBGE). data

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<sup>3</sup> The course "Landscape Planning and Management: Propositional Study" is available at: <https://biosphera21.net.br/0UNESP/4-MPGEO-PLANEJAMENTO-2024.html>, and was taught by Prof. Dr. Euler Sandeville Jr., while he was a Collaborating Professor in the Professional Master's Program in Water Resources and Environment at the Faculty of Science and Technology of the São Paulo State University (PPG MP FCT-UNESP). The course "Landscape Analysis with GIS" was taught by Prof. Dr. Diego Gonçalves, also offered by the PPG MP FCT-UNESP. The CNPq Project, coordinated by Prof. Dr. Euler Sandeville Jr., brought contributions from Yasmin Anefalos de Oliveira, Letícia Roberta Amaro Trombeta, Matheus Moraes Gonçalves da Silva, and Valdirene Ijano.

from the latter encouraged the production of the race and income maps presented below.

The land use and occupation maps of the Cedro River Basin, where the housing complex is located, were produced using raster layers provided by the MapBiomass platform. Three files from different years (1985, 2015, and 2023) were used for this purpose. Finally, Microsoft Excel spreadsheet software generated graphs that demonstrate changes in land use and land cover in the Cedro River Basin over the selected time series, which are presented throughout this work.

Through the development of cartographic and field surveys, several analyses were conducted to reflect on the environmental and social impacts of the Ana Jacinta Housing Complex in a watershed area, replete with springs, permanent preservation areas, and remote from employment, commerce, education, and social centers. Field visits to the study area included joint observation activities, photographing, and discussion groups with local residents to listen to their feelings, assessments, and desires regarding the neighborhood, eliciting accounts of belonging, conflicts, and potential. In addition to the visits, telephone interviews were conducted with the Ana Jacinta Housing Complex's merchants, seeking to understand how residents perceive the surrounding landscape, its conflicts, obstacles, and challenges, as well as their characteristics and needs.

This fieldwork phase, supported by cartographic studies, considered social elements and processes of spatial appropriation, the fragmentation and connectivity of protected areas; processes of landscape valuation through memories and cultural and socialization activities; the correlation of spatial scales of observation; and the collection of testimonies from residents and citizens who experience and use the neighborhood, in order to understand their practices and actions, allowing for a debate aligned with the needs of the community and their roles in the landscape.

## **2 RESULTS**

### **2.1 Ana Jacinta: the duality between urban occupation and water source preservation**

Between 1983 and 1999, around 50 new subdivisions were installed in the city of Presidente Prudente (Miyazaki, 2014), one of which was the Ana Jacinta Housing Complex, a large housing project launched under the administration of Mayor Paulo Constantino, with 2,500 homes built and delivered in 1992 (Vieira, 2019).

Cruz e Carnevali (2021) attest that the construction of the complex was contested in the early years of its implementation, especially due to the various environmental problems that arose. that the area was subject to, as well as its physical characteristics such as the "high slope, type of relief, presence of springs, sandy soil, and project characteristics, with intense occupation and proximity to the water reservoir" (Vieira, 2019, p. 173). According to the authors, the Environmental Prosecutor's Office of Presidente Prudente even embargoed the work and requested several adjustments:

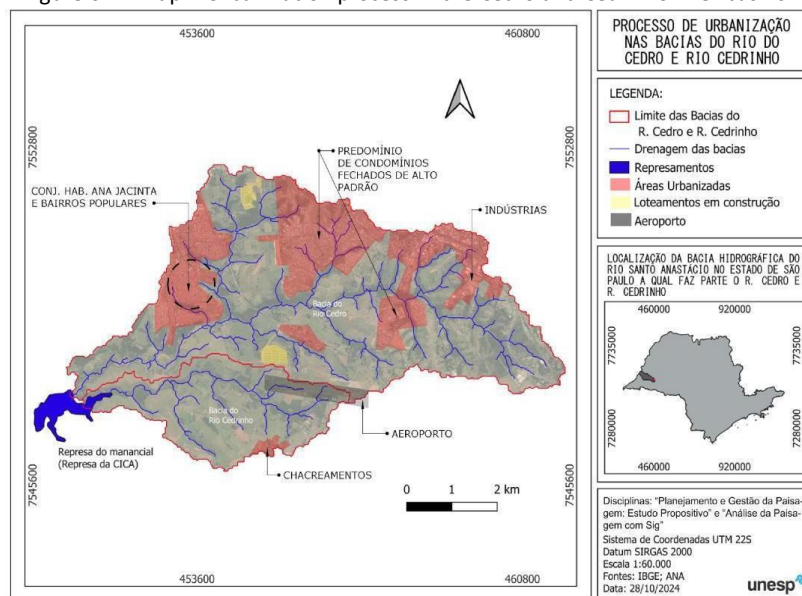
The requirements included the prevention and control of erosion and silting of streams, the construction of three sewage pumping stations, regular collection of domestic waste, preservation of riparian forests, maintaining 50 m on the banks of the streams that cross the complex and make up the Santo Anastácio River basin, and



finally, the planting of at least one tree on the sidewalk of each lot (Vieira, 2019, p. 173).

Following the findings on environmental irregularities in the area, the city of Presidente Prudente committed to carrying out an Environmental Impact Study (EIA) (Vieira, 2019). Although the study was conducted, Cruz and Carvaneli (2021) point out that it occurred late, after construction had begun. Once the construction permit for the complex was granted, construction resumed even before the EIA was completed, meaning it did not properly address the environment. This occupation process brought with it several challenges, especially regarding the preservation and sustainable use of natural resources. Built on a spring area, the neighborhood is located in the Cedro stream basin, a major tributary of the Santo Anastácio River (Figure 2).

Figure 02 – Map – Urbanization process in the Cedro and Cedrinho river basins



Source: Prepared by the authors (2024).

In research carried out with the digital collection of the Library of the Faculty of Science and Technology of Unesp, Presidente Prudente campus, an article published on April 17, 1974 by the newspaper "O Imparcial" of Presidente Prudente shows that even before the creation of the Housing Complex, the source for water collection was already suffering from erosion and silting problems present in the Santo Anastácio River.

In addition to environmental issues, the distance between the housing complex and the city's central region contributes to the intensification of social and economic inequality. This is evident in impersonal conversations with residents, who attested to the lack of vocational training and development programs in the area, limiting their employment opportunities and economic growth, demanding more sensitive policies in these areas.

Urban planning committed to social inclusion requires an integrated approach. Slum upgrading can solve environmental sanitation problems. Assigning legal addresses to homes improves housing conditions and urban security, but it doesn't improve education or literacy levels, organize women to improve their standard of living, or

help organize work cooperatives or foster youth leisure. 'Exclusion is a pervasive issue' economic, cultural, educational, social, legal, environmental, racial - and cannot be fought in a fragmented way (Maricato, 2015, p. 95).

The author suggests an administrative reform, in which urban planning is viewed in an integrated manner, considering all the agents that construct the urbanized space. To effectively combat exclusion, it is necessary to adopt public policies that address all these issues simultaneously, in a coordinated manner, in order to promote true social and urban inclusion. By considering environmental challenges in symbiosis with social emergencies, the need for sustainable urban planning becomes evident, which guarantees the preservation of the water source and the appreciation of the community.

Current public policies and planning instruments show difficulties in interpreting and regulating the complex and multifaceted dynamics of urban agglomerations, weakening regulatory instruments in the face of private interests, with few concrete strategies for participatory and integrated management (when this occurs), as well as implementation and control.

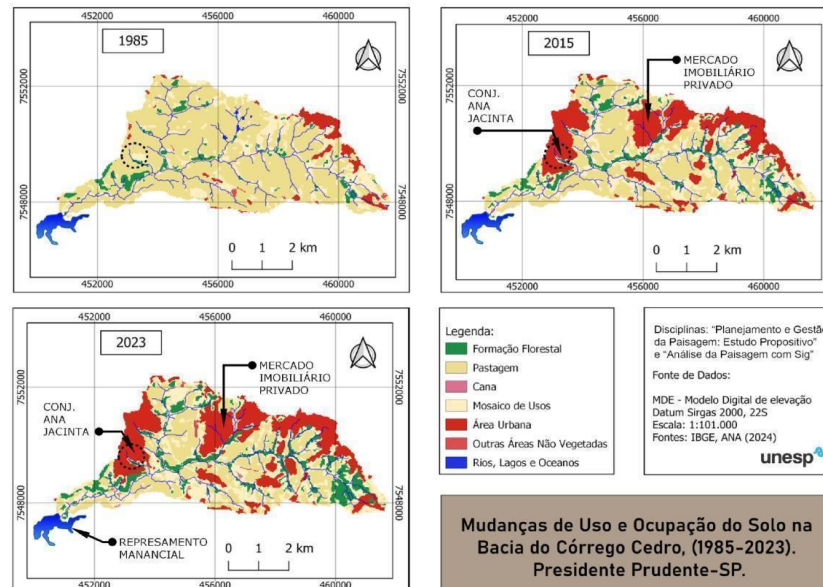
The current Master Plan does not address this, but it would be necessary to collaboratively design a participatory and decentralized management model, promoting coordination between sectors and services. Sandeville Jr. (2013) advocates for the creation of an ongoing process of participation, which must be learned over time. The challenge is to define new participation strategies at local levels and empower local agencies to act with autonomy and technical competence for effective public management and planning policies for the neighborhood (Sandeville Jr., 2013, p. 6).

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## 2.2 Cartography

The Cartography allows for precise landscape analysis, consolidating its position as a strategic tool for landscape planning and management. Within this scope, the production of a series of maps has contributed to highlighting the process of land-use change in the Córrego do Cedro Basin, highlighting the intensifying nature of these changes in the vicinity of the water source, placing society and the environment in conflict (Figure 3).

Figure 3 – Changes in Land Use in the Cedro Stream Basin, (1985-2023)



Source: Prepared by the authors (2024).

