

Sustainability via Soft Natural Resource Management. The Coastal Area of Vouliagmeni

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1 ABSTRACT

The survey focuses on the coastal urban area of Vouliagmeni, in the region of Attica in Greece. Vouliagmeni presents a natural environment and large open spaces with vegetation. The soft use of natural resources and preservation of the natural environment has resulted in, the area being sustainable. However, the degradation of the surrounding areas of Athens, has lead the residents to search other sites for a better quality of life. This, along with good climate conditions, has resulted in the area of Vouliagmeni being under pressure for further development and exploitation of its natural environment. Thus, despite the constraints on construction and the protection of the marine environment, which have been implemented until now, the area is in danger of degradation.

In the present survey the physiognomy of the area, the natural and human environment, infrastructure, natural resources use and others are investigated. The main problems of the area and the potential for further development via proper management of natural resources are identified via personal interviews with members of the municipality, of the area as well as field work in situ.

The survey showed that, not only are actions in order to limit human activities that cause land-use intensity required, but an expansion of the boundaries of the already legally protected areas is also required.

2 INTRODUCTION

Nowadays, many European cities are facing the problem of degradation. The causes are many, such as urban transport, construction, or lack of vegetation areas, the location of infrastructure, the lack of a systematic design for a high quality urban environment, the fact that not enough attention to environmental impacts is paid when decisions are made, and others.

In order to face these problems the European Union (EU) has been led, to the undertaking of various actions, such as funding programs etc. For instance through the Community programs URBAN 1 (1989-1993) the EU has supported innovative activities for redevelopment projects and planning in big cities. On the other hand, in smaller cities, the projects dealing with urban deprivation were funded by the URBAN II (1994-1999) program (Commission of the European Communities, 2002, 2004).

An integrated approach has been promoted via the European Union Thematic Strategy on the urban environment in an effort to improve the quality of urban areas and ensure a high standard of living.

In addition to this, the role of the local government is important in achieving sustainable urban development. According to the World Conference of 1992 which established the Local Agenda 21, the municipalities are called upon to develop strategies for sustainable development in their region. As is known, the Union was the first to sign the Local Agenda 21 and directly coordinated its policy in these directions.

Nowadays, the current EU directives require the authorities of urban communities, to manage air quality, noise, river basins, and others. In other words, they require the design of proper management of natural resources and their protection at the same time (Commission of the European Communities, 2004).

However, for the proper management of natural resources, proper use is not the only thing required, but as it is proven below, proper management must be accompanied by the appropriate legislative framework that sets limitations on the utilization of these natural resources.

Thus, the design is one of the key points on environmental protection and the achievement of sustainable development in an area (Aravantinos A et al). In this framework, the current situation is analyzed and the main problems of the research area of Vouliagmeni are identified.

3 METHODOLOGY

In order to carry out this research, in the coastal urban area of Vouliagmeni an evaluation of the status quo initially took place. For this task, sources such as, land use, topographical diagrams, spatial and urban plans that are in force, were used. Then, a research in situ and interviews with relevant staff of the municipality to

identify problems followed. Finally, an evaluation of the results was undertaken and guidance for the sustainable development of the area via soft natural resource management was provided.

4 CASE STUDY

The area of Vouliagmeni is located on the southeast boundary of the basin of Athens, 20 kilometers from the centre of Athens. The area of Vouliagmeni is bounded by the coast of the Saronic Gulf and the mountains of Hymettus. The key factors shaping the climate are a combination of hills and the coastline, the presence of pine trees to the beach and large open areas. The presence of Hymettus gives Vouliagmeni some climatic features such as low rainfall, and the existence of a prevailing wind direction. An important peculiarity of the landscape is the Lake of Vouliagmeni, the waters of which have medicinal properties and the variations of horizontal and vertical folds of the land (Aravantinos, et al, 1971). The area is very close to the port of Piraeus and the airport Eleftherios Venizelos (Fig.1).

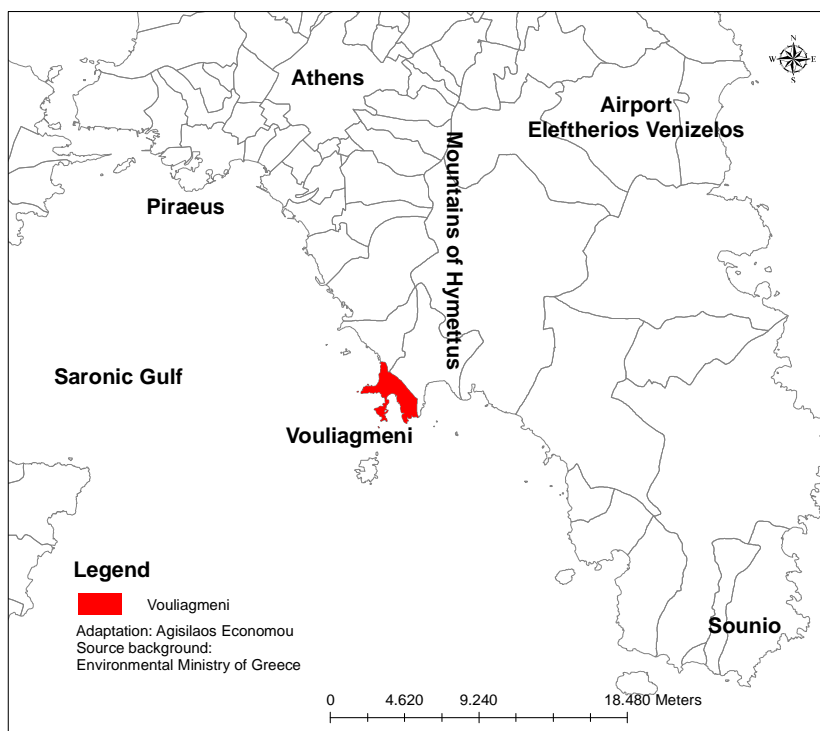


Fig. 1: The area of Vouliagmeni.

Years	Residents
1920	31
1928	227
1940	1471
1951	1674
1961	1621
1971	1469
1981	2743
1991	3450
2001	6442

Table 1: Popoulation growth in Vouliagmeni (National Statistical Service of Greece, 2001)

4.1 Developmental physiognomy

Initially the area of Vouliagmeni was a rural area with good climate conditions. In the early 70s, the population growth in the area of Athens, had as a result the search for new residential areas by expanding construction. The area of Vouliagmeni was one of those areas. Vouliagmeni due to its' small distance from the centre of Athens and its' good climate conditions began to develop as a residential area, a second housing area, as well as an area with high-quality hotel accommodation.



Then, the development of tourism caused the concentration of the population in that area in order to provide service to that development. Taking into account that the area of Attica received heavy pressures from the building and population growth, one can see that the result of those pressures was the conversion of the secondary housing area of Vouliagmeni into a permanent residence area.

The population growth of the region is presented in the following table:

One reason that has contributed to the delay of the residential development of permanent housing areas was the lack of basic infrastructure during the 70s.

Most residents are occupied in the tertiary sector of the economy. In 1969, the area of Vouliagmeni gathers 12.5% of the tourist beds in the whole of Coastal Attica (Aravantinos et al, 1971).

Employments	Primary sector	Second sector	Tertiary sector
Years			
1971	8	76	244
1981	-	200	684
1991	14	165	1106
2001	45	319	1187

Table 1: Employments in Vouliagmeni (National Statistical Service of Greece, 2001)

In 1970, in the area of Vouliagmeni a planning, regulatory development study was undertaken by the National Technical University sponsored by the Agency for the Administration and Management of the Church Property. This study was aimed at the development of Vouliagmