INVENTORY OF SHADE TREES IN GREEN OPEN SPACES IN TAMAN AHMAD YANI, TAMAN BERINGIN, TAMAN CADIKA IN MEDAN CITY

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Abstract
City parks are green open spaces (RTH) that have social, aesthetic, recreational, educational and other activity functions in urban areas, making them valuable assets for cities. Green open space is important for preserving the environment, mitigating climate impacts due to CO2 emissions, reducing air pollution, and increasing water absorption. The city of Medan, with an area of 281.99 km² and a population of 2,494,512 people, is facing serious problems due to imbalanced development which reduces green open space, increases emissions and air pollution, and the risk of flooding. According to Medan City Regional Regulation no. 1 In 2022, Medan has a green open space of 16.39% of the target of 20%, but the current condition has only reached 6.37%. Green open space is effective in reducing emissions, air pollution and flood risk, as well as providing recreational space. Green open space inventory with satellite imagery is important for real-time monitoring and better spatial planning. This research is needed to determine the condition and types of trees in various green open spaces in Medan City, including the number of trees, types of trees, types of shade trees, and tree stratification. This data will guide future greening strategies to benefit the environment and community well-being. Based on the inventory at Beringin Park, Ahmad Yani Park and Cadika Park, Medan City, there are a total of 1193 trees. In Ahmad Yani Park there are 222 trees with Raja Palm dominating 77 trees (34.68%) and Mahogany 35 trees (15.77%) and has 25 tree species with 20 types of shade trees, 47 large trees, 53 medium trees, and 122 small trees. Beringin Park has 183 trees with Mahogany dominating with 67 trees (36.61%) and Trembesi with 25 trees (13.66%) and has 25 tree species with 21 types of shade trees, 11 large trees, 20 medium trees, and 23 trees. small. Cadika Park has 788 trees with Ketapang Kencana dominating with 135 trees (17.13%) and Mahogany with 109 trees (13.83%) and has 40 tree species with 35 types of shade trees, 164 large trees, 250 medium trees, and 374 small tree. Identification of tree canopy width shows that 216 trees in Medan City have a canopy width of 4 meters, 68 trees have the smallest canopy width of 2 meters, and the trees with the largest canopy width are Angsana and Pulai in Ahmad Yani Park with a canopy width of 25 meters.

*Keywords: **City Park, Inventory, Medan City***

1. INTRODUCTION

City parks are green open spaces (RTH) which have social and aesthetic functions and function as a means of recreation, education and other activities at the urban level. City parks are intended to serve the population of an entire city or part of an urban area. City parks have various values and meanings, making them valuable assets for the city (Pratomo, A. at all, 2019). The role of green open space is very important in maintaining the environmental sustainability of living ecosystems in urban areas and mitigating climate impacts due to CO2 gas emissions (Samsoedin. I. & Wibowo. A, 2012). Global climate change is mainly caused by large emissions from the use of fossil fuels such as oil, natural gas and coal by motor vehicles and industry. Burning fossil fuels produces a lot of CO2, a major greenhouse gas that traps heat in the atmosphere and causes global warming. Cities face greater challenges regarding greenhouse gas emissions than rural areas due to the high concentration of vehicles and industry. The use of motorized vehicles, intensive public transportation, and the operation of factories and industrial facilities in cities increase CO2 emissions. In addition, economic activity and high energy consumption in cities, including for lighting, heating and cooling buildings, also increase greenhouse gas emissions. Therefore, reducing emissions and

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mitigating climate change is critical, especially in urban areas that contribute significantly to the problem. Urban development that is not balanced with environmental development can reduce green open space, increase emissions and air pollution, and reduce water catchment areas (Jayanti, AV, et al., 2020). Medan City, with an area of 281.99 km² and a population of 2,494,512 people, has a density of 9,283 people per km² which correlates with high levels of pollutants and emissions. This imbalance causes serious problems such as reduced green open space, which reduces the ability to absorb CO_2, reduce air pollution and regulate temperature. Reducing water catchment areas increases the risk of flooding because rainwater is not absorbed properly and flows directly into drainage. Air pollution is exacerbated by the large number of vehicles that emit harmful gases such as CO_2, NO_2 and particulate matter, worsening air quality and population health. Therefore, it is important for the City of Medan to balance infrastructure and environmental development by increasing green open spaces, traffic management, and implementing environmentally friendly technology in transportation and industry for sustainable development and a better quality of life.

Green open space (RTH) is very effective in reducing emissions and air pollution in cities (Harahap, I., 2021). According to Medan City Regional Regulation no. 1 In 2022, Medan City will have green open space of 16.39% of the planned target of 20%, but the current condition has only reached 6.37%, so green open space is still less than 30%. Green open space not only functions as a CO_2 absorber and oxygen producer, but also reduces the risk of flooding and provides recreational space to improve the quality of life for urban residents. Inventory of green open space using satellite imagery is important because of limited spatial data, especially in areas with tree stands of at least 0.5 hectares. By monitoring satellite imagery, changes in green open space can be understood in real-time to increase its area and quality. This data supports better spatial planning and equal distribution of green open space throughout the city, for optimal environmental benefits and community welfare. Considering the urgent need for data on greening that already exists in Medan City, this research is needed to determine the conditions and types of trees that grow in various green open spaces in the city. The aim is to find out the number of trees, types of trees, types of trees that function as shade and tree stratification in Medan City. This data will be used to guide future greening strategies and goals.

2. LITERATURE REVIEW
2.1 Understanding green open space

In general, public open space in urban areas is divided into two main types: green open space and non-green open space. Urban green open space (RTH) is an area planted with various types of plants, including native and endemic plants, with the aim of increasing ecological, socio-cultural and architectural benefits in urban areas as well as providing beneficial economic contributions to local communities (Dwiyanto, 2009) . Physically, green open space can be divided into two types: natural, such as protected areas and national parks that preserve nature, and artificial, such as city parks and playgrounds, which are designed for recreational and social purposes in an urban environment.

According to Pratomo (2019), city parks are a type of public green space that offers various activities for urban residents. In accordance with Minister of Public Works Regulation Number 05/PRT/M/2008, city parks are part of urban areas designed to meet the needs of city residents. City parks are generally in the form of green fields equipped with recreation and sports facilities, where a minimum of 80% to 90% of the area must be used as green open space (RTH). City residents can use this city park for various social and recreational activities, such as playing in the children's park, gathering in the elderly park, or enjoying the beauty of the flower garden, all of which are open to the public. City parks are often surrounded by annual trees that provide jogging paths and various supporting facilities, such as public toilets and parking areas.