Figure 4 – Changes in Land Use in the Cedro Stream Basin



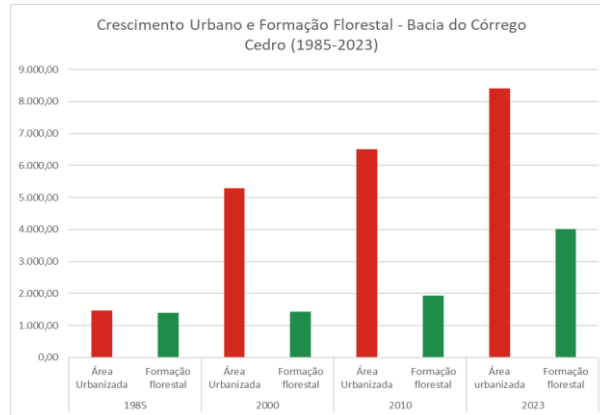
Source: Prepared by the authors (2024).

The change in land use and occupation dynamics in the studied watershed area is noticeable (Figure 4). Since the 1980s, a significant increase in the urban growth rate has been observed within this region, generating several transformations in environmental, ecological, and social dynamics (Figure 5). On the one hand, there have been positive impacts, such as the fencing of permanent preservation areas (PPAs), which promoted significant growth in the natural regeneration of species.

The correlation between urban growth and the reduction of drainage areas, especially rivers, stands out. This phenomenon, according to Tucci (1997), may be related to the increased impermeability of the watershed, which intensifies surface runoff and leads to numerous other

environmental problems such as leaching, erosion, and silting of water bodies, among others.

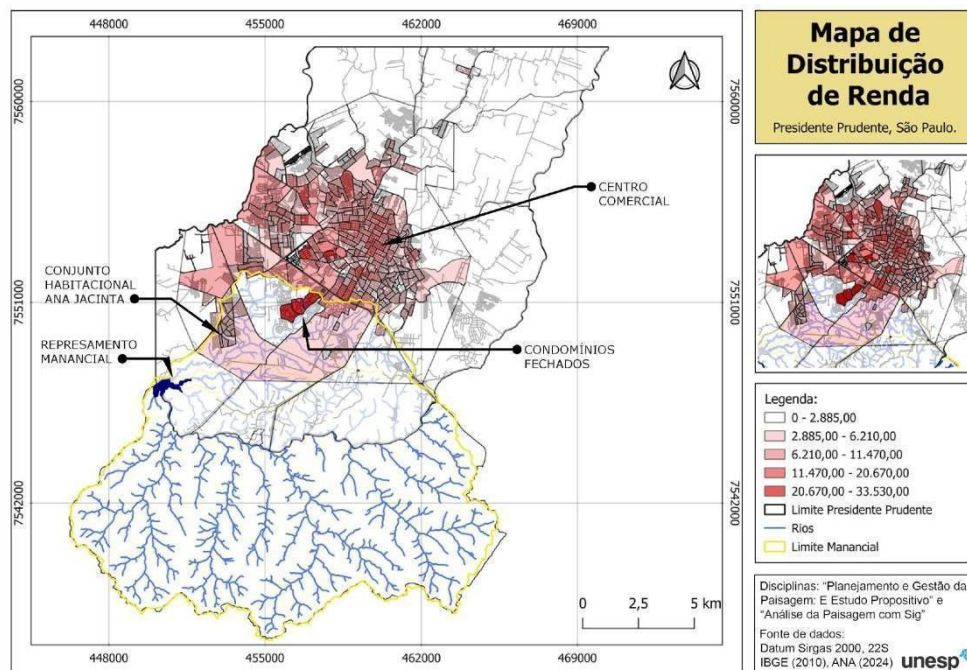
Figure 5 – Urban Growth and Forest Formation, Cedro Stream Basin (1985-2023)



Source: Prepared by the authors (2024).

When analyzing the Income Map of the Municipality of Presidente Prudente (Figure 6), a significant discrepancy in income levels between citizens and the places where they live can be observed. Focusing on the study area, the Ana Jacinta neighborhood, it becomes clear that income is a determining factor in residential location. Close to the city center, the colors on the map indicate a greater concentration of income, while in more remote areas, income is significantly lower, evidencing the presence of socio-spatial fragmentation in the municipality.

Figure 6 – Income Map of Presidente Prudente, SP



Source: Prepared by the authors (2024).

