

AMERICAN UNIVERSITY OF BEIRUT

FROM FRAGMENTED LANDSCAPE TO GREEN-BLUE
NETWORK: SUSTAINABLE GREENING OF TYRE

by

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I dedicate my thesis to my beloved brother Mohammed who left for his heavenly abode during my study journey. As you look down from heaven, I hope you're proud of your sister.

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ABSTRACT OF THE THESIS OF

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The rapid urban growth is reshaping the Lebanese coastal cities and their surrounding hinterlands, by, introducing major challenges for the preservation and conservation of open/green landscapes. Besides, "Political instability is partly responsible but also collapse of the welfare state, economic liberalization and partial integration into global systems" (Makhzoumi, 2015). As Lebanon faces an unprecedented economic and financial crisis, the privatization of state lands has been suggested as a silver bullet solution by the government. As a result, in Lebanon's fourth largest coastal city - Tyre, state lands that constitute 63% of the city's area are threatened.

The repercussions of privatizing Tyre's state lands leave severe concerns that the southern area of the city that hosts large areas of agricultural and natural landscapes will be disfigured. The current urban planning approaches failed to accommodate sustainable urban development and green urban strategies. Therefore, this thesis adopts the ecological landscape methodology to propose a strategic design and conceptual approach that first, protects the ecological and cultural character of these threatened lands and second, connects the fragmented landscapes of municipal Tyre taking into consideration the complementarity between city and its periphery.

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CHAPTER 1

INTRODUCTION

Twentieth century morphological transformations of Mediterranean coastal cities come at the expense of ecological deterioration, as well as the disappearance and loss of open space that in turn lead to the fragmentation of coastal landscapes and damage the environment in cities and their peripheries. Coastal cities in Lebanon, in the eastern end of the Mediterranean, endure such morphological ecological transformations. The outdated urban planning framework fails to address these transformations, particularly given rigid planning tools such as master planning and zoning. Indeed, approaches to master planning and building codes borrow heavily from the early modernist functionalist approach that is rigid and outdated (Al-Sabbagh, 2015). None of these tools explicitly incorporates ecological landscape approach, leaving severe concerns that the coastal landscapes will be disfigured, in line with earlier urbanization trends as coastalization and periurbanization. Worse, urban sprawl is rampant in multiple cities, thus, the scarcity, disappearance, and “steady erosion of public space” due to excessive policing and downright neglect’ (Mitchell, 2003; Smith, 1996; Low & Smith, 2006 in Amin, 2008:7). In Lebanon’s context that lacks the availability of accessible open public spaces (Fawaz, 2007; Harb, 2016; Nazzal & Chinder, 2018; UN-Habitat, 2011).

Tyre, the focus of this research, is one of the richest Lebanese cities in open publicly owned spaces which cover more than 50% of its total area. What makes Tyre’s open public spaces significant is their diverse character and large in scale, which encircle the city along its administrative boundaries. These open public spaces include archeological sites, governmental and institutional green spaces, municipal parks, the coastal nature

reserve and the fertile agricultural strips. Similar to other Lebanese cities, ad-hoc urban sprawl could take over a large percentage of these open public spaces area that constitute important environmental and economic assets for the city, as a result, destroy its cultural and natural landscapes and convert them into urbanized districts.

1.1.Case Study: Tyre as a Public City

Tyre is characterized by its publicly owned lands by which it could be considered as a public city or a city for the public. Two trends have been identified that may transform Tyre's urban morphology: First, that public assets constitute 62% of the administrative area of Tyre, majorly located within the southeastern administrative boundary (Figure 1).



Figure 5: Public Assets on the southeastern administrative boundary of Tyre. Source: (Author, 2023).

These terrains are cadastered and they fall under the land category “Amiri lands” (Public Works Studio, 2021). The evolution of Amiri land landholding was drastically affected by the modernization of land tenure systems during the Ottoman and French mandate periods, which in turn altered land uses and property right status. Historically, during the Ottoman Empire, Amiri lands were properties owned by the state that are at the disposal of emirs and walis, or princes and governors, who have the right to distribute it to their subjects to dispose of it “to the benefit of Muslims”. During and after the French Mandate, Amiri lands were still properties that are owned by the state yet they can be at the disposal of any person - the disposer - who has a special right over them called “the right of disposal”, which falls if he abandons his use for five consecutive years. In this case, his right will be forfeited, and the land will be returned to the state as its own possession and disposal (Public Works Studio, 2021). In majority of cities and villages of South Lebanon, the ownership of Amiri lands has been transferred from the state to the disposer as a tool to gain political loyalty during the French Mandate period (Badawi, 2023). Conversely, in Tyre, public awareness prevented such a scenario to happen by refusing such temptations from the French Mandate considering this process as a bartering between land and loyalty. Thus, Amiri lands in Tyre remained as public assets until now (Charafiddine, 2022). The majority of these Amiri Lands are under the disposal of different governmental agencies except for the agricultural lands that are disposed by the locals and Palestinians. According to the analysis done by Public Works Studio, the largest area of these lands in Tyre is: (1) agricultural, (2) historical – part of the Roman ruins, (3) ecological -the eastern beach and the nature reserve, (4) recreational – the park, (5) institutional- Lebanese University Campus, (6) army and (7) Ras Al Ain springs –Al-Jaftali Area. (Figure 2) These public

open spaces and landscapes are under the risk of a possible privatization because of the proposed law in 2020 to convert Amiri lands – public domain of the state - into properties that fall under ownership - private domain of the state (Public Works, 2021). This process of conversion allows the state to sell its private properties (ibid). In fact, urban expansion was mainly happening in the northeastern part of the administrative city boundaries while constrained by the presence of these public lands in the southeastern part. (Debs, 2015). Passing the proposed law may dramatically affect the

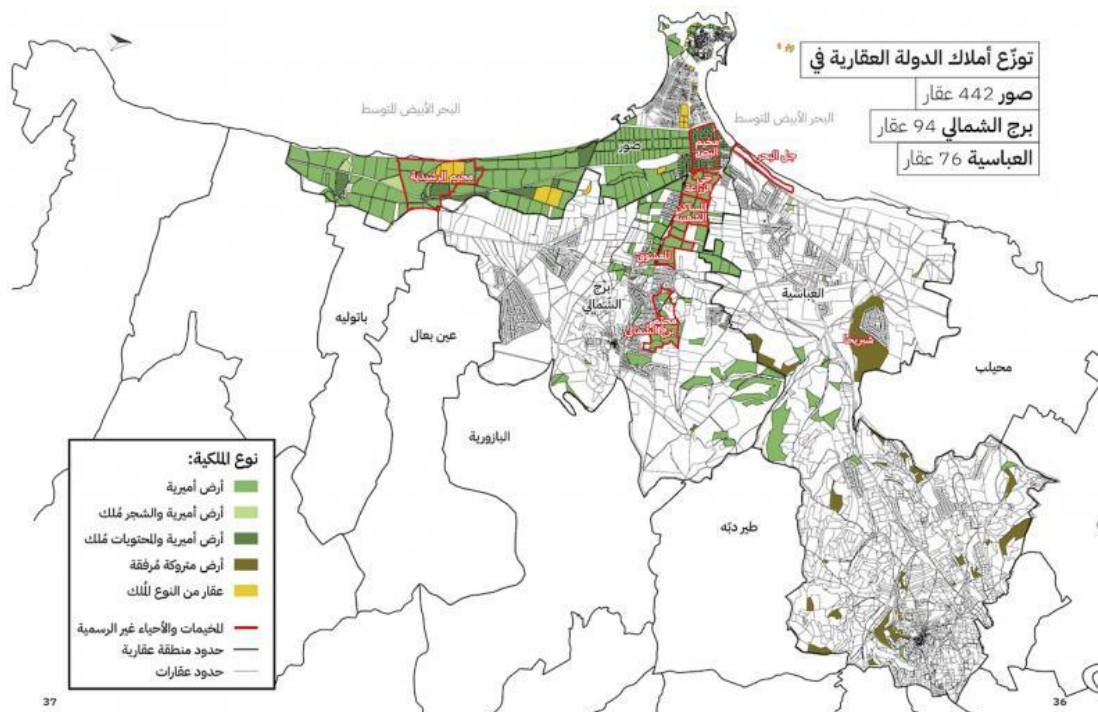


Figure 2: Amiri Lands Distribution in Greater Tyre. Source: Public Works Studio (2021).

large agricultural lands at administrative limits of the city due to land subdivision by the owners. Subsequently, these lands will be subject to the active real-estate speculation market. Consequently, the undefined sprawl extending over the jurisdiction of two surrounding towns (Ain Baal and Burj El-Chemali) would immediately continue over these public lands when opportunities arise. Correspondingly, the conversion of these

lands undermines their role in defining the distinctiveness of Tyre's landscape character.

Second, despite the fact that Tyre is rich in public landscapes, those areas are spatially segregated and enclaved even though they are condensed in certain spots of the city, as previously mentioned, in the southeastern administrative boundary. Also, these public properties are disconnected from the other spot areas of open spaces and landscapes in the northern and western part of the city. As Trancik sees that the "spatial discontinuity" in many cities led to "lost spaces" that he describes as: "They are ill-defined, without measurable boundaries, and fail to connect elements in a coherent way" (1986: 3). Indeed, each enclave has an independent identity, unique characteristics, different qualities and serious issues that need to be investigated. The majority of these enclaves are protected areas (the historical site, the nature reserve, Ras Al Ain springs...). They all lack a spatial connectivity network that defines and strengthens their existence within the city. In addition, due to these dense ensemble of heterogeneous enclaves surrounding one of the major city entrances that links Tyre to Al- Housh and Ain Baal (south-east axis), the transition between the city and its periphery is impermeable. Therefore, these landscapes are in need of a holistic sustainable urban strategy that reforms the urban–urban and urban–suburban linkages, recreates coherence, functionality, enhances their ecological connectivity, combats un-friendly environmental practices, and improves the quality of life.

1.2.Thesis Argument/ Questions

1.2.1. Argument

First, the privatization of public lands in Tyre puts the city under the threat of losing a high percentage of its landscapes and public assets. Consequently, land

subdivision or parcelization and unregulated urban developments would possibly happen and convert the different categories of public lands into urban districts with disconnected urban characters from the core of the city and the periphery. Also, the three proposed masterplans for Tyre have failed to tackle the complex urbanization processes, expansion trends and landscape transformation (Nahas,2007).

In my research, I argue that an urban sustainable development strategy is needed to regenerate these landscapes and connect them together in a cohesive, systematic, inclusive, holistic integrative, and comprehensive green blue network. Otherwise, the pattern of developments surrounding the city will continue to happen inside the city, especially that the failure of the successive masterplans in strategically directing the city's expansion led to land-use change in favor of building development and real-estate speculation.

Second, although these public landscapes have diverse typologies, characteristics and programs, they have common issues. They are spatially and programmatically unconnected, enclaved, partially functional and accessible and they have no clear spatial definition for the users. Based on these assorted characteristics of these landscapes, I argue that if different connectivity themes are proposed through a blue-green network strategy that is proposed by the USUDS (Urban Sustainable Development Strategy), the public realm of the city would be enhanced and the existing character of the city is requisitioned.

1.2.2. Questions

In this thesis I will be testing and questioning if these complex fragmented and enclaved landscapes could be areas of “opportunities” that can be reimagined in order to form urban linkages and enhance ecological and spatial connectivity.

To tackle the research question, the thesis raises the following set of questions:

- How existing landscapes and public assets can evolve to create a cohesive and integrative connected network of open green spaces in the urban environment
- Can green-blue networks serve as the catalyst for the urban and ecological regeneration of Tyre?
- What are the modes and the possibly negative impacts of possible privatization of the public assets?
- What is the planning and institutional framework that would support the design /ecological landscape approach to protect the public landscapes from privatization/urban sprawl?
- What are the recommendations to strategically implement a multifunctional green blue network within the administrative boundary of Tyre that could be situated in a larger landscape context in Greater Tyre?

1.3 Thesis Significance

This thesis's significance lies in the following:

1. The situation of Tyre public open/ green spaces is unique and complex if compared to other cities in the Lebanese context due to its diversity, concentration, scale and ownership.
2. The issue of state lands in the Lebanese context has not been investigated enough in previous publications. In particular, their situation in Tyre needs

intensive research especially that they cover a high percentage of the City's administrative area which makes Tyre as a unique case study.

2. Most of the development projects that were introduced to Tyre focused on the old city while this thesis is shedding light on other parts of the city.
3. This thesis will fill in a gap in the lacking references about the urban issues in Lebanese cities other than Beirut that has the largest share of urban studies.

1.4. Methodology

In this thesis, I adopted a qualitative and quantitative lens to explore how existing landscapes and public assets can evolve to create a cohesive and better connected network of open spaces in the urban environment, through:

1.4.1. Methodological Framework

The adopted methodology will adapt and implement the principles of the Ecological Landscape Approach that are introduced through the Ecological Landscape Associations (ELAs) (Makhzoumi & Pungetti, 1999) and apply them to the case study of Tyre. These landscape research methodologies take on the knowledge and analysis of many different fields including cultural, economic, and social with a focus on the influence of human processes in determining landscape changes throughout history (Makhzoumi and Pungetti, 1999). In other words, through this methodology, Ecological Landscape Associations, key public landscape components in the city and the southeastern administrative boundary site will be identified, analyzed and designed. This framework encourages ecological integrity, guides urban development by responding to environmental pressures and urban needs, and provides quality living in future planning. Furthermore, the approach provides planning tools to protect agricultural enclaves and

public assets in strategic locations, and helps to develop a base for the legal framework that preserves and formulates strategies to align the management and production of green landscapes.

1.4.2. Develop the Ecological Landscape Design Approach Framework

- A. Integrate marine, riparian and agricultural landscapes into a green blue multifunctional landscape network, providing opportunities for economic development, amenity and recreation and reaffirming Tyre's urban distinctiveness.
- B. identify legal and planning tools that enable and support the development of a green-blue network and guidelines for sustainable landscape management.
- C. Proposing an urban design development strategy for soft mobility, connectivity between the public assets and different landscapes through implementing a multi-functional ecological blue-green network.
- D. Proposing a set of recommendations for regenerating the connected public open spaces and landscapes.

1.5. Literature Review

- A. I reviewed theories of the ecological landscape approach and discussed ecologically guided strategies for planning the publicly owned spaces in the urban fabric of Tyre through sustainable urban greening.
- B. Local Case Studies:

This thesis proposes to reimagine the fragmented urban landscapes of administrative Tyre, the complementarity between city and countryside landscapes and the connection the city is to the periphery. Therefore, I will build my literature review on Urban Sustainable Development Strategies in the Mediterranean (USUDS). USUDS is part of the initiative MedCities that is created in Barcelona. This initiative aimed to strengthen decentralized actions through technical assistance to promote awareness of urban environmental problems and use them as a platform for action that empowers municipalities to manage urban environmental issues. USUDS offers an integral view of the different green areas and public spaces of the city and implements connecting sectors that lead to the creation of a system of green areas and green corridors that enrich the ecological matrix of the city (Makhzoumi, J. and Sabbagh, S, 2013). The USUDS was applied in Saida created an opportunity to demonstrate the expansive landscape design approach through participatory, contextualized, and multifunctional framing.

1.6. Case Study Profiling: Tyre and its Southeastern Administrative Edge.

- A. Document the historical and spatial evolution of the city. Identify the historical analysis of the development of Tyre through analyzing previous plans, maps, zoning plans, regulations, land uses and development projects that were adopted to introduce a degree of connectivity of the city core and its relation with its surrounding landscape.

- B. Map existing landscape character at the city scale and analyze the typologies of open spaces and landscapes. The purpose of this step is to understand the emergence of public open spaces and the evolution of different landscapes within the city in line with the historical analysis.
- C. Digitize the current map of Tyre using GIS - some data are collected from Beirut Urban Lab - and Google maps since all the available plans are outdated and does not match the existing urban situation, land distribution and road networks.
- D. Profiling of the current situation of the enclaved open spaces in the southeastern boundary of the city. This step will provide an in-depth understanding of the conditions that are shaping these enclaves, investigating permeability and accessibility issues, identification of the stakeholders of these areas and possible exploration urban modalities through which these open spaces could be connected and regenerated.
- E. Investigating the possible future and ongoing drivers/threats that could incite an urban transformation in these landscapes. As a result, a major change could affect their potentials as ecological, agricultural, recreational and communal assets for the city as well as increase the disconnection between the city and its periphery. Particularly, I want to understand the urban sprawl drives and dynamics in the suburban of Tyre to get a sense of prediction of what could continue to happen in the administrative boundary of Tyre if the government takes action to privatize the state lands. I would take my colleague's - Noura Madi - thesis "From Urban Sprawl to An Urban Quarter: Al-Hosh (1997-2019) As Case Study" as a base for this step.

- F. Defining the existing spatial networks and corridors and analyzing permeability and accessibility through mapping at the full city scale the following: hierarchal road network analysis, city focal and magnet points, natural corridors and topography lines, public transportation lines, pedestrian corridors analysis, parking spaces.
- G. Mapping important stakeholders, ownership status, and real-estate market data to understand the decision-making process cycle that needs to be instituted to strengthen urban governance.
- H. Conducting survey that targets residents and users of different age groups, gender, and educational background to better realize their awareness about their city public assets, and to understand the limits of disconnectivity between these spaces through directed questions that address mobility modes, permeability and accessibility aspects.

CHAPTER 2 LITERATURE REVIEW

2.1. Introduction

Urban growth, by reshaping cities and the surrounding hinterlands, introduces major challenges for the preservation and conservation of urban green/open spaces, and consequently for human health and well-being. According to research by (UNFPA, 2007, 80), it is expected that the urban population “will grow by 72% from 2000 to 2030, while the built-up area of cities (with 100,000 residents) will grow by 175 %”. Besides, more than 50% of the global population currently lives in urban areas, and this percentage continues to grow rapidly (World Health Organization, 2014). The rapid growth of the world population and the anthropogenic activities has changed the land cover and contributed to the disappearance of the natural landscape (Rayan, 2022). Specifically, “cities in the Mashreq are growing fast, harboring an increasingly large share of the population of these countries” (UN-Habitat, 2012, 59). The resulted urban growth patterns are shaping the formation of the future urban fabric, which determines the future infrastructure layout, land use patterns, and the spatial agglomeration of the socio-economic phenomenon, thereby affecting the urban vitality. Makhzoumi (2015) adds that the "regional agglomerations and urban growth corridors the emerging trend, is transforming not only the spatial and socio-economic structure of cities, but undermining the relationship of city and outlying region. Political instability is partly responsible but also collapse of the welfare state, economic liberalization and partial integration into global systems”. Relating this to Lebanon, as (UN-Habitat, 2012) estimated, by 2030, 90% of Lebanon’s population will be living in cities. The repercussions of the increase in urban population densities in parallel with the

disappearance of sustainable planning policies that reconsiders unregulated urban growth will aggravate environmental challenges, threaten the permanence of open landscapes, thus, decline the quality of urban living. Lebanese cities are lacking the availability of accessible open public spaces (Harb, 2016; Fawaz, 2007, Nazzal & Chinder, 2018; Kollmar, 2013; UN-Habitat, 2011) due to decades of privatization, real-estate encroachment and securitization. These aforementioned issues prevail due to nonexistent urban greening strategies in the existing urban plans and policies, “where such effective strategies are perceived only as a luxury urban activity” (Rayan, 2022).

2.2. Key Areas of Research:

As an urban designer who is concerned with advocating for the conservation and preservation of the public natural and socio-cultural heritage and promoting sustainability, I will argue the need for a holistic sustainable green strategies as urban greening. This sustainable urban greening strategy is a key aspect that could respond or act as a tool to minimize/prevent/limit privatization and uncontrolled urbanization or its outcomes as well as promote connectivity of the fragmented public landscapes on different attributes through green – blue networks. To understand the adopted ecological landscape design approach, key areas (landscape, landscape urbanism, landscape ecology and sustainable urban greening) that underlie this research are defined as follows:

2.2.1. Landscape

Dragoni states that landscape is an important element of people’s surroundings, a base of their identity and a result of the diversity of their integrated natural and

cultural heritage (2018, p5). Makhzoumi adds that landscape is a realization of a certain place and an expression of culture. It's a collection of the natural environment, the geomorphological operations of the site that shapes the cultural attitude of "the sense of place" to introduce "place of people": "Landscape accordingly can be defined as the place which human inhabit and organize as a system of functional form and spaces. It is a synthetic space of shaped systems functioning to serve the community and respond to their needs" (Makhzoumi & Pungetti, 1999, pp. 5-6). Since landscape is being the "place of people", the resulted integration between the environmental aspects with the socio-cultural and economical aspects of a place gave Landscape discipline a holistic character.

2.2.2. Landscape Ecology

Ecology provided a systematic dimension that influenced the landscape approach by which humans and nature are correlated in a hierarchical approach structured spatially and temporally (Wu, 2013). In other words, landscape ecology advocates the need for a holistic framework through analyzing the function, structure, and dynamics of landscapes of various kinds, incorporating all levels of interactions between ecological, socio-cultural, economic and physical aspects onto the natural, semi – natural, peri-urban and urban scales over time (ibid). Also, Naveh & Lieberman adds that landscape ecology promotes environmental development and management through dealing with the interrelations between man and the open and built-up landscapes (1994). Landscape ecology introduced a mosaic model that investigates the spatial configuration of landscapes. This model used three essential landscape components to shape landscape structure: (1) patches, that are homogeneous nonlinear

areas that differ from its surroundings, (2) corridors, that are linear areas of a certain land typology that have different physical structures and contents from its context, and (3) the matrix which is “the dominant land cover type in terms of area, degree of connectivity and continuity, and control that is exerted over the dynamics of the landscape” (Forman, 1995).

Urban Patches	Urban Corridors	Urban Matrix
● Parks	● Rivers	● Residential Neighborhoods
● Sportsfields	● Canals	● Industrial Districts
● Wetlands	● Drainageways	● Waste Disposal Areas
● Community Gardens	● Riverways	● Commercial Areas
● Cemeteries	● Roads	● Mixed Use Districts
● Campuses	● Powerlines	
● Vacant Lots		

Table 1: Examples of Urban Landscape Elements Classified in the Patch-Corridor-Matrix Model. (Forman, 1995)

2.2.3. Landscape Urbanism

According to Waldheim, urban designers and landscape architects considered landscape as the larger framework or “the fundamental building block for urban design”. From this perspective, the concept of Landscape Urbanism is revealed (2006). As McHarg and Michel Hough define, landscape urbanism is a result of integrating landscape ecology with the urban design approach to produce designs of urban spaces derivate from ecological systems and operations. Unlike the ecological landscape planning, landscape urbanism does not react or respond to ecological process. It rather deals with the ecological processes as one of the elements of the site (2004).

2.2.4. Sustainable Urban Greening:

A city is a sophisticated ecosystem consist of natural, social, ecological and economic subsystems (Ma and Wang, 1984). In addition to social and economic factors,

natural and ecological aspects play a substantial role in the planning and management of urban green/open spaces, and more widely the urban environment (Shafer, 1999).

Bradley adds that the urban green/open spaces are an important element of the complex urban ecosystem which have significant ecological, social and economic functions (1995). The need to preserve and protect the green/open spaces in cities led to the introduction of sustainable urban greening strategies such as “Urban Greening”. The concept of urban greening assures the quantity and quality of the urban and peri-urban green spaces (Turner, 1996) their multi-scalar role (Sandstrom, 2002), and the importance of interrelations between habitats (van der Ryn and Cowan, 1996). The planned, developed and maintained urban greening has the potential to guide urban development in cities by introducing a framework that manages urban growth and ecological conservation (Walmsley, 2006). Thus, urban greening as a sustainable strategy would offer opportunities for integration between urban development, ecological conservation and livability improvement. As Tappert states, urban greening is an effective tool to make the urban environment more inclusive, livable, and resilient (2019). Besides the environmental and social advantages, urban greening has been widely perceived as a competitive strategy and an increasingly relevant aspect of city branding (Garcia-Lamarca et al. 2019). According to (De Vries, van Dillen, Groenewegen, & Spreeuwenberg, 2013; Tzoulas et al., 2007), urban greening is an essential strategy of developing city’s green infrastructure (GI). Ghofrani (2017) defines GI as networks of interconnected natural and designed landscape components, that include water bodies and green and open spaces which provide multiple functions. Bakay (2012) describes, GI is a system of different green and blue areas with different naturalness degrees. It includes natural, semi-natural, and artificially created multi-

functional elements that can be considered around, within, and between urban areas (Beery, 2017). A number of principles are critical to follow to ensure the effectiveness of urban greening (UG) in developing city's green infrastructure (GI) (Benedict & McMahon, 2006):

- **Connectivity matters:** it works on two main levels: first, it should be formed between natural lands and other open spaces typologies, between programs, and between people. Second, connectivity between the different decision makers and stakeholders is required to guarantee the success of the implemented urban greening network.
- **Planning and protection of UG should be applied before any GI development:** to assure the protection of existing natural assets and landscapes, starting a development action with forming a UG leads to ecological protection and land conservation against any future urban expansion or possible urban sprawl.
- **GI responds to the needs of landowners and stakeholders:** partnerships between the public authorities themselves or with private sectors allow to produce a design network that complements the different stakeholders' perspectives.
- **Context is important:** in addition to studying the biological factors of the designated site of UG implementation, further biological, physical and morphological analysis are required to comprehend and predict the changing dynamics of the site, therefore, making the network sustainable, resilient, adaptive and flexible.

- **UG offers natural, ecological and social benefits:** a continuous and connected urban greening infrastructural networks of different open spaces typologies benefits nature, ecological systems, and community quality of life.
- **GI needs a long-term commitment:** GIs have to be considered as “living documents that need to be modified and updated periodically to remain relevant” as the urban interface is constantly evolving and growing.

Anchoring on the holistic integrative, systematic, and comprehensive concept of landscape ecology, methodology of ecological landscape design (Makhzoumi and Pungetti 1999) is proposed as a flexible framework for urban greening. (Makhzoumi, 2014)

2.3. The Ecological Landscape Approach

The ecological landscape approach demonstrates a holistic and dynamic urban framework that considers the history as a central for understanding the past, present and future of landscapes. The foundation of the holistic landscape framework is formed through the study of the temporal, evolutionary and hierarchical classification of landscapes. The advantages of the ecological landscape approach are that it directs urban development, reduces environmental degradation, encourages the ecological integrity and continuity, and responds to stressing urban and environmental needs (Makhzoumi and Pungetti, 1999). In addition, it reconnects the rural/urban interface, and it paves the way for the multi-disciplinary integrity. in other words, it integrates the cultural realm of humanities with the ecological realm of sciences. This framework

allows the ecological landscape approach the ability to interact with the opportunities and limitations of the various types of contexts. It defines the primary determinants for planning through natural and cultural attitudes. In addition, this approach links the given landscape to its larger context considering that the landscape and its elements are part of continuous geographical and geomorphological ecosystems (Makhzoumi & Pungetti, 1999). In this thesis, the ecological landscape design methodological framework is approached to propose urban greening strategies that are integrative of the history, contextualized, and responsive to the different dimensions of the city. The framework was applied to secure a holistic reading and write future greening scenarios in two projects that will be introduced in the next section.

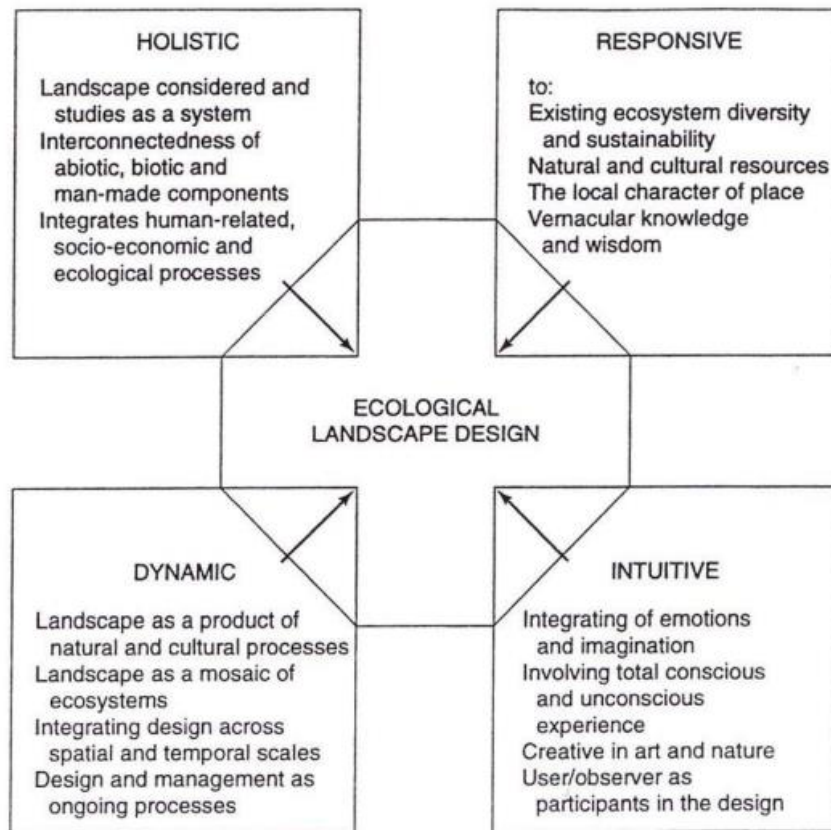


Figure 3: The Ecological Landscape Design Framework (Makhzoumi and Pungetti, 1999, p. 196)

2.4. Ecological Landscape Design Framework Case Studies

To further elaborate, the study will analyze the case studies of (1) Saida Urban Sustainable Development Strategy (USUDS), and (2) Revisiting Musha' Lands through an Ecological Landscape Approach: The Case of Tibneen. The two cases represent local examples that have implemented the ecological landscape design framework to re-conceptualize the publicly owned lands and state owned lands on different levels and scales; the first case worked on a city scale while the second case worked on the rural areas.

2.4.1. Saida Urban Sustainable Development Strategy (USUDS) Case Study

The USUDS strategically developed the city of Saida (40 Km south of the capital Beirut) that is the third largest city in Lebanon after the capital Beirut and Tripoli City. Saida's coastal plain is typically Mediterranean, 7 km long and 1–1.5 km wide, associated with a series of major rivers (Awali and Sayniq) and seasonal watercourses which traverse the foothills that define the eastern boundaries of the city. The city's character is defined by an accumulation of a contemporary, Islamic, medieval and ancient urban layers. Historically, the city was famed for its rich publically accessible productive landscapes "Basateen", the citrus orchards. Today, 28% of the municipal area of Saida is covered by coastal agriculture which is highly threatened by realty speculations due to declining in agriculture profitability and the rapid urban growth and expansion. In addition, developing green spaces in Saida is mainly limited to planting of roundabouts and road medians although insufficient efforts were made to enrich Saida's public/green spaces through establishing its municipal park. Besides, the urban development is constrained by major issues including a deterioration in the living environment, a continuous discharges of solid waste in coastal sites and domestic sewage into the watercourses, shortages in energy supply and inadequate urban infrastructure. Saida as a Mediterranean city was part of the USUDS Project's vision that focuses on "the promotion of sustainable development and social cohesion of Mediterranean cities through networking and use of urban sustainable development strategies (USUDS, 2014). The project aimed to adopt the ecological landscape design framework that introduces greening strategies such as "Urban Greening" to strategically target the public realm's and state owned lands' landscape, environment, and ecology that include the waterfront and river corridors (Figure 4). According to Makhzoumi,

“the urban greening challenge for the Saida USDS was to demonstrate that a landscape framing of environmental and ecological concerns not only spatializes them but also addresses social concerns, provision of amenity green spaces, and cultural dictates, protecting the landscape heritage” (2014). The adopted ecological framework stands on three key principles, (a) spotlighting the light on environmental sustainability and protecting ecological integrity in riparian and marine landscapes, (b) maintaining landscape connectivity through creating spatial open/green spaces network that conserves urban biodiversity and promotes safe pedestrian mobility, and (c) fostering multifunctional and multi-scalar landscapes by introducing different greening strategies that create corridors of protected riparian ecosystems and reinforce the local urban economy through amending the urban agriculture. As (Makhzoumi, 2014) describes, the implemented greening strategies are based on four complementary and comprehensive themes:

1) “The ecological context”:

The implementation of USUDS provoked the reconnection of the city with its periphery spatially, programmatically and ecologically through re-conceptualizing the threatened riparian corridors by urban encroachment and sewage dumping to work as “multifunctional amenity corridors”. Thus, enforcing the continuation of integrated geomorphological feature and urban ecosystems of the rivers and watercourses and the intersected open/green spaces from the city to hinterlands and vice versa.

2) “The spatial context”:

USUDS responded to the urban growth in Saida through increasing open/green spaces footprint. Therefore, the key greening strategy was to shift from the

concept “municipal park” to develop a network of blue and green areas that improves urban livability. The networks integrated natural, ecological and cultural landscapes collectively including the coastal waterfront, rivers and the abandoned railway to guarantee the accessibility from/to all the municipal area and its surroundings. This strategy “increases the per capita green area allocation, from 3.2 m² /capita to 7.42 m² /capita in Saida” (ibid).

3) “Urban distinctiveness”:

The aim of integrating watercourses, rivers, open/green spaces and agricultural lands collectively to reconnect the city with its periphery is most probably will "counter homogenizing processes" (ibid). In this case, targeting certain areas of intervention strategically through appropriate planning tools is more feasible and applicable than working generically and comprehensively on developing all available assets.

4) “The planning framework”:

The project applied the participatory approach in all of its phases. This approach engaged key actors whose presence was essential to formulate and analyze a common vision and development strategy for the city. The key actors that participated in all project phases included mainly Saida municipality in addition to NGOs, local communities and civil society representatives.

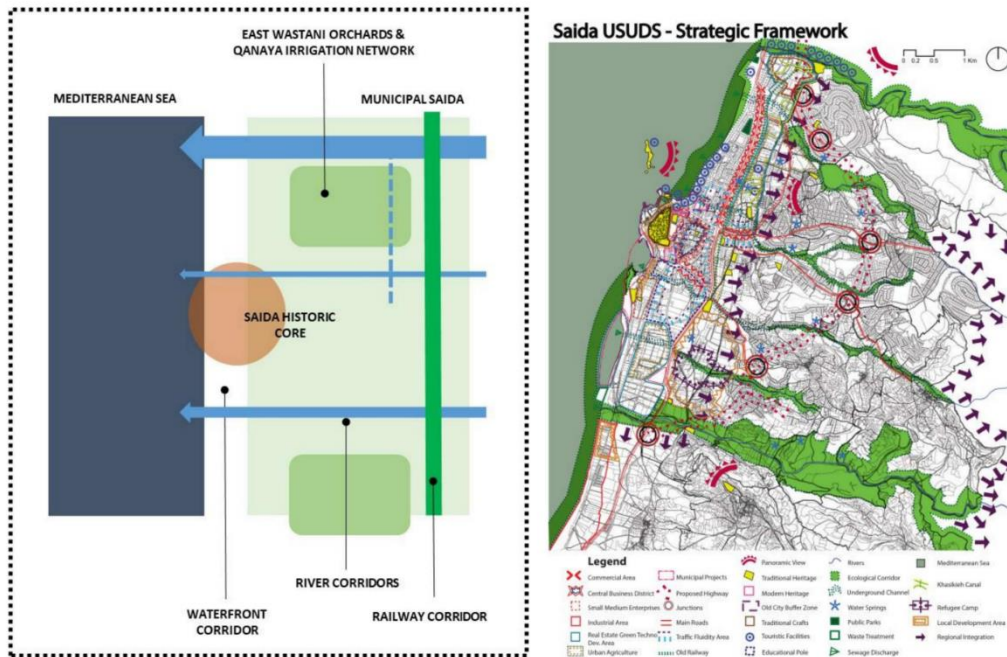


Figure 4: Saida USDS landscape concept and consolidated structure plan embracing all five project disciplinary tracks. (Makhzoumi,J & Al-Sabbagh,S, 2018)

2.4.2. Revisiting Musha' Lands through an Ecological Landscape Approach: The Case of Tibneen

Tibneen is a village located in South Lebanon, 106 km away from Beirut, the capital. Tibneen's significance lies in the fact that its outskirts include one of the largest areas of state owned lands "musha' lands" within the rural interface (Figure 5). "While reading the landscape, Tibneen retains at its outskirts two prominent natural components with socio-cultural,

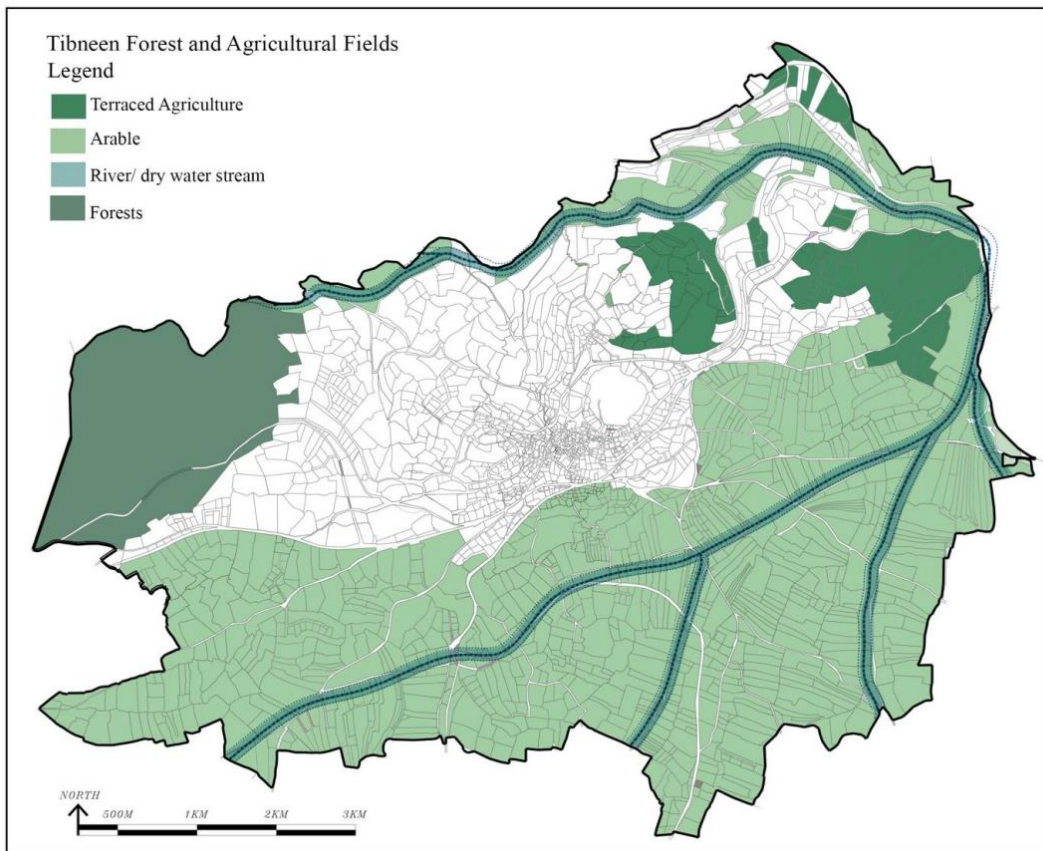


Figure 5: Map showing the agricultural fields of Tibneen and Mashrou' al Akhdar. (Fayad, R, 2019)

environmental and ecological significance forming a greenbelt confining and encircling the existing urban fabric of the village" (Fayad, 2019). Musha' lands are being historically considered as common lands specified for the purpose of grazing, cultivating or conserving forests and communal ponds. "For generations, musha 'lands

in the Middle-East were considered a fundamental source of livelihood for rural communities that are sustainably managed and governed by cultural practices and communal rules and customs” (ibid). During the French Mandate period, the modernization of land tenure laws didn’t consider musha’ to be an ownership category, and therefore communal lands were lost. Worse, the failure of establishing a legal planning framework paralyzed the historical cultural practices. Most of musha’ lands that were categorized during the Ottoman Empire were thus privatized. Fayad’s thesis tackled the issue of musha’ lands based on its social and cultural perspectives away from being legally a registered land category. The socio-cultural perspective was anchored on the combination of the shared responsibility to sustainably manage and maintain the village’s landscape, the collective understanding of place identity, and the communal sense of belonging to safeguard the ecological resources and integrity of the village. Two main areas in Tibneen were studied, first, the forest or Mashrou’ al Akhdar that occupies 7.28 % of village’s total area and second, Sahel Al Khan, the agricultural valley of the village that occupies 66% of village’s total area. The agricultural fields preserved a rich cultural and natural heritage shaped by the inherited social and rural practices. The privatization of these fields started during the French mandate. However, “the fields have maintained locally their communal significance as “agricultural fields,” the location of agrarian investments for most town dwellers, whether they are propertied or not” (Fawaz, 2016). Although Sahel Al Khan is shared with seven adjacent villages, it is considered in the land-use maps of the Master Plan of 2005 within the municipal boundaries of Tibneen. The proposed master plan produced a land-use plan that serves the benefits of property owners “who value their lands as a real estate asset aiming at increasing their market value with a higher building coefficient” (Fayad, 2019, p.52).

The implementation of the master plan threatens the ecological continuity of the agricultural lands, as a result, the common resources of rain water collection channels will disappear. Thus, the ecological landscape approach is adopted as an attempt to maintain the ecological and cultural integrity, “promote sustainable development based on community inclusive scenarios and reinforce the natural and cultural spirit of the place” (ibid).

The thesis concentrated on reading the different landscape elements of Tibneen addressing the abiotic components - soil topography and geology, climate and hydrology - and the biotic elements – including the archeological sites and vegetation cover of the forests. It also addressed the cultural and social elements including the built-up landscapes, agricultural landscapes and infrastructural landscapes. The thesis suggests to propose a new definition of *musha'* as a property category in the land registry rather than the restrictive and inherited definition. It suggests a definition “that includes all lands, one which collective/shared social meaning is inscribed, irrespective of property ownership” (ibid). Based on the new proposed definition of *musha'* in Tibneen, *musha'* is classified into three categories based on ecological landscape associations (ELAs) reading of Tibneen that only concentrated on the natural and open landscapes (ibid). The first category defines “*musha'* as natural resource” that includes the seasonal water channels, the river bed and the water spring which played an important role in feeding the irrigation channels of the cultivated fields not only on the scale of Tibneen but also on a wider scale covering the surrounding villages. The second category defines “*musha'* as productive landscapes and sources of livelihood”. This category includes the arable and terraced agriculture of Sahel Al Khan that are defined as (1) lands adjacent to the river bed and occupies 18.77% of Tibneen’s total

area; (2) lands located in the topographical flat areas of the river valley and occupies 35.3% of the village’s total area; (3) the terraces that occupies 4.8% of Tibneen total area along the village’s hill sides and (4) the privately-owned lands that are perceived as green public space or a scenic landscape which “promotes social networking, providing recreational opportunities as well as a place that anchors the sense of belonging” (ibid). The third category defines “musha’ as natural heritage” that includes forests managed and governed by different public authorities; (1) the Citadel’s green buffer zone is managed by the Municipality of Tibneen and The Ministry of Antiquities and (2) Mashrou’ al Akhdar is governed by the Ministry of Agriculture and the Municipality. The ELAs reading showed that the contemporary built-up footprint is gradually

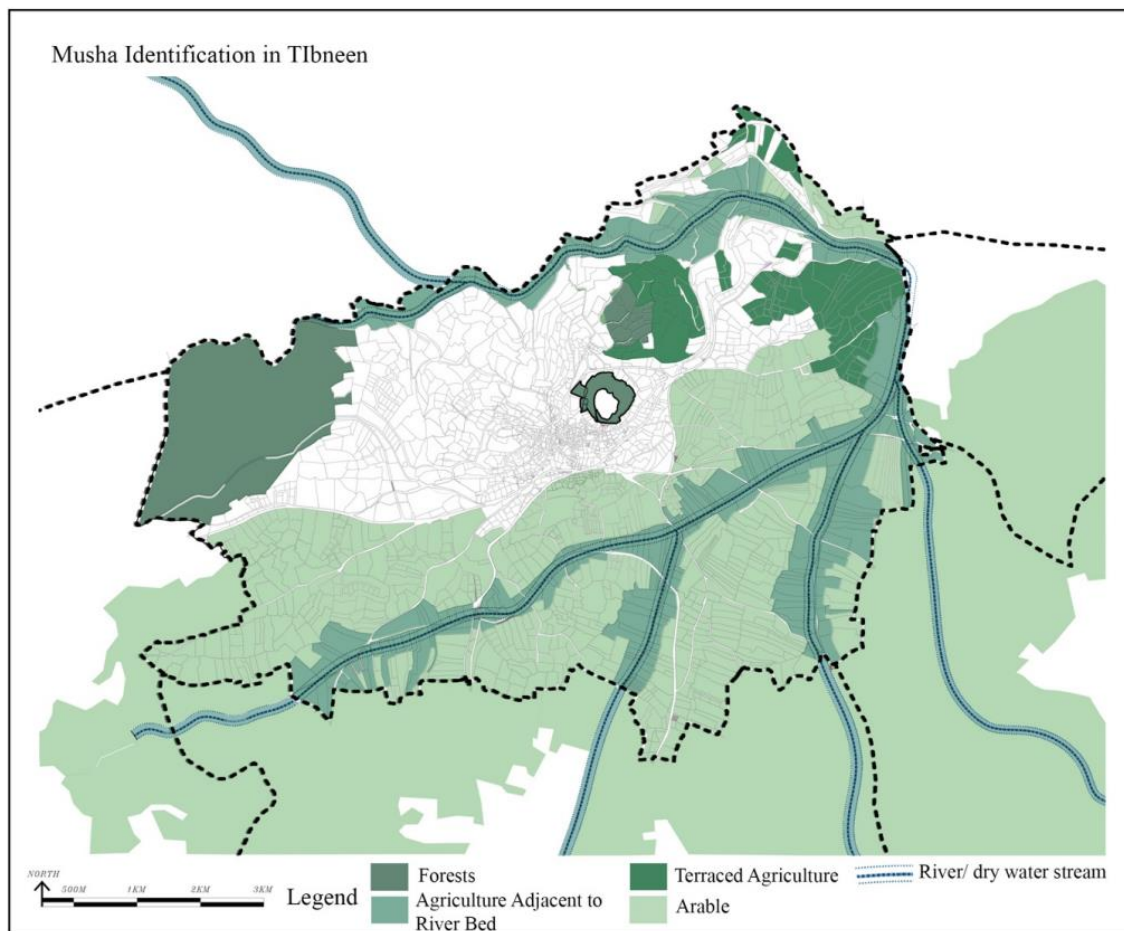


Figure 6: Map Showing Musha’ in Tibneen. (Fayad, 2019)

expanding outside the historic core towards the categorized musha' lands. As a result, the productive landscapes are threatened by the uncontrolled urbanization despite the fact that these landscapes are a source of livelihood for 60% of Tibneen's permanent residents who use it for cultivation (Harajli, 2013). Thus, the thesis proposed a multi-scalar planning framework that: (1) reclaims communal ownership of musha' landscape through "reintroducing musha' in the land registry as a sub-category of propertied ownership", (2)revives institutional framework of musha' by establishing Musha' Council in the Union of Municipality that aims to "promote communal engagement in the planning and management process and raise awareness in preserving musha' landscapes while reaffirming the communal sense of belonging" (Fayad, 2019), and (3) recommends planning strategies, guidelines and incentives that helps in managing, preserving and protecting musha'. In addition, the thesis introduced a design intervention aimed at (a) strengthening landscape connectivity and ensuring communal accessibility through designing a green public promenade "that connects along the same pathway the old historic core, the citadel, the green buffer zone, and the Mashrou el Akhdar. It also extends beyond the municipal boundaries of Tibneen to physically connect the village with nearby villages, specifically Safad al Batikh, Haris, and Haddatha" (ibid). (b) Preserving and activating the ecological corridor through small-scale water ponds "to revive and reactivate this musha' as a shared resource used by the farmers to maintain the agricultural production and expand the cropping options especially during drought seasons" and (c) rethinking 2005 Tibneen Master Plan (Figure 7).

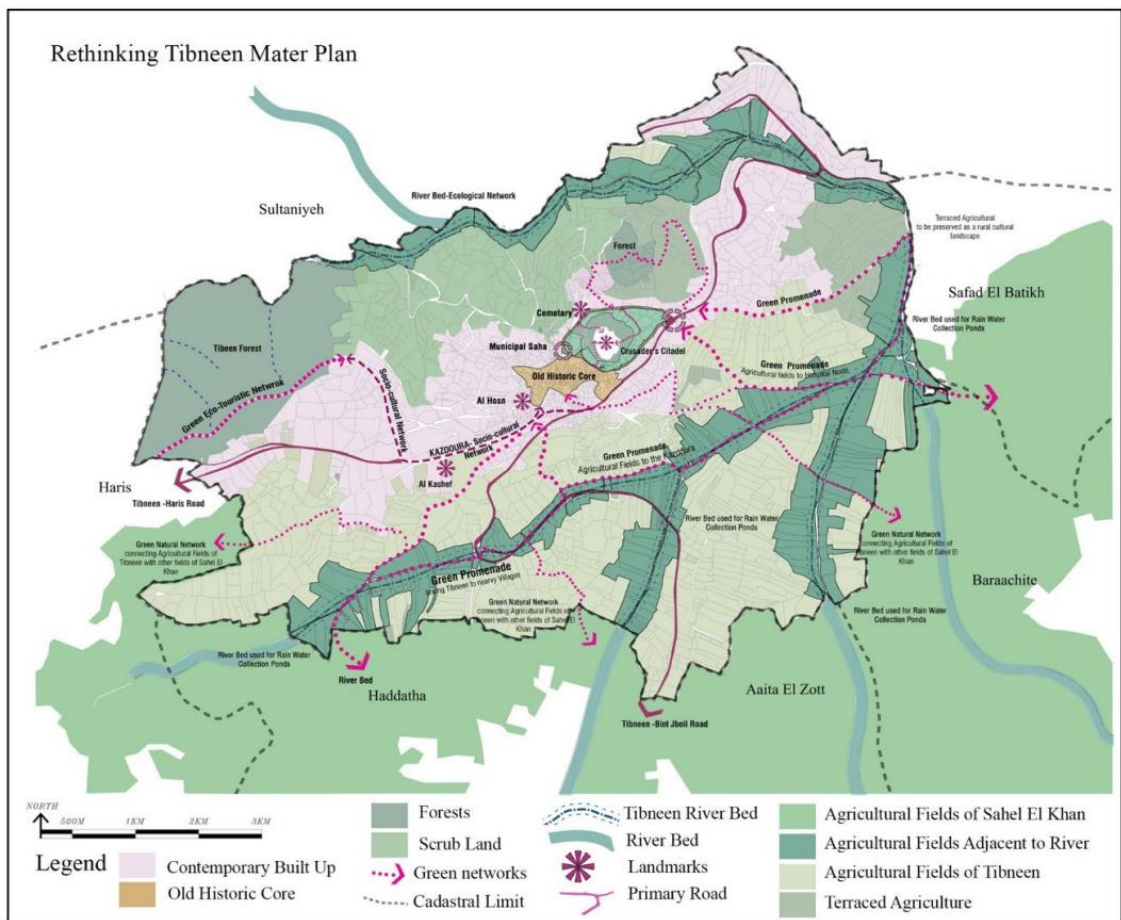


Figure 7: Rethinking Tibneen Master Plan through the Concept of Musha‘ (Fayad, 2019)

The two case studies discussed above are examples of the adoption of the ecological landscape planning and design approach over varying scales in local contexts, in a rural and urban landscapes. The study cases have presented implemented strategies that have managed to control any possible future irregular expansion, preserve valuable natural resources, re-conceptualize the definition of state owned lands and define urban boundaries. They investigated the importance of implementing an ecological landscape approach that tackles, the environment, the landscape, and the land ownership. They traced the significance of the ecological landscape approach in providing an integrative and holistic reading of the natural, rural and urban environments and comprehending the heterogeneous and diverse components of Tibneen’s and Saida’s landscapes. Public

lands and state owned lands in the two cases were protected and developed in a way that ensures the ecological integrity of blue green networks which increases the per capita allocation of green areas in Saida and sustainably manages the green state lands in Tibneen. In addition, the adoption of landscape character zones created dynamic and flexible tools that respond to the evolution of the city of Saida and the village of Tibneen. Also, what makes the case of Tibneen significant is that it dealt with an inherited land category “musha” from the Ottoman land laws which covers different land uses managed by different stakeholders. This similarity with the parameters of this thesis provides a guiding methodology that could direct the development of state lands in Tyre.

2.5. State Owned Lands

My initial research track was to understand land ownership categories, but eventually after doing the research, I realized that this is a very complex issue that requires archival work beyond the scope of a master’s thesis in urban design. However, I will list herein the key findings that I have come across.

According to Beer (1990), because of the way of how people have related to the natural and physical environment in the past, different landscapes have evolved in different characters. Conserving these characters is essential, as they express the way people have used the land within the limitations of the local environment and reflect the cultural heritage. In other words, landscape is part of people’s sense of belonging to a certain place. In Lebanon, land law was established during the Ottoman Empire and started to evolve since then. The evolution of the Ottoman land laws was a reflection of the cultural and communal behaviors that followed nature, religion and agricultural

practices (Warriner, 1948). In brief, there was an increasing correspondence between the continuity of communal practices and the continuity of landscapes evolution within a legislative framework. The Ottoman land legislative framework reflected these different forces: the relation between the Sultan or state and the community, the relation between man/community and nature and agriculture as the main driver of the economy at the time (Owen, 2000).

Many of the systems, and laws that belonged to the old eras of the Ottomans and the French Mandate have not been updated and developed in line with the new dynamics taking place in different aspects especially in the realm of real estate and public property. The establishment of the Lebanese property law no. 3339 dated 12/11/1930 during the French Mandate period was based on the principle that land is the most important asset owned by the newly established state, which the French claimed to strengthen at the time. Also, following the principles of modern efficient capitalism at the time, a rational and optimal use of these assets was considered as the foundation on which planning at multi levels, types and objectives must be based. At the present time, the responsibility of managing the Lebanese state's property does not lie in one hand or party as happened in the Ottoman era. Rather, according to Law 275/1926, the management of public land is distributed among different ministries mainly by the Ministry of Finance, the Ministry of Agriculture and other ministries. Each ministry is responsible for managing the properties allocated to it (private and public state properties) in order to meet the needs of the Lebanese society. They determine their needs to acquire real estate or give it up. The 1930 Property Law, made some amendments on the state's land classifications in order to abolish the feudalism that occurred in abundance during the Ottoman and French periods. The Public Land Law

defined 11 categories of public land ownership officially defined land categories in the land registry were classified under three main titles “Private Lands”, “Private State Lands / State-owned Lands” and “Public Lands” that are identified as follows (Public Works Studio, 2022):

- **Private Lands:** includes one category, *Mulk Land*. It represents lands that are fully and totally owned by individuals or groups, which means the land owners enjoy the privilege of both the right of resource Ownership - Hak Al-Rakabah and the right of use or disposal -Hak Al-Tasarouf.
- **Private State Lands:** includes three land categories, *first, Amiri land* which is the land that belongs to the state under the use or disposal of individuals. As previously mentioned, the resource ownership right - Hak Al-Rakabah - belongs to the state while the individual enjoys the right of use or Usufruct right - Hak Al-Tasarouf. *Second, Metrake Murfakah /Musha’* (*متروكة مرفقة أو*) (*المشاع*), are lands owned by the state or municipality and used by municipality or groups or all the village inhabitants under certain conditions. The resource ownership right - Hak Al-Rakabah - belongs to the state represented by the municipality while the inhabitants of the village enjoys the right of use or Usufruct right - Hak Al- Tasarouf of the musha’ land that is located within their village’s municipal boundary. Also, the law divided this category into two classes, Private Municipal Lands - Mulk Baladi Khas (*ملك بلدي خاص*) – and Public Municipal Lands - Mulk Baladi ‘aam (*ملك بلدي عام*). *Third, Mewat Lands – Dead Lands*, also Known as *Khaliyah Mobaha* (*خالية مباحة*) are lands that are geographically located outside the limits of villages and that cannot be cultivated such as sand dunes, rocky slopes and

swamps that belong to no one and are not allocated since ancient times to a certain village. Their resource ownership right - Hak Al-Rakabah - belongs to the state while the right of use or Usufruct right - Hak Al-Tasarouf is given to no one.

- **Public State Lands:** includes one category, *Matruke Mahmiyeh* refers to the lands are left for the general public use without any charge. These lands may be natural lands, such as beaches and river properties, or they may be artificial such as public roads, streets, public parks, ports, harbors etc. The resource ownership right - Hak Al Rakabah - and the right of use or Usufruct right - Hak Al-Tasarouf – only belong to the state.

The law distinguished between private state lands /state-owned lands and public lands.

The types of rights that can be acquired on public state lands are different from those that can be acquired on private state lands. Private state lands /state-owned lands refer to lands that are owned by the state as a legal entity. The right of use or disposal is given for either the state, community or individual. The state can dispose of its private land as the individuals do with their private properties, such as selling, giving it up or leasing the property for its own account under certain conditions. These transactions are handled by the Ministry of Finance through the Directorate of Real Estate Affairs and Survey. On the other hand, public lands are assigned for the use of the public interest. These public lands cannot be sold, disposed of or acquired and no rights can be acquired with time. If it is to be sold or part of it, there is a completed process to follow through which the land to be sold falls from being a public state land to a private state land, then the sale could take place. Nowadays, the state discusses the possibility of giving up Amiri lands which constitute 52% of its total properties to become non-state private

lands (ibid). This step transforms productive lands with social and economic values into a mere commodity by exposing them to real estate monopoly.

The current Lebanese land law is based on what the Ottomans have established with some shifts that happened throughout the time. The Lebanese property law differentiated between public lands and state owned lands. The former type includes lands that are left for the use of the public interest. Referring to the decision 144 issued in 10/07/1925, public lands cannot be sold, acquired or disposed of and no rights can be acquired with time. However, state owned lands refers to lands that are owned by the state as a legal entity where the right of use is granted for either the state, community or individual. The later type of lands were clearly identified in law number 275 issued in 25/5/1925, that specified Amiri of Mirri lands, Matruke Murfakeh as well as forests and uncultivated lands as state owned lands governed by State Private Property Department except for forests that are administered and managed by the Ministry of Agriculture.

2.5.1. The Threat of Privatizing Public/State Owned Lands in Lebanon

Considering the current economic recession in Lebanon as well as the soaring prices of urban lands, counting on the state for the development and provision of new public spaces is problematic. Neoliberal politics are increasingly transforming the public realm in capital cities into exclusive, market driven and securitized landscapes (Fawaz, 2009). As Lebanon faces an unprecedented economic and financial crisis, according to Albert Kostanian - the Senior Policy Fellow for Economics at the Issam Fares Institute at AUB - “the privatization of Publicly Held Assets (PHA) has been proposed as a silver bullet solution, with little evidence to support such claims. PHAs are the martingale of the debate; a trick that will purportedly ease the government’s proposed plans to get the country out of the current deadlock.” (2021, p. 2). According

to Fawaz, the state's inability to impose a political reform that encloses an administrative reform that encompass productivity and financial correction was one of the main reasons that induced privatization in the post-civil war era (2018). The state is pushing for solutions to protect the interests of banks and the political elite at the expense of public assets through the increasingly rising voices of politicians that call for the sale of state properties to make up for banks' losses. Indeed, it is crucial to get lessons from Lebanon's previous experiences with the privatization of the PHAs that largely happened in the nineties after the civil war in parallel with an evolution of laws that are relevant in this regard. Therefore, I will introduce in the following sections the case of privatizing Beirut's city center –that has set an example of neoliberal market driven appropriation of state owned land throughout Lebanon - and I will introduce the possible privatization of state owned lands in Tyre City that are categorized as Amiri lands.

2.5.2. The Privately Owned City Center; The Case of Beirut.

When thinking about any kind of privatization efforts in Lebanon, it is worth noting that the Solidere¹ experience in Down Town Beirut and the disregard it had for the importance of public assets constitutes a warning sign that must be heeded in case any privatization campaigns are raised again. The story behind Solidere started during the Lebanese civil war intensive shelling that damaged the downtown area (1975-1990) and when the Council for Development and Reconstruction (CDR) called for rebuilding the city center, improving its infrastructure and restoring its centrality in the life of Beirut (Makdisi,1997). Until late 1983, official development and reconstruction plans

¹ The name stands for Société Libanaise pour le Développement et la Reconstruction du Centre- ville de Beyrouth, French for "The Lebanese Company for the Development and Reconstruction of Beirut Central District" (Solidere, 2017).

were absent. This absence led to continuous demolitions in the city center area on the pretext of cleaning up the damage. Without the authorization or approval of any governmental institution, the cleaning up involved the destruction of major public areas as Souk Sursuq, Souk Al-Nouriyeh and large sections of Saifi in addition to some of the area's most significant surviving buildings (ibid). In the early 90's, the demolition of most of the remaining structures in the center continued under a "legalized" set of master plans for the reconstruction of central Beirut in order to facilitate a large-scale development project that develops "a surface area of about 180 hectares, in addition to 60 hectares of land reclaimed from the sea" (Makhzoumi, 2021, p. 188). These plans were managed by a single private real estate company – Solidere - that was established - as claimed - to expropriate all the land in the city center and take over the reconstruction process. Also, it's claimed that the establishment of Solidere was the key to solve the puzzle of the "increased fragmentation of property rights, the diffusion of property-rights claimants and related inheritance disputes" in the city center (Makdisi, 1997, p. 79). The establishment of Solidere represented the extreme form of privatization and partnership with the private sector in Lebanon. On the pretext of the state's inability to reconstruct Beirut's City Center (BCD) after the civil war, Law No. 117 was issued in 1991, stipulating the expropriation of private and public properties in downtown Beirut. When Hariri was elected as the prime minister in 1992, the state claimed that privatization is the solution to accelerate the post-war economy beside the challenges posed by the political instability. Assem Salam argues, "entrusting Beirut's Central Business District (CBD) redevelopment to the CDR is a typical example of the dangers inherent in the state's abdication of its role in orienting and controlling one of the most sensitive reconstruction development projects in the country" (1995, p. 98). By passing

this law, rights' holders were forced to relinquish their ownership from its most stable form, land ownership, to its most volatile form, share ownership. Makdisi mentions that this process not only “confuses public and private interests, but that it represents the colonization of the former by the latter” (1997). Makhzoumi adds that “this is evident in the project’s disregard for the public and its dismissal of citizens whose property, inherited over generations, was expropriated by the company” (2021). One of the persistent criticisms of the Solidere project is that the state disregarded its social responsibilities to what is related to upholding the right of citizens in their own properties in specific and the right of citizens in the public realm in general. It is worth pointing out that 50% of the municipal public spaces are located within the developed BCD by Solidere. In spite of the fact that Solidere claims the increasing of the public realm area by 25% (Gavin & Maluf, 1996), Makhzoumi argues that “Solidere prioritized real estate value over built heritage, cultural values, and sentimental attachment” (2021). In other words, Solidere’s methodology of establishing open spaces in BCD was superficial, dealing with the significant values of social and cultural landscapes as urban scenery (ibid). Moreover, securitization has been as a disgrace attached to every opportunity that a citizen could spend in the public spaces controlled by Solidere. Despite the different reasons and factors of BCD’s scenario, when the floodgates of privatization open in another scenario, it’s worth learning from the repercussions of the withering away of the state and colonizing it by capital as happened by Solidere.

2.5.3. The Publically Owned City; The Case of Tyre.

The experience of Solidere and the market-driven development of the Beirut Central Business District (CBD), forms the background for my case study, Tyre City. Tyre or Sour (صور) is a harbour city well recognized for its mercantile activity throughout the Mediterranean since ancient Phoenician times. Located in Lebanon's South Governorate 83km south of the capital Beirut and 26km north of the country's southern border, Tyre is considered Lebanon's fourth largest coastal city, and is characterized by its wealth of sites of archaeological and natural significance. At a time when other cities in Lebanon have lost their open/green areas, Tyre continues to have enormous and diverse open spaces that covers a great percentage of its area (Public Works Studio, 2022). State lands constitute 62% of Tyre's area within its municipal boundaries, while the area of state lands with its all categories reaches more than 70% of the city area. Most of state lands are agricultural lands, natural protected areas, historical lands and park, all are along the Mediterranean coast. (ibid). What distinguishes these lands in Tyre, is that these lands were not privatized as happened in the other Lebanese cities or villages (Charafiddine, 2022). Nevertheless, according to Public Works Studio study, in the last few years, two members of the Lebanese Parliament suggested - beside verbal attempts from the Central Bank of Lebanon - to privatize state owned lands in Lebanon (2021). Thus, a large area of open/ green spaces in Tyre are under the threat of privatization. Kostanian states "while privatization can theoretically alleviate losses borne by the financial system, any decision to sell off state assets must be weighed based on economic and social criteria that will contribute to the long-term objective of improving the population's overall welfare in a sustainable manner." (2021, p. 1).

2.6. Summary

Historically, Amiri lands were lands that lie outside the boundaries of cities and villages. They were temporarily allocated as lands of conquest during the battles of the Ottoman Empire and were mostly agricultural lands that produce a huge income for the state's economy (Warriner, 1948). Being owned by the state for centuries, Amiri lands protected vast agricultural areas in Tyre (Public Works Studio, 2022). Today, Amiri land is facing various challenges resulting in possible transformation into areas of urban sprawl or a target for market driven and real estate development agenda with no attention being paid to the social rights and environmental repercussions. Last, the emphasis of this study is that all the categories mentioned in previous sections are all state lands regardless of being Amiri or another. The following chapter will analyze state lands in Tyre, the case study of this thesis, pointing on their soci-cultural and ecological values, and on the environmental challenges that state lands are facing in the 21st century.

CHAPTER 3

CASE STUDY: TYRE CITY

In Lebanon, coastal lands are highly demanded. The absence of sustainable urban vision and regulations may lead to the uncontrolled and unregulated development of the coastal zone and the disruption of natural ecosystems in the future. This chapter analyzes the urban sprawl surrounding the city of Tyre, details how state lands are managed by different stakeholders and discusses the importance of preserving and protecting these lands from privatization.

3.1. Historical Overview

The National Physical Master Plan of the Lebanese territory (IAURIF, 2005) describes the City of Tyre as a “patrimonial city” and a major southern agglomeration with special agricultural, natural and historical features. Tyre city has witnessed pivotal and transitional historical stages with regard to urban expansion. In the late 3rd Millennium BC, the Phoenicians established Tyre over two distinct cores. The first core is sea fort on an island less than a kilometer offshore and the second core is on the mainland which is the old city known as Ushu which in effect became a suburb that feeds the island with water and timber (Marriner, 2008). During the Canaanite rule of Tyre, Nebuchadnezzar - King of Babylon - laid siege to the city for 13 years which is considered the longest siege in history to depose the king of Canaanite Tyre. This siege led to population migration from the mainland to the fortified island city. Then, in

332BC, a circumstantial shift happened when Alexander the Great laid siege to the city and failed to win the loyalty of the besieged Souri people on the island. He decided to invade the island by expanding the city through a causeway connecting the sea fort with the mainland forming a peninsula (the current boundaries of Tyre). In 64BC, Tyre became a Roman province. During this era, the archeological area that covers 10% of current Tyre's municipal area that includes the Arch of Hadrian and

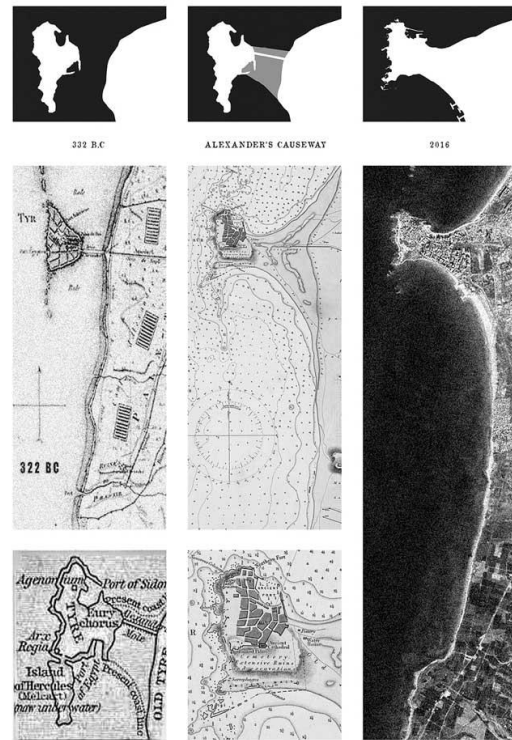


Figure 8: Urban transformations of Tyre throughout the ages. (Abi Karam, 2017).

the hippodrome was built. Tyre continued on as a port city under the Byzantine Empire until the 7th century AD when it was taken in the Muslim conquest of the region (ibid). In 1291, Tyre was taken by the Mamluk Sultanate. This was followed by Ottoman rule from 1516 up until the fall of the Empire in 1918. Documents that date back to 1883 during the late Ottoman Empire show that Tyre was a typical model of Islamic Mediterranean coastal cities which was a cluster of staggered houses concentrated in a small geographic area, confined within the old city walls, and encompassed by Amiri lands which are mostly agricultural plains (Diab, 2010). The Ottoman rule in Tyre considered Amiri lands as an agricultural asset to feed the growing city. With the end of World War I, Tyre was integrated into the modern state of Lebanon under the French Mandate that planned to gradually privatize Amiri lands (Mounayer, 1929).

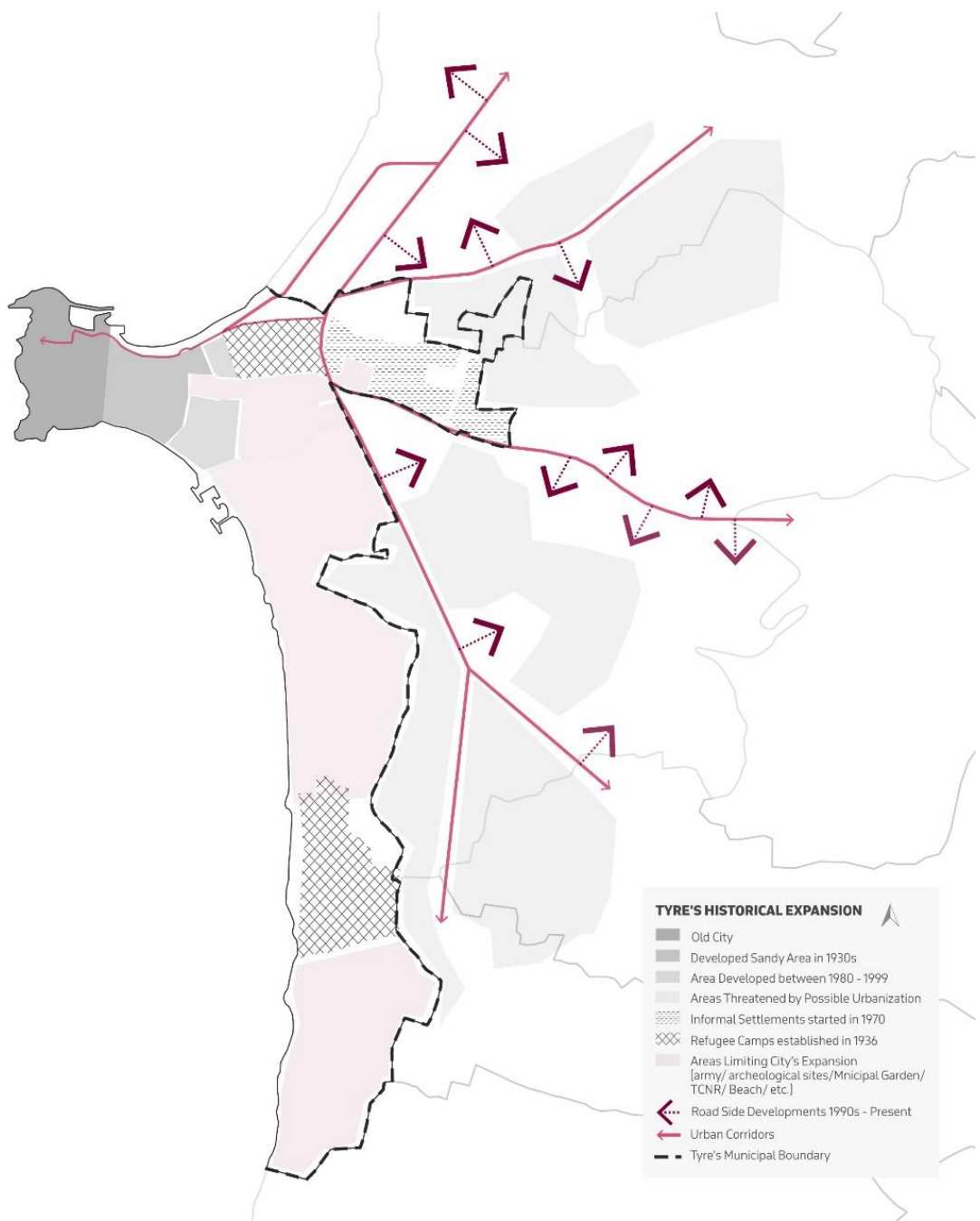


Figure 9: Tyre Expansion Areas. By (Author, 2023).

Besides, during the French Mandate, the city expanded towards the empty sandy lands in the eastern edge of the old city. Thus, the municipality was forced to pave the main roads with asphalt due to the increase in car numbers. On one side, transportation infrastructures connected the city with its peripheries (Tyre-Bent Jbeil, Tyre-Naqoura, Tyre-Al-Bus) and revitalized its economy. On the other side, it led to roadside development with new urban fabric appearing in the old city's peripheries (Al-Buss, Rachideye, Maachouk, Jal Al-Baher) (Debs, 2015). In the 1930s, the sandy area continued shrinking due to the high demand on construction and the excessive selling of state lands. In parallel, Tyre was subject to the influx of Armenian refugees in the 1930s, and the subsequent influx of refugees from Palestine as of 1948. In 1936, the French Authorities established refugee camps in Tyre for Armenian refugees (Nakhal, 2014). Later, with the influx of Palestinian refugees, these already established refugee camps were denoted as Palestinian refugee camps (Nahas, 2007). Tyre has been subject to an ongoing rural exodus since the 1960s. Between the end of 1960s and beginning of 1970s, a first settlement to manage the urban growth was initiated as a government

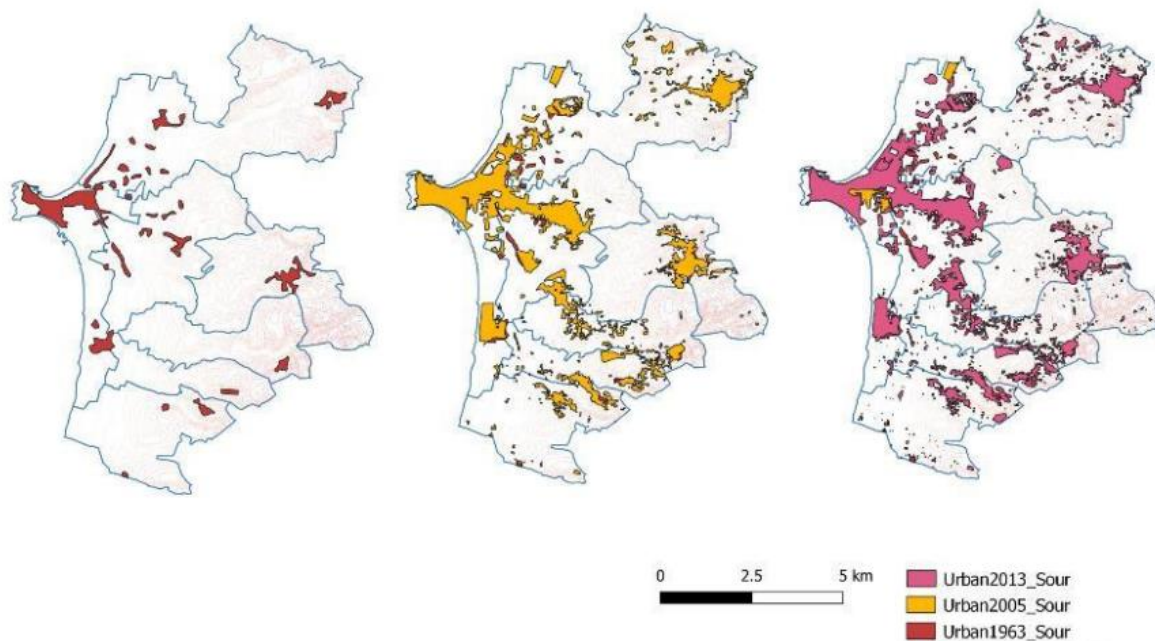


Figure 10: Urban Expansion of Tyre Caza. (Basma, 2020).

housing project located on state lands of the eastern edge of the city forming Al-Masaken neighborhood. Since then, this neighborhood has grown informally by several folds, attracting waves of population, frequently displaced involuntary from other sections of South Lebanon through the repeated Israeli aggressions across the Lebanon/Palestine border (Nakhal, 2014). This informal growth led to expanding Al-Masaken neighborhood on the adjacent state lands forming two informal neighborhoods of “Al-Ziraa” and “Al-Maashouk”. This rural-urban migration that expanded the city and increased its population led to the development of the city’s first masterplan in 1966, by architect Pierre Khoury that was barely put into action before the civil war started in 1975. During the civil war, Tyre’s urban expansion progressed both horizontally and vertically in an uncontrolled manner which changed the city’s morphology and included unregulated development in close proximity to major archaeological sites and historical properties (Diab, 2010). Today, urban expansion in Tyre’s agricultural plain extends along three main axes following the major roads around Tyre linking to Al-Abbassieh (north-east axis), Ain Baal (south-east axis), and Bezoureye (east-west axis). A map conducted in 2021 by Noura Madi shows that building development is mostly concentrated around the municipal boundaries of Tyre while building development within the city is less dense. According to (Madi, 2021), building is very difficult in Tyre where most of the land had archeological/cultural constraints, a difficulty that had pushed developers to invest outside the city. Consequently, the city nearby districts are the sites of intense building developments, namely the towns of Abbasiyyeh, Burj El-Chemali, Ain Baal, and Chaaitiye (Figure 11).

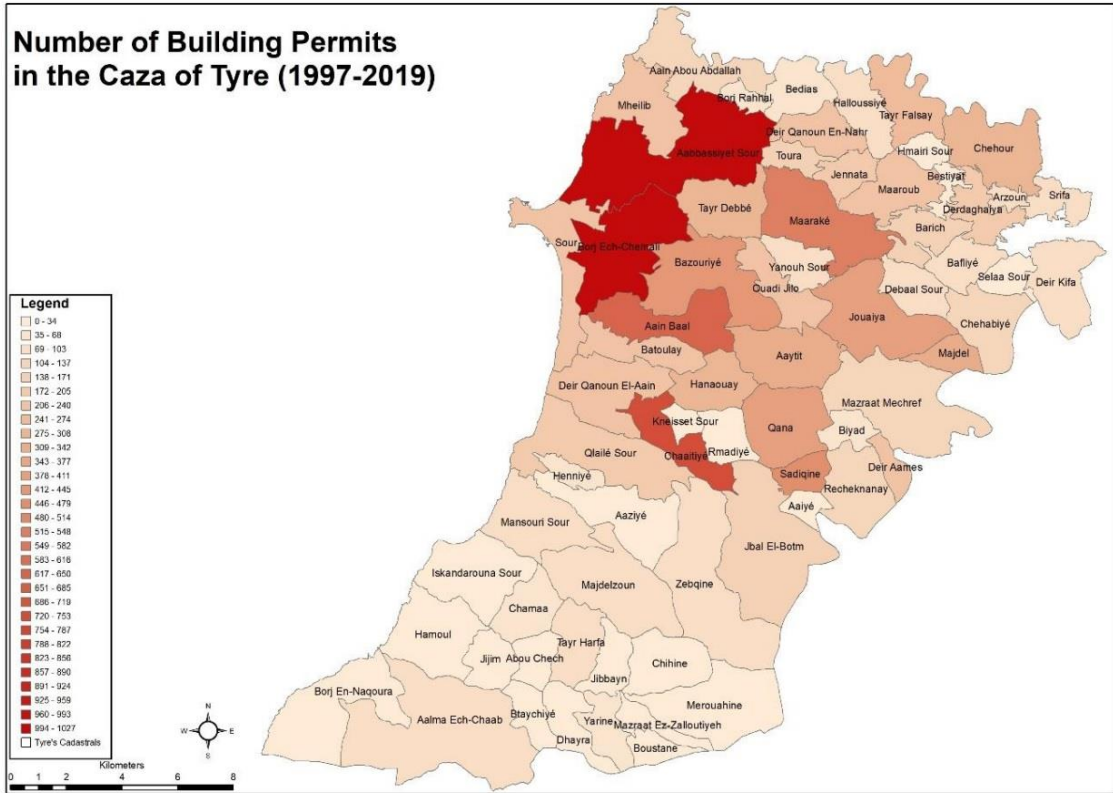


Figure 11: Number of Building Permits since 1997 in Tyre Caza. (Madi, 2021).

3.2. Tyre Boundaries

Tyre city falls within the administrative division of Tyre Caza that groups 60 municipalities. The administrative boundaries of Tyre city are defined by the five surrounding municipalities of Borj Al-Shemali, Abbassieh, Ain Baal, Batoulay, and Deir Qanoun El-Ain. The phenomenon of urban sprawl is affecting the urban, the peri-urban and the hinterland leading to an increasing pace and scale of landscape change which make defining urban-rural boundaries

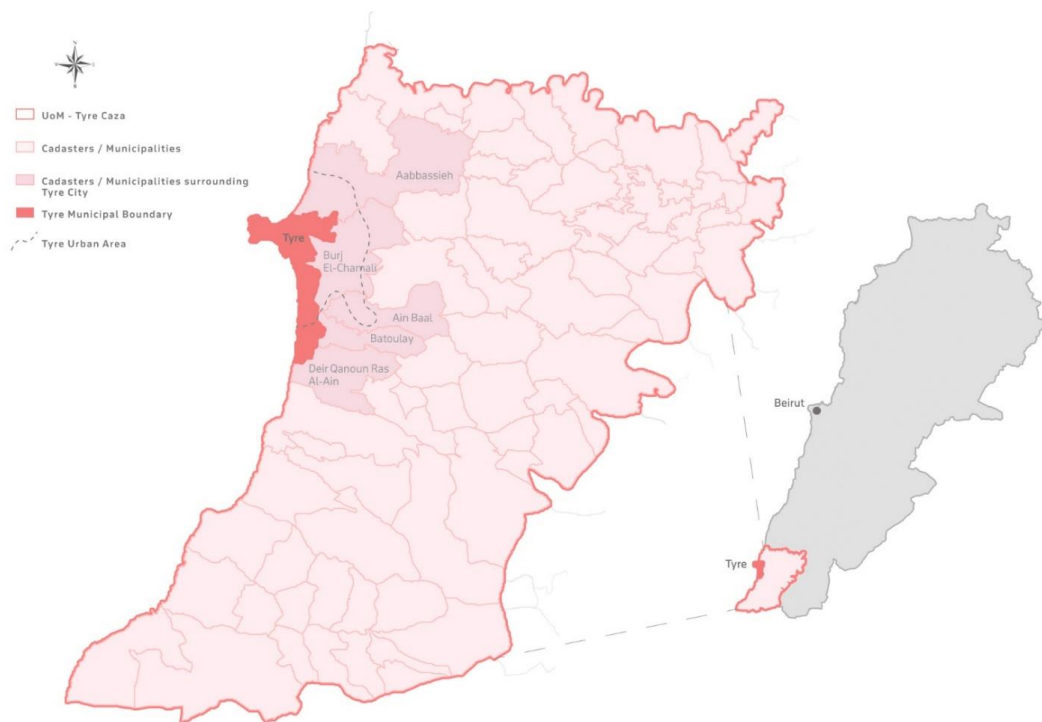


Figure 12: Tyre Caza, Tyre City and Surrounding Municipalities. (Author, 2023).

controversial. Beside the hierarchal administrative boundaries, UN-Habitat (2017) defined a new boundary titled “Tyre Urban Area” for Tyre and its surrounding villages as a base for a future Metropolitan Tyre. This boundary included the built-up areas in Tyre, Aabbassieh, Burj El-Shemali and Ain Baal and excluded unpopulated and low dense areas and agricultural lands. This new boundary corresponds to the reality of spatial impact of urban sprawl around Tyre’s municipal limits. Urban sprawl has

crossed the municipal boundaries of Tyre and overrun its surroundings along roads leading northeast, east, and south-east through coastal rural landscapes, agricultural, and natural lands. This thesis discusses the importance of state lands concentrating on the southern area of municipal Tyre, that did not witness urban sprawl as the other borders of the city (Figure 12). Therefore, it is essential not to constrain the analysis of Tyre to its municipal limits in isolation from its regional dynamics to understand the possible scenarios that could happen on the southern border if state lands are privatized.

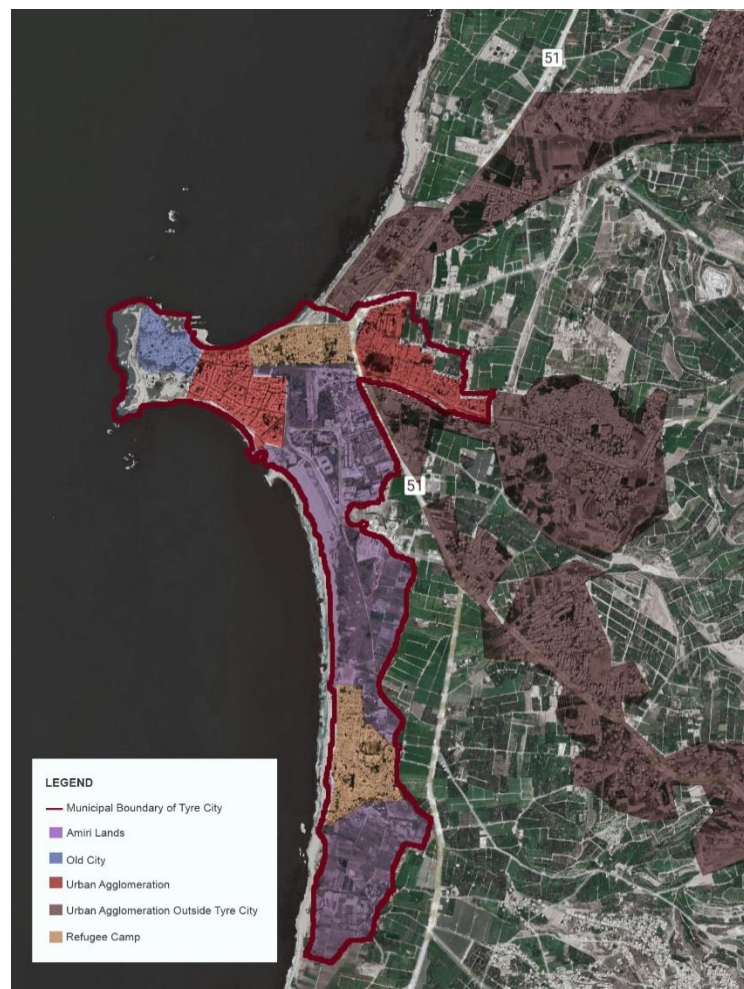


Figure 13: Urban Agglomeration of Tyre. (Author, 2023).

3.3. Governance in Tyre

Governance involves the informal and formal institutions for making and implementing decisions in society. “It highlights questions of administrative efficiency, power distribution and democratic accountability” (UNHABITAT, 2016, p.20). The municipality of Tyre is the administrative center of its district. “Each district is chaired by a Qaimmaqam, who is an executive officer appointed by the Ministry of Interior to supervise and control the activities of the municipal councils in each district as well as several other administrations where possible” (UN Habitat, 2016, p.25). Tyre municipality is supposed to handle projects within its municipal boundaries. Besides, major development projects that intersect with the municipalities of Tyre Caza are supposed to be planned and achieved by Tyre Union of Municipalities (UoM) (UNHABITAT, 2016). However, the role of UoM and the municipalities is restricted due to limitations in administrative and financial resources. Also, within the Caza of Tyre, major planning decisions are taken by the dominant political parties; Amal Movement and Hezbollah. (Nahas, 2007).

3.4. Natural and Cultural Heritage of Tyre

Tyre owns an exceptional natural heritage that needs to be protected and developed. It has a 22km long seashore, the southern part of which offers a continuous walking path. Also, Tyre has the largest and most fertile coastal plains in the country which made the locals consider agriculture as a valuable investment (Debs, 2015). The sector relies mainly on four major crops including olives, citrus, bananas and exotic fruits. In addition, water related heritage represents an essential pillar of Tyre’s regional identity. Ras Al-Ain site includes four springs which are the main sources of water in Tyre (estimated volume of 10,000 to 15,000 m³/day). They feed seven main reservoirs;

two are used for irrigation of Tyre's coastal plains in the southern municipal boundary of Tyre, one for the distribution of potable water by Tyre Water Treatment Plant (WTP) and the last four reservoirs are not used (Nahas, 2007). Tyre has two important archeological sites, registered by UNESCO since 1984. The one of the town, on the headland, and the one of the Necropolis of Al Bass, on the continent. The site of the town comprises important archaeological vestiges, a great part of which is submerged. The most noteworthy structures are the vestiges of the Roman baths, the two palaestrae, the arena, the Roman colonnaded road and the residential quarter. The sector of Tyre Al Bass, constituting the principal entrance of the town in antique times, comprises the remains of the necropolis, on either side of a wide monumental causeway dominated by a Roman triumphal arch dating from the 2nd century AD. Debs summarizes the threat to Tyre's bio-cultural diversity as follows, (1) the linear/ribbon construction in the coastal zone and agricultural lands, (2) the potential of future encroachment on the public maritime domain, (3) the encroachment of refugee settlements on natural and cultural heritage areas, (4) the absence of preventive measures to protect coastal areas, associated with the poor implementation of existing master plans, and (5) the lack of sustainable solid waste management (Debs, 2015).

3.5. Land Use

The unregulated urbanization that is accompanied with the failure of the successive masterplans in managing the city's expansion have led to land use modifications in favor of real-estate speculation. This urban expansion invaded large areas of the agricultural lands surrounding the city. However, the agricultural lands form the largest land category in Greater Tyre since they occupy 44% of its territory, (UNHABITAT, 2016). The land use within the municipal boundaries of Tyre is diverse. It includes residential, commercial, educational, agricultural, military and historical and cultural sites. It is observed that some lands in Tyre are very large parcels that were a result of the quasi-feudal social system which still exists till now. Lots of these lands that are located at the limits of the city were subdivided by their owners and built by developers considering the edge of the city as an attractive spot for residential and commercial uses across the Caza of Tyre (Debs, 2015).

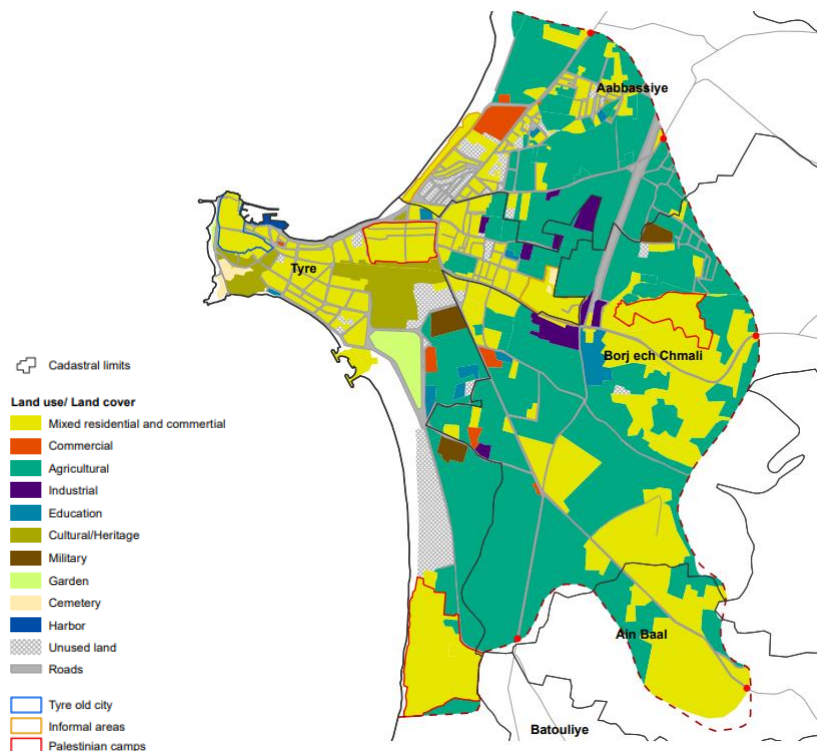


Figure 14: Major Land Cover Categories in Urban Area of Tyre. (UN-Habitat, 2016).

3.6. Socio-Economic Structure

The Caza of Tyre population is growing faster than the national rate. The average annual growth is 2% in Caza of Tyre while it is 1% for Lebanon in General. Also there is a difference between the population growth in Greater Tyre and the rest of the Caza of Tyre. The greater Tyre agglomeration continues to attract population movements from the rural areas of the Caza. “Indeed, it is estimated that Greater Tyre accounts for around 45% of the total population of the Qada” (Debs, 2015, p.42). This accelerating urbanization and densification have serious repercussions in terms of increased demand for infrastructural landscapes and services.

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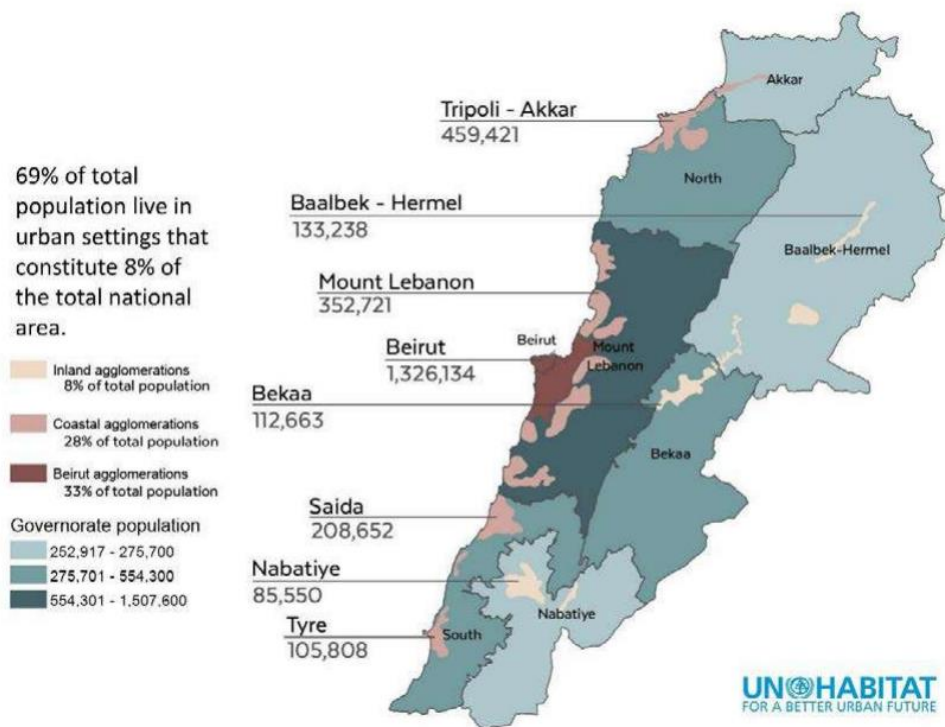


Figure 15: Main Urban Agglomeration in Lebanon (UN-Habitat, 2020).

Within the boundaries of the Greater Tyre agglomeration, Palestinian and Syrian refugees live in formal camps; Al Bass, Burj El Chemali, Al Rashidieh and three informal settlements Jall El Bahr, Maashouk, Shabriha. Al Rashidiy eh (on the seashore 5km south of Tyre) and Al Bass camp (1.5km south-east of the core city of Tyre) are located within the municipal boundaries of Tyre. Al Rashidiyeh Camp has encroached on natural (beach) and agricultural areas while Al Bass Camp is located within an area that should be protected for its natural and archaeological heritage.

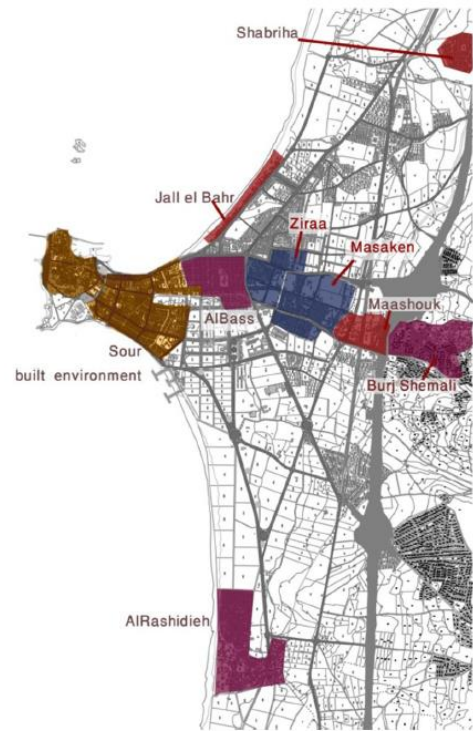


Figure 16: Formal and informal Palestinian Camps in Tyre. (Debs, 2015).