2.2 RTH function

Physically, green open space plays a role in maintaining urban ecosystems by regulating temperature and humidity and absorbing carbon dioxide and air pollutants. Apart from that, green open space also

functions as a habitat for plants and animals, reduces urban noise, prevents erosion, and restores degraded land. Socially and economically, green open spaces provide space for recreation and social interaction and improve the quality of life by supporting environmental education, cultural activities, and physical and mental health. Green spaces also beautify the environment and provide aesthetic value, both at the micro scale of the park and at the macro scale of the entire urban landscape. This feature stimulates the creativity and productivity of city residents, guarantees a balance between physical and psychological life, while providing opportunities for active and passive recreational activities (Febriarto, 2019). Green Open Space (RTH) not only functions for recreation and beauty purposes, but also has a crucial role in maintaining the ecological balance of the city and supporting the social welfare of its people. One of the components of this green open space is the City Park. City parks are an integral part of urban green open spaces. Its existence not only supports the urban ecosystem by absorbing rainwater, planting trees, and acting as the lungs of the city, but also functions as a place of relaxation for city residents. Each park has different characteristics and concepts, which creates diversity and serves as a distinguishing feature of each block and area. Therefore, city parks not only fulfill practical needs, but also have aesthetic value and identity-forming value that supports the integrated development of urban areas (Rochim, F. N and Syahbana, J. A, 2013).

2.3 Understanding and Function of Tree Inventory

According to the Big Indonesian Dictionary (KBBI), inventory is the activity of recording or collecting data. In the context of plant inventory, what is meant is the activity of collecting information about various types of plants found in an area. The aim is to support the area management planning process by providing complete and accurate plant type data. Plant inventory activities include data collection and morphological characterization of plants to determine the potential and information needed to identify plant types in a particular area. This also serves as the first step in plant taxonomy, which aims to collect detailed data regarding the diversity, habitat and distribution of plant species both in natural habitats and protected facilities, (M. Hidayat, · 2021).

Tree inventory, as stated by Wahyuni (2023), is very important in managing the environment and natural resources. The data collected helps governments and related institutions plan green open spaces and conservation strategies to protect biodiversity and maintain ecosystems. Inventories also support disaster risk management by identifying trees that are vulnerable to natural disasters and disease. Through regular tree health monitoring, health problems can be detected early for appropriate treatment. The inventory results also support sustainable development by considering air quality, soil health and natural beauty. Educating the public about the importance of protecting trees and biodiversity is also the main goal of this activity.

2.4 Types of RTH Trees

According to the paper (Ramadhan et al, 2022) trees play an important role in the earth's ecosystem and help reduce the impact of global warming. Regarding the selection of trees in city parks, (Nurhaliza et al, 2023) emphasizes the importance of considering the criteria and characteristics to create a comfortable and calm urban atmosphere. As explained (Dwiyani, 2013), shade trees have the ability to protect people and objects around them from sunlight, wind and rain. According to (Nita et al, 2023), shade trees usually have a dense canopy to carry out their main function. (Amin, 2015) stated that urban shade trees must be safe for local communities, adapt to the urban environment, be resistant to pests, have strong roots, not fall easily, not shed leaves, and have environmentally friendly value to improve product quality, he added. Oxygen production. (Rahman et al, 2015) identified the characteristics of an ideal shade tree, namely having a medium to high, dense canopy and various shapes such as circular, dome-shaped and irregular to provide adequate protection. These shade trees are not only used for recreation in city parks, but also create a comfortable environment for visitors to relax and enjoy the beauty of nature. The diversity of shade tree species also stimulates public interest in enjoying and maintaining city parks.

3. METHOD
3.1 Research sites

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The research location to identify this tree was carried out in one of the green open spaces in the form of a city park. The location used as the object of this research is Beringin Park, which is located on Jln. Jendral Sudirman, Taman Ahmad Yani on Jln. Jendral Sudirman and Cadika Park on Jln. Tourist Work, Medan City.The research location is presented in Figure 1.
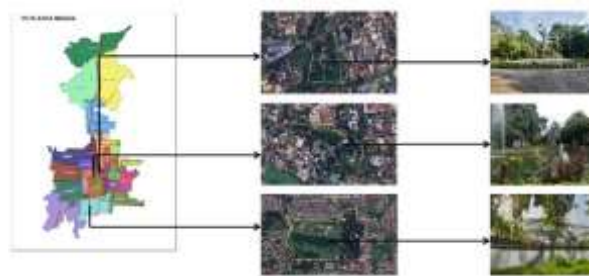

Figure 1. Map of research locations

3.2 Research methodology

These three parks were chosen as study locations because they represent different aspects of urban green open space management. The data used in research is divided into two main types, namely primary data and secondary data. Primary data was obtained through direct observation by researchers in the field, which included identifying tree types and analyzing tree stratification in each park. Meanwhile, secondary data involves information from literature and other relevant external sources, such as regional regulations, city planning documents, and previous studies. The research method used is direct observation to collect field data, which is then analyzed using quantitative and qualitative descriptive approaches. A quantitative descriptive approach is used to measure the distribution and number of existing tree species, while a qualitative descriptive approach is used to understand the morphological and ecological characteristics of trees in each park location. This analysis aims to provide a comprehensive understanding of the contribution of these parks in maintaining biodiversity, providing ecological functions such as water catchment areas, and providing social and aesthetic benefits for urban communities. This research process includes the data collection stage through systematic field observations and literature studies to support data analysis. It is hoped that the results of this research can provide valuable input for the management and development of green open spaces in Medan City, as well as become a basis for better planning in utilizing the potential of city parks as valuable environmental assets.

4. DISCUSSION RESULT
4.1 Tree Inventory Analysis

Based on the results of the inventory that has been carried out, there are 1193 trees spread across Beringin Park, Ahmad Yani Park and Cadika Park, Medan City.

1. Ahmad Yani Park

Field observations show that Ahmad Yani Park has 222 trees of different types. The most numerous trees were king palm (Roytonea regia) with 77 trees (34.68%) followed by mahogany (Swietenia mahagoni) with 35 trees (15.77%). King palm trees are known for their majestic appearance which adds an aesthetic and tropical feel to the garden, while mahogany is a high quality wood and is known for its ability to absorb pollutants and provide shade. In addition to royal palms and mahogany, the park has a variety of other plants that contribute to the park's biodiversity and ecological functions, such as providing habitat for birds and insects and reducing the impact of urban heating. Apart from functioning as a recreation area, Ahmad Yani Park also plays an important role in mitigating climate change through carbon sequestration, reducing air pollution and protecting river watersheds. The presence of this park provides green space for various outdoor

activities and supports the physical and mental health of its residents. Overall, the composition of the trees in Ahmad Yani Park shows that the park was designed with sustainable aesthetics and ecological function in mind, which is important for the quality of the urban environment and the welfare of the local community. Such inventories and observations are essential for planning and managing urban green spaces and ensuring that parks function optimally from an ecological, social and aesthetic point of view. For more details regarding the distribution of trees in Ahmad Yani Park, see Table 1 and Figures 2 and 3 below:

Table 1. Number of Trees in Ahmad Yani Park

Tree Name	Latin name	Amount	Percentage (%)
Angsana Tree	*Pterocarpus indicus*	14	6.31
Banyan Tree	*Ficus benjamina*	1	0.45
Bony Tree	*Bunius antidesma*	1	0.45
Glodokan Tree	*Polyalthia longifolia*	7	3.15
Guava Bol Tree	*Syzygium malaccense*	6	2.7
Kamboja tree	*Plumeria*	1	0.45
Coconut tree	*Cocos nucifera L*	7	3.15
Ketapang Tree	*Terminalia catappa*	2	0.9
Umbrella Krai Tree	*Filicium decipiens*	2	0.9
Butterfly Tree	*Bauhinia purpurea*	16	7.21
Mahogany Tree	*Swietenia mahagoni*	35	15.77
Mango tree	*Mangifera indica*	1	0.45
Matoa Tree	*Pometia pinnata*	10	4.5
Jackfruit tree	*Artocarpus heterophyllus*	1	0.45
King Palm Tree	*Roystonea regia*	77	34.68
Areca Palm Tree	*Areca catechu*	1	0.45
Red Areca Palm Tree	*Areca vestiaria*	15	6.76
Pulai Tree	*Alstonia scholaris*	14	6.31
Rambai Tree	*Baccaurea motleyana*	1	0.45
Rambutan tree	*Nephelium lappaceum*	1	0.45
Wheel Tree	*H. crepitans*	1	0.45
Sentul Tree	*Sandoricum koetjape*	1	0.45
Breadfruit Tree	*Artocarpus altilis*	1	0.45
Tabebuya tree	*Handroanthus chrysotrichus*	5	2.25
Cape Tree	*Mimusops elengi*	1	0.45
Total		**222**	**100**

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Figure 2. Map of Tree Distribution in Ahmad Yani Park

Figure 3. Graph of Tree Distribution in Ahmad Yani Park

2. Banyan Park

It is known that the number of trees identified in Banyan Park reached 183 trees through field observations. The main trees are Mahogany (Swietenia mahagoni) with 67 trees (36.61%), followed by Trembesi (Samanea saman) with 25 trees (13.66%). Apart from that, there are also white banyan, fan pine, coconut, red areca, rambutan, shaver and soursop trees, each of which only has one tree. Mahogany is famous for the quality of its wood and its ability to absorb air pollutants and provide shade. Trembesi, on the other hand, is famous for its wide tree canopy, which can reduce flooding and provide habitat for wildlife. Other trees, although fewer in number, also contribute to the park's biodiversity and aesthetics. Apart from its visual beauty, banyan gardens also play an important role in ecological functions such as absorbing carbon dioxide, reducing air pollution, providing shade, and providing habitat for wildlife. This monitoring and inventory is important to support effective planning and management of green spaces and ensure parks continue to provide optimal environmental, social and aesthetic benefits for the people of Medan City. For more details regarding the distribution of trees in Banyan Park, see Table 2 and Figures 4 and 5 below:

Table 1. Number of Trees in Banyan Park

Tree Name	Latin name	Amount	Percentage (%)
Angsana Tree	*Pterocarpus indicus*	8	4.37

Tree Name	Latin name	Amount	Percentage (%)
Banyan Tree	*Ficus benjamina*	3	1.64
White Banyan Tree	*Ficus benjamina*	1	0.55
Fan Pine Tree	*Casuarina equisetifolia*	1	0.55
Durian tree	*Durio zibethinus*	3	1.64
Guava Bol Tree	*Syzygium malaccense*	4	2.19
Coconut tree	*Cocos nucifera L*	1	0.55
Ketapang Tree	*Terminalia catappa*	9	4.92
Ketapang Kencana Tree	*Terminalia mantaly*	3	1.64
Butterfly Tree	*Bauhinia purpurea*	4	2.19
Mahogany Tree	*Swietenia mahagoni*	67	36.61
Mango tree	*Mangifera indica*	5	2.73
Matoa Tree	*Pometia pinnata*	6	3.28
Melinjo Tree	*Gnetum gnemon*	4	2.19
King Palm Tree	*Roystonea regia*	3	1.64
Petai Tree	*Leucaena leucocephala*	4	2.19
Red Areca Palm Tree	*Areca vestiaria*	1	0.55
Pulai Tree	*Alstonia scholaris*	16	8.74
Rambutan tree	*Nephelium lappaceum*	1	0.55
Sentul Tree	*Sandoricum koetjape*	7	3.83
Shaved Tree	*Streblus asper*	1	0.55
Soursop Tree	*Annona muricata*	1	0.55
Tabebuya tree	*Handroanthus chrysotrichus*	3	1.64
Cape Tree	*Mimusops elengi*	2	1.09
Trembesi Tree	*Samanea saman*	25	13.66
Total		**183**	**100**

Figure 4. Map of Tree Distribution in Banyan Park

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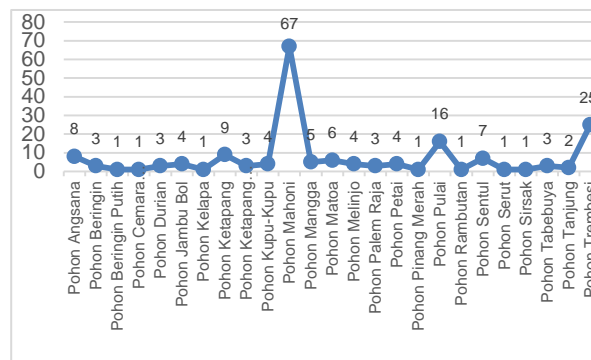*Ihsan Nur Harahap[1], Abdiyanto[2], Abdi Sugiarto[3]*

Figure 5. Distribution graph of Banyan Park trees

3. Cadika Park

From field observations, it is known that the number of trees identified in Cadika Park reached 788 trees. The most dominant tree in this park is Ketapang Kencana (Terminalia mantaly) with a total of 135 trees, which means Ketapang Kencana accounts for 17.13% of the total trees in the park. Ketapang Kencana is known for its dense, umbrella-shaped leaves, which are very effective in providing shade and lowering the surrounding temperature, as well as having a good ability to absorb air pollutants. Mahogany trees (Swietenia mahagoni) are the second most common type of tree found in Cadika Park, with 109 trees or around 13.83% of the total trees. Mahogany trees are famous for their high quality wood and are often used in making furniture and various construction purposes. Apart from that, Mahogany has a good ability to absorb pollutants and provide shade which is much needed in urban environments. Apart from Ketapang Kencana and Mahogany, there are several other types of trees in Cadika Park which are smaller in number, but are still important for the biodiversity and ecological function of the park. For example, there is only one Teak tree and Orange tree each in the park. Teak trees are famous for their strong and durable wood, often used in making furniture and construction, while orange trees have economic and consumption value because of their fruit. For more details regarding the distribution of trees in Cadika Park, see Table 3 and Figures 6 and 7 below:

Table 3. Number of Trees in Cadika Park

Tree Name	Latin name	Amount	Percentage (%)
Acasia tree	*Acacia mangium Willd*	10	1.27
Angsana Tree	*Pterocarpus indicus*	27	3.43
Palm tree	*Arenga pinnata*	4	0.51
Starfruit tree	*A. carambola*	2	0.25
Banyan Tree	*Ficus benjamina*	4	0.51
Cherry tree	*Prunus subg. Cerasus*	2	0.25
Dadap Tree	*Erythrina variegata*	35	4.44
Duku Tree	*Lansium parasiticum*	2	0.25
Durian tree	*Durio zibethinus*	4	0.51
Jabon Tree	*Neolamarckia cadamba*	33	4.19
Water Guava Tree	*Syzygium aqueum*	31	3.93
Guava Bol Tree	*Syzygium malaccense*	50	6.35
Teak tree	*Tectona grandis*	1	0.13
Orange tree	*C. Sinensis*	1	0.13
Coconut tree	*Cocos nucifera L*	29	3.68
Palm tree	*Elaeis guineensis*	2	0.25
Longan Tree	*Dimocarpus longan*	3	0.38
Ketapang Tree	*Terminalia catappa*	8	1.02

Ketapang Kencana Tree	*Terminalia mantaly*	135	17.13
Umbrella Krai Tree	*Filicium decipiens*	8	1.02
Butterfly Tree	*Bauhinia purpurea*	54	6.85
Mahogany Tree	*Swietenia mahagoni*	109	13.83
Mango tree	*Mangifera indica*	39	4.95
Mangosteen Tree	*Garcinia mangostana*	13	1.65
Mindi Tree	*Melia azedarach*	4	0.51
Jackfruit tree	*Artocarpus heterophyllus*	2	0.25
Petai Tree	*Leucaena leucocephala*	4	0.51
Pine trees	*Pinus palustris*	12	1.52
Red Bud Tree	*Syzygium myrtifolium*	25	3.17
Pulai Tree	*Alstonia scholaris*	24	3.05
Rambutan tree	*Nephelium lappaceum*	13	1.65
Rukam Tree	*Flacourtia rukam*	3	0.38
Laurel	*Syzygium polyanthum*	3	0.38
Sapodilla Tree	*Manilkara zapota*	3	0.38
Sengon Tree	*Albizia chinensis*	5	0.63
Soursop Tree	*Annona muricata*	9	1.14
Tabebuya tree	*Handroanthus chrysotrichus*	17	2.16
Cape Tree	*Mimusops elengi*	12	1.52
Trembesi Tree	*Samanea saman*	41	5.2
Waru Tree	*Hibiscus tiliaceus*	5	0.63
Total		**788**	**100**

Figure 6. Map of Tree Distribution in Cadika Park

Figure 7. Chart of the distribution of Cadika Park trees

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Based on the identification results, the most common tree species in Medan city parks are mahogany trees with 211 trees or 17.69% of the total trees. Apart from that, there are 138 Ketapang Kencana trees or 11.57%, 80 Raja palm trees or 6.71%, 74 butterfly trees or 6.20%, and 66 Trembesi trees or 5. 53%. The presence of various types of trees is very important in supporting urban spatial planning which aims to increase green open space (RTH) and improve the quality of the urban environment. Urban spatial planning usually includes strategies to increase and improve green open space to support ecological balance, reduce pollution, and improve the quality of life of residents.

a. Mahogany Tree (Swietenia mahogoni): Mahogany with 211 trunks is the main tree type in Medan city parks. Mahogany is a high quality wood and is known for its ability to absorb air pollutants. From a city planning perspective, mahogany trees can make a big contribution to increasing green open space because they are wide and shady, provide shade and habitat for flora and fauna, and help absorb CO2.

b. Ketapan Kencana Tree (Terminalia mantaly): With 138 stems, Ketapan Kencana is a tree that effectively provides shade and lowers the temperature of the surrounding environment. With its dense foliage and wide canopy, Ketapang Kencana helps control the microclimate in urban areas, making it an important element in arranging green open spaces.

c. Palam Raja (Roystonea regia): With a total of 80 stems, Palam Raja enhances the aesthetic value and brings a unique tropical feel. Due to its majestic appearance, Palam Raja is often used in urban park designs, thereby contributing to the aesthetic aspects of urban spatial planning.

d. Butterfly Tree (Bauhinia purpurea): This tree of 74 is famous for its beautiful and colorful flowers. Butterflies add aesthetic value and biodiversity and can be a visual attraction in urban public spaces.

e. Trembesi Tree (Samanea saman): The Trembesi tree with a total of 66 trees is a tree that provides excellent shade because of its wide and shady canopy. Trembesi also acts as an excellent water absorption material, aiding flood prevention and providing important ecological benefits in urban planning.

The integration of these trees in the Medan city spatial plan will support increasing the number and quality of green open spaces. The presence of large trees such as Mahogany and Trembesi which are able to absorb pollutants and provide shade, is very important in mitigating the impact of urban heat islands (the phenomenon of higher temperatures in urban areas compared to the surrounding areas) and improving air quality. To achieve the ideal Green Open Space (RTH) target in accordance with Medan City Regional Regulation No. 1 of 2022, where green open space has currently only reached 6.37% of the target of 20%, significant improvement efforts are needed through planting new trees and maintaining existing trees. This approach will not only improve environmental quality, but also support community health and wellbeing by providing more space for recreation and social activities. Overall, the trees that have been identified in Medan City parks have an important role in the city's spatial planning which aims to create a greener, healthier and more sustainable urban environment.

4. Shade Tree Analysis

Shade or protective trees are types of trees planted to protect people and objects around them from sunlight, wind and rain. The main characteristics of shade trees are that they have wide branches, at least 2 meters, and reach a height of 15 meters. These trees provide benefits in the form of shade and protection from the sun's glare for visitors enjoying the park. In Ahmad Yani Park, Beringin Park and Cadika Park, shade trees are the dominant type of vegetation spread throughout the park area. The tree crown refers to the top of the tree which consists of the twigs and leaves that cover the trunk and branches. The main function of the tree canopy is as a place for photosynthesis, which is the process in which trees produce food (glucose) from water and carbon dioxide with the help of sunlight. The shape and size of tree crowns vary depending on the type of tree, the environment in which the tree grows, and the growing conditions. The crown of a tree can be umbrella-shaped, conical, circular, spreading, or even irregular, according to the tree's adaptation to its environment.

Apart from being a place for photosynthesis, tree canopies also play a role in providing shelter for animals, reducing the flow of rainwater that falls directly to the ground (erosion), and reducing the intensity of sunlight reaching the ground, thereby preventing excessive evaporation and regulating environmental temperature and also functions as a shade to protect people and objects around them from exposure to sunlight, wind and rain. Based on the identification results in Ahmad Yani Park, Beringin Park and Cadika Park in Medan City, it has been identified that there are 216 trees with a canopy width of 4 meters. In addition, 68 trees had a canopy width of 2 meters, which was the smallest among the trees observed. The trees with the largest canopy width are found in Ahmad Yani Park, namely the Angsana (Pterocarpus indicus) and the Pulai Tree (Alstonia scholaris), each of which has a canopy width of up to 25 meters. This shows significant variations in the size and types of trees in the three parks in Medan City. For more details, see Table 4 and Figure 8 below.