Wage differences and residential location relative to urban centers are influenced by

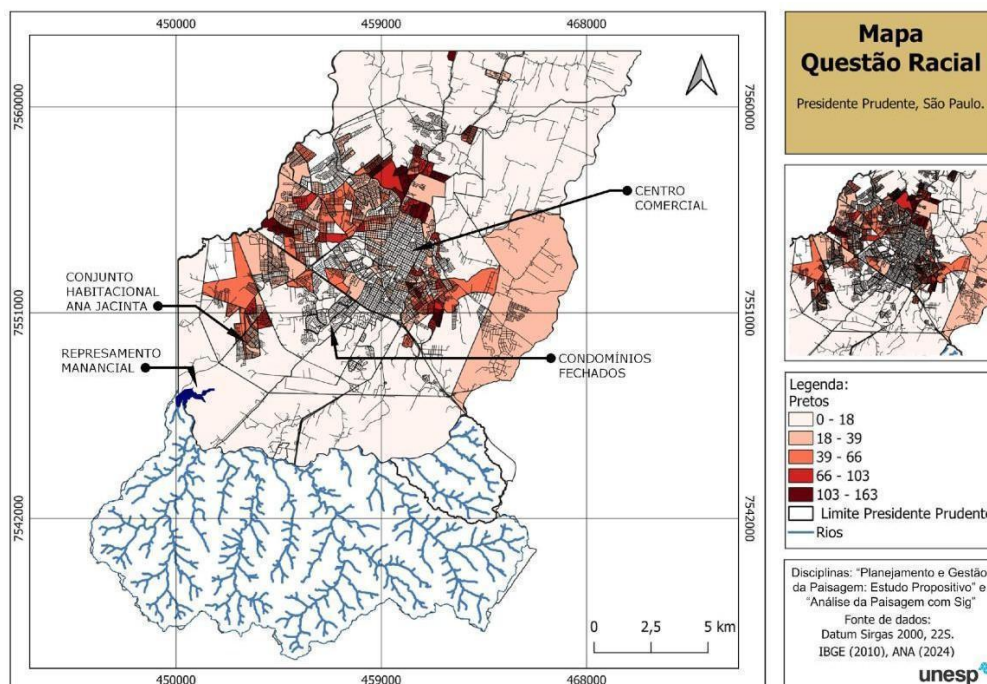


a variety of economic and social factors. People living farther from urban centers tend to have lower wages for a variety of reasons, including fewer employment opportunities and quality education. Peripheral areas often have fewer infrastructure and services, which can limit higher-paying job opportunities.

Furthermore, the lower cost of living in these areas can attract low-wage workers. On the other hand, living near a city center often means access to a wider variety of jobs, especially those that pay better and require higher qualifications. Urban centers tend to be home to high-quality educational institutions, better medical services, and other amenities that attract high-income earners.

Urban mobility also plays a vital role. Those who live further away often face long commutes, which can impact productivity and limit time available for other activities, such as education or professional training. These factors combine to create a scenario where proximity to the city center not only provides a better quality of life but also greater economic opportunities, thus exacerbating inequalities between outlying neighborhoods and surrounding areas. The cartographic representation of the self-identified Black population in the municipality of Presidente Prudente corroborates the above by demonstrating the peripheral areas occupied by this population (Figure 7).

Figure 7 – Map: Racial Issue – Self-Declared Black People in the Municipality of Presidente Prudente



Source: Prepared by the authors (2024).

The map demonstrates a trend in social statistics across the country. According to studies presented by the IBGE in 2022, the average income of Black workers is 75.7% lower compared to the average income of white workers. While white workers have an average salary of R\$3,099.00, the black portion of the working class has an average salary of R\$1,764.00, and the population declared as brown receives, on average, the amount of R\$1,814.00.



With significantly lower incomes than the white population, black and brown people have limited access to housing in central areas, leaving them with no alternative but to occupy peripheral urban spaces, often with precarious infrastructure. According to the 2010 Demographic Census (the most recent data at the time of this study), 68.4% of residents in favelas and urban communities are black or brown.

### **2.3 Master plan: opportunity for review**

The master plan is considered a basic instrument of urban development and expansion policy, mandatory for cities with more than twenty thousand inhabitants. In Presidente Prudente, the Master Plan is regulated by Complementary Law No. 230/2018 and is revised every ten years, with mandatory public participation in the discussions.

It is interesting to note that the municipality's first Master Plan was drawn up in 1969 and approved in 1973 by the city council (Law No. 1582/73), well before the legal obligation established by the City Statute (Law No. 10,257 of 2001). Despite its avant-garde nature, an analysis of subsequent documents reveals a significant loss of the Master Plan's conception as an instrument capable of conducting a robust urban analysis, fundamental for future proposals and projects (Baron, Da Silva, 2014).

As Scatolon (2019) points out, regarding the 1969 Master Plan<sup>4</sup>, There was a commitment to fostering compact municipal growth, characterized by a few expansion areas. Initially, the proposal was to occupy regions designated as "priority areas" (west of the central quadrilateral) and areas designated as "specialized industrial districts" (northwestern portion where Jardim CECAP and the Industrial District are located).

The Southwest region, where the Ana Jacinta Housing Complex is located and to which the Raposo Tavares Highway, until the end of the 1980s, represented a physical barrier, was classified as a "Complementary Area", indicating the hypothesis of a portion whose occupation will only be realized after the occupation of the priority and industrial areas, a dynamic that was not conceived, given the construction of the Ana Jacinta Housing Complex in this landscape. When the complex was implemented, the 1969 Master Plan was still in force and, as Fernandes (1998) points out, the chosen area was outside the current urban perimeter. Therefore, the State was promoting a housing policy that subverted the legal requirements created within its own framework.