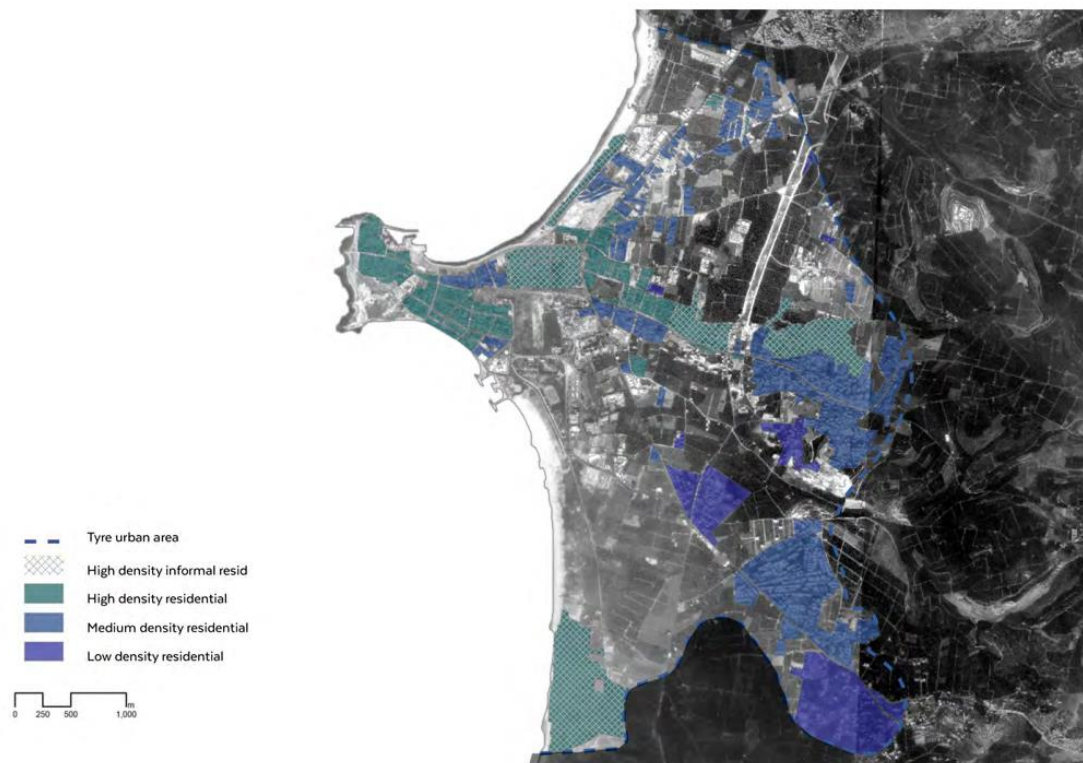


Figure 17: Building Density in Tyre Urban Area. (UN-Habitat, 2016).

3.7. Mobility

Historically, the roads located on the three main axes surrounding the city witnessed a concentration of major urban agglomerations through land subdivisions and real estate developments. This pattern of urban development is expected to dramatically increase when the project of the new expressway cuts through the spacious agricultural lands surrounding the city. The agricultural cover of the city would be drastically threatened if a proper sustainable vision and plan is not adopted.

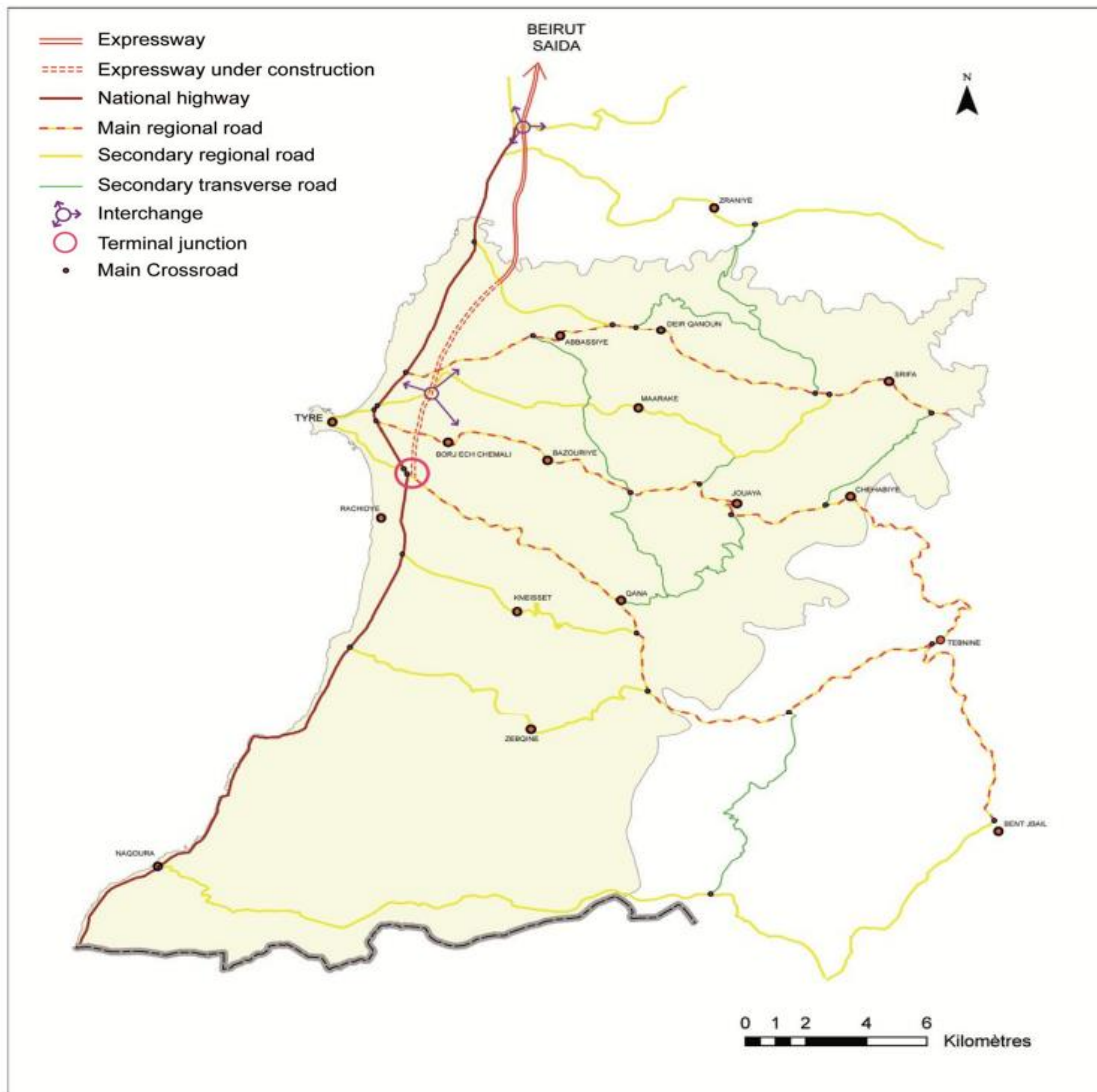


Figure 18: Road Network of Caza of Tyre. (CRI et al. 2015).

In general, mobility patterns within Tyre could be categorized into three classifications; first, the agriculture sector that benefits from the low traffic in the early morning to transport agricultural products to wholesale markets or to other villages and cities. Second, the residents of Tyre and the inhabitants of the nearby villages who commute to the city to work, as well as to visit the different local shops. Third, residents of the city who are contributing to the congestion at peak hours seeking social services, mainly education (CRI et al. 2015).

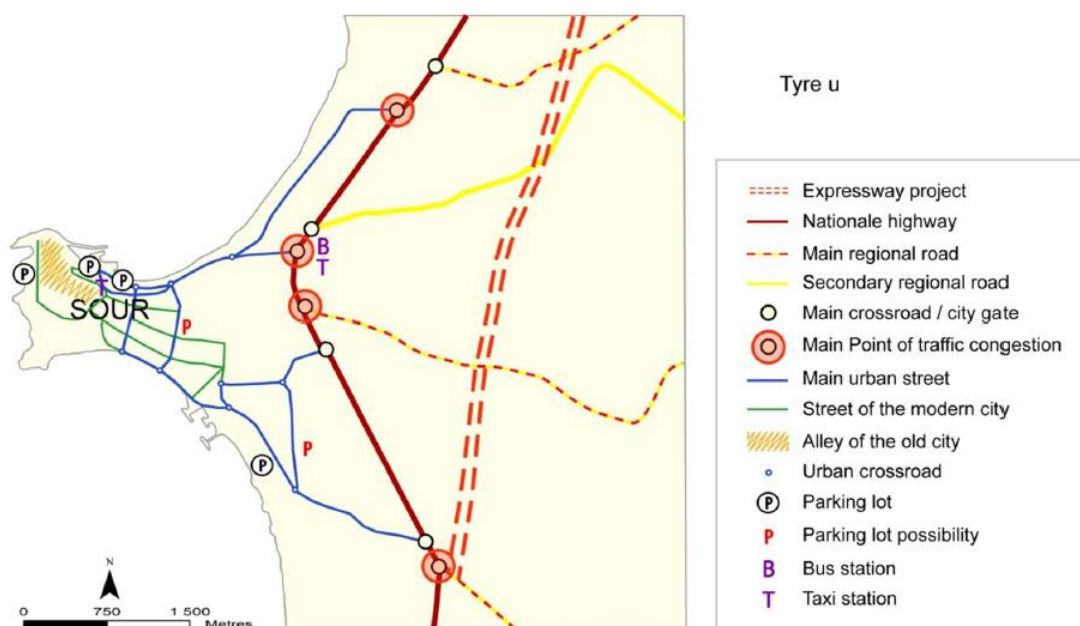


Figure 19: Tyre Urban Road Network. (CRI et al. 2015).

The street network of Tyre is entirely dedicated for vehicles and dismisses formal public transports and soft traffics. In addition, the road network struggles with traffic jams during peak hours specifically at the main urban crossroads and city entrances.

3.8. Reading Landownership in Tyre

As mentioned previously, 62% of Tyre's municipal area is state lands. They are namely categorized as Amiri lands. I have analyzed state landownership categories in Tyre are categorized as follows in (Figure 20):

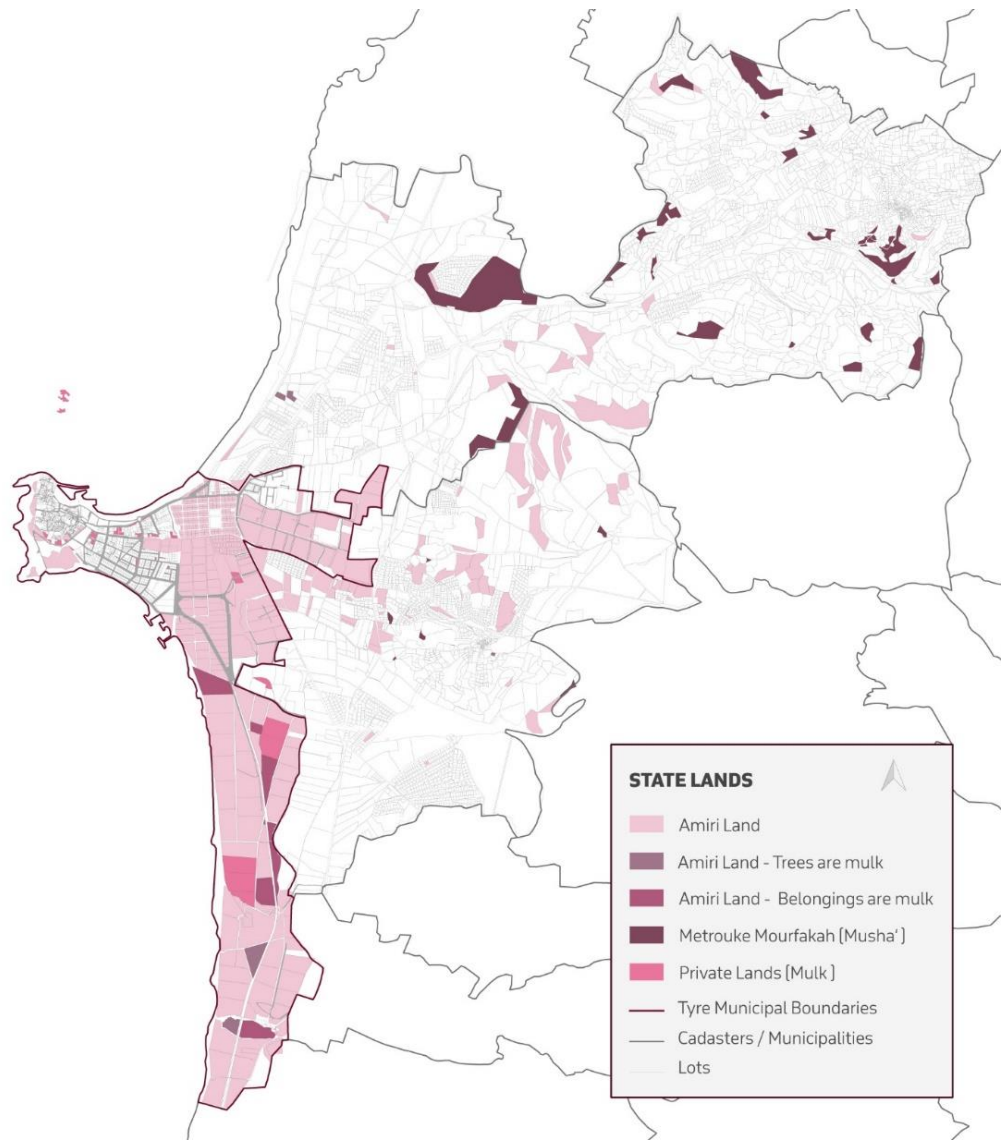


Figure 20: State Lands in Tyre and Surrounding Villages. (Author, 2023)

The map shows that state owned lands in Tyre are categorized as Amiri lands and private lands purchased by the state. While in two adjacent villages to Tyre, Al-Abbasieh and Borj Al-Shamali state owned lands appear as Musha' –Metrouke Morfakah- and Amiri. In the end, the emphasis is that these lands are all state owned lands, regardless of being Amiri. I just have analyzed landownership categories in Tyre because it is part of my historical research. In the next chapter in which I will trace the historical ecology of Tyre, I will discuss why Tyre has spacious areas of state lands

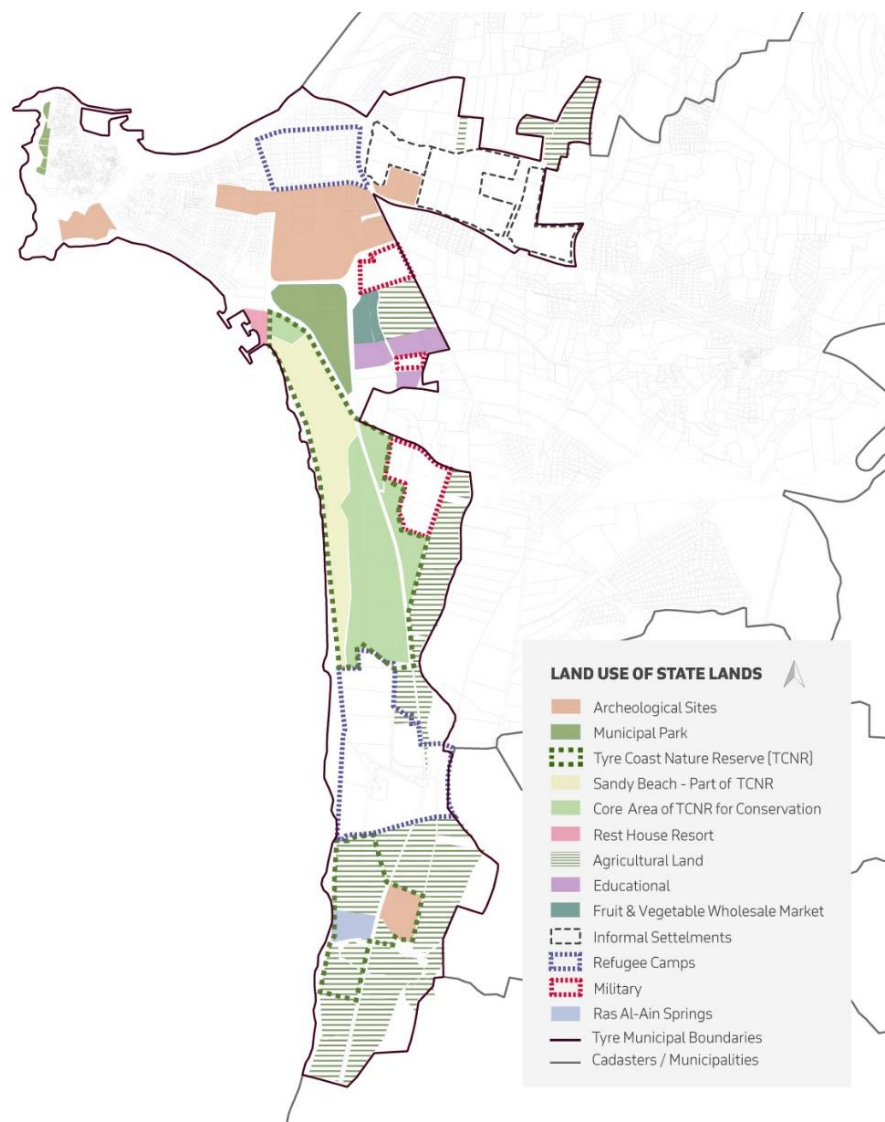


Figure 21: Land Use of state lands in Municipal Tyre. (Author, 2023).

State lands are forming a mosaic of different forms of land cover due to the various land uses. The land use of these landscapes is as follows: 45% of agricultural lands, 40% of Tyre Coast Nature Reserve, 35% of archeological sites, 30% of informal settlements, 25% of refugee camps and lower area percentages for the municipal park, army barracks, institutional, educational and service buildings (Figure 21). These lands are mainly owned by the state, the Ministry of Finance and the DGA - Directorate of General Antiquities – while managed by different governmental authorities as analyzed in (Figure 22) and based on Ministry of Finance records (Sasso, 2022).

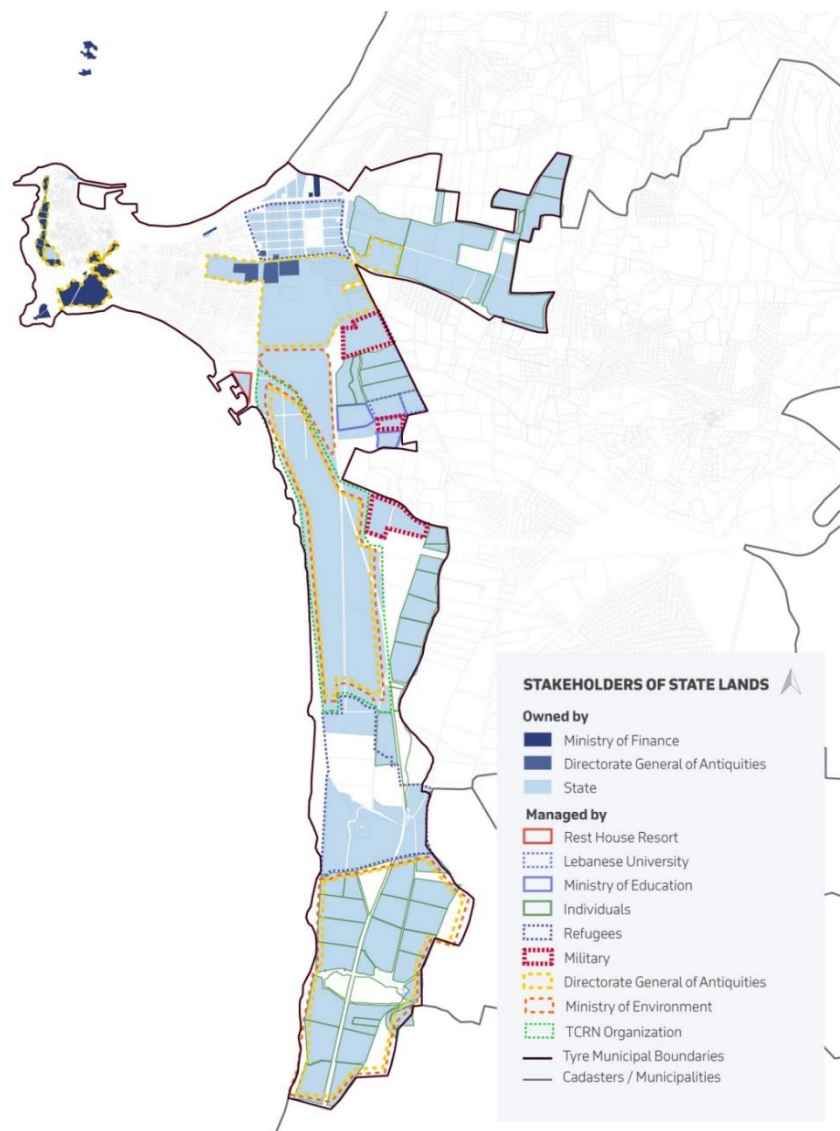


Figure 22: Stakeholders of state lands in Municipal Tyre. (Author, 2023).

3.9. Masterplans of Tyre

In Lebanon, the first urban planning law adopted in 1964 and later modified in 1983, allowed public authorities to regulate building regulations, urban growth and land uses on the national territories (Al-Sabbagh, 2015). Regulatory tools are prescriptive and organizational and include national, general, and detailed masterplans. They were mainly used to direct future development through land-use and building regulations (ibid.). These tools have failed to protect natural and agricultural areas since their main focus is on buildings that are studied as isolated units disconnected from the natural environment and urban spaces. The widely used regulatory tools are general and detailed masterplans to dictate building coefficients and land uses. In Lebanon, the practice usually mistakes using these two tools and produces the masterplan (التصميم) consisting of a zoning plan that works as a functionalist organizational tool (ibid). In Tyre, the city has been developed by three masterplans that dealt with the city as a separated body from its wider region (Nahas, 2007). Subsequently, they have all failed managing the urban expansion or analyzing urbanization trends.

3.9.1. Masterplan of 1966

Architect Pierre Khoury was commissioned to prepare the city's first masterplan in 1965 (Nahas, 2007). This masterplan only covered the municipal boundaries of Tyre and identified three residential zones in the city, (a) the historic city, (b) Hay al-Ramel, the recently built low-density quarter and (c) Palestinian refugee camp of Al-Bass that blocks the city's expansion eastward. The plan mainly proposed to, first, displace refugees and preserve the camp sites as future expansion areas, second, control future development through imposing building heights between the historic core and its

extension, last, enhance sanitary conditions and decongesting the old core through resettlements (ibid.).

3.9.2. Masterplan of 1991

This masterplan was approved by decree no. 1379. The study encompassed areas beyond the municipal boundaries of Tyre to cover the future suburban extension over the surrounding agricultural lands (ibid). The masterplan recognized that, “the peninsula of Tyre has an area of 100 ha occupied by the old core, the archeological sites, and the al Bass Palestinian refugee camp, leaving little room for residential expansion. Furthermore, a large area of the city outside the peninsula is public property. Consequently, if the future expansion of the city is left uncontrolled, the few remaining agricultural plains that surround the city will disappear (Nahas, 2007, p. 257).” The significance of this masterplan lies in the fact that this study was based on topographical and geological analysis, also, it limited the city’s suburban expansion to peripheral areas with low agricultural potential. In addition, it encouraged coordination between Tyre’s municipality with surrounding municipalities to consider agricultural lands as a reserve for future urban expansion.

3.9.3. Masterplan of 1998

To control the repercussions of the 15-year civil war that caused massive urban chaos, the 1998 masterplan’s main target was to regularize the illegal settlements in the city. Along with the CDR-World Bank team, UNESCO reviewed the masterplan and proposed new zoning regulations (Figure 23). The masterplan only covered Tyre’s municipal boundaries without developing any strategies to tackle urban sprawl. I will

discuss the reperfusions of this master plan on state lands and the ecological continuity of city's landscapes in chapter VI.

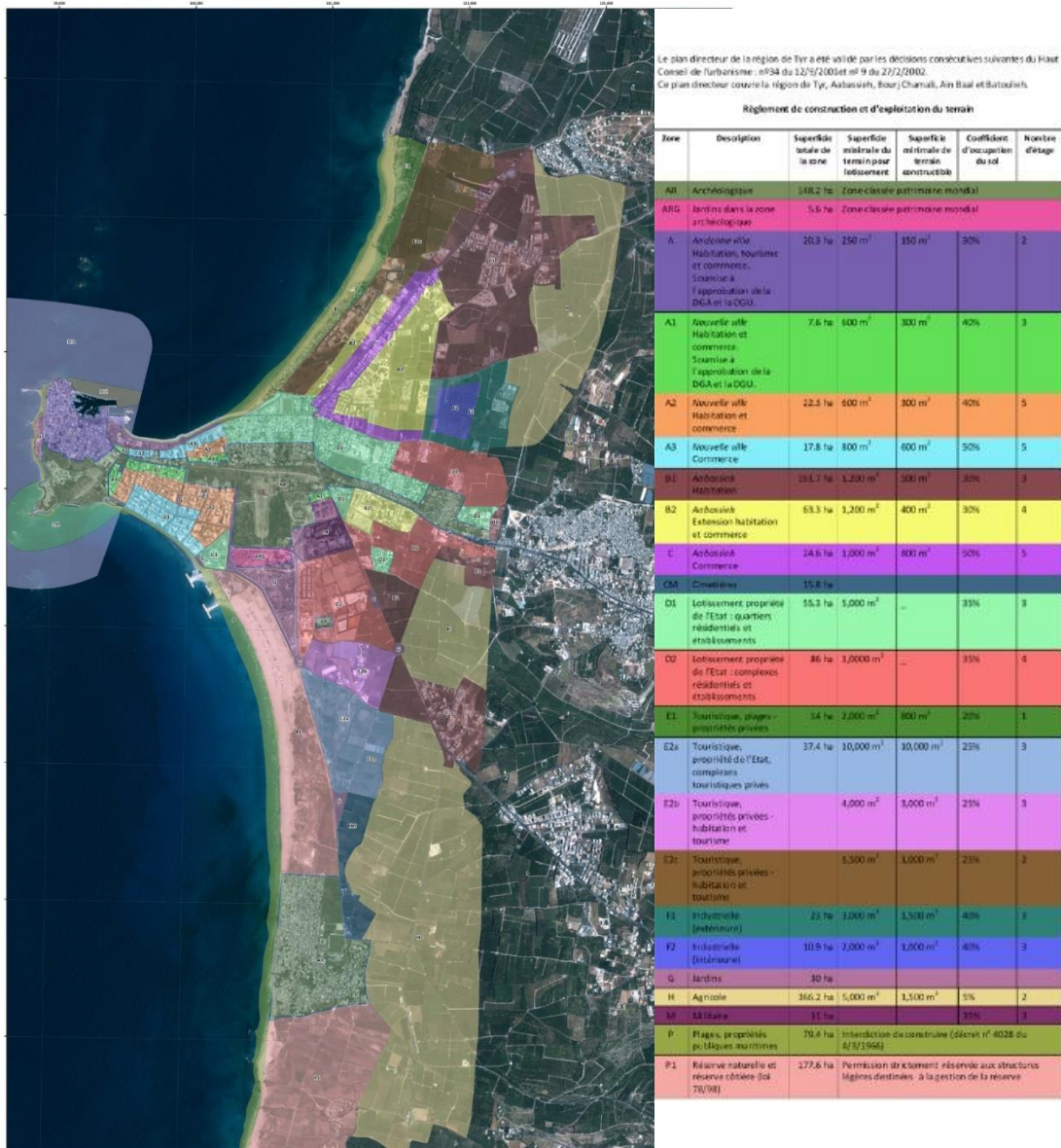


Figure 23: Zoning regulations proposed in the 1998 masterplan. (UNESCO, 1999).

CHAPTER 4

TRACING THE ECOLOGICAL HISTORY OF TYRE

A rapid assessment of the current Lebanese planning framework reveals a heavy reliance on outdated planning tools that frequently rely on earlier frameworks of the modernist urban planning. Policymakers have ignored the “ecological” layer in urban design and planning, namely, the underlying geography of the city and the natural features that came to be replaced or transformed by the urban fabric. As a result, memory of the ecological layer was forgotten, the natural features successively missing when mapping the city. An approach to sustainable urban greening that is sustainable and ecologically sound, should necessarily consider and re-introduce the ecological foundation of the city.

This chapter does that by researching available archives on Tyre’s historical development, interviews with scholars and by looking at successive maps. I have relied on Tyre maps undertaken by the Lebanese Army in 1963 that are in turn based on and update maps dating to the French Mandate carried out in 1931 (Badawi, A, 2023). Reconstructing the ecological history of municipal Tyre is the first step before applying an ecological landscape reading of the current landscapes.

4.1. The Ecology of Municipal Tyre:

Tyre city has witnessed several historical milestones that contributed to the formation of the present day urban morphology. Unlike the other Lebanese Mediterranean coastal cities that are continually inhabited, Tyre passed through a dark age of a mass depopulation that lasted approximately for five hundred years. With the collapse of the last Crusade strongholds in Akka city to the Mamluks in 1291, Tyre

seized to develop when Crusaders left the city empty until 1750 CE –during the Ottoman era (Redding, 1875). The fact that the city was denied growth up to circa 1940s when the Lebanese gained independence from the French colonial occupation explains the survival of abundant natural and agricultural landscapes in the urban peripheries. Another reason lies in that Tyre is part of Jabal Amil (modern-day South Lebanon) the center of rural Shia Muslim families where, the absence of growth in Tyre was intentional during the Ottoman Empire and as part of the discrimination against Shiites who were forbidden to rule coastal cities to prevent economic gains from commerce that relies on the economic sea ports (ibid). During this period, the orchards surrounding Tyre reaching Saida city were owned not by the inhabitants of Tyre, but by affluent families living in Sidon. This continued until the local ruler in Jabal Amel, sheikh Nasif Al-Nassar took advantage of the Ottoman state's preoccupation with World War I to possess Tyre city. Thus, Siadawi land owners started to sell their orchards located within Tyre's periphery to the new inhabitants of Tyre city who were attracted to the semi-deserted city and to newly constructed quarter initiated by Al-Nassar (Blanford, 2011). Revival of Tyre by Sheikh Nasif al-Nassar, which marked the peak political power of Shia families in Lebanon during the Ottoman era, nevertheless was curtailed by the Ottoman land laws (Winter, 2010). As a result, the empty lands between the orchards defining the urban periphery, outside of the historic city walls, remained properties of the Ottoman Empire as defined by the Ottoman Land Laws (Badawi, A, 2023). The majority of these natural and agricultural landscapes had seasonal water streams, swamps and sand dunes that were formed and expanded over large areas of the city covering massive archeological sites beneath it (Badawi, 2023). These landscape elements appear in archival illustrations dating to the Ottoman period

and later on in the analysis produced by the French mandate in 1931 and drawn in the Lebanese army maps of 1963 (ibid). The following maps demonstrate the ecological layer of municipal Tyre in 1930s and 2022 (Figure 24) and 2022 (Figure 25).

Furthermore, the next sections will trace and analyze the morphological and ecological transformations of key urban landscape of the city.

TRACING THE ECOLOGICAL HISTORY OF TYRE

(TRACING ARMY MAPS OF 1963 THAT ARE BASED ON FRENCH MANDATE ANALYSIS OF 1931)

Legend

- MUNICIPAL TYRE
- AGRICULTURAL LANDS
- SANDY BEACH
- MIMOSA WOOD/ HORSH SOUR
- SEASONAL WETLANDS
- SEASONAL SALTY WETLANDS
- HISTORIC CITY
- ARCHEOLOGICAL SITE
- CEMETERY
- DUNES
- ROMAN AQUEDUCTS ABOVE GROUND LEVEL
- SEASONAL STREAMS
- TOPOGRAPHY
- BUILT-UP
- INFORMAL SETTLEMENTS
- WATER SPRINGS
- WATER WELLS

0 0.4 0.8 1.2 1.6 2.0 2.4 (kilometers)

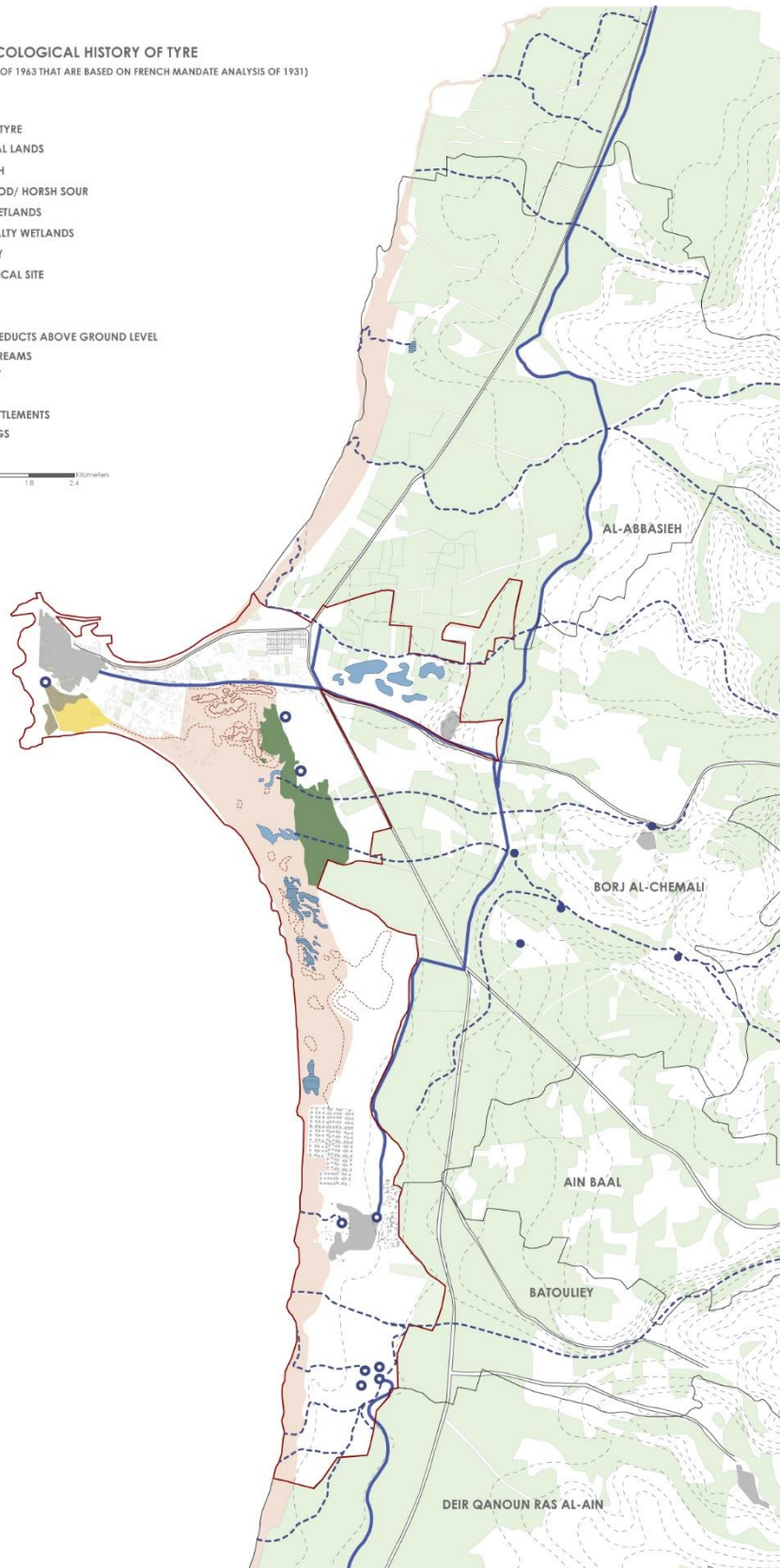


Figure 24: Reconstructing Municipal Tyre by tracing the ecological history based on Lebanese Army Maps of 1963 and earlier features surveyed by the French Mandate in f 1931. (Author, 2023.)