Table 4. Tree Canopy Width

Header Width (m)	Number of Trees	Percentage (%)
2	68	5.70
3	175	14.67
4	216	18,11
5	113	9.47
6	135	11.32
7	91	7.63
8	137	11.48
9	31	2.60
10	50	4.19
11	8	0.67
12	25	2.10
13	33	2.77
14	24	2.01
15	37	3.10
16	25	2.10
17	3	0.25
18	2	0.17
20	15	1.26
22	1	0.08
24	2	0.17
25	2	0.17
Total	**1193**	**100.00**

Figure 7. Tree header graph

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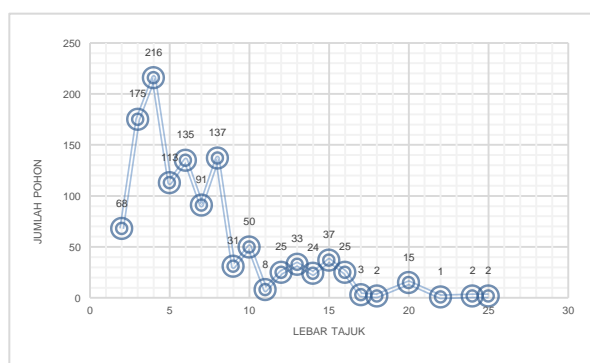
After carrying out an inventory of the tree types in Ahmad Yani Park, Beringin Park and Cadika Park in Medan City, it was discovered that these three parks contain various types of vegetation and trees. To better understand the distribution of shade trees in these parks, researchers carried out mapping using the ArcGIS 10.8 application. The aim is to visually and in detail describe the distribution of shade trees in each area of the park. The results of this mapping can be seen in the table below.

5. Ahmad Yani Park

After direct observation at Ahmad Yani Park, of the number of species found in Ahmad Yani Park, there are 25 types of trees, of these 25 types of trees there are around 20 types of shade trees. For more details, see Table 5 and Figure 9 below.

Table 5. Number of Shade Trees in Ahmad Yani Park

Tree Name	Latin name	Function	Amount	Percentage (%)
Angsana Tree	*Pterocarpus indicus*	Shade	14	12.17
Banyan Tree	*Ficus benjamina*	Shade	1	0.87
Bony Tree	*Bunius antidesma*	Shade	1	0.87
Guava Bol Tree	*Syzygium malaccense*	Shade	6	5.22
Kamboja tree	*Plumeria*	Shade	1	0.87
Ketapang Tree	*Terminalia catappa*	Shade	2	1.74
Umbrella Krai Tree	*Filicium decipiens*	Shade	2	1.74
Butterfly Tree	*Bauhinia purpurea*	Shade	16	13.91
Mahogany Tree	*Swietenia mahagoni*	Shade	35	30.43
Mango tree	*Mangifera indica*	Shade	1	0.87
Matoa Tree	*Pometia pinnata*	Shade	10	8.70
Jackfruit tree	*Artocarpus heterophyllus*	Shade	1	0.87
Pulai Tree	*Alstonia scholaris*	Shade	14	12.17
Rambai Tree	*Baccaurea motleyana*	Shade	1	0.87
Rambutan tree	*Nephelium lappaceum*	Shade	1	0.87
Wheel Tree	*H. crepitans*	Shade	1	0.87
Sentul Tree	*Sandoricum koetjape*	Shade	1	0.87
Breadfruit Tree	*Artocarpus altilis*	Shade	1	0.87
Tabebuya tree	*Handroanthus chrysotrichus*	Shade	5	4.35
Cape Tree	*Mimusops elengi*	Shade	1	0.87
Total			**115**	**100.00**

Figure 9. Map of the distribution of shade trees in Ahmad Yani Park

6. Banyan Park

After direct observation at Banyan Park, of the number of species found in Banyan Park, there are 25 types of trees, of these 25 types of trees there are around 21 types of shade trees. Dominated by Mahogany trees are 67 trees with a percentage of 37.85%. For more details, see Table 6 and Figure 10 below.

Table 6. Number of Shade Trees in Bergin Park

Tree Name	Latin name	Function	Amount	Percentage (%)
Angsana Tree	*Pterocarpus indicus*	Shade	8	4.52
Banyan Tree	*Ficus benjamina*	Shade	3	1.69
White Banyan Tree	*Ficus benjamina*	Shade	1	0.56
Durian tree	*Durio zibethinus*	Shade	3	1.69
Guava Bol Tree	*Syzygium malaccense*	Shade	4	2.26
Ketapang Tree	*Terminalia catappa*	Shade	9	5.08
Ketapang Kencana Tree	*Terminalia mantaly*	Shade	3	1.69
Butterfly Tree	*Bauhinia purpurea*	Shade	4	2.26
Mahogany Tree	*Swietenia mahagoni*	Shade	67	37.85
Mango tree	*Mangifera indica*	Shade	5	2.82
Matoa Tree	*Pometia pinnata*	Shade	6	3.39
Melinjo Tree	*Gnetum gnemon*	Shade	4	2.26
Petai Tree	*Leucaena leucocephala*	Shade	4	2.26
Pulai Tree	*Alstonia scholaris*	Shade	16	9.04
Rambutan tree	*Nephelium lappaceum*	Shade	1	0.56
Sentul Tree	*Sandoricum koetjape*	Shade	7	3.95
Shaved Tree	*Streblus asper*	Shade	1	0.56
Soursop Tree	*Annona muricata*	Shade	1	0.56
Tabebuya tree	*Handroanthus chrysotrichus*	Shade	3	1.69
Cape Tree	*Mimusops elengi*	Shade	2	1.13
Trembesi Tree	*Samanea saman*	Shade	25	14,12
Total			**177**	**100.00**

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Figure 10. Map of the distribution of shade trees in Banyan Park

7. Cadika Park

After direct observation at Cadika Park, of the number of species found in Cadika Park, namely 40 types of trees, of these 40 types of trees there are around 35 types of shade trees. Dominated by Ketapang Kencana trees are 135 trees with a percentage of 18.85% followed by mahono trees with 109 trees. For more details, see Table 7 and Figure 11 below.