In addition to this contradiction, the site held (and still holds) latent water resources essential for the urban water supply of Presidente Prudente. It is noteworthy that the implementation of the Housing Complex contradicted the Master Plan, but above all, also disregarded the Forest Code (Law No. 4,771 of September 15, 1965), which already advocated the preservation of areas adjacent to watercourses. This was denied to the Botafogo Stream, a tributary of the Cedro River, which was traversed by the boundaries of the complex's route

<sup>4</sup> Scatolon (2019) points out that the first Master Plan of Presidente Prudente (PDDI Presidente Prudente, 1968/1969) was the result of an agreement signed between the Municipality of Presidente Prudente (PMPP), the Association of Architects of Alta Sorocabana and the Center for Urban and Economic Planning of the Faculty of Architecture and Urbanism of the University of São Paulo (CPEU - FAU USP).

(Scatalon, 2009).

In 1995, during Mayor Agripino Lima's administration, another document was created (Law No. 29 of 1996). This document was created after the implementation of several housing complexes in the city<sup>5</sup>, including Jardim Itapura (1989), Brasil Novo (1992), Jardim Maracanã (1994), and Ana Jacinta itself (1992). These projects, implemented by the State, contributed to the reduction of rates related to the favela centers cited by Vieira (2019), which leads us to understand the reasons why housing complexes were referenced for the first time in this Master Plan.

Still, it is surprising that the 1995 Master Plan did not shy away from some essential points regarding housing policy. In this sense, even just three years after the implementation of Conjunto Ana Jacinta, the document already warned about the need for caution in choosing the locations for the implementation of these projects:

It would be a good idea if the selection of housing development sites took into account the medium- and long-term urbanization costs, so that the public services and infrastructure that these settlements end up demanding due to their isolation do not end up placing an excessive burden on the municipality. This would also avoid traditional transportation problems, employment and consumption (Master Plan, 1995, p. 53).

Despite the timely recommendation of the 1995 Master Plan, the region has seen an intensification of speculative expansion driven by the city's fragmented growth. From the 2000s onward, following the construction of the Ana Jacinta Housing Complex, several adjacent neighborhoods were created, including through private sector intervention, intensifying conflicts over environmental protection in the region.

It would be extremely important for the Master Plan, following the 1995 Master Plan, to address this issue, in order to mitigate the impact of real estate speculation and the real estate market's involvement in the appropriation of areas modified by state action, especially in the implementation of housing projects. However, this did not happen, and even with advances in national urban legislation, especially the creation of the City Statute (National Law No. 10,257/2001), a Master Plan (Complementary Law No. 151/2008) was approved in 2008 to comply with legal requirements. Baron; Da Silva; and Do Carmo (2016) point to the lack of demarcation of areas or application of the urban planning instruments recommended by the City Statute.

In the 2008 Plan, the Ana Jacinta Housing Complex already appears within the municipal urban perimeter (Figure 8). However, a considerable portion of the Cedro River Basin is still protected as rural land. This configuration changed with the 2018 revision (Law No. 230/2018), with an expansion of the municipal urban perimeter, even including the Manancial dam within the urban perimeter. In practice, the 2018 Master Plan created a vector for

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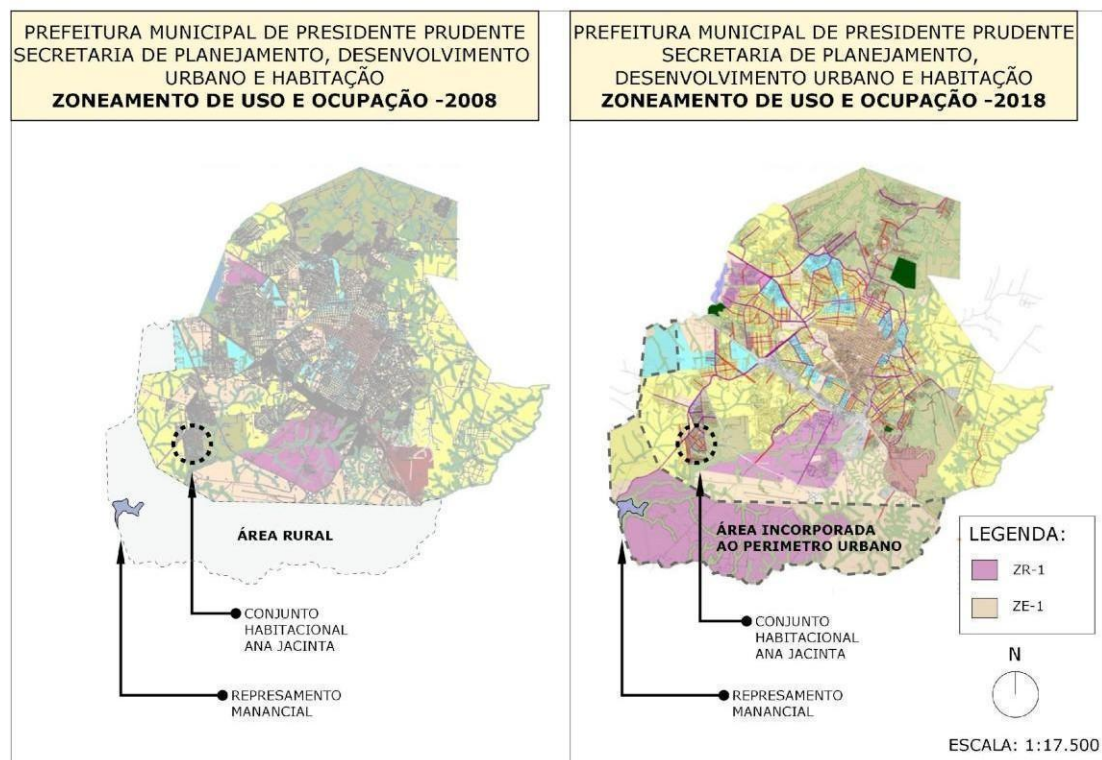
<sup>5</sup> According to the table systematized by Baron; Da Silva; Do Carmo (2016), several agents were involved in the production of housing in Presidente Prudentes, namely: National Housing Bank (BNH), the Popular Housing Company of Bauru (COHAB-Bauru), the Institute for Guidance to Housing Cooperatives of São Paulo (INOCOOP), the São Paulo Development Company (CODESPAULO), the Prudentina Development Company (PRUDENCO), the Regional Company for Social Interest Housing (Cohab - CRHIS) and, more recently, the Caixa Econômica Federal through the Minha Casa Minha Vida Program (PMCMV).

expansion in the real estate market, which has been intensively exploiting this available land, as demonstrated during field visits: subdivisions under construction, the creation of controlled-access condominiums, signs offering lots, some verticalized developments, new road paving, etc. This idea was illustrated in some of the images included in the graphic summary at the beginning of this work.

The changes seen in the landscape are increasingly worrying; it is urgent that a concise urban policy be developed in accordance with the right to the city and the environment. Master Plans, revised after revised, have become increasingly inadequate, and the way they are revised is shaping up to be a strong ally of the specific interests of private capital. Barão; Da Silva; Do Carmo (2016), when discussing the various Master Plans of Presidente Prudente, echo this argument by emphasizing that:

[...] the quality of the master plans carried out was declining, which is contradictory considering the resources and laws existing after the 1988 Constitution. The Plans were structured as legal pieces, without urban readings and diagnoses that supported the urban proposals (Baron; Da Silva; Do Carmo, 2016, p.11).

Figure 8 – Land Use and Occupation Zoning of Presidente Prudente, comparison between the 2008 and 2018 Master Plans



Source: Presidente Prudente (2008, 2018). Modified by the authors (2024).

If the implementation of the Ana Jacinta Complex in the vicinity of the Botafogo and Cedro Streams already posed a significant threat to the preservation of water resources and ecological services, the changes established by the 2018 Master Plan have exacerbated a much more unstable scenario. Much of the area incorporated by the urban perimeter (in light purple

on the map) is characterized as a Low-Density Residential Zone (ZR-1), characterized by horizontal occupation, in keeping with the urban morphology gradually taking shape around the basin through the real estate market.

Another considerable portion of land (in beige on the map) is characterized as a Zone of Special Urban Interest (ZE-1) and "is intended exclusively for residential use, farms, or recreational ranches" (Presidente Prudente, 2018). It is worth questioning whether this definition will be maintained in the next revision, or whether it will become a ZR-1, a situation favorable to intensified urbanization, but worsening the preservation of the biophysical support of that landscape.

The issue is a matter of concern, as the increasingly intense and continuous urbanization expected in water source recharge areas poses a major threat to these water bodies: domestic sewage, garbage, and diffuse urban pollution. Silva and Porto (2003) emphasize that the main challenge related to water source protection:

[...] lies in the fact that the protection of these areas, in terms of regulating land use and occupation, is not the responsibility of the water resources management system, but rather of the municipalities belonging to the respective producing basin. Only an integrated management system can shed some light on the solution to this problem. This is one of the main points where it is urgent to articulate water resources management with urban land management (Silva; Porto, 2003, p. 5).

The implementation of the Ana Jacinta Housing Complex, promoted by the State, was the driving force behind the private market's activity in those areas, it is worth reflecting on to what extent the State becomes the main agent causing socio-spatial fragmentation and to what extent housing policies are capable of guaranteeing a healthy environment and decent housing, rights outlined in the 1988 Federal Constitution.

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## 2.4 Field observation and dialogue: this is how we persist in the landscape

During fieldwork, it was possible to observe the improper disposal of solid waste in areas near waterways. The lack of adequate infrastructure for waste collection and treatment in areas of irregular occupation contributes to the accumulation of garbage on streets and vacant lots, which degrades the environment, compromises public health, and results in a disorganized and unhealthy landscape. Among the problems reported by residents are the lack of access to public emergency services, such as - Mobile Emergency Medical Services (SAMU), the Fire Department, and the Military Police, as well as the scarcity of public transportation at certain times.

This scenario reinforces the urgency of promoting awareness and strengthening a citizen vision focused on the protection of water resources, especially considering that the studied area is located close to the Córrego do Cedro basin, a tributary of the Santo Anastácio River and one of the sources of drinking water for the municipality of Presidente Prudente.

During telephone conversations with merchants in the Ana Jacinta neighborhood, it was possible to understand bonds of belonging and different perceptions of the space they live in. The shared experiences revealed personal stories, outbursts, anxieties, but also affection for the area. Although this is a small sample of ten merchants, these interactions highlight the need

for urgent intervention by the government.

With community mobilization over time, the neighborhood received significant improvements to its infrastructure, which attracted investment and increased the population. However, the distance from the urban center has created challenges, such as a lack of public services, waste management, and sanitation. Despite the difficulties, some residents see opportunities, such as creating a recycling cooperative and offering professional training courses. While some residents consider the neighborhood a good place to live, local workers also recognize its development potential.

Observations indicate that the community has an intuitive understanding of the importance of water conservation, but lacks more in-depth information about the impacts of everyday actions on public water supply and environmental protection. Although there is some awareness, many residents still lack clear guidance on how to effectively preserve water resources.

The field visits also revealed striking scenes. During their daily lives, residents create fond memories in a space marked by the absence of consistent public management actions. This feeling of dissatisfaction is recurrent, but, in turn, some residents develop their own initiatives, adopting squares, medians, and small public spaces, seeking to transform them into more welcoming and meaningful environments.

In conversations with adolescents between the ages of 14 and 18, the lack of recreational spaces geared towards this age group was highlighted. In an interview, the coordinator and vice principal of the Francisco Pessoa State School, located in the neighborhood, confirmed the lack of current environmental education projects, both at the school and in the community. It was mentioned, however, that in the early 2000s, initiatives in this direction took place, such as the implementation of selective collection of recyclable and reusable materials, the result of coordination between the school, the Basin Committee, the City Hall and São Paulo State University (FCT-UNESP).

The Presidente Prudente Master Plan establishes that Environmental Preservation and Protection Areas (APPs) are intended exclusively for the protection of water sources, valley bottoms, springs, streams, creeks, forests, and native vegetation. The neighborhood's size, configuration, and the transformations resulting from human occupation in recent years are significant. Furthermore, because it is a water source area, one would expect greater public effort to seek management solutions capable of reconciling urban growth and environmental preservation. However, a significant disparity was found between what the legislation provides and the observed reality: the presence of garbage, illegal occupations, the raising of large animals (horses and cattle), vegetation degradation, the spread of the invasive species *Leucaena leucocephala*, and evidence of breaches of the protective fences within the APPs.

Permanent Preservation Areas (APPs) are essential for environmental protection. However, in urban environments, these areas often end up fenced off, isolated, and forgotten by government and society. This isolation stems from sociocultural and educational factors, real estate pressures, and the lack of effective public urban planning policies. Therefore, the redevelopment of APPs becomes essential for building a more sustainable and socially inclusive urban environment.

The issue of the urban landscape related to valley bottoms is complex, involving a



series of interconnected challenges and a joint effort from different sectors of society, with solutions to be built over time, based on the needs and demands of the population, in a collaborative process that involves public authorities and civil society (Azevedo; Constantino, 2025, p. 72).

In the Ana Jacinta neighborhood, creating recreational areas and bringing nature into people's daily lives can bring countless benefits to mental health and quality of life. Urban planning that considers the protection and redevelopment of these areas can help create more humane, resilient, and balanced cities. "The search for new, more efficient and sustainable solutions has proven increasingly necessary, given the visible population growth and the increasing demands on the city" (Ravache et al., 2024, p. 121).

The correlation between inadequate waste disposal, the lack of public authorities, the distance from major urban centers, the disorganization of civil society, and the lack of professional training programs demonstrates the urgent need for an integrated and multidisciplinary approach to urban management. Only through the active participation of all sectors of society and the implementation of effective public policies will it be possible to transform these areas into healthier, more organized, and sustainable environments.

### 3 CONCLUSION

When considering the neighborhood as a living space that enables diverse learning experiences, it is important to reflect on the understanding of housing. As Sandeville points out, Jr. (2010), the act of inhabiting, essential and supportive for human beings, is where they are deposited all our knowledge, as well as the contradictions that arise in the construction, appropriation and transformation of this space:

Because it is both experience and heritage, history, time, the landscape, the city, the rural space, and dwelling are decisions. Decisions that expose and conceal the struggles for power and civility in space. Thus, the landscape harbors veiled narratives of the decisions that preceded us, constructing our possibilities for being here through conflicts, desires, and rationalities, demarcating countless subtle contours of the transformation that our being here engenders. It is the material, symbolic, and sensitive expression of our way of inhabiting the world. It is active, offering or denying possibilities (Sandeville Jr., 2010, p. 02).

In this way, it is worth highlighting that inhabitation is about decisions made and not made, understanding that active observation or abandonment construct landscapes that teach unequal and unjust processes or collective and supportive constructions. In the Ana Jacinta neighborhood, we identified potential for concrete transformative action through integrated public policies, which would involve schools and expand institutional spaces, value and recover naturalized spaces and increase participation and access for residents.

Reflection on education must consider an ongoing process, based on experience and always open to the world. The central question, therefore, is whether current education truly meets the needs and objectives we wish to achieve (Sandeville Jr., 2010). What story is the landscape of the Ana Jacinta neighborhood telling us? In this sense, when observing how residents perceive the fenced Permanent Protection Areas (APP), they express a feeling of isolation from the natural space, conveying the feeling that these areas are forbidden or

uninhabited, thus constructing subjective feelings of non-belonging. In contrast, if they are redefined, safeguarding their essential ecological and landscape role in solving or alleviating many of the problems faced by the neighborhood, they could contribute even more effectively to improving the quality of life of the population.

The surroundings of these areas could become collective spaces, with innovative projects and ecological tours, professional training and income-generating projects, the creation of parks, and the training of environmental monitors to care for these spaces. Because they are located in a water source area, they could play an integrated role in environmental education within the municipality of Presidente Prudente, and could also welcome neighboring cities and the entire region to learn about a new model of water resource management. These areas would not be simply fenced-off and forgotten preservation areas, but rather created and planned to interconnect the environment and society.

Urban planning, when integrated with landscape and water source planning, can serve as an effective tool for local residents to observe and propose improvements to their neighborhoods. This process is aligned with the principles established by the City Statute (Law No. 10,257/2001). According to the Primer of the 6th National Conference of Cities (BRASIL, 2013, p. 29), the Master Plan should be developed in a participatory manner, involving the participation of collegiate bodies and holding public hearings.

In this way, residents have the opportunity to define guidelines for the full development of the city's social functions, ensuring the well-being of the population and highlighting the importance of administrative decentralization and the active participation of these citizens. In collective planning spaces, it is possible to reflect on "the city we want" and, from there, create educational projects and programs that prioritize landscape integration urban the source, valuing watercourses, native vegetation, urban trees and their environmental and landscape potential.

By involving the community in environmental education and technical training programs, it's possible to ensure that they understand the specificities of their territory and the impacts of their actions on the environment. However, despite the numerous challenges, opportunities arise in the potential of schools within the territory, in addition to the care that many residents show for the neighborhood, already creating, individually, spaces of beauty and connection. These spaces could, together with public policies, promote environmental projects to build collective and participatory solutions that contribute to improvements in the environment and the community's quality of life.

It is urgent that the next revision of the Master Plan, scheduled for 2028, implement more effective mechanisms for protecting the source's water courses, landscape planning, environmental dynamics, and addressing climate issues, as well as creating decentralized forums for developing the municipality's regional policies. As demonstrated by the images presented throughout this work, the real estate sector has expanded significantly along the region's slopes, further intensifying pressure on water resources. The Master Plan, in its article 23, clearly defines Permanent Preservation Areas, which include the areas surrounding the Botafogo and Cedro streams.

Art. 23. Environmental Preservation and Protection Zones (ZPPA) are intended

exclusively for the preservation and protection of water sources, valley bottoms, springs, streams, creeks, forests, and native vegetation. Any works in these zones are limited to corrections of rainwater runoff, sanitation, erosion control, infrastructure, and equipment to support leisure and recreational activities (Presidente Prudente, 2018, p. 12).

Unfortunately, there is a clear conflict between what the law establishes and what the landscape reflects in everyday life. The functionality and integrity of protected areas are threatened by advancing urbanization and the expansion of urban perimeters, irregular waste disposal, the presence of large animals, and the invasion of exotic species, factors that seriously compromise ecological balance. This situation demands more concrete actions from managers and public administration, both in the care and maintenance of these spaces and in the implementation of environmental education measures. It is essential to raise awareness among the population living near these areas about the importance of preserving them to ensure environmental sustainability.

If the Master Plan Review scheduled for 2028 expands the urban occupation process in the Upper Anastácio Basin as has been done, or at least avoids applying any restrictive device in this area that is being intensely modified, the timely question arises: until when will the water supply for human consumption of the population of Presidente Prudente be protected through this source? What urbanization project is being adopted in light of climate issues and citizen education for participation in decision-making processes and landscape configuration?

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- **Supervisão:** Euler Sandeville Junior

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### DECLARAÇÃO DE CONFLITOS DE INTERESSE

Nós, Euler Sandeville Jr., André Aparecido da Silva Araujo, Diego Delmore Moreno, Ian Damaceno, Lucia Ramalho Ferreira dos Santos e Matheus Morais Gonçalves da Silva declaramos que o manuscrito intitulado "**Planejamento da paisagem e crescimento habitacional em áreas de mananciais em Presidente Prudente-SP**":

1. **Vínculos Financeiros:** Não possui vínculos financeiros que possam influenciar os resultados ou interpretação do trabalho.
2. **Relações Profissionais:** Não possui relações profissionais que possam impactar na análise, interpretação ou apresentação dos resultados.
3. **Conflitos Pessoais:** Não possui conflitos de interesse pessoais relacionados ao conteúdo do manuscrito.