ECOLOGICAL ANALYSIS OF TYRE

Legend

-  MUNICIPAL TYRE
-  AGRICULTURAL LANDS
-  SANDY BEACH
-  MUNICIPAL PARK
-  SCRUBLANDS
-  SEASONAL WETLANDS
-  SEASONAL SALTY WETLANDS
-  HISTORIC CITY
-  ARCHEOLOGICAL SITE
-  CEMETERY
-  INFORMAL SETTLEMENTS
-  BUILT-UP
-  DUNES
-  AQUADUCT ABOVE GROUND LEVEL
-  DYSFUNCTIONAL AQUEDUCT
-  SEASONAL STREAMS
-  DISAPPEARED STREAMS
-  TOPOGRAPHY
-  WATER SPRINGS
-  WATER WELLS
-  EDGE

0 0.3 0.6 1.2 1.8 2.4 kilometers

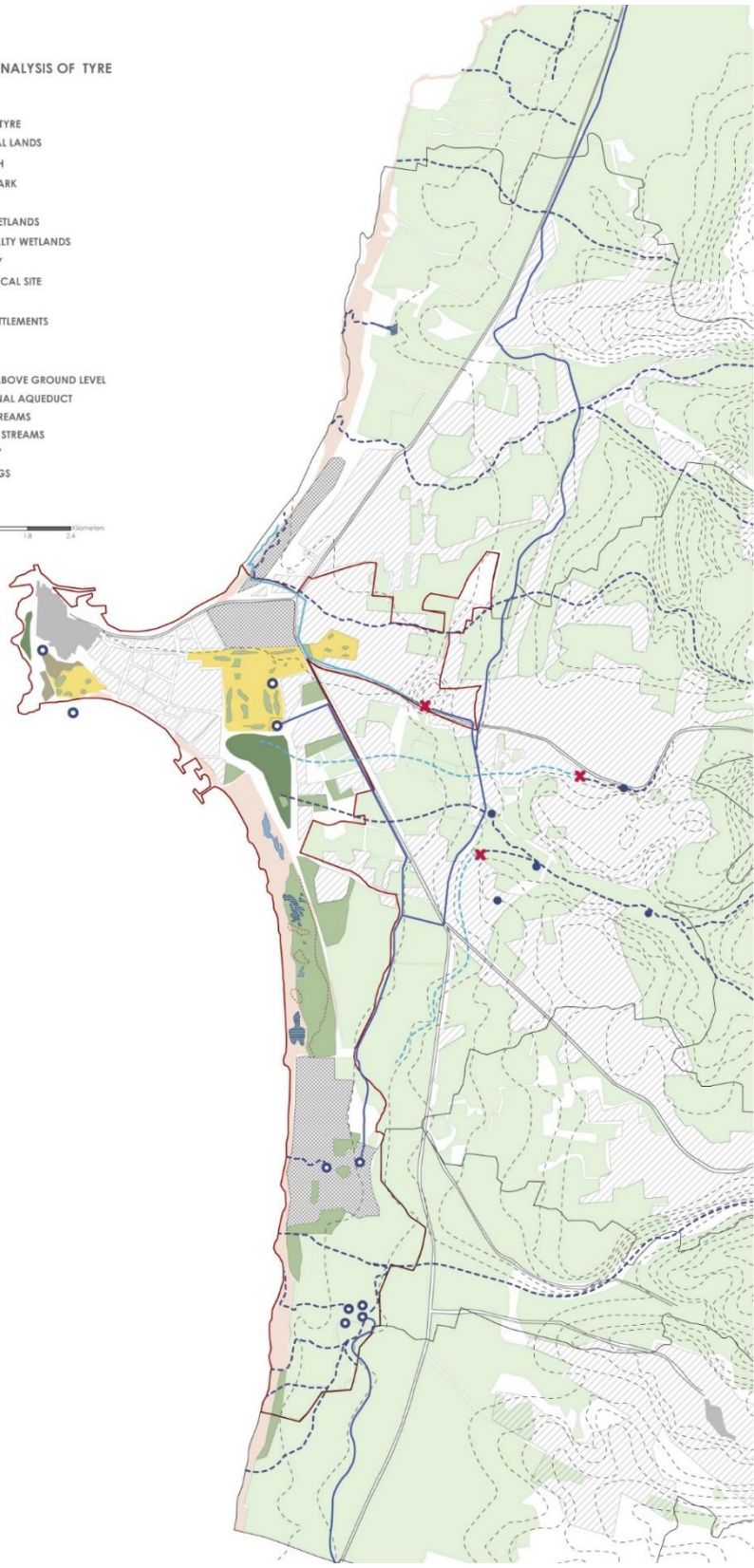


Figure 25: Ecological Analysis of 2022 Tyre. (Author, 2023.)

4.2. Tyre's Southwestern Beach

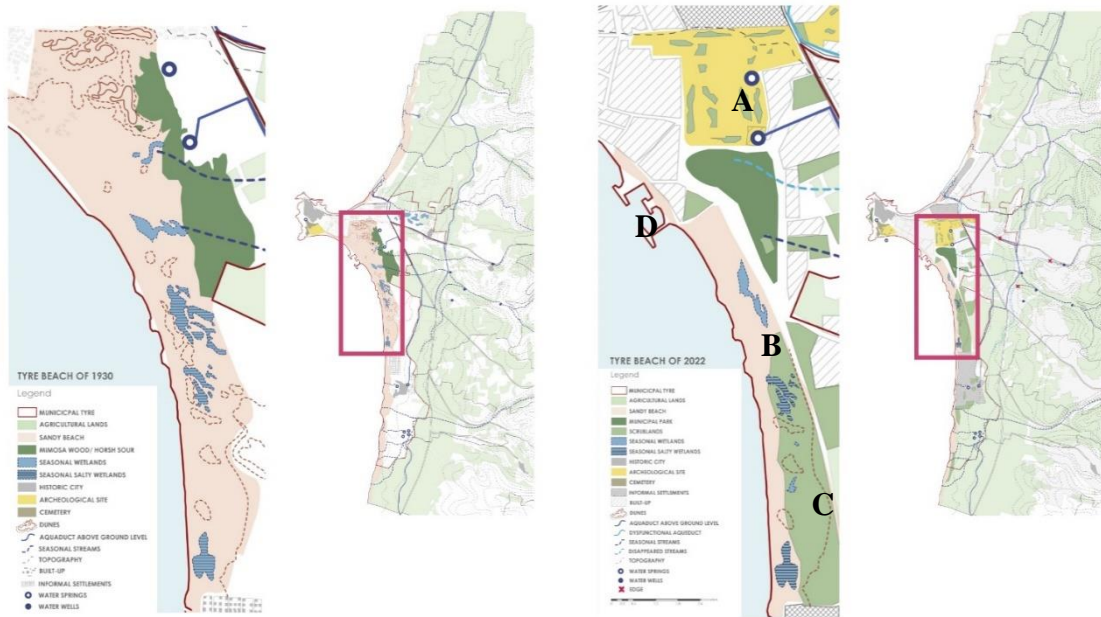


Figure 26: Tyre's Southwestern beach in 1930(left) and 2022(right). Author, 2023.)

1930: The sandy beach covered a large area of Tyre city in the period before 1960s around (40% of total municipal Tyre). The sand dunes were formed gradually by nature forces throughout the time covering major locations of archeological site. These dunes constitute an important feature of the waterfront south of the historic city. Large seasonal fresh and salty swamps were part of the beach's ecology that appeared due to rain or waves or streams flows.

2022: The beach is famed for its white sand. Marine sand dredging is widespread, the sand used in construction. Overall, the area has suffered from illegal sand mining for decades. **(A)** Large area of the sand dunes disappeared due to the excavations of the discovered Roman archeological site of Al-Bass in 1963 that was added to UNESCO's list of World Heritage Sites in 1984.

(B) Some seasonal swamps appear due to the rain and Al-Nabbaa’ water stream that originates from Borj Al-Shamali. **(C)** The beach includes an area that designates the remained natural Mediterranean landscape (scrublands). This green cover is essential as it protects soils from erosion and constitutes habitat for large turtles’ nests and migratory birds (Figure 28). The area is protected by a law, was decreed in 1998 by the Ministry of Public Works and is considered as the the last bio-geographic ecosystem in Lebanon named Tyre Coast Nature Reserve (TCNR). **(D)** The continuity of the sandy beach was cut into two by the establishment of the “Rest House” (a publicly-owned resort that is rented out to operators) that encroached the beach by a private Marina (Figure 27).



Figure 27: Rest House. (Author, 2019.)



Figure 28: Tyre’s Beach Seasonal Swamp during winter and spring. It becomes a car parking in the summer for beach visitors. (Author, 2022.)



Figure 29: Rest House Marina cutting the public beach in two. (Imad Khadra, 2022.)

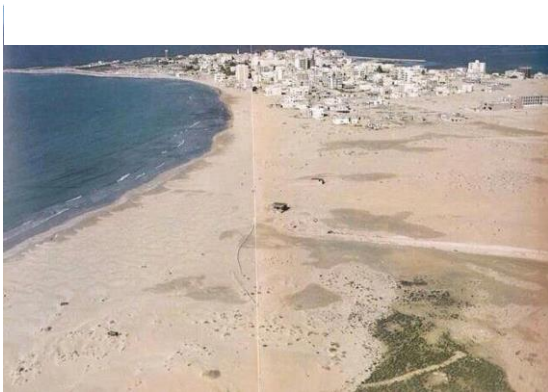


Figure 30: Tyre's Beach in 1950. (Source, Unknown.)

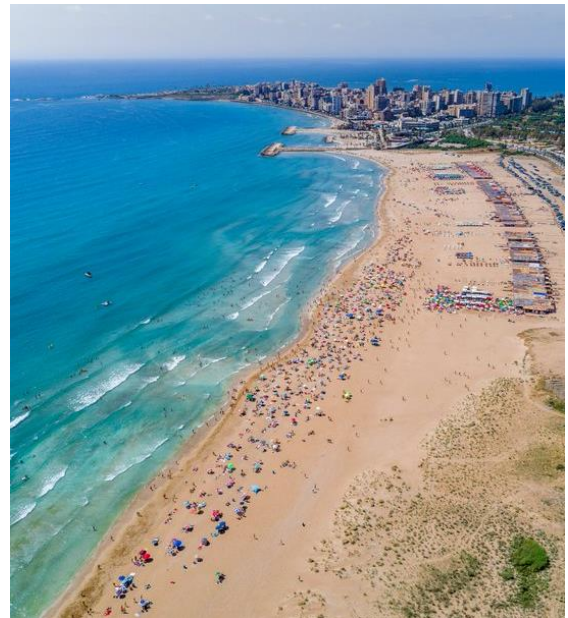


Figure 31: Tyre's Beach in 2019. (Rami Rizk, 2019.)

4.3. Tyre's Northern Beach

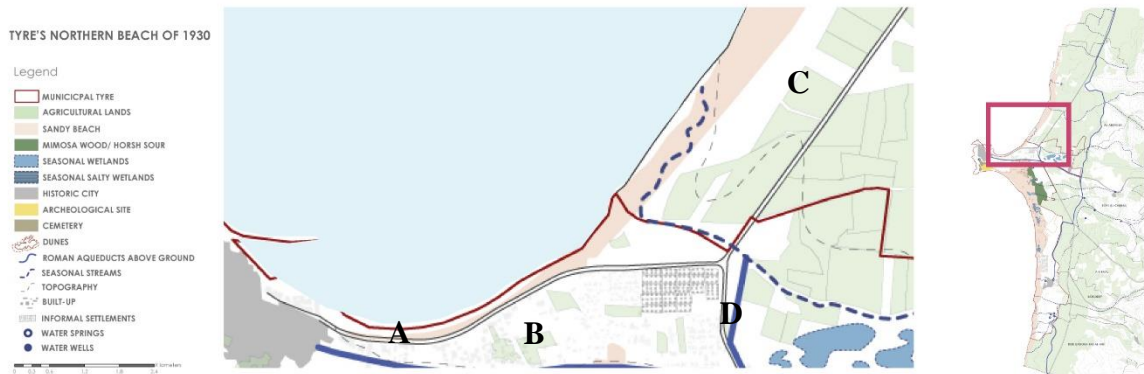


Figure 32: Tyre's Northern beach in 1930. (Author, 2023.)

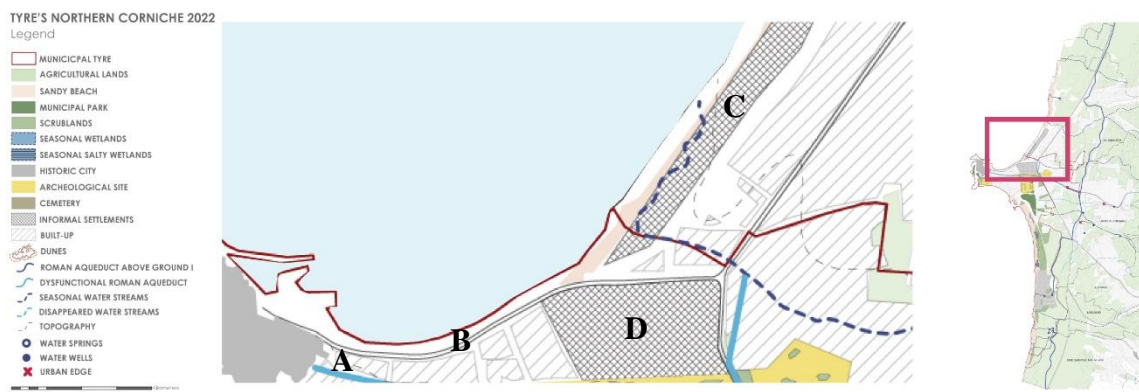


Figure 33: Tyre's Northern Corniche in 2022. (Author, 2023.)

1930: (A) Al-Bawabeh area is the location of the old gate of the fenced city (Figure 32).

(B) (C) The northern sandy beach of Tyre starts from the port of tyre and continues towards Saida. It had several estuaries of seasonal and permanent water streams such as the estuary of Al-Samer seasonal river. (D) This area was the first informal attempt for city expansion as a temporary location for the Armenian refugees in 1939.

2022: (A) Al-Bawabeh area was expanded as part of the new road networks that connects the old core and the port with the primary road networks of Tyre. The expansion area includes a public square called Al-Bawabeh Square that is part of the old market and a place for commemorating Ashura rituals specifically by Amal Movement. (B) This expansion established at the expense of the sandy beach that turned to be a corniche mainly for fishing.



Figure 813 Tyre's Extended Corniche. (Author, 2023.)

2022: (C) The area hosts one of the unofficial Palestinian camps “Jal Al-Baher” that started to appear in 1952. The camp created an edge that cut through the northern waterfront of Tyre.

(D) The camp was established in 1939 to house Armenian refugees, and turned to be an official Palestinian refugee camp in 1948.



Figure 35: Tyre's Northern Beach of 1936 and the extension area. (Source, unknown)



Figure 36: Tyre's Northern Beach of 1900. (Source, unknown)

4.4. Horsh of Tyre (حرش صور)

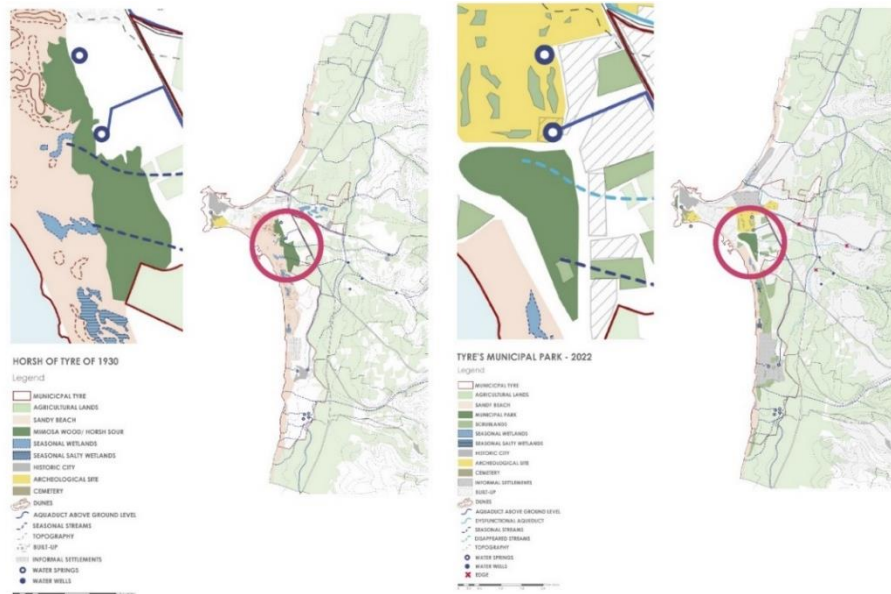


Figure 37: Horsh of Tyre in 1930(left) and Tyre’s Municipal Park 2022(right). (Author, 2023.)

1930: Horsh of Tyre was planted with *Acacia cyanophylla* trees (Figure 38) imported by French Mandate as part of their strategy to protect the old city against sand dune encroachment (Badawi, 2023). The Horsh is an important component of Tyre’s memory and reflects a strong sense of nostalgia, particularly the traditional Kazdoura that once took place from old Tyre to the Horsh. The Kazdoura used to be a pedestrian social practice promoting social interaction amongst different age groups and genders.

2022: The Horsh area was reduced due to the excavations of the Roman archeological site of Al- Bass in 1963 (Figure 39). Now, some areas of the Horsh are part of the street network and roundabouts that were established between the 80s and 90s. The rest of the Horsh was redesigned and replanted as a municipal park. The Municipal Park is not fully functional due to its design and to the illegal encroachments (Charaffiedine, 2023). The most functional part is its western edge that faces the beach “الخيم”.



Figure 38: *Acacia cyanophylla* (Author, 2023.)



Figure 39: Tyre Hippodrome that was discovered in The Horsh area in 1963. (Wikipedia, 2020.)



Figure 40: The western edge of Tyre Municipal Park. (Author, 2023.)

4.5. Agricultural Lands

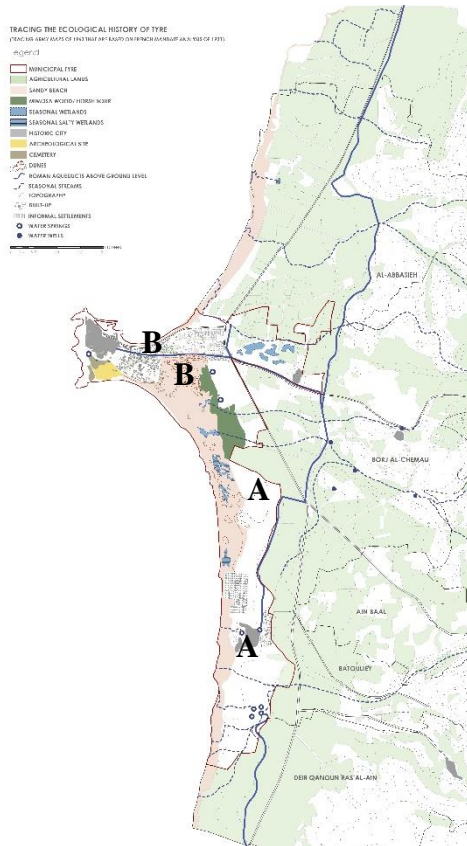


Figure 41: The Agricultural Cover of 1930. (Author, 2023.)

1930: (A) These areas were empty lands forming a transitional area between the sandy beach and the agricultural lands.

(B) Agricultural lands were extending to the heart of the city that witnessed new urbanization movements in the 30's.

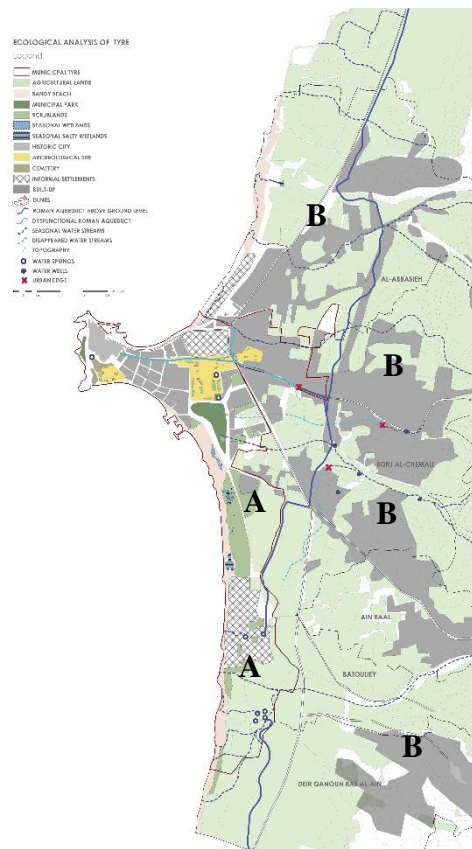


Figure 42: The Agricultural Cover of 2023. (Author, 2023.)

2022: (A) The Palestinian refugees enriched the agricultural cover of Tyre by growing new orchards in the lands adjacent to Al-Rashidieh camp. (B) The city is expanding over the agricultural plain along three main axes following the major roads around Sour linking to Ain Baal (south-east axis), Al-Abbassiye (north-east axis), and Bezoureye (east-west axis).

4.6. Al-Masaken & Al-Maashouk Neighborhoods

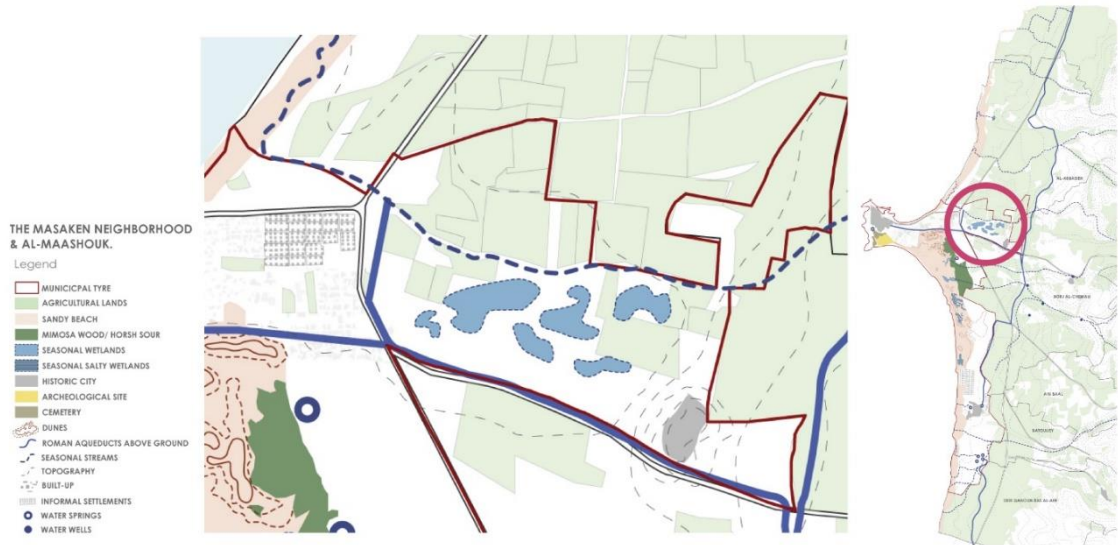


Figure 43: The Agricultural Cover of 2023. (Author, 2023.)

In 1930:

- It was a swamp area due to its low topographical level. It was known as “Balou’ta” “البلعوطة”. It appeared in the earlier maps of 1912 under the title “Birket AlGhueir” “بركة الغوير” (Figure 44) The area was surrounded by agricultural lands. Also, a seasonal water stream called “Al-Samer River” “نهر السامر” passes through it. The stream originates from Wadi Saifi in Maarakeh and flows in Jal Al-Baher area. Being constructed along a slight downward gradient within conduits of stone, the Roman aqueducts transfer water from Ras Al-Ain Springs

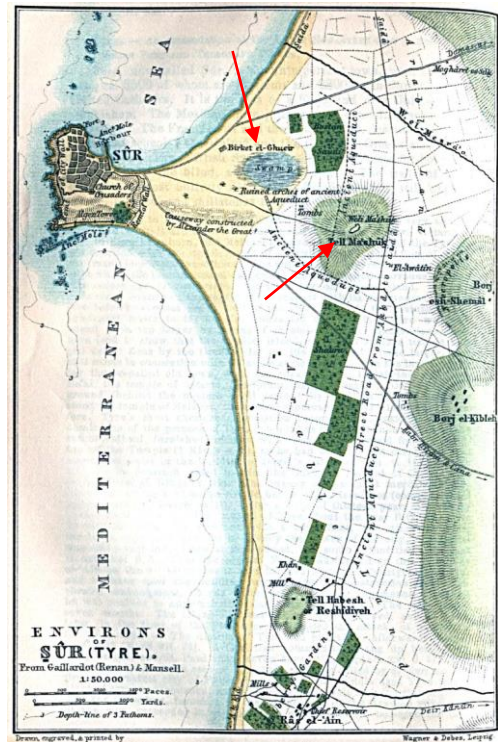


Figure 44: Tyre Map of 1912. (Gaillardot & Mansell, 1912.)

through gravity alone passing by Tell Al-Maashouk heading to. the old city of Tyre (Figure 45).

- Al- Maashouk neighborhood was a natural hill that was used for security through a watch tower built over it since the Roman Empire (Badawi, 2023).



Figure 45: The Roman Aqueducts near Hiram water spring– near Al-Maashouk Hill now. (Griffith, 1905.)



Figure 46: Unregulated Urbanization Over the Roman Aqueducts in Al-Maashouk Neighborhood now. (Badawi, 1997.)

In 2022:

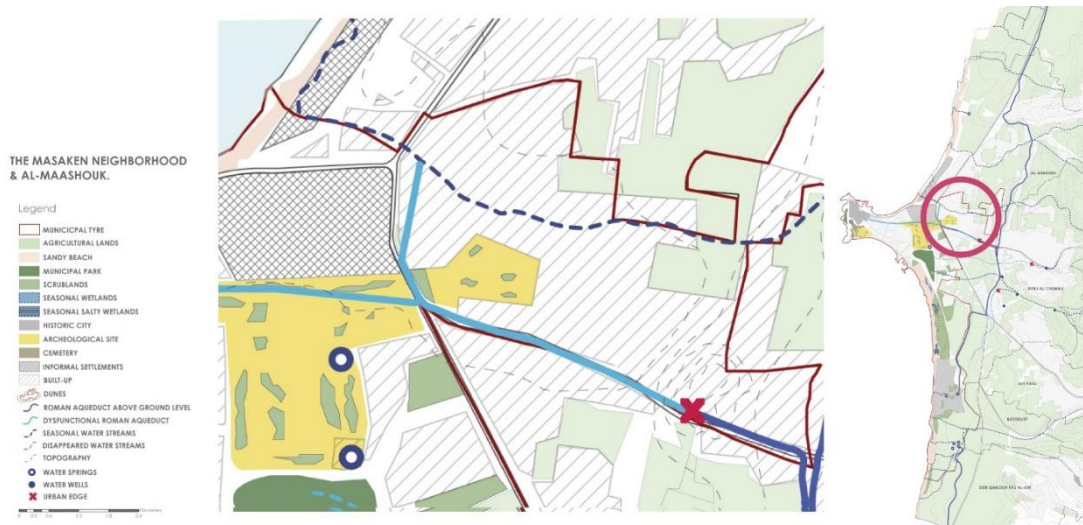


Figure 47: The Masaken Neighborhood & Al-Maashouk in 2022. (Author, 2023.)

- As mentioned in the previous chapter, Al-Masaken Neighborhood is an informal settlement. The neighborhood is located on a state land that was assigned by the state to be a social housing project as an expansion of the old city but due to the consecutive Israeli invasions the houses were inhabited by the southern Lebanese who migrated from the occupied lands to Tyre. The neighborhood witnesses unregulated and illegal constructions until today. Due to ignoring the ecological layer in state's planning frameworks, the area of Al-Masaken lost its ecological character as a natural large swamp of fresh water, thus, the neighborhood still floods in the winter season (Figure 48). Also, due to the illegal constructions, the roman aqueducts passing through the area has been dysfunctional and their water flow is blocked by urban edges (Figure 46). In addition, the seasonal stream of Al- Samer river has lost its importance as a source of water for irrigation due to pollution (Figure 49).



Figure 48: Floods in winter season in Al-Masaken Neighborhood (Author, 2022.)



Figure 49: The polluted Al-Samer seasonal stream (Author, 2023.)

To sum up, research into the ecological history of Tyre has uncovered a number of natural, geomorphological features that do not appear in contemporary maps of Tyre just as they have disappeared from the collective memory of the people of Tyre. These features are significant when approaching sustainable urban greening. However, identifying these natural and cultural urban layers is not sufficient (a) without a dynamic understanding of the relations and processes that bind the features and shape the urban morphology and (b) unless integrated into future urban planning strategies. Uncovering the ecological history is a key for the study of Ecological Landscape Associations (ELAs) as the key components of municipal Tyre landscape.

CHAPTER 5

ECOLOGICAL FRAMING OF MUNICIPAL TYRE

This chapter undertakes an ecological landscape reading of municipal Tyre and Greater Tyre in preparation for an understanding of the dynamics occurring between the natural, semi natural or cultural and urban landscapes. An ecological landscape reading aims to allocate the Ecological Landscape Association (ELAs), a dynamic and integrative approach to reading the urban landscape that has the potential to assist the urban designer to develop creative, holistic and sustainable strategies and guidelines. After identifying the ELAs for Tyre and highlighting their significance, this chapter determines key components of the landscape and the criteria for engaging them into an urban design framework and a design approach.

5.1. Ecological Landscape Assessment

The objective of ecological landscape assessment is to realize the interplay between the natural and cultural heritage in addition to the physical values of a certain site to assess the relationship between the complex landscape processes and patterns along a temporal continuum and across various levels of hierarchal and spatial landscapes (Figure 50) (Makhzoumi & Pungetti, 1999). The assessment of the landscape is achieved through an investigative framework of site exploration, desk and field surveys and data compilation and analysis. The site exploration is completed through five steps that form a landscape classification, description, history, legislative framework, and evaluation (ibid.).