Table 7. Number of Shade Trees in Cadika Park

Tree Name	Latin name	Function	Amount	Percentage (%)
Acasia tree	*Acacia mangium Willd*	Shade	10	1.40
Angsana Tree	*Pterocarpus indicus*	Shade	27	3.77
Starfruit tree	*A. carambola*	Shade	2	0.28
Banyan Tree	*Ficus benjamina*	Shade	4	0.56
Cherry tree	*Prunus subg. Cerasus*	Shade	2	0.28
Dadap Tree	*Erythrina variegata*	Shade	35	4.89
Duku Tree	*Lansium parasiticum*	Shade	2	0.28
Durian tree	*Durio zibethinus*	Shade	4	0.56
Jabon Tree	*Neolamarckia cadamba*	Shade	33	4.61
Water Guava Tree	*Syzygium aqueum*	Shade	31	4.33
Guava Bol Tree	*Syzygium malaccense*	Shade	50	6.98
Teak tree	*Tectona grandis*	Shade	1	0.14
Orange tree	*C. Sinensis*	Shade	1	0.14
Longan Tree	*Dimocarpus longan*	Shade	3	0.42
Ketapang Tree	*Terminalia catappa*	Shade	8	1.12
Ketapang Kencana Tree	*Terminalia mantaly*	Shade	135	18.85
Umbrella Krai Tree	*Filicium decipiens*	Shade	8	1.12
Butterfly Tree	*Bauhinia purpurea*	Shade	54	7.54
Mahogany Tree	*Swietenia mahagoni*	Shade	109	15.22
Mango tree	*Mangifera indica*	Shade	39	5.45
Mangosteen Tree	*Garcinia mangostana*	Shade	13	1.82
Mindi Tree	*Melia azedarach*	Shade	4	0.56
Jackfruit tree	*Artocarpus heterophyllus*	Shade	2	0.28
Petai Tree	*Leucaena leucocephala*	Shade	4	0.56
Pulai Tree	*Alstonia scholaris*	Shade	24	3.35
Rambutan tree	*Nephelium lappaceum*	Shade	13	1.82
Rukam Tree	*Flacourtia rukam*	Shade	3	0.42

Tree Name	Latin name	Function	Amount	Percentage (%)
Laurel	*Syzygium polyanthum*	Shade	3	0.42
Sapodilla Tree	*Manilkara zapota*	Shade	3	0.42
Sengon Tree	*Albizia chinensis*	Shade	5	0.70
Soursop Tree	*Annona muricata*	Shade	9	1.26
Tabebuya tree	*Handroanthus chrysotrichus*	Shade	17	2.37
Cape Tree	*Mimusops elengi*	Shade	12	1.68
Trembesi Tree	*Samanea saman*	Shade	41	5.73
Waru Tree	*Hibiscus tiliaceus*	Shade	5	0.70
Total			**716**	**100.00**

Figure 11. Map of the distribution of shade trees in Cadika Park

4.2 Tree Stratification Analysis
1. Ahmad Yani Park

Based on the identification results, there are 222 trees in Ahmad Yani Park with a stratification of 47 large trees, 53 medium trees and 122 small trees. The most dominant type of tree in Ahmad Yani Park is the king palm tree with a total of 77 trees. For more details, see Table 8 below.

Table 8. Tree Stratification in Ahmad Yani Park

Stratification	Tree Name	Latin name	Amount
Big tree	Angsana Tree	*Pterocarpus indicus*	11
	Kamboja tree	*Plumeria*	1
	Umbrella Krai Tree	*Filicium decipiens*	1
	Butterfly Tree	*Bauhinia purpurea*	4
	Mahogany Tree	*Swietenia mahogoni*	21
	Matoa Tree	*Pometia pinnata*	2
	Pulai Tree	*Alstonia scholaris*	6
	Wheel Tree	*H. crepitans*	1
Grand Total			**47**
Medium Tree	Angsana Tree	*Pterocarpus indicus*	2
	Banyan Tree	*Ficus benjamina*	1
	Bony Tree	*Bunius antidesma*	1
	Glodokan Tree	*Polyalthia longifolia*	1
	Ketapang Tree	*Terminalia catappa*	1
	Umbrella Krai Tree	*Filicium decipiens*	1
	Butterfly Tree	*Bauhinia purpurea*	6

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Stratification	Tree Name	Latin name	Amount
	Mahogany Tree	*Swietenia mahagoni*	11
	Mango tree	*Mangifera indica*	1
	Matoa Tree	*Pometia pinnata*	5
	Jackfruit tree	*Artocarpus heterophyllus*	1
	King Palm Tree	*Roystonea regia*	7
	Pulai Tree	*Alstonia scholaris*	8
	Rambai Tree	*Baccaurea motleyana*	1
	Sentul Tree	*Sandoricum koetjape*	1
	Breadfruit Tree	*Artocarpus altilis*	1
	Tabebuya tree	*Handroanthus chrysotrichus*	3
	Cape Tree	*Mimusops elengi*	1
Grand Total			**53**
Little Tree	Angsana Tree	*Pterocarpus indicus*	1
	Glodokan Tree	*Polyalthia longifolia*	6
	Guava Bol Tree	*Syzygium malaccense*	6
	Coconut tree	*Cocos nucifera L*	7
	Ketapang Tree	*Terminalia catappa*	1
	Butterfly Tree	*Bauhinia purpurea*	6
	Mahogany Tree	*Swietenia mahagoni*	3
	Matoa Tree	*Pometia pinnata*	3
	King Palm Tree	*Roystonea regia*	70
	Areca Palm Tree	*Areca catechu*	1
	Red Areca Palm Tree	*Areca vestiaria*	15
	Rambutan tree	*Nephelium lappaceum*	1
	Tabebuya tree	*Handroanthus chrysotrichus*	2
Grand Total			**122**

2. Banyan Park

Based on the identification results, there are 54 trees in Banyan Park with a stratification of 11 large trees, 20 medium trees and 23 small trees. The most dominant type of tree in Banyan Park is the sentul tree with a total of 7 trees. For more details, see Table 9 below.

Table 9. Tree Stratification in Banyan Park

Stratification	Tree Name	Latin name	Amount
Big tree	Angsana Tree	*Pterocarpus indicus*	6
	Banyan Tree	*Ficus benjamina*	2
	Durian tree	*Durio zibethinus*	1
	Ketapang Tree	*Terminalia catappa*	2
	Butterfly Tree	*Bauhinia purpurea*	1
	Mahogany Tree	*Swietenia mahagoni*	10
	Matoa Tree	*Pometia pinnata*	1
	Pulai Tree	*Alstonia scholaris*	12
	Sentul Tree	*Sandoricum koetjape*	5
	Shaved Tree	*Streblus asper*	1
	Trembesi Tree	*Samanea saman*	6
Grand Total			**47**
Medium Tree	Durian tree	*Durio zibethinus*	1
	Guava Bol Tree	*Syzygium malaccense*	1

Stratification	Tree Name	Latin name	Amount
	Ketapang Tree	*Terminalia catappa*	4
	Ketapang Kencana Tree	*Terminalia mantaly*	2
	Butterfly Tree	*Bauhinia purpurea*	1
	Mahogany Tree	*Swietenia mahagoni*	21
	Mango tree	*Mangifera indica*	2
	Matoa Tree	*Pometia pinnata*	5
	Petai Tree	*Leucaena leucocephala*	1
	Pulai Tree	*Alstonia scholaris*	4
	Rambutan tree	*Nephelium lappaceum*	1
	Sentul Tree	*Sandoricum koetjape*	2
	Cape Tree	*Mimusops elengi*	1
	Trembesi Tree	*Samanea saman*	14
Grand Total			**60**
Little Tree	Angsana Tree	*Pterocarpus indicus*	2
	Banyan Tree	*Ficus benjamina*	1
	White Banyan Tree	*Ficus benjamina*	1
	Fan Pine Tree	*Casuarina equisetifolia*	1
	Durian tree	*Durio zibethinus*	1
	Guava Bol Tree	*Syzygium malaccense*	3
	Coconut tree	*Cocos nucifera L*	1
	Ketapang Tree	*Terminalia catappa*	3
	Ketapang Kencana Tree	*Terminalia mantaly*	1
	Butterfly Tree	*Bauhinia purpurea*	2
	Mahogany Tree	*Swietenia mahagoni*	36
	Mango tree	*Mangifera indica*	3
	Melinjo Tree	*Gnetum gnemon*	4
	King Palm Tree	*Roystonea regia*	3
	Petai Tree	*Leucaena leucocephala*	3
	Red Areca Palm Tree	*Areca vestiaria*	1
	Soursop Tree	*Annona muricata*	1
	Tabebuya tree	*Handroanthus chrysotrichus*	3
	Cape Tree	*Mimusops elengi*	1
	Trembesi Tree	*Samanea saman*	5
Grand Total			**76**

3. Cadika Park

Based on the identification results, there are 788 trees in Cadika Park with a stratification of 164 large trees, 250 medium trees and 374 small trees. The most dominant type of tree in Cadika Park is the Ketapang Kencana tree with a total of 135 trees. For more details, see Table 10 below.

Table 10. Tree Stratification in Cadika Park

Stratification	Tree Name	Latin name	Amount
Big tree	Angsana Tree	*Pterocarpus indicus*	7
	Banyan Tree	*Ficus benjamina*	2
	Jabon Tree	*Neolamarckia cadamba*	30
	Guava Bol Tree	*Syzygium malaccense*	1

INVENTORY OF SHADE TREES IN GREEN OPEN SPACES IN TAMAN AHMAD YANI, TAMAN BERINGIN, TAMAN CADIKA IN MEDAN CITY

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Stratification	Tree Name	Latin name	Amount
	Ketapang Tree	*Terminalia catappa*	2
	Ketapang Kencana Tree	*Terminalia mantaly*	38
	Butterfly Tree	*Bauhinia purpurea*	11
	Mahogany Tree	*Swietenia mahagoni*	19
	Mango tree	*Mangifera indica*	2
	Petai Tree	*Leucaena leucocephala*	1
	Pulai Tree	*Alstonia scholaris*	20
	Rambutan tree	*Nephelium lappaceum*	1
	Sengon Tree	*Albizia chinensis*	3
	Trembesi Tree	*Samanea saman*	27
Grand Total			**164**
Medium Tree	Angsana Tree	*Pterocarpus indicus*	17
	Palm tree	*Arenga pinnata*	4
	Starfruit tree	*A. carambola*	1
	Banyan Tree	*Ficus benjamina*	1
	Cherry tree	*Prunus subg. Cerasus*	2
	Dadap Tree	*Erythrina variegata*	6
	Durian tree	*Durio zibethinus*	2
	Jabon Tree	*Neolamarckia cadamba*	3
	Water Guava Tree	*Syzygium aqueum*	10
	Guava Bol Tree	*Syzygium malaccense*	13
	Teak tree	*Tectona grandis*	1
	Coconut tree	*Cocos nucifera L*	4
	Palm tree	*Elaeis guineensis*	2
	Ketapang Tree	*Terminalia catappa*	4
	Ketapang Kencana Tree	*Terminalia mantaly*	45
	Umbrella Krai Tree	*Filicium decipiens*	5
	Butterfly Tree	*Bauhinia purpurea*	32
	Mahogany Tree	*Swietenia mahagoni*	59
	Mango tree	*Mangifera indica*	2
	Mangosteen Tree	*Garcinia mangostana*	3
	Mindi Tree	*Melia azedarach*	3
	Petai Tree	*Leucaena leucocephala*	1
	Red Bud Tree	*Syzygium myrtifolium*	1
	Pulai Tree	*Alstonia scholaris*	4
	Rambutan tree	*Nephelium lappaceum*	5
	Rukam Tree	*Flacourtia rukam*	1
	Laurel	*Syzygium polyanthum*	2
	Sengon Tree	*Albizia chinensis*	1
	Tabebuya tree	*Handroanthus chrysotrichus*	1

Stratification	Tree Name	Latin name	Amount
	Cape Tree	*Mimusops elengi*	3
	Trembesi Tree	*Samanea saman*	7
	Waru Tree	*Hibiscus tiliaceus*	5
Grand Total			**250**
Little Tree	Acasia tree	*Acacia mangium Willd*	10
	Angsana Tree	*Pterocarpus indicus*	3
	Starfruit tree	*A. carambola*	1
	Banyan Tree	*Ficus benjamina*	1
	Dadap Tree	*Erythrina variegata*	29
	Duku Tree	*Lansium parasiticum*	2
	Durian tree	*Durio zibethinus*	2
	Water Guava Tree	*Syzygium aqueum*	21
	Guava Bol Tree	*Syzygium malaccense*	36
	Orange tree	*C. Sinensis*	1
	Coconut tree	*Cocos nucifera L*	25
	Longan Tree	*Dimocarpus longan*	3
	Ketapang Tree	*Terminalia catappa*	2
	Ketapang Kencana Tree	*Terminalia mantaly*	52
	Umbrella Krai Tree	*Filicium decipiens*	3
	Butterfly Tree	*Bauhinia purpurea*	11
	Mahogany Tree	*Swietenia mahagoni*	31
	Mango tree	*Mangifera indica*	35
	Mangosteen Tree	*Garcinia mangostana*	10
	Mindi Tree	*Melia azedarach*	1
	Jackfruit tree	*Artocarpus heterophyllus*	2
	Petai Tree	*Leucaena leucocephala*	2
	Pine trees	*Pinus palustris*	12
	Red Bud Tree	*Syzygium myrtifolium*	24
	Rambutan tree	*Nephelium lappaceum*	7
	Rukam Tree	*Flacourtia rukam*	2
	Laurel	*Syzygium polyanthum*	1
	Sapodilla Tree	*Manilkara zapota*	3
	Sengon Tree	*Albizia chinensis*	1
	Soursop Tree	*Annona muricata*	9
	Tabebuya tree	*Handroanthus chrysotrichus*	16
	Cape Tree	*Mimusops elengi*	9
	Trembesi Tree	*Samanea saman*	7
Grand Total			**374**

5. CLOSING
5.1 Conclusion

Based on the results of the research and discussion of each analysis, several conclusions can be drawn as follows:

1. Based on the inventory at Beringin Park, Ahmad Yani Park and Cadika Park, Medan City, there are a

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total of 1193 trees. In Ahmad Yani Park there are 222 trees, with Raja Palm as many as 77 trees (34.68%) and Mahogany as many as 35 trees (15.77%). In Beringin Park there are 183 trees, with 67 Mahogany trees (36.61%) and 25 Trembesi trees (13.66%). In Cadika Park there are 788 trees, with Ketapang Kencana with 135 trees (17.13%) and Mahogany with 109 trees (13.83%). There is only one tree species such as White Banyan, Fan Pine, Coconut, Red Areca, Rambutan, Serut, Teak, and Orange in each park.

2. Based on the results of identification carried out on the width of the tree canopy in Ahmad Yani Park, Beringin Park and Cadika Park in Medan City, it is known that 216 trees in Medan City have a canopy width of 4 meters. The tree with the smallest canopy width is 2 m with a total of 68 trees and the trees with the largest canopy width are the Angsana tree (Pterocarpus indicus) and the Pulai tree (Alstonia scholaris) which are located in Ahmad Yani Park with a canopy width of 25 meters.

3. After direct observation, in Ahmad Yani Park there are 25 types of trees, with 20 types of shade trees. In Beringin Park there are also 25 types of trees, with 21 types of shade trees, dominated by Mahogany with 67 trees (37.85%). In Cadika Park there are 40 types of trees, with 35 types of shade trees, dominated by Ketapang Kencana with 135 trees (18.85%) and followed by Mahogany with 109 trees.

4. Based on the identification results, in Ahmad Yani Park there are 222 trees, consisting of 47 large trees, 53 medium trees and 122 small trees. The most dominant tree is the Raja Palm with 77 trunks. In Banyan Park there are 54 trees, consisting of 11 large trees, 20 medium trees and 23 small trees, with Sentul trees dominating 7 trees. In Cadika Park there are 788 trees, consisting of 164 large trees, 250 medium trees and 374 small trees, with Ketapang Kencana trees dominating 135 of them.

5.2 Suggestion

The suggestions from this research are that the results of the research that has been carried out provide important input for the Medan City government to improve maintenance and upkeep of parks such as Ahmad Yani, Beringin, and Cadika, especially in terms of planting shade trees. Some trees may currently be unsuitable for recreational use due to various reasons such as poor physical condition or irregular planting. Therefore, it is necessary to carefully consider various aspects to choose a type of shade tree that is safe and comfortable to plant in this city park. Considerations to consider include safety for visitors, comfort, and suitability of the tree type to the park environment. Choosing the right tree can create a cool, comfortable and well-organized atmosphere in the garden. In this way, visitors can enjoy the park more pleasantly, while enjoying the shade and natural beauty provided by the shade trees. This effort will also improve the image and function of the park as a green open space that contributes positively to the quality of life of the people of Medan City as a whole.

REFERENCES

Amin, N. (2015). Shade plants in the Banda Aceh city forest as a medium for biology learning. National Seminar on Biotics, 3(1), 495–501.

Dwiyani, R. (2013). Get to know the protective plants around us. Udayana University Press. Denpasar.

Dwiyanto., (2009). Quantity and Quality of Green Open Space in Urban Settlements. ENGINEERING – Vol. 30, no. 2, 2009, ISSN 0852-1697

Febriarto. P., (2019). The Quality of Social Functions on the Existence of Public City Parks in the City of Surakarta. SPACE Journal, Volume 1, Number 1, June 2019

Please. I., (2021). Analysis of the Availability of Green Open Space and its Impact on DKI Jakarta City Residents. Journal of Entrepreneurship, Management, and Industry (JEMI) Vol. 4, no. 1, (2021), pp. 18-24

Hidayat. M., Mukarramah. L, Nurlia Zahara. N., (2021). Inventory and Distribution Pattern of Tree Vegetation in the Pucoek Lrueng Raba Tourism Area, Lhoknga District, Aceh Besar Regency. Proceedings of the National Seminar on Biotics, ISBN: 978-602-70648-3-6

Istijanto. 2005. Human resources research: practical ways to detect employee work dimensions. Book. PT Gramedia Utama Library. Jakarta. 273 pp.

Jayanti. AV, (2020). Vertical Garden: Greening to Support Smart Living in the City of Yogyakarta. AL-IMARAH: Journal of Islamic Government and Politics, Vol. 5, no. 1, 2020

Nita, Y., Nastiti, R., Ananta, A., & Nurhaliza. (2023). Planting protective trees as an effort to green the environment. Journal of Community Service and Empowerment, 4(1), 111–116.

Nurhaliza, L., Gustaf, R., & Monika, D. (2023). Evaluation of the Function of Vegetation as Protective Trees Based on Plant Morphology on Jalan Pangeran Ratu. Proceedings of SEMNAS BIO 2023, 310–326.

Medan City Regional Regulation Number 1 of 2022 Medan City Regional Spatial Plan for 2022 - 2042. 14 January 2022. Medan City Regional Gazette for 2022 Number 1. Medan.

Regulation of the Minister of Public Works of the Republic of Indonesia No. 5 of 2008. (2008). Guidelines for the provision and use of green open space in urban areas, 1–84.

Pratomo. A, Soedwiwahjono, Miladan. N., (2019). Quality of City Parks as Public Spaces in the City of Surakarta Based on User Perceptions and Preferences. Village-City, Volume 1, Number 1, 2019, 84-95

Ramadhan, M., Harahap, SA, Lubis, RHH, Herdyana, T., Hariati, E., Malinda, L., & Ramadhan, N. (2022). Planting Red Shoot Trees as Reforestation in Ajibaho Village. Journal of Community Service (JAPAMAS), 1(1), 48–54.

Rahman, A., Najoan, J., & Polii, M. G. M. (2015). Evaluation of Plant Functional Aspects in the Road Landscape of the SAM Ratulangi University Campus. 6(17), 1–10.

Rochim. FN & Syahbana. JA, (2013). Determining the Function and Suitability of Vegetation in Public Parks as Green Open Spaces (RTH) in Pekalongan City (Case Study: Monument Park 45, Pekalongan City). PWK Engineering, Vol. 2, no. 3, 2013, p. 314-327

Samsoedin. I. & Wibowo. A., (2012). Analysis of the Potential and Contribution of Urban Trees in Absorbing Greenhouse Gases. Case Study: National Monument City Park, Jakarta. JOURNAL of Forestry Social and Economic Research, Vol. 9, no. 1, March 2012, Pg. 42 – 53

Wahyuni. HI, Shoukat. N., Romadhon. N., (2023). Inventory of Plant Use and Their Relevance as a Resource for Ecopedagogical Learning Based on Local Wisdom. Biology Didactics: Biology Education Research Journal, p-ISSN 2549-5267, e-ISSN 2579-7352