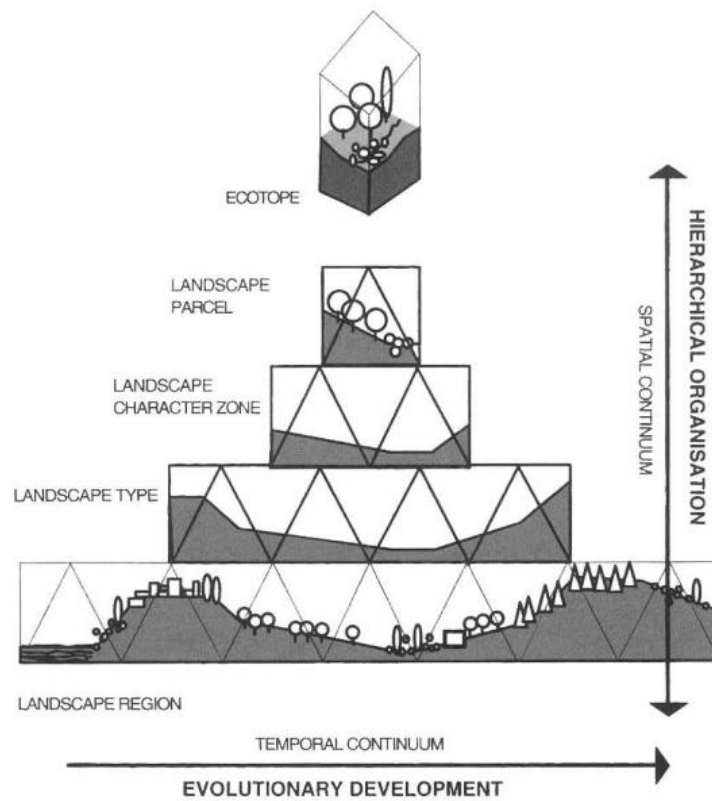


Figure 50: Spatial Hierarchy and Temporal continuum of the Ecological Landscape components (Makhzoumi, 2000, p. 339).

5.2. Ecological Landscape Associations

They are core spatial units of the landscape that attract the designer's attention to successful associations over evolutionary time scales of the existing landscape that could be used as a morphological matrix and problem-solving attributes (Makhzoumi and Pungetti, 1999). In summary, the ELAs investigative methodological framework assists creating an ecological understanding of the landscape, positioning the ecological landscape associations, and defining landscape associations' patterns, which is the spatial pattern and processes of interactions of two or more landscape components (abiotic, biotic and cultural) (ibid.). The thesis will anticipate that this ecological landscape methodology has the potential to construct a comprehensive, holistic and integrative understanding of the site, as well as to identify the basic units composing the

landscape of municipal Tyre in relation to Greater Tyre. ELAs complement traditional planning models with concepts that direct the planning process by patterns gained from ecological understanding of the landscape.

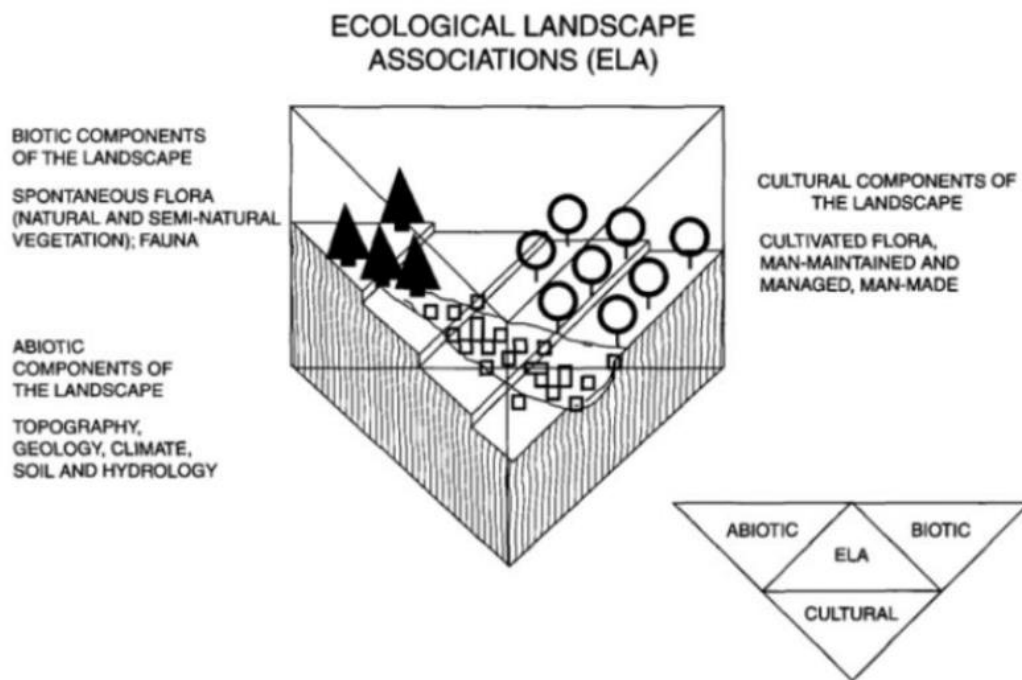


Figure 51: Schematic Illustration of the Ecological Landscape Association Methodology. (Makhzoumi and Pungetti, 1999, p. 221.)

5.3. Reading Municipal Tyre Landscape

5.3.1. The Abiotic Components

5.3.1.1. Geomorphology, Topography, Geology and Soil Morphology.

The geo morphology of Municipal Tyre has passed through different dynamics that shaped its waterfronts, coastal plain and its periphery. Since the 1930's, the coastal plain of the peninsula of Tyre has witnessed movements from the old historic city to the core of the peninsula that was first inhabited by the Armenian refugees. The urbanization of city's core continued according to different stages and time periods of city master planning. Today, the city witnesses a very slow real estate market due to the

unavailability of vacant lands and to the fact that 60% of the city's area is state lands (Charaffidien, 2022). The waterfront has been subjected to major morphological transformations: (1) Expansion of Tyre port (2) Establishment of the Maritime Corniche eating up parts of the sandy beaches of the northeastern and southwestern shores. (3) Establishment of the unofficial camp of Jal Al-Baher directly on the eastern beach of Tyre. In addition, the peripheral urbanization has been invading the green covers on the sides of major roads creating contemporary clusters in hinterlands, while separating the continuity of the agricultural lands and the ecological corridors. This pattern is highly noticeable in areas of Al-Abbasieh, Borj Al-Shamali, Al-Hosh and Ain Baal.

The topography of the coastal landscape of the natural area of Tyre and its surrounding villages lies in the western aspect of the Mount Lebanon. The elevations of Tyre city and the surrounding villages start from zero meters to 1500 meters above sea level. Municipal Tyre is located at an elevation that ranges between 0m and 30m (Figure 52).



Legend

— Greater Tyre Topography (10m)



Figure 52: Topography of Greater Tyre and Municipal Tyre -10m Contour.
(Author, 2023.)

According to Darwish & Khawlie, the wide diversity of the geological formations in Lebanon, the fluctuating climate and the rough topography are the foundation for the formation of various soil types in the Lebanese landscape (2006). Thus, the diversity of soil types allowed for a variety of plant cultivation and land covers creating several ecological units. The geological formations of Tyre city can be defined according to the topographical component “coastal plain” which belongs to the quaternary geological formation characterized by sedimentary calcareous brown soil specific to the coastline stretching from south of Litani/Qasmiyeh to Naqoura River and deposits of brown or gray mostly clay loamy soils. On the plain, the alluvial-colluvial soil is found to be fertile and ideal for the cultivation of subtropical plants such as citrus and banana.

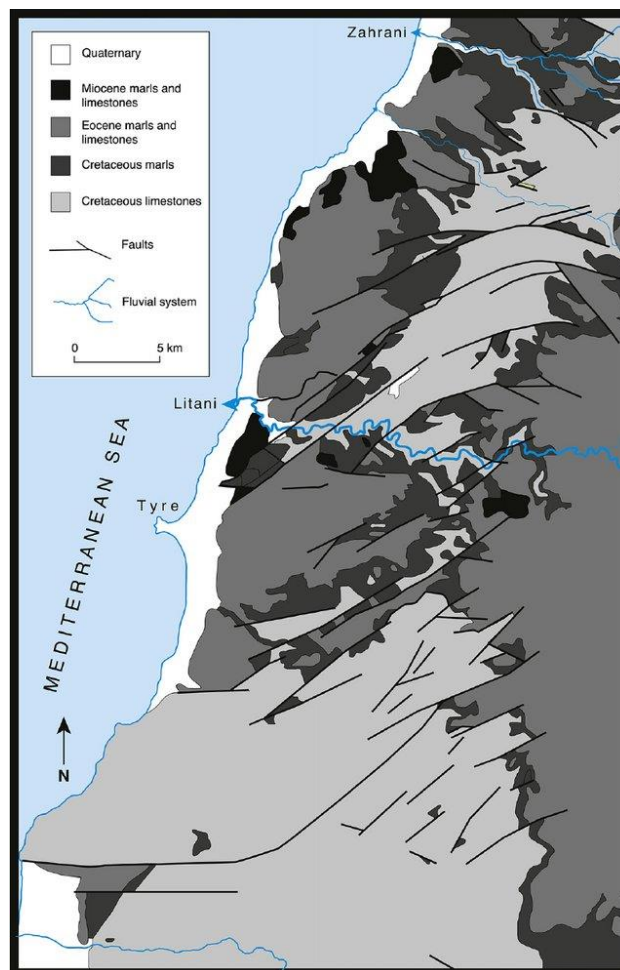


Figure 53: Geology of the Tyre Area. (Mariner et al., 2012)

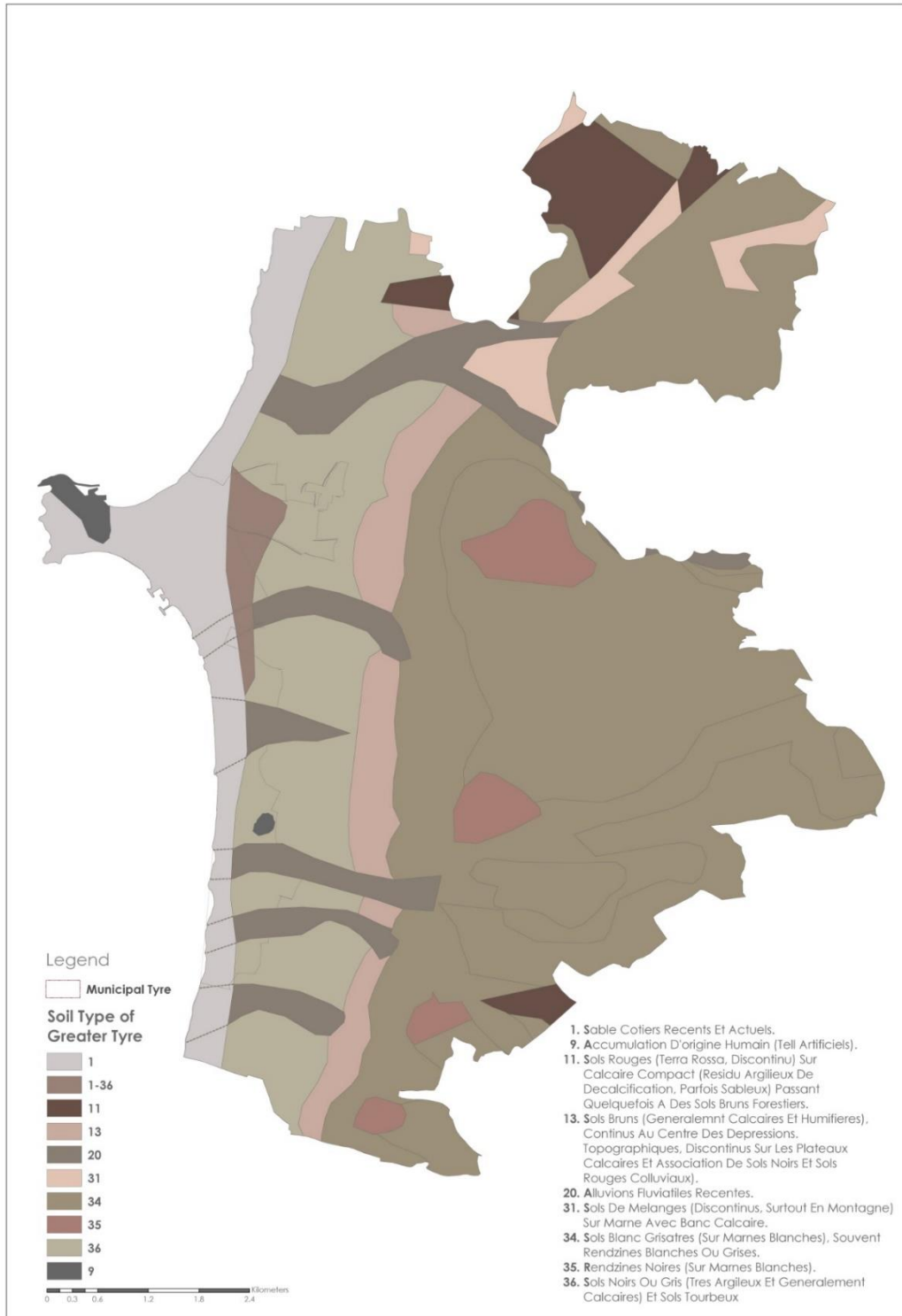


Figure 54: Soil Type of Greater Tyre and Municipal Tyre. (By Author, 2023.)

According to UN-Habitat and Darwish, T maps, Tyre Caza is mainly at high risk of erosion, Tyre urban area is at medium risk while municipal Tyre is least likely to experience erosion in relation to geomorphology and climatic conditions (2017), (2002). Accordingly, this is an added value to the importance of the coastal plain of Municipal Tyre.

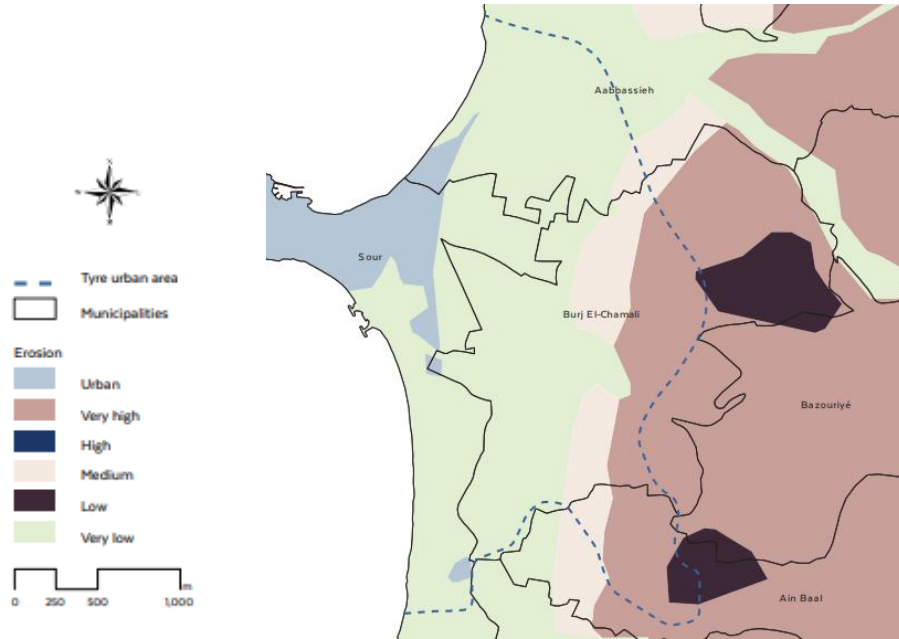


Figure 55: Erosion in the Urban Area of Tyre. (UN-Habitat, 2017 adapted from: DDR unit, UoTM).

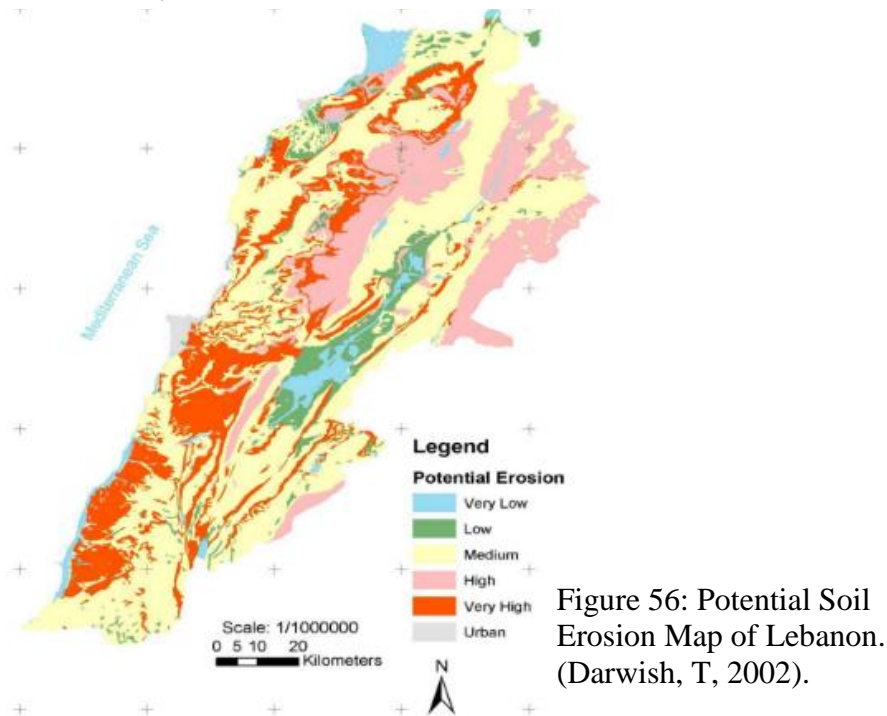


Figure 56: Potential Soil Erosion Map of Lebanon. (Darwish, T, 2002).

5.3.1.2. Hydrology

Tyre city is fully dependent on springs as the main source of fresh drinking water. Water supplies are provided by the still functional Roman Aqueducts that originate from the Ras Al-Ain springs and Al-Rashidieh springs. Ras Al-Ain has four water sources are substantially flowing, two sources named “Safsafa”, the third source named “Israwiyya” and the forth source is called “Sayde” (Badawi, 2012). Ras Al-Ain springs have an estimated water flow of 16 m³/s and volume of 10,000 to 15,000 m³/day (Debs, 2015) that irrigates the narrow coastal plain from the village of Mansouri to the south and the village of Abbasieh to the north, fulfilling its historical role to this day as the primary source of drinking water as well as for agricultural irrigation. There are 7 reservoirs in Ras El Ain; two are used to irrigate the southern part of Tyre’s coastal plains, one is used for potable water distribution by Tyre Water Treatment Plant and other four reservoirs are not used and located near Al-Rachidiyeh Camp. In addition to Ras Al-Ain springs, the springs of Al-Rashidieh (with water flow of 6,600 m³ per day) are currently a source of drinking water for the city of Tyre. (Figure 57) shows that Tyre represents the meeting point of over four seasonal water streams descending from the hilltops of Al-Abbasieh, Maarakeh, Bazouriye and Batouley.

In addition to water springs, seasonal water streams demarcate the coastal plain and the region are filled to the brim with torrential rains during winter and spring and dry in summer. They cross the rural-urban interface transversally from East to West. Al-Samer river springs in foothills of Maarakeh and flows to Jal Al-Baher, while Al- Nabbaa springs in the foothills of Al-Bazourieh and flows to the area adjacent to the municipal park of Tyre, and Ain Baal stream originates from Ain Baal Valley all the way to Ras Al-Ain springs area.

HYDROLOGY OF TYRE

Legend

MUNICIPAL TYRE

TOPOGRAPHY



- SEASONAL WATER STREAMS
- DISAPPEARED WATER STREAMS
- ROMAN AQUEDUCTS
- CADASTRAL BOUNDARIES
- WATER SPRINGS
- URBAN EDGE

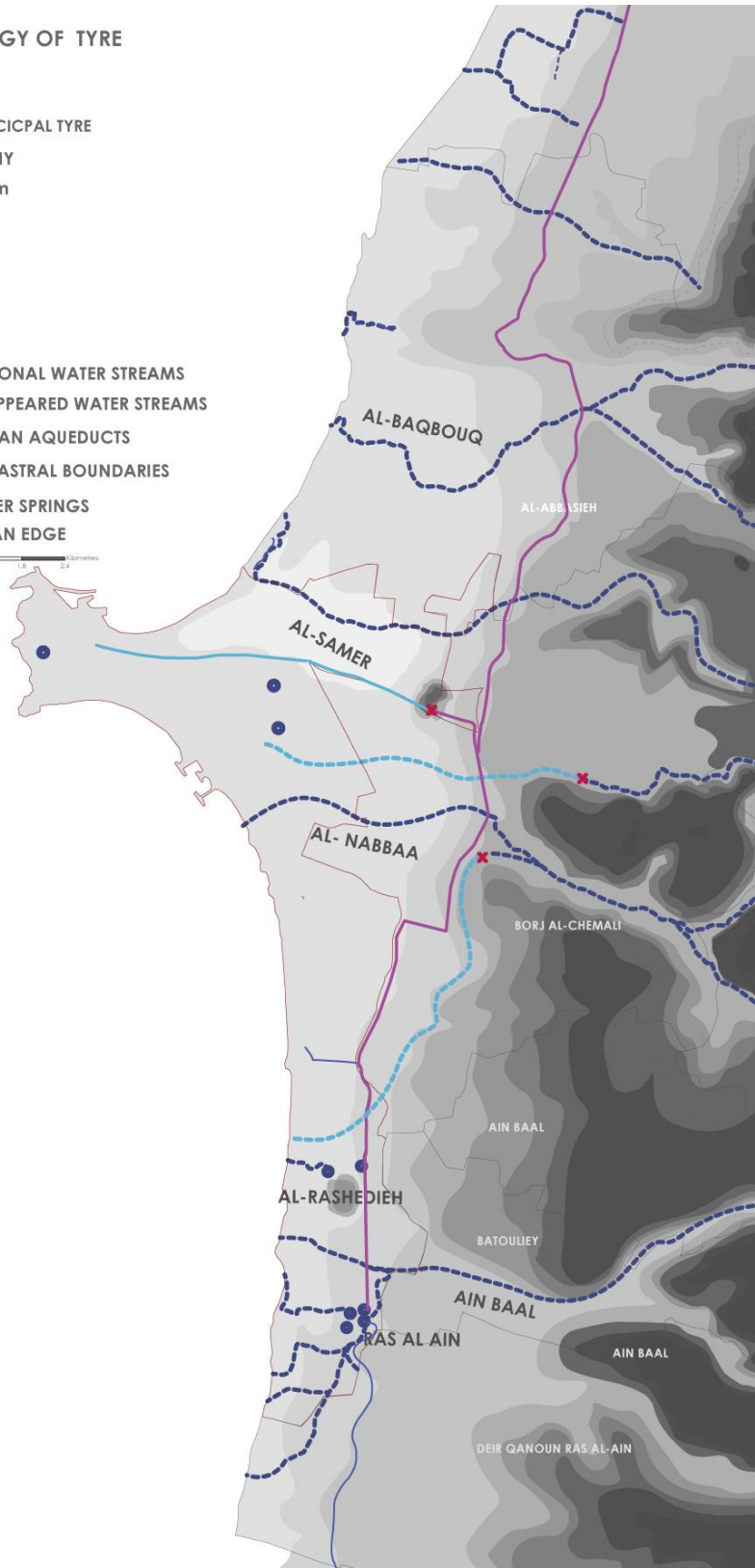


Figure 57: Hydrology Map of Tyre. Analysis by (Author, 2023)

5.3.1.3. Rainfall and Climate

Tyre has a hot summer Mediterranean climate characterized by six months of drought from May to October. On average, the city has a yearly temperature of 20.8°C. The average maximum temperature reaches its highest at 30.8 °C in August and the average minimum temperature its lowest at 10 °C in January (Yacoub, A, 2011). On average, the mean annual precipitation reaches up to 645 mm, during winter, average precipitation in the area ranges from 620 mm to 800 mm and the highest precipitation rates (150 mm to 200 mm) happen in the months of December, January, and February. Based on the data of “Atlas Climatique du Liban”, the predominant winds rise from the south and south-west orientation are weaker in winter season and stronger and more frequent in summer. In general, the area has a medium to high relative humidity (averaged 68% annually) that reaches 73% during summer and 63% during winter. (CDR, 2017).

5.3.2. The Biotic Components

5.3.2.1. Land Cover

Land cover in Municipal Tyre is diverse. Some areas of the landscape are part of the regional scrubland zone that mainly are characteristic in the TCNR and Tyre’s archeological sites (Figure 58) (Figure 59). Based on GIS map analysis, verified by field observations, there are two types of the green cover in the area under study: natural and semi-natural. The south eastern part of municipal Tyre is historically part of the Tyre’s agricultural belt, cultivated with bananas and citrus trees. Citrus is combined with the cultivation of bananas and other field crops specifically in the lands along the main southeastern road leading to Naqoura and in the coastal plain adjacent to Al-Rashidieh Camp and Al-Ain water springs as well as in the threatened agricultural area

located in Al-Masaken neighborhood. Agricultural harvests, mainly citrus and bananas, are sold in the wholesale market of Tyre, Saida and Beirut and different areas of the villages of the Caza. Breeding and grazing domestic animals such as cows, goats, and sheep is still practiced within the boundaries of the city (Figure 60).



Figure 58: Scrublands in the TCNR. (Author, 2023)



Figure 59: Scrublands in the Roman Archeological sites in Tyre (Author, 2023)



Figure 60: Land Cover of Greater Tyre and Municipal Tyre. (Author, 2023)

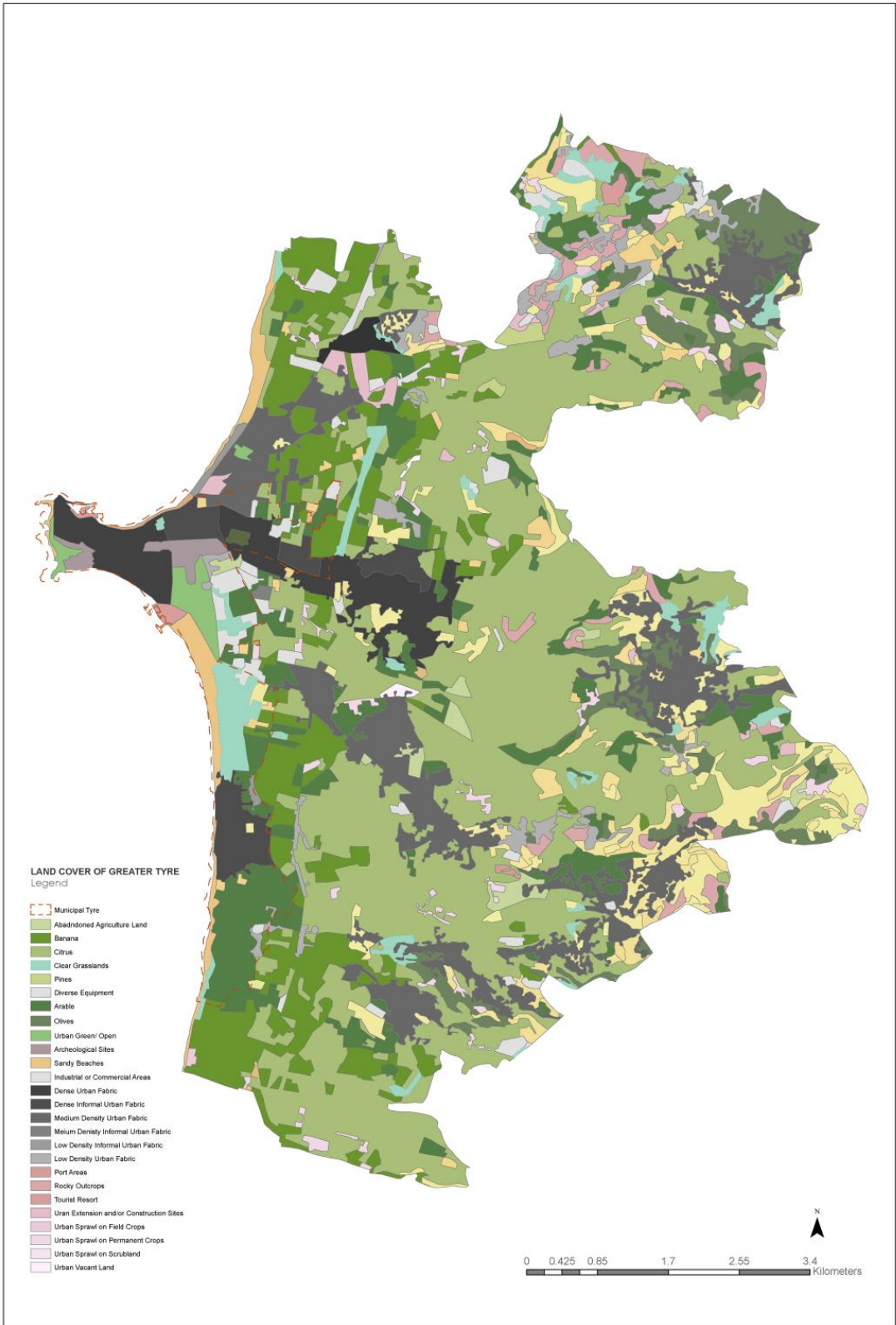


Figure 61: Land Cover of Greater Tyre and Municipal Tyre. (Author, 2023)

5.4. Municipal Tyre: Ecological Landscape Associations

By overlaying the maps presented in the previous sections, the natural setting (topography, soil, hydrology), the semi natural/cultural (agriculture) and the cultural/urban setting (archeological sites, army, contemporary and informal settlements), twenty-one ELAs are identified as follows (based on the table below):

- **ELA1:** Coastal Plain/ Scrublands
- **ELA2:** Maritime Edge/ Scrublands
- **ELA3:** Fresh Water Springs/ Scrublands
- **ELA4:** Coastal Plain/ Arable
- **ELA5:** Fresh Water Springs/ Arable
- **ELA6:** Coastal Plain/ Orchards
- **ELA7:** Stream/ Orchards
- **ELA8:** Fresh Water Springs/ Orchards
- **ELA9:** Coastal Plain/ Urban Green/Open
- **ELA10:** Maritime/ Urban Green/Open
- **ELA11:** Coastal Plain/ Archeological
- **ELA12:** Maritime Edge/ Archeological
- **ELA13:** Fresh Water Springs/ Archeological
- **ELA14:** Marine/ Archeological
- **ELA15:** Coastal Plain/ Historic
- **ELA16:** Maritime Edge/ Historic
- **ELA17:** Coastal Plain/ Contemporary
- **ELA18:** Coastal Plain/ Army
- **ELA19:** Maritime Edge/ Army
- **ELA20:** Coastal Plain/ Informal Settlements

- **ELA21: Maritime Edge/ Informal Settlements**

	Cultural								
	Natural	Semi Natural			Urban				
	Scrublands	Arable	Orchards	Urban Green/Open	Archeological	Built-up			
						Historic	Contemporary	Army	Informal Settlements/Camps
Coastal Plain	ELA1	ELA4	ELA6	ELA9	ELA11	ELA15	ELA17	ELA18	ELA20
Maritime Edge	ELA2			ELA10	ELA12	ELA16		EL19	ELA21
Stream			ELA7						
Fresh Water Springs	ELA3	ELA5	ELA8		ELA13				
Marine					ELA14				

Table 2: ELAs of Municipal Tyre. (Author, 2023)

5.4.1. Natural ELAs

- **ELA1 & ELA2 & ELA3:**

Maritime Edge, Coastal Plain & Fresh Water Springs/ Scrublands

These two associations represent large areas of TCNR which preserves natural landscapes and are of ecological significance. The TCNR protecting a large area of the original sandy beach, all that remain of a much larger zone as discussed in the previous chapter. The protected area offers as well environmental benefit of protecting the southern waterfront from soil erosion. ELA1 & ELA2 include one of the two zones of TCNR which is a 1.8 km long and 500 meters wide-ranging from the Rest House in the north to Al-Rashidieh Refugee Camp in the South. This zone has two sections; one for tourism including a 900m public beach that hosts up to 20,000 visitors on a busy day in the summer season hosting and another 900 m of conservation area

ECOLOGICAL LANDSCAPE ASSOCIATIONS

MUNICIPAL TYRE

NATURAL

- ELA1 - COASTAL PLAIN/ SCRUBLANDS
- ELA2 - MARITIME EDGE/ SCRUBLANDS
- ELA3 - FRESH WATER SPRINGS/ SCRUBLANDS

SEMI NATURAL

- ELA4 - COASTAL PLAIN/ ARABLE
- ELA5 - FRESH WATER SPRINGS/ ARABLE
- ELA6 - COASTAL PLAIN/ ORCHARDS
- ELA7 - STREAM/ ORCHARDS
- ELA8 - FRESH WATER SPRINGS/ ORCHARDS
- ELA9 - COASTAL PLAIN/ URBAN GREEN-OPEN
- ELA10 - MARITIME EDGE/ URBAN GREEN-OPEN

URBAN

- ELA11 - COASTAL PLAIN/ ARCHEOLOGICAL
- ELA12 - MARITIME EDGE/ ARCHEOLOGICAL
- ELA13 - FRESH WATER SPRINGS/ ARCHEOLOGICAL
- ELA14 - MARITIME/ ARCHEOLOGICAL
- ELA15 - COASTAL PLAIN/ HISTORIC
- ELA16 - MARITIME EDGE/ HISTORIC
- ELA17 - COASTAL PLAIN/ CONTEMPORARY
- ELA18 - COASTAL PLAIN/ ARMY
- ELA19 - MARITIME EDGE/ ARMY
- ELA20 - COASTAL PLAIN/ INFORMAL SETTLEMENT/ CAMPS
- ELA21 - MARITIME EDGE/ INFORMAL SETTLEMENT/ CAMPS

0 0.3 0.4 1.2 1.8 2.4 Kilometers

	Cultural								
	Natural			Semi Natural			Urban		
	ScrUBLANDS	Arable	Orchards	Urban Green/Open	Archeological	Built-up			
					Historic	Contemporary	Army	Informal Settlements/Camps	
Coastal Plain	ELA1	ELA4	ELA6	ELA9	ELA11	ELA15	ELA17	ELA18	ELA20
Maritime Edge	ELA2			ELA10	ELA12	ELA16		EL19	ELA21
Stream			ELA7						
Fresh Water Springs	ELA3	ELA5	ELA8		ELA13				
Marine					ELA14				

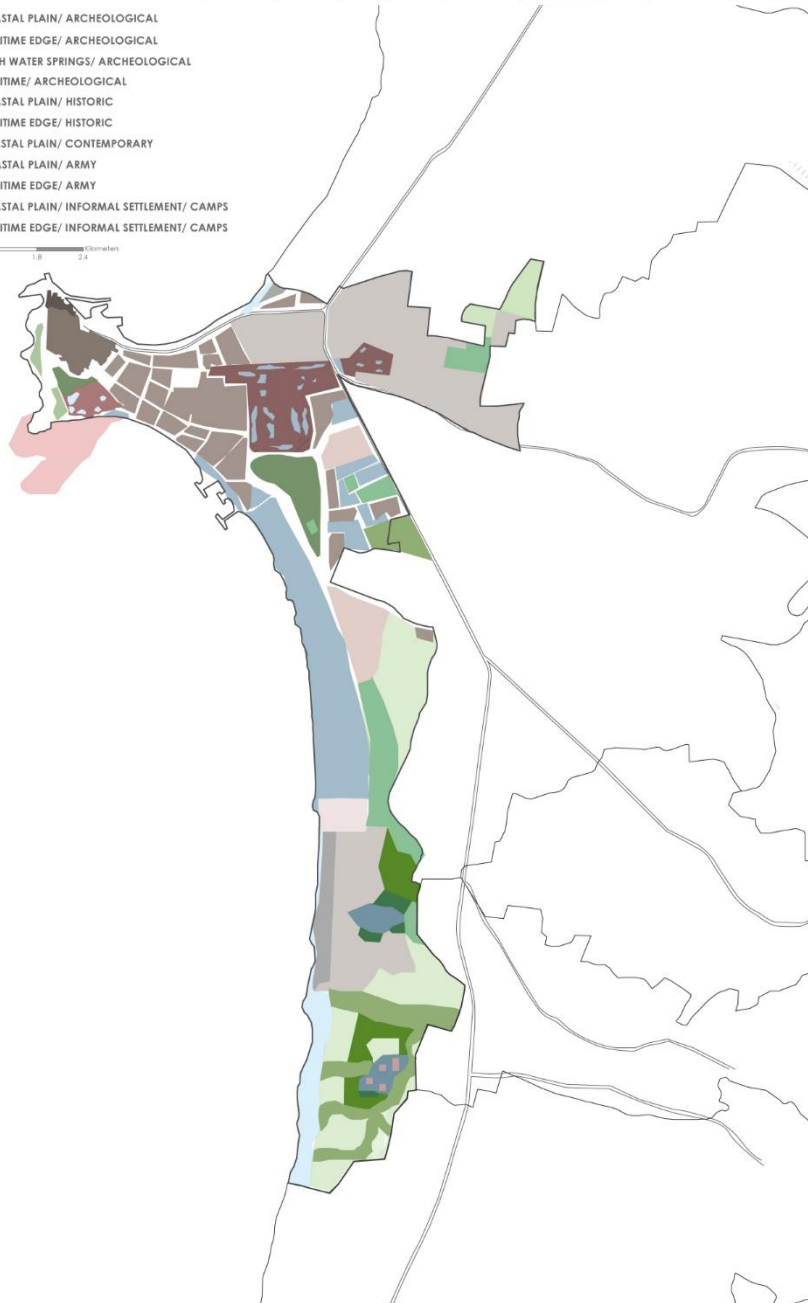


Figure 62: ELAs Spatial Distribution over Municipal Tyre (Author, 2023)

for research and being a sanctuary as a habitat for regionally and nationally threatened large variety of flora and fauna. It is a hotspot for the Arabian spiny mouse, the endangered Loggerhead and green sea turtle, wall lizards, common pipistrelle, and European badger, in addition to being an important nesting site for migratory birds (El Shaer, 2012). In addition, they are a bank for Mediterranean medicinal and edible plants. Also these two associations include army empty lands, and the empty lands within the archeological sites that also constitute the remaining natural Mediterranean landscape of scrubland. ELA 3 represents the dense remaining natural Mediterranean landscape of scrubland surrounding Ras Al-Ain and Al-Rashidieh fresh water springs which are also part of the TCNR.

5.4.2. Semi Natural - Cultural ELAs

- ELA4 & ELA5: Coastal Plain & Fresh Water Springs/ Arable

These two associations have an economic, socio-cultural and ecological significance. They represent landscapes resulting from the historic process of the Palestinian refugee adaptation and management of natural resources and environmental conditions as a source of livelihood. These landscapes are integral to the historic development of the coastal plain surrounding Al-Rashidieh camp and the water springs of Ras Al-Ain and Al-Rashidieh.

- ELA6, ELA7 & ELA8: Coastal Plain, Stream & Fresh Water Springs/ Orchards

These associations correspond to fertile agriculture fields surrounding the fresh water springs that irrigate the whole orchards of the coastal plain of greater Tyre. Also, ELA7 represent the fertile lands along the seasonal water streams originating from the hilltops of the adjacent villages creating ecological green fingers that exceed the

municipal boundaries of Tyre. The unregulated urbanization outside the boundaries of municipal Tyre is expected to disrupt the continuity of the ecological green corridors surrounding the streams and the orchards of the coastal plain from the adjacent villages into Tyre city. These associations are famed for the prime quality of their orange, citrus, clementine and Banana. They constitute an important part of the greater Tyre's economy, and provide a natural buffer zone between Tyre city and the adjacent urbanizing areas.

- **ELA9 & ELA10: Coastal Plain & Maritime Edge / Urban Green/Open**

ELA9 used to impose an ecological and socio-cultural significance when it was a Horsh. Since it was declared the municipal park of Tyre the significance has changed to favor amenity services. This association requires a revival planning strategy that shifts the design and governance of park amenities and programming to flexible spaces that encourage physical activity, enriches the ecological character of the city and adapts environmental and social activities. According to a study done by Nahnoo NGO, although the park covers a wide area, it dramatically lacks a green cover. It is seen in the eyes of the citizens as a sandy hill “إسم عالفاضي حديقة، هيدي تلة “ زمل” while others look at in nostalgic eyes recalling the park when it was a Horsh in 1930s till 1970s (2013). The citizens have laid the blame for the negligence that led to the poor condition of the park on the Municipality of Tyre while the park is a state land that belongs to the Ministry of Finance and the Municipality has no warrant to manage it.

ELA10 is man-made landscape (cemetery of Tyre and Al-Kharab municipal park) that shapes part of the western morphology of the coastal marine edge. This association is a cultural linkage of the old city with the waterfront.



Figure 63: ELA 10: The cemetery and Al-Kharab Park. by Badawi, A, 2022)



Figure 64: ELA9: The Aerial view of the Municipal Park of Tyre shows the deterioration of the green cover in the park. (Google Earth, 2022)

5.4.3. Urban - Cultural ELAs

- ELA11, ELA12, ELA13 & ELA14:

Coastal Plain, Maritime Edge, Fresh Water Springs and Marine/ Archeological

These associations comprise what remain of the archeological sites that date to the Phoenician era but was developed significantly by the Greeks and Romans. These associations occupy around 2/3 of the city's total area (Badawi, A, 2023). They are characterized by (a) ELA11: The archeological area of Al-Bass Site, (b) ELA12: The

archeological area of The City Site, (c) ELA13: The Basins and Aqueduct of Ras Al-Ain and (4) ELA14: The Drowned Island of Tyre that include the Roman Basin and The Egyptian Eastern Harbor (Figure 65).



Figure 65: ELA 14: The Drowned Island of Tyre (Badawi, A, 2022)

- **ELA15 & ELA16: Coastal Plain & Maritime Edge / Historic**

These associations are located at the northeastern tip of the city. They embrace the old historic fabric/core of the city in addition to various historic landmarks. These associations preserve cultural, architectural and historical significance.

- **ELA17: Coastal Plain/ Contemporary**

This association corresponds to the contemporary urban development outside the historic city towards the eastern and southern boundaries of the city. This association was mainly developed from the 1940s until 1990s through different master planning stages. This association preserves economic and cultural significance.

- **ELA18 & ELA19: Coastal Plain & Maritime Edge / Army**

These associations represent security enclaved areas of army bases on the maritime edge adjacent to Al-Rashidieh camp and in the coastal plain inside the city including military medical centers and supermarkets for army members.

- **ELA20 & ELA21: Coastal Plain & Maritime Edge / Informal Settlements & Camps**

They are man-made interventions that drastically changed the morphology of the natural coastal marine edge and interrupted the continuity of the TCNR when the French Mandate planned the area as a camp with different infrastructures - mainly water resources from Ras Al-Ain and Al-Rashidieh springs in addition to empty lands for agriculture as a source of food security (Charaffiedine, 2022) - for the Armenians and turned to be for the Palestinian refugees later on. In addition, the coastal plain of the city includes Al-Bass Camp that is located on the eastern entrance of the city and Al-Masaken Neighborhood that was built on a large swamp area as mentioned in the previous chapter which illegally developed and expanded to create other neighborhoods on state lands; Al-Mazraa and Al-Maashouk. These associations represent the incompetent state's land use and planning that missed the importance of the ecological layer.

5.5. Reading The ELAs of the Areas Adjacent to Municipal Tyre Boundaries

Ecological continuity is a key to healthy environment and the basis for sustainable urban greening. As the physical, visible and tangible expression of ecosystems, landscapes are similarly fluid, they do not follow administrative boundaries. For this reason, I have extended my ELA analysis to include landscapes that form the peripheries of Tyre Municipal boundaries. The differentiation between the associations within the site of Municipal Tyre and outside of it helps understanding the landscape character of the area, defining edge elements as well as the contentious landscapes. Although the analysis is not as detailed as that I undertook for municipal

Tyre, they help establish an understanding of the landscape morphology and character necessary for the objective of my thesis research. Greater Tyre is a very interesting site as the ELAs forming its landscape are interrelated and diverse. Some ELAs inside the municipal boundaries of Tyre intersect with others outside, as the association of Coastal Plain/ Arable (ELA4), Maritime Edge/ Scrublands (ELA2), Coastal Plain/ Army (ELA18), Coastal Plain/ Contemporary (ELA17) that appears in the eastern edge of the city and the most important intersection is the association of Coastal Plain/ Orchards (ELA6) which is under a real threat since the adjacent municipalities to Municipal Tyre are repeatedly insisting on changing the property classification of the agricultural lands along the roads leading to south-east rural landscapes (Badawi, A, 2023). Other ELAs juxtapose defining an edge landscape like Coastal Plain/ Informal Settlements/Camps (ELA20) with Coastal Plain/ Orchards (ELA6) and Coastal Plain/ Informal Settlements/Camps (ELA20) with Coastal Plain/ Contemporary (ELA17) creating urban fingers invading the rural agricultural lands. The association of Coastal Plain/ Orchards (ELA6) constitutes large areas of greater Tyre shaping a green built in which 70% of the Lebanese citrus cultivation is concentrated according to the agricultural atlas of Lebanon.

	Cultural								
	Natural	Semi Natural			Urban				
	Scrublands	Arable	Orchards	Urban Green/Open	Archeological	Built-up			
					Historic	Contemporary	Army	Informal Settlements/Camps	
Coastal Plain	ELA1	ELA4	ELA6	ELA9	ELA11	ELA15	ELA17	ELA18	ELA20
Maritime Edge	ELA2			ELA10	ELA12	ELA16		EL19	ELA21
Stream			ELA7						
Fresh Water Springs	ELA3	ELA5	ELA8		ELA13				
Marine					ELA14				

Table 3: The continuing associations over areas adjacent to Municipal Tyre (Author, 2023)

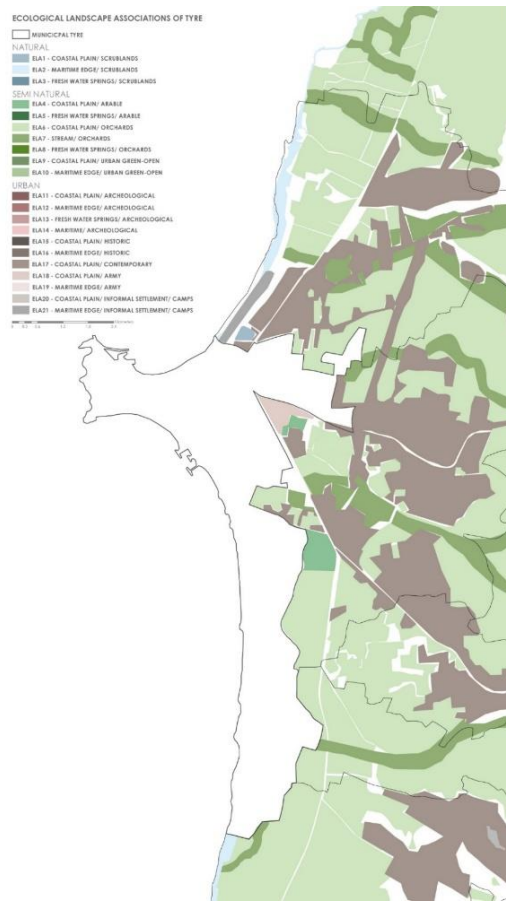


Figure 66: ELAs Spatial Distribution over areas adjacent to Municipal Tyre (Author, 2023)

Today, the agriculture cover Tyre’s plain is still diverse, and produces the famous prime quality of orange, citrus, clementine and Banana. This agricultural production is, however, under threat by the current and future urban development characterized by the association of Coastal Plain/ Contemporary (ELA17). Although the urban agglomeration is indispensable for the growth of the city, yet, it is shrinking the green cover. There is a real necessity to reconsider the strategies that control and manage urban growth in methods that focus balancing between built/ green or open areas and developing criteria with detailed urban regulation that take into consideration cultural and natural heritage in addition to the establishment of a character and identity specific to municipal and Greater Tyre.



Figure 67: ELAs Spatial Distribution over Greater Tyre (Author, 2023)

CHAPTER 6

URBAN LANDSCAPE STRATEGIC FRAMEWORK FOR MUNICIPAL TYRE

The ecological landscape associations (ELAs) identified for Tyre in the previous chapter recognizes the evolution, changing spatial morphology and transformation of the landscape ecology. In this chapter, the Landscape Character Zones (LCZs) will be developed to serve to test the threats posed by the existing master plan of 1998 and as a basis for proposing a conceptual greening framework with strategies for zoning and connecting the fragmented landscapes of state lands in Municipal Tyre.

6.1. From Ecological Landscape Associations (ELAs) to Landscape Character Zones (LCZs)

Landscape character zones (LCZs), are defined as mappable landscape zones “with almost homogeneous abiotic and biotic features delimited by distinct margins” (Makhzoumi & Pungetti, 1999). LCZs group one or more of the ELAs identified for Tyre to form larger components that can thereafter serve as the building blocks for urban design strategies. And because ELAs and LCZs are composed of smaller and larger ecosystems, they are sustainable in themselves as well as able to guide future planning towards sustainable scenarios. In this thesis, LCZ mapping will guide and inspire an urban landscape design conceptual greening strategy/ framework that serves as the foundation for a sustainable urban development strategy that can complement and guide the current existing 1998 master plan of Municipal Tyre through specifically developing the south and southeastern area of Municipal Tyre. Eight LCZs were identified for municipal Tyre study area based on the biotic components, mainly land

cover (arable, agriculture, scrublands, built-up, etc.) and the main ecological features forming the landscape (watercourse, coastal plain, etc.).

In the following section, the fine grain mosaic of ELAs is converted into coarse landscape mosaics. This conversion is listed in the (Table 4) and illustrated in (Figure 68).

Zones	Landscape Character Zones (LCZs)	Ecological Landscape Associations (ELAs)
Zone 1	Fresh Water Springs Arable Landscapes (Arable lands with different crops)	ELA4: Coastal Plain/ Arable ELA5: Fresh Water Springs/ Arable
Zone 2	Coastal Plain Orchards (citrus, banana & avocado orchards and olive groves)	ELA6: Coastal Plain/ Orchards ELA7: Stream/ Orchards ELA8: Fresh Water Springs/ Orchards
Zone 3	Scrublands and Semi Natural Landscapes (uncultivated lands, grasslands, TCNR, archeological site grasslands, sandy beach)	ELA1: Coastal Plain/ Scrublands ELA2: Maritime Edge/ Scrublands ELA3: Fresh Water Springs/ Scrublands ELA11: Coastal Plain/ Archeological
Zone 4	Riparian Landscapes	Seasonal Streams and Watercourses
Zone 5	The Horsh (Municipal Park, spaces in between and within governmental and institutional buildings)	ELA9: Coastal Plain/ Urban Green/Open ELA11: Coastal Plain/ Archeological ELA1: Coastal Plain/ Scrublands
Zone 6	Temporary Landscapes (Army Land & Refugee Camps)	ELA18: Coastal Plain/ Army ELA19: Maritime Edge/ Army ELA20: Coastal Plain/ Informal Settlements ELA21: Maritime Edge/ Informal Settlements
Zone 7	The Historic Core (high density, cultural heritage)	ELA15: Coastal Plain/ Historic ELA16: Maritime Edge/ Historic
Zone 8	Contemporary Built-up (contemporary built-up, informal settlements, High density, medium density, low density, mixed-use)	ELA17: Coastal Plain/ Contemporary

Table 4: Landscape Character Zones. Analysis by (Author, 2023).



Figure 68: Map of Landscape Character Zones for Municipal Tyre. (Author, 2023).

6.1.1. Description of Landscape Character Zones (LCZs)

In the following section each of the 8 LCZs is described in terms of its character, function, and importance.

- Zone 1: Fresh Water Springs Arable Landscapes

This zone constitutes all the arable lands found in the rich water-holding soils that are directly surrounding or aligning the fresh water springs (ELA4) & (ELA5). According to one of the area's peasants Mahdi Hamadeh, since these lands provide a persistent water supply directly from the springs, these lands are suitable for arable that requires intensive water irrigation. This feature has formed a general norm of using the lands by specifying the water springs' surrounding lands as for arable while the lands located afterwards are orchards. This norm has an economic layer which tells that the rich water-holding lands are cultivated from 4 to 6 times a year if they are arable while once a year if they are orchards. This zone should be protected as an important cultural heritage and for its socio-economic benefit.

- Zone 2: Coastal Plain Orchards

This zone constitutes the fertile coastal plain orchards (ELA6), (ELA7) and (ELA8). These orchards represent a green cover of scale and productive landscapes that possess ecological, environmental, cultural, and economic values. This zone can act as green buffer zones between the city and the surrounding villages that prevent urban sprawl of the rural-urban interface as well as can be part of the greening connectivity network that will form a regional park for Tyre and the Caza as well. This zone should be protected as it is threatened by the 1998 master plan zoning that considered different orchards as areas for future commercial, touristic or residential uses.

- Zone 3: Scrublands and Semi Natural Landscapes

This zone constitutes the natural scrublands of the coastal plain (ELA1), the maritime edge (ELA2), the fresh water springs area and the archeological site. This zone is mainly located in the TCNR and the Roman archeological site of Al-Bass. This area is known for hosting the longest sandy beach in Lebanon, a variety of plant species, the seasonal swamps, the international route of migratory birds, the nests of the large turtles as well as the significant cultural heritage landscapes of Al-Bass archeological site. This zone is protected by laws.

- Zone 4: Riparian Landscapes

This zone constitutes the network of seasonal watercourses flowing all the way from the hilltops of the surrounding villages. Some streams pass through agricultural lands and end up in the sea while others get interrupted by urbanization affecting by that the natural water flow that appears as flooding in the rainy season or as polluted buried canals. This zone must be protected as it can provide ecological corridors within the urbanizing areas and the existing green cover and is an important source of fresh water to irrigate the existing agricultural lands naturally. These streams should be preserved and protected by a buffer zone - 50m at least - on both sides.

- Zone 5: The Horsh

This zone constitutes different areas located in the historical Horsh location which currently includes the municipal park, Al-Hesbeh (fruits and vegetables wholesale market) and the green areas surrounding the governmental and institutional buildings built on state lands (ELA1), (ELA9) & (ELA11). This zone will reform the main landscape features that contribute to the shared memory of the place and anchors

the sense of belonging since it is integral to the city's identity as well as Tyre's natural and cultural heritage.

- Zone 6: Temporary Landscapes

This zone constitutes the temporary lands of the Palestinian refugee camps as well as army barracks. Although Tyre is not considered a large city, the city hosts two Palestinian refugee camps located in different areas, one in the eastern entrance of the city while the other one is in the TCNR area. These temporary lands require further investigations that addresses their social, economic, morphological impacts on the city as whole and on its ecological layer.

- Zone 7: The Historic Core

This zone constitutes the historic area of municipal Tyre. The latter contains many old residential buildings situated at a proximity to the sea and churches of historical, cultural and heritage significance. The area forms part of the coastline's urban fabric (ELA15) and the coastal plain's urban fabric (ELA16). This zone's heritage and cultural character are protected by the law.

- Zone 8: Contemporary Built-up

This zone constitutes the contemporary built-up of the coastal plain of municipal Tyre (ELA17). This zone has been gradually developed from 1940s till 1990s. Building regulations should be revisited in these zones to enhance the urban infrastructure, protect the character of culturally significant areas, and activate the ecological features within

Zones	Landscape Character Zones (LCZs)	Ecological Landscape Associations (ELAs)	Stakeholders	Status	Area
Zone 1	Fresh Water Springs Arable Landscapes (Arable lands with different crops)	ELA4: Coastal Plain/ Arable ELA5: Fresh Water Springs/ Arable	Ministry of Environment, DGA and The State	Protected by law	13%
Zone 2	Coastal Plain Orchards (citrus, banana & avocado orchards and olive groves)	ELA6: Coastal Plain/ Orchards ELA7: Stream/ Orchards ELA8: Fresh Water Springs/ Orchards	The State, DGA	Unprotected	13%
Zone 3	Scrublands and Semi Natural Landscapes (uncultivated lands, grasslands, TCNR, archeological site grasslands, sandy beach)	ELA1: Coastal Plain/ Scrublands ELA2: Maritime Edge/ Scrublands ELA3: Fresh Water Springs/ Scrublands ELA11: Coastal Plain/ Archeological	Ministry of Environment, DGA and The State	Protected by law	15%
Zone 4	Riparian Landscapes	Seasonal Streams and Watercourses	The State	Unprotected	7%
Zone 5	The Horsh (Municipal Park, spaces in between and within governmental and institutional buildings)	ELA9: Coastal Plain/ Urban Green/Open ELA11: Coastal Plain/ Archeological ELA1: Coastal Plain/ Scrublands	The State, DGA	Unprotected	6%
Zone 6	Temporary Landscapes (Army Land & Refugee Camps)	ELA18: Coastal Plain/ Army ELA19: Maritime Edge/ Army ELA20: Coastal Plain/ Informal Settlements ELA21: Maritime Edge/ Informal Settlements	The State	-	14%
Zone 7	The Historic Core (high density, cultural heritage)	ELA15: Coastal Plain/ Historic ELA16: Maritime Edge/ Historic	The majority is private lands	Protected by law	6%
Zone 8	Contemporary Built-up (contemporary built-up, informal settlements, High density, medium density, low density, mixed-use)	ELA17: Coastal Plain/ Contemporary	The majority is private	-	26%

Table 5: Description of Landscape Character Zones. Analysis by (Author, 2023).

Due to the time limitation, the scope of the study will only intervene on the zones of the open/green landscapes (Zone 1, 2, 3, 4 &5) leaving the floor for other studies or theses to enrich the narrative.

6.2. The LCZs as a reference for Critiquing the 1998 Masterplan of Tyre

The 1998 Masterplan of Tyre has developed lands through the conventional zoning tool. Concerning the zoning tool, Khayyat (1999) mentions that zoning is a general model that does not take into account the specificity of the existing urban landscape (social, ecological, environmental, cultural and physical context). (LaGro, 1994) adds that zoning has been criticized for not adequately responding to the dynamic of land use and the fragmentation of landscapes. In addition, the conventional applied strategy to control sprawl is to deal with development factors (densities) and to determine areas of development. Through that, it drives the urban dynamics to the real-estate markets, disregarding any provision to ecological assets preservation. Due to the reality of the conventional master planning that looks at the site as a tabula rasa, points of conflicts between the analysis have I have made through the ecological landscape reading and the 1998 master plan constitute threats that undermine the character for which Tyre is known for. In other words, based on the natural extension of LCZs beyond municipal boundaries in addition to the projected urbanization directions and the current and proposed zonings, a set of repercussions of the 1998 proposed masterplan on the landscape of municipal Tyre are identified as follows:

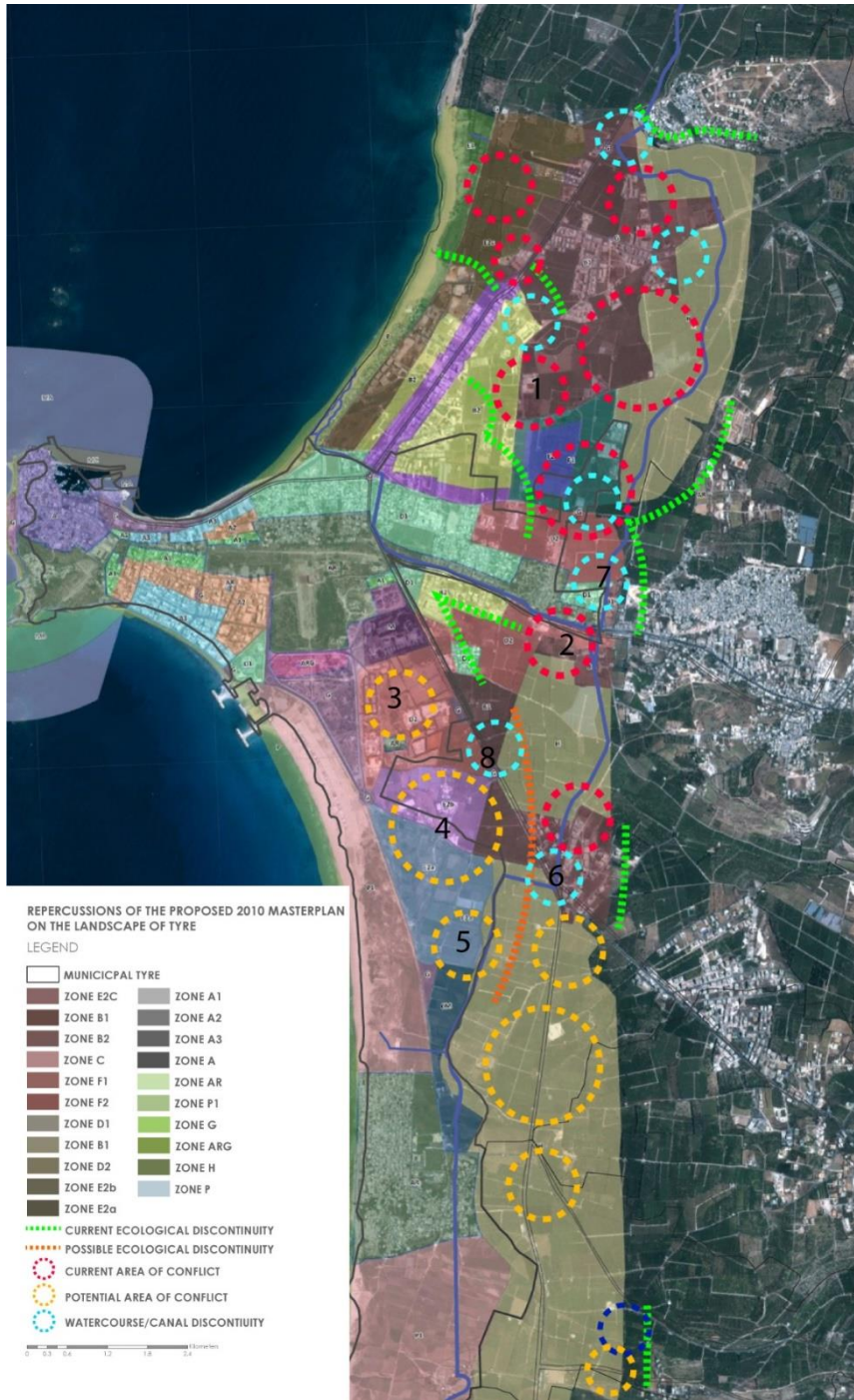


Figure 69: Map showing the Repercussions of the 1998 Masterplan Analysis by (Author, 2023)

-Ecological Discontinuity (1,2)

The zoning of the adjacent villages as built-up areas, coupled with the absence of green buffer zones will end up with ecological discontinuity. As (Badawi, A, 2023)

mentions, the adjacent municipalities to Tyre are raising their voices to change Zone h (Agricultural lands) to a zone for residential and commercial developments but the DGA still refuses to take such a step. Converting Zone h would consequently destroy the green buffer zones, thus, the ecological continuity of the various natural elements will dramatically disappear.

-Encroachment on Agricultural Lands (3, 4, 5)

The proposed zoning encourages urban encroachment on the agricultural lands within municipal Tyre and outside the TCNR zone by proposing zones for residential and tourism on agricultural state lands. Moreover, these proposed zones will polarize various developments due to their vicinity from the international highway leading to Naqoura. Although the eastern entrance of Tyre - Al-Bass Area - suffers from congestion, this zoning worsens the situation by introducing new developments on the southern entrance of the city. Besides, two industrial areas are proposed next to Al-Masaken neighborhood which needs a rehabilitation strategy. In addition to the fact that this zone is an area of water catchment due to its low topography levels.

-Disruption of Watercourse Corridors (6,7,8)

The masterplan zoning did not take into consideration the watercourse corridors originating from the surrounding villages to the coastal plain of municipal Tyre. By contrast, and in addition to the rapid urbanization processes happening in the periphery, the zoning catalyzes urbanization on these corridors, and constitutes a threat on the hydrological continuity of the area. Also, the agricultural lands surrounding watercourses are considered as productive fertile landscapes. Accordingly, these corridors must be protected and maintained with a buffer zone that includes the watercourses and agricultural lands surrounding it.

Due to the fact that urbanization dynamics are wide and complex, their effect on the ecological landscapes requires new strategies that have never been included in the conventional masterplans. A comprehensive understanding of the urban-rural interface and frequently analyzing urbanization processes is always required since urbanization trends are unique in each geographical context of the villages and the city. Thus, the ecological conceptual model provides an entry point to revisit these masterplans and create new strategies and guidelines to manage the ecological future of landscapes.

6.3. Conceptual Model for Strategies as an Alternative to the Conventional Mater Plans

The resulting LCZ plan focuses on major landscape corridors and greenway networks and defines zones of distinct urban and landscape character depending on the existing site features, needs and dynamics. Based on the analysis and the gaps of the 1998 masterplan, and drawing on the identified ELAs and LCZs, the first step was to create an ecological conceptual model for the southeastern area of municipal Tyre which holds the majority of state lands. This model represents the dynamic interrelationships between these components to construct the basis for a conceptual ecological landscape planning model that ensures continuity within the landscape, ecological effectiveness, and responsiveness to different urban dynamics.

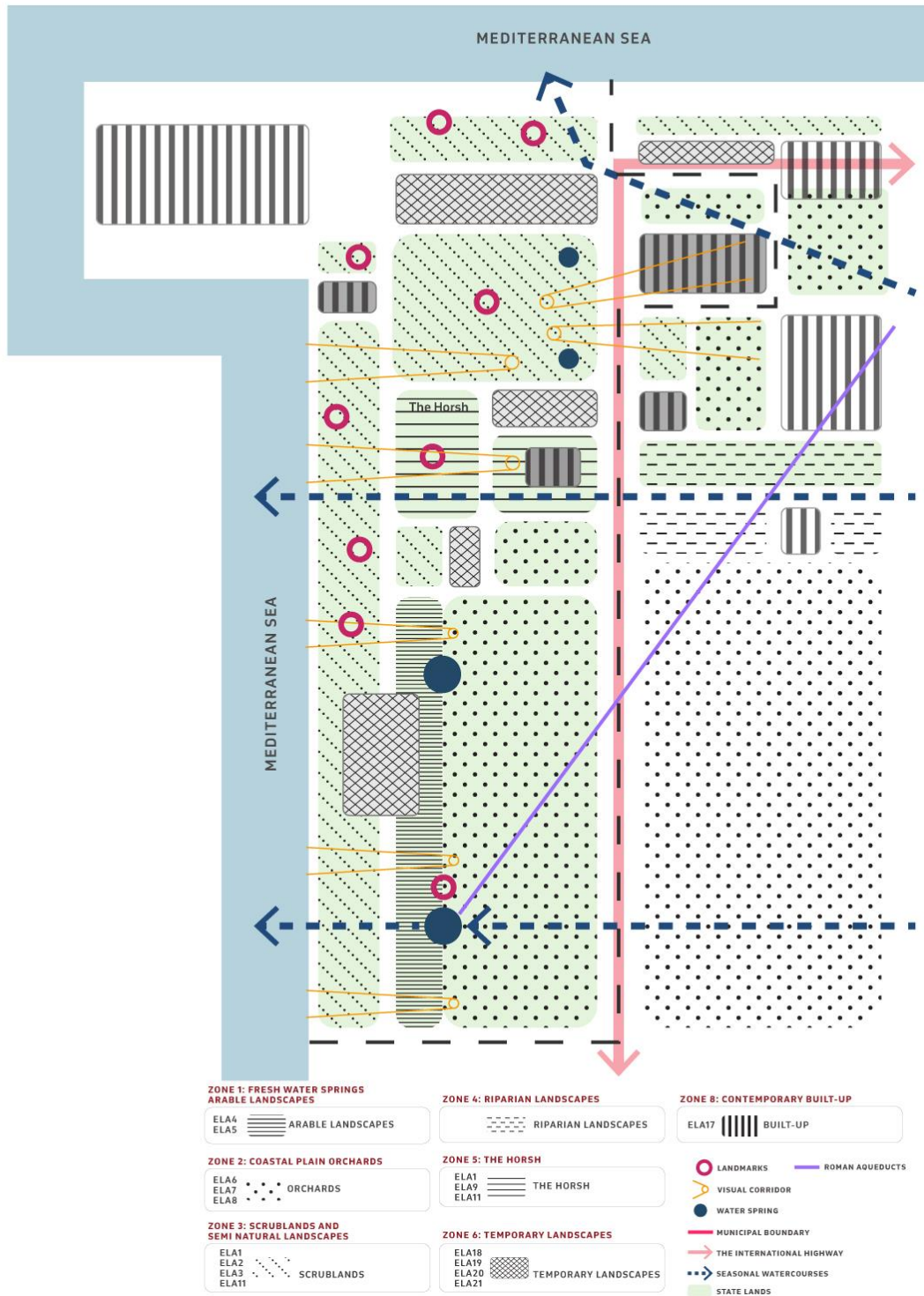


Figure 70: Ecological Landscape Conceptual Model of the southern area of municipal Tyre. Analysis by (Author, 2023)

Based on the ecological landscape conceptual model, a strategic framework of intervention has been developed (Figure 70). The model ensures the protection of ecologically and culturally sensitive landscapes and elements such as the watercourses, water springs, and threatened agricultural lands, through enhancing connectivity and introducing protected buffer zones. Thus, the model is proposed with a two-fold aim:

- Protecting state lands landscapes that have ecological and cultural significance

Preserving and enhancing state lands that host the agricultural landscapes, namely banana orchards and arable fertile lands, the watercourses corridors and the scrublands to (1) protect the state lands forming a green buffer surrounding Tyre. This green buffer will define the edge between municipal Tyre and the adjacent villages by establishing landscape connectivity through the protected blue green corridors that belong to state lands. As a result, urban sprawl developing from the adjacent villages to the urban interface of municipal Tyre will be limited.

- Establishing ecological connectivity and landscape continuity

The plan proposes a blue-green infrastructure network that assures connectivity of open/ green landscapes through incorporating all ecological elements such as green corridors, watercourses, and green covers within a greening sustainable strategy that is incorporated with the establishment of a regional park that not only serves municipal Tyre but also serves greater Tyre.

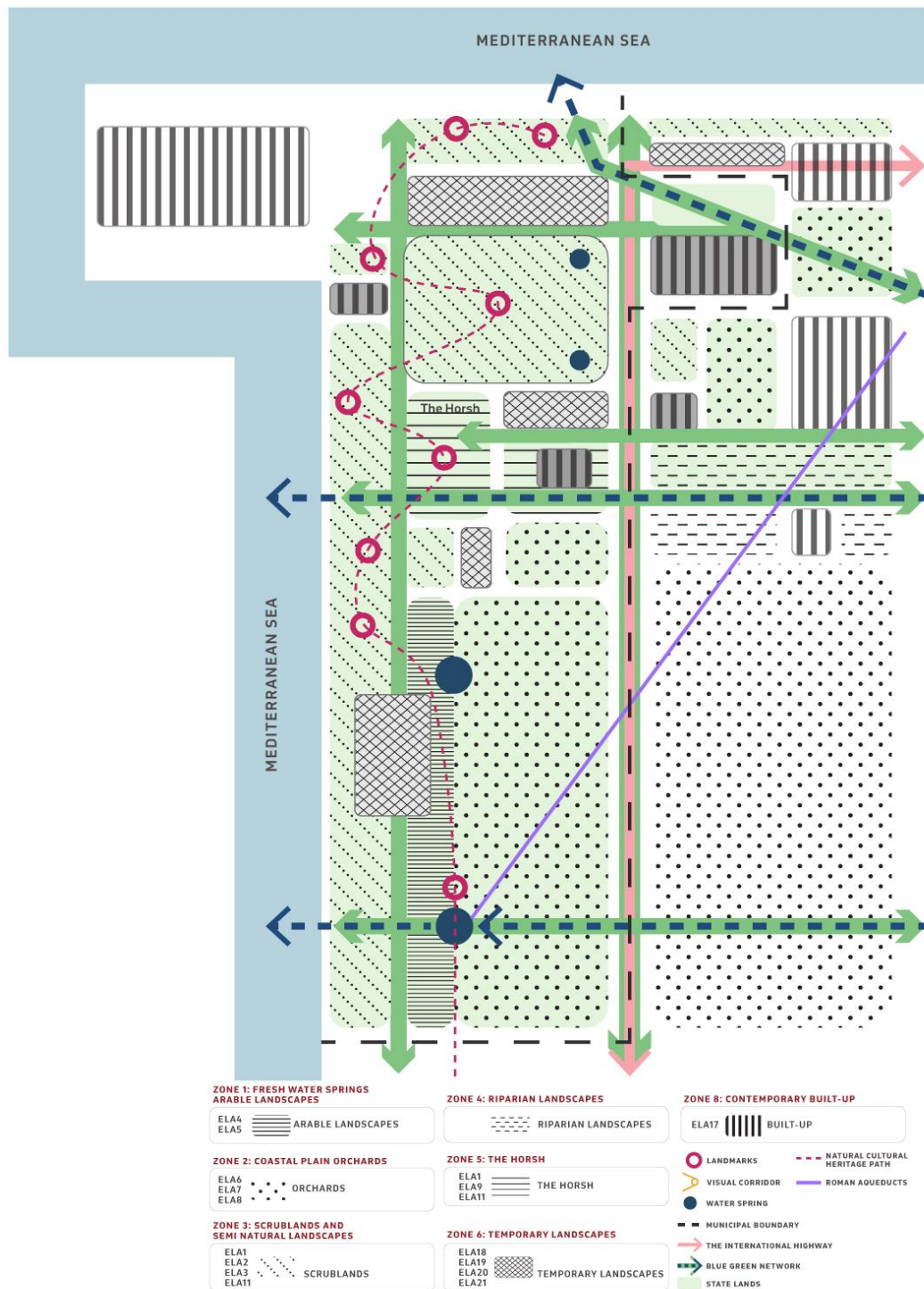


Figure 71: Ecological Landscape Conceptual Model of the southern area of municipal Tyre. Analysis by (Author, 2023)

The proposed blue green network incorporates the existing green/open landscapes within the Municipality of Tyre, the agricultural lands, the Horsh, the archeological site, the waterfront and the other watercourses to establish effective ecological zones and linkages and produce a network that serves all of Municipal Tyre and its region. The impact of the ecological conceptual model is not restricted to the municipal boundaries. It extends beyond and paves the way to rethink the adjacent ecological assets in relation to Municipal Tyre. In that manner, the blue green network does not stop at the site boundaries; it extends to connect the seasonal watercourses from the east to the sea across the site of the study. Even if the green network is reduced to mere streetscape in some areas, it can still form ecological and cultural connectivity the different watercourses.

6.4. Urban Strategic Design Intervention as an alternative to the proposed 1998 Masterplan of Municipal Tyre

The proposed strategic design intervention translates the conceptual model into a series of urban design principles that can inform the proposed masterplan, especially that these principles are (a) sensitive to ecological, environmental and cultural values, (b) preventative from the possible complex threats happening at the interface of Tyre and its surrounding, and (c) extends beyond municipal boundaries and tailored to address the region's complexities that treat the area as part of its wider region with flexible strategies rather than codes and (d) protective of any possible land state privatization through protecting, reclaiming and activating the open/ green spaces. Through the strategic intervention that provides recreational areas dedicated for activities for the local community and inhabitants of the city and nearby villages, the awareness among local community on ecological significance and the right to preserve state lands will

consequently be raised. This awareness would build a sense of collective ownership and reinforce the shared responsibility to sustainably preserve and manage state owned landscapes for the sake of the common good. The outcomes of such awareness of Tyre inhabitants have been traced against many unwise political decisions that were one step away from being implemented, as a result, they were canceled.

The proposed framework includes the following components of strategic greening of municipal Tyre:

6.4.1. Green-Blue Network Design Intervention

The proposed green-blue network of Tyre aims to protect state owned landscapes that have ecological and hydrological values. It is based on planning the network of green vegetation-based elements, blue water-based elements, and transportation networks, to promote ecological and landscape connectivity, establish a regional park and enhance the livability and walkability of the area. This intervention recognizes the blue green networks as essential elements that connect the fragmented state owned landscapes in municipal Tyre, extend beyond the boundaries of municipal Tyre and connect to the regional scale with the surrounding villages. The network includes:

(a) Patches

These spaces are defined as pattern of distribution by (Forman,1996). They serve as green multifunctional patches within Tyre including the fresh water springs area of Ras Al-Ain that host a public zone that needs rehabilitation, as well as the TCNR that hosts the large turtle nests, the seasonal swamps and the sandy beach all the way up to the western part of the archeological site of Al-Bass ending with the football stadium and the northern waterfront.

(b) Core elements

These spaces shape the reclaimed Horsh of Tyre that will represent the “lung” of the blue green network. They include the municipal park, in addition to parts of the archeological site that are regularly used for public speeches and reviving Ashura. Also, they include spaces with important coverage of trees located within state institutional building areas such as the Lebanese University horsh and the large area surrounding the The Center of Agricultural Studies as well as the state vacant plots. This core will connect the riparian corridor of Al-Nabbaa seasonal stream and with the patches of the TCNR. Also, its location beside the international highway will pave the way to support the pedestrian connectivity between municipal Tyre and the adjacent neighborhoods of Borj Al-Shamali.

(c) Edge elements

These spaces are characterized by their high naturalness level and adequate state of conservation that will work as green buffer zones which represent the agricultural landscapes of the arable lands and the orchards. They are preserved to ensure landscape connectivity and limit the possible urban sprawl from the adjacent municipal areas. Also, they are utilized as transition zones that guarantee internal and external ecological connectivity.

(d) Connectors

These spaces are defined as (a) flow of biotic factors (corridors) and (b) the process of formation over time (mosaic and connectivity) (Forman,1996). These are linear natural elements that facilitate the ecological connection between the patches, the core elements and the edge elements. They form existing riparian corridors of seasonal watercourses, constitute green corridors, natural cultural heritage path connecting the

previously mentioned patches, tree-lined streets, ecological tailored bridges over the international highway connecting municipal Tyre with the adjacent neighborhoods and other elements situated between patches and core elements. In the case of municipal Tyre, they include:

- **Natural Cultural Heritage Path:** which represents an eco-path that tailors the patches of the TCNR in the southwestern waterfront with areas of the archeological site of Al-Bass all the way to the northern waterfront (Figure 72).

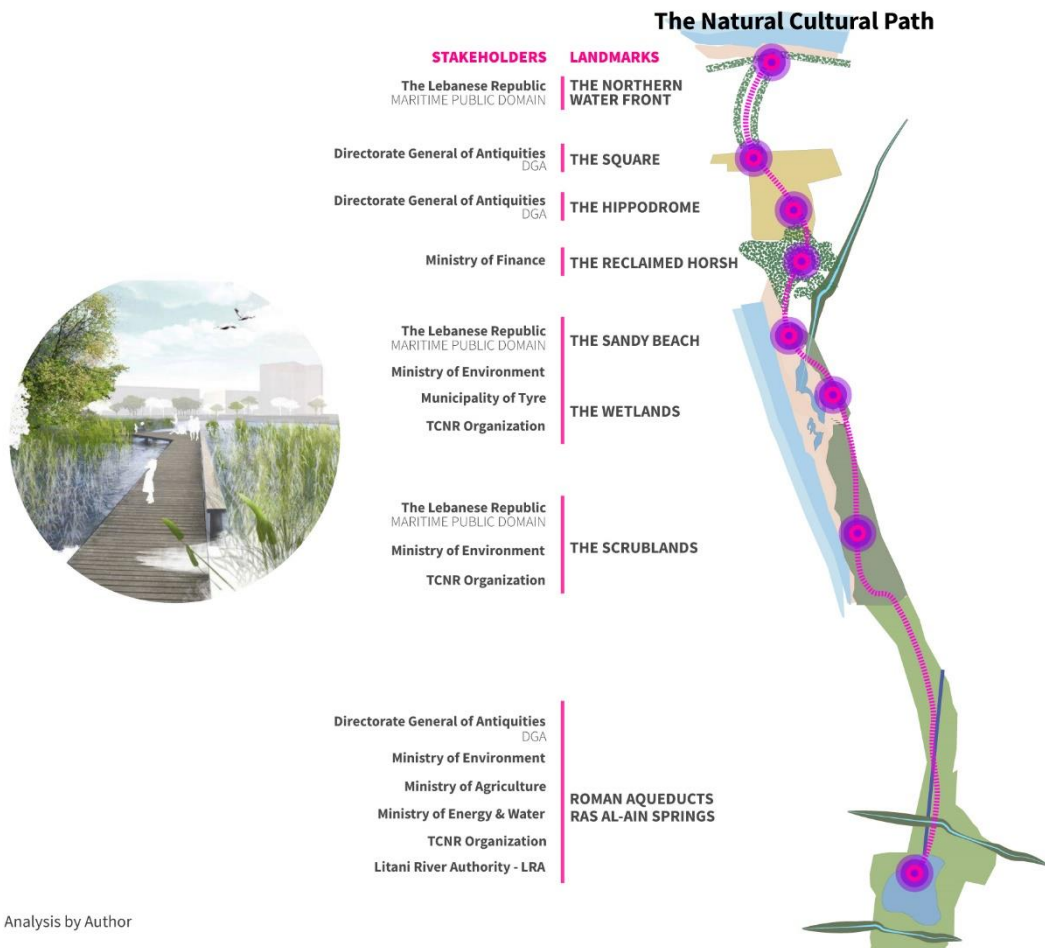


Figure 72: Natural Cultural Heritage Path. (Author, 2023)

- **Ecological Corridors:** which represent the riparian corridors of the seasonal watercourses of Al-Samer river, Al-Nabbaa stream and Ain Baal stream. These corridors should be revitalized to restore their natural integrity and ecological health.

The adequate management of these corridors is essential to avoid encroachment, pollution or flooding. They should be considered as protected public amenities maintaining natural flow and hosting riparian agriculture which holds cultural and ecological values.

- **The Roman Aqueduct:** represent the water-based corridor that has a cultural value and most importantly an economic asset that feeds wide agricultural areas all the way from Ras Al-Ain springs area to Al-Abbasieh area ending in Al-Qasmieh.

- **Green Promenades:** represent strips of the ecological corridors that are imagined as public recreation spaces that secure connectivity and promote economic development, if properly planned.

- **Tree-lined streets:** represent pedestrian walkways and vehicular networks bordered by trees planted in rows which form visual corridors.



Figure 73: Strategic Framework of Intervention as an Alternative for the 1998 Proposed Masterplan. Analysis by (Author, 2023)

To sum up, the strategic sustainable intervention envisions the creation of a regional public park on the state owned lands that will host different natural and cultural zones including the whole TCNR area, the Horsh zone, the archeological site of Al-Bass, and the agricultural lands. This park will “reinforce the link between several major landmarks located at the south of the city (the animated Corniche and sandy beach, the archeological site, the public facilities area, the orchards of the agricultural belt and the nature reserve)” (Debs, 2015). As Debs proposes, it is vital to rethink state lands by upgrading, activating and extending the landscape structure of the existing natural and cultural elements create a park located at the heart of the south east of the city (2015). He adds that establishing coherent sustainable development of the southern state owned lands will allow to constitute “an administrative pole destined to the whole Caza” (ibid).

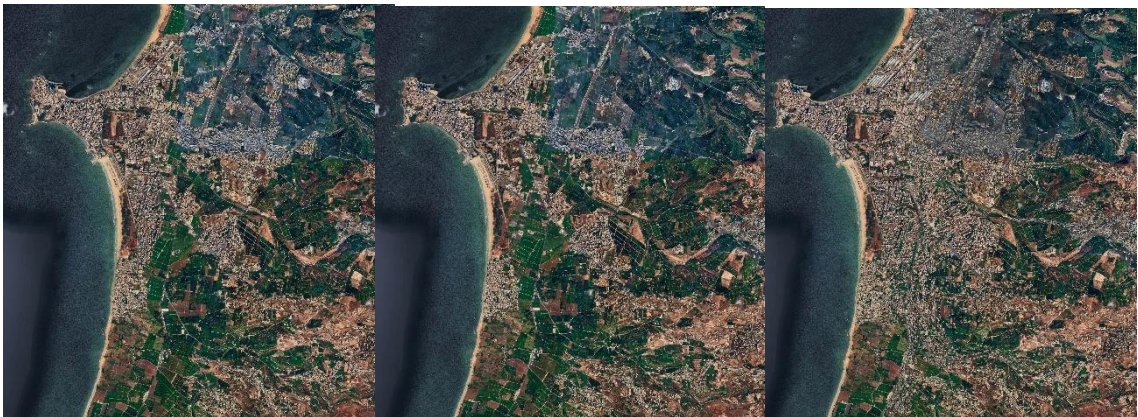


Figure 74: Current Tyre (Author, 2023).

Figure 75: Tyre’s Urban Fabric if Public Lands Become Private (Author, 2023).

Figure 76: Tyre’s Urban Fabric if the 1998 Masterplan is Totally Applied and Public Lands Become Private (Author, 2023).

CHAPTER 7 CONCLUSION

When I started my research into Tyre, I was puzzled as to why Municipal Tyre had such an abundance of public lands, of green and open landscapes, that were integral to the city's distinct character. The focus of this thesis has given me the opportunity to search for answers, to investigate the potentials of the ecological landscape approach as a methodology and explore its potential to recognize, protect and connect the vast public lands in Tyre. The current patterns of the urban sprawl happening in the rural-urban interface of Tyre needs more investigations since they led to the formation of complex and diverse landscapes consisting of a highly fragmented mosaic of different forms of land cover and dense transport infrastructures (Antrop & Van Eetvelde, 2017). Unfortunately, my thesis was limited to a strict timeline and resources, otherwise, I would have extended the proposed green-blue network of municipal Tyre to a larger context reaching the adjacent municipalities of Batouley, Bezoureye, Borj Al-Shemali, and Abbasieh to guarantee sustainable management of water resources and promote landscape connectivity. The ongoing urban sprawl is shaping tomorrow's Metropolitan Tyre. Two colleagues of mine in the MUD and MUPP program at AUB have addressed some patterns of the urban sprawl happening in Borj Al-Shemali and Ain Baal (Madi, 2021) & (Basma, 2020). Beside my thesis, these studies can be tailored with other studies tackling the other urbanizing areas in greater Tyre to rethink the fragmented compartmentalized traditional planning approach and integrate the ecological landscape methodology in the planning process that protects and connects the natural and cultural landscapes of Tyre Caza.

7.1. Reflections on the Ecological Strategic Design Intervention in Tyre

This thesis adopted the ecological landscape framework to establish an ecological strategic intervention that provided effective implications at various levels:

- It ensures protection, creation, linkage, and management of natural and semi – natural features through promoting ecological continuity and landscape connectivity of the public lands in Tyre to overcome masterplan limitations and municipal boundaries.

- It shows that the conventional masterplan failed to address the city's expansion, and its effects on landscape discontinuity and disappearance.

- It recognizes the historical ecological rich foundation of Tyre and traces on the remaining significance of these landscapes.

- The implementation of the ecological landscape approach succeeded in protecting and establishing a homogeneity of public landscapes that overlaps different management authorities.

- It encourages the socio-cultural viability through including recreational activities within the green-blue networks that extends along ecological corridors connecting the urban and rural interface instead of introducing the trend of municipal gardens. This network connects the landscapes of the archeological site with the horsh all the way to the beach passing by the TCNR through a path providing recreational spaces for public gatherings, or sports activities. One of the fundamental aspects in creating the natural cultural heritage path lies is in maintaining and protecting the tangible landscape features that are linked to the memory of the place and contribute to the collective identity.

7.2. Planning Framework: Protecting and Connecting the Fragmented Public Lands

The focus of this thesis has been to study and analyze the public lands in Tyre through a holistic, dynamic ecological landscape approach to search for alternative planning and design strategies that recognize, protect and connect open/green areas. The approach, recognizes the natural and semi-natural specificities of Tyre that contribute to the distinct character of Tyre that unlike other coastal cities in Lebanon has endured up to the present. The research and archival investigation of reconstructing Tyre's ecological history uncovered landscape features and looked at the fragmented landscapes of the public open/green lands consolidating them by building on "landscapes of opportunities" that would promote and regenerate the ecological complementarity between the city and its periphery.

The failure of conventional planning frameworks in Lebanon in tackling urban sprawl and protecting ecological features is unsustainable environmentally, socially and culturally. In contrast, the proposed strategic conceptual model and proposed urban design intervention have the potential to re-direct future developments away from green/open public landscapes and those urban features with ecological and cultural significance specifically the agricultural lands. In accordance, the thesis suggests a set of recommendations in the next sections to assure the effectiveness of the adopted strategic ecological design intervention in Tyre.

This section proposes a framework that recommends planning guidelines, strategies and incentives that helps in the recognition, protection, connection and management of public open/green lands in Tyre.

7.2.1. Institutional Dimension

The starting point for future planning is to acknowledge that in public open/green lands are managed by different state agencies (Figure 77). Within this institutional setup, the municipal role is too limited due to the land categorization of these public lands as “Amiri lands” by which the right of ownership (حق الرقبة) or the ownership of these lands in Tyre specifically belongs to either the state (Lebanese Republic) or the Ministry of Finance or the DGA and the right of use (حق التصرف) or the management belongs to different ministries. This situation led to the

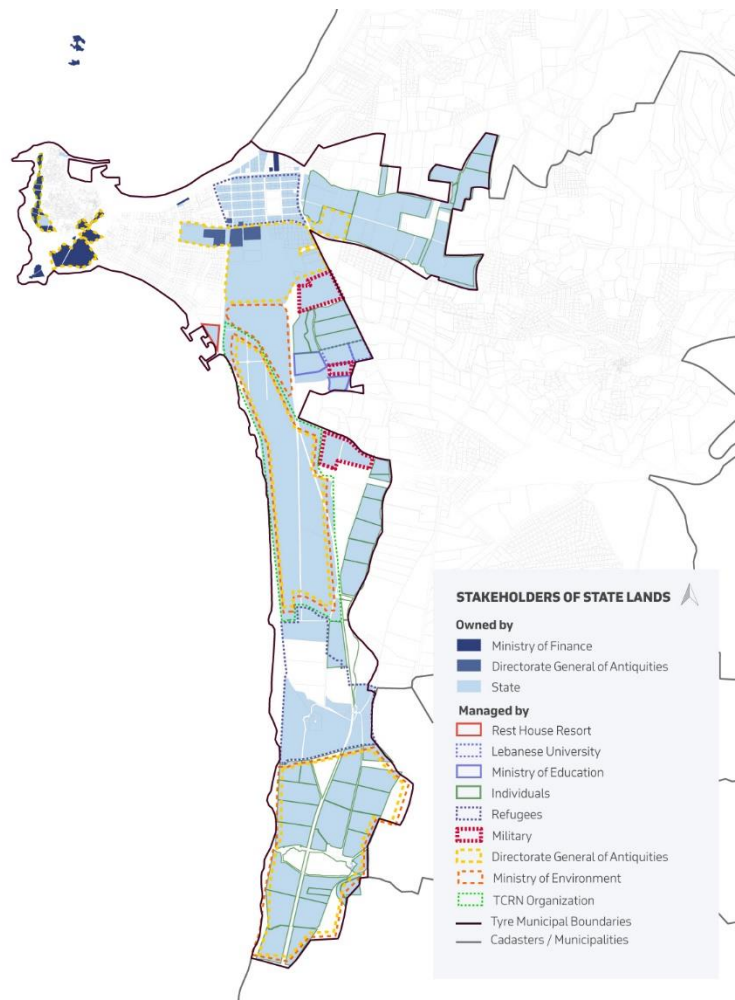


Figure 77: Stakeholders of State Lands in Municipal Tyre. (Author, 2023)

absence of the municipal governance on 62% of the municipal area of Tyre. The implementation of the proposed green-blue network, further research should be considered on how the management of public lands can be consolidated. However, at this stage, institutionally, I recommend empowering the local authority, which is an elected body and custodian of the public interest in this city. This can be achieved (Figure 78) by activating the mechanism of public lands governance in municipal Tyre whereby Tyre Municipality is established and recognized as a centralized “Planning Unit” within the municipal body. The role of the planning unit is to coordinate across the multiple stakeholders of public lands, manage the contradicting and conflicting uses of these lands and approve any suggested masterplan by which the responsibilities of the different stakeholders are managed and directed.

The importance of activating the municipal governance to ensure management of the green-blue network landscapes is not just limited to the jurisdiction of municipal Tyre, but also extends to making the municipality as a representative of all of these stakeholders when it comes to the task of coordinating with neighboring municipalities to work along the continuing ecological networks. This role would guarantee implementing efficient management practices that protect the ecological continuity specifically of the riparian landscapes through proposing a set of guidelines that direct the planning of the adjacent municipalities towards a holistic ecological approach.

LaGro (1994) addressed that the ecological landscape planning should be supported with policies that develop guidelines that (a) limit the fragmentation of the ecological network; (b) manage the timing and phasing of new developments through directing urbanization; and (c) provide incentives for the revitalization of riparian landscape and

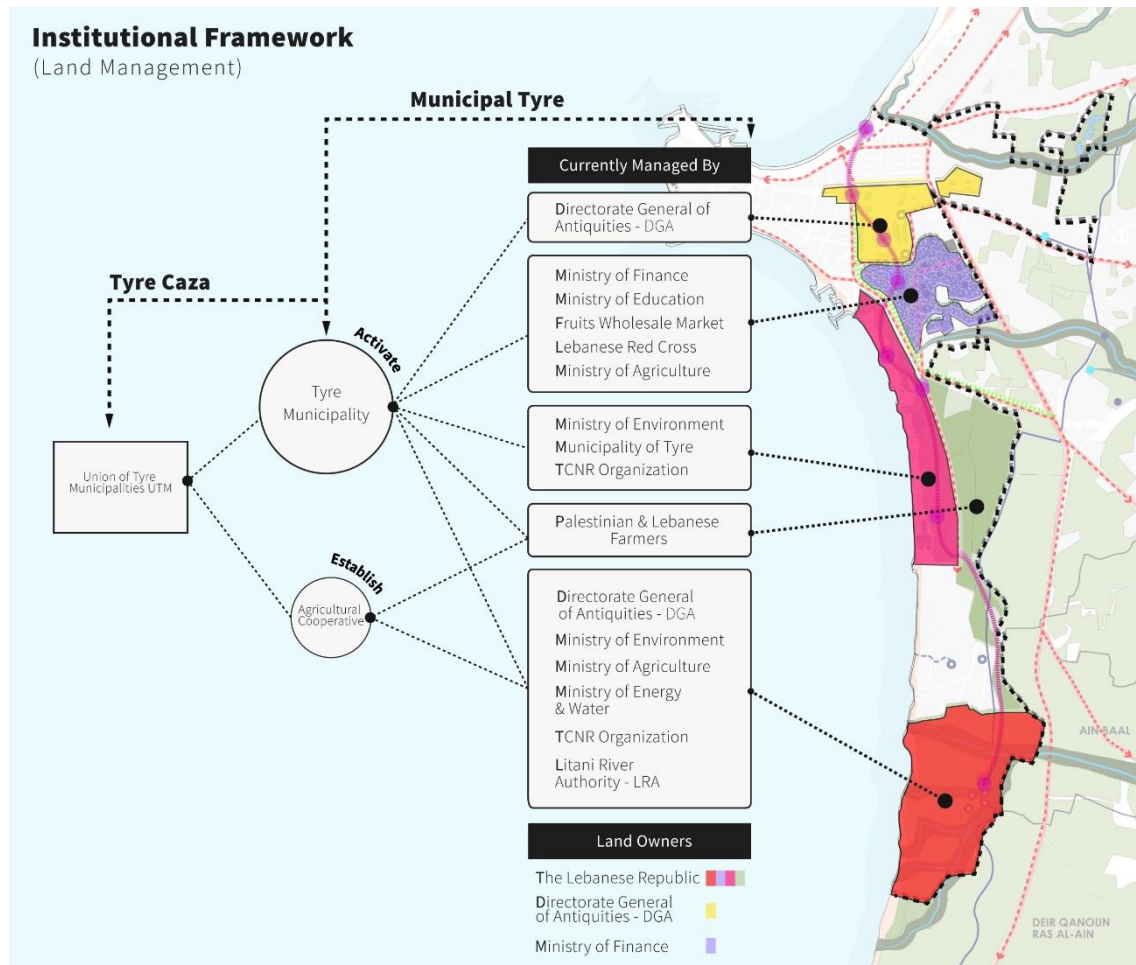


Figure 78: Proposed Institutional Framework of the Ecological Landscape Design Intervention in Tyre. (Author, 2023)

upland linkages in the blue green infrastructure and preservation of the landscape character. “These incentives can be applied vis a vis performance standard in form of tax reduction or developmental rights to protect the ecological integrity of landscapes suffering from urbanization pressures. (Al-Sabbagh, 2015). In addition, urban agricultural strategies that include financial incentives, quality standards and awareness highlighting the contribution of cultural landscapes to the health of the living environment.

7.2.2. Land Use and Zoning Dimension

Since the ecological strategic design intervention aims to limit and direct the urban sprawl happening on the municipal edge and beyond, the current status of agricultural lands under the threat of development because they have been designated for future urban development by the 1998 masterplan zoning should be reconsidered. The zoning of these agricultural lands that are adjacent to Al-Rashidieh Camp should be changed from being residential and touristic as proposed in the 1998 masterplan to agricultural zones with a lowered exploitation ratio to 0%. Accordingly, if these public lands are privatized, the interests of real-estate speculation in these lands would be less, as a result, the agricultural lands would be protected. In addition to this, the lands along the seasonal watercourses should be considered as protective buffer zones where plots situated within this buffer are prohibited from any urbanization developments applying the Water Resources Law no. 221/2000 that organizes the management, protection, and governance of the water sources in Lebanon.

7.2.3. The Cultural Dimension

This thesis recommends that preserving the existing agricultural fields could be supported by establishing farmers/agricultural cooperative that guarantee the economic feasibility and continuity of the agricultural practice on these lands. The idea of a cooperatives is highly needed to empower the role of the farmers in the area who are majorly Palestinians from Al-Rashidieh Camp who considered these lands, for generation, as a source of livelihood. This cooperative can provide the farmers with guidance on best practices and production as well as provide essential equipment, fertilizers, seeds, and fuel. In addition, it could secure funds from local and international agencies and NGOs to maintain this practice. Also, it could introduce training and

educational workshops for farmers or anyone interested to practice agriculture by cooperating with international agricultural organizations and NGOs. The agricultural cooperative could play a great role by raising awareness of the importance of the agricultural practice for the sake of the common good through making public workshops or weekly/monthly markets of the cultivated products.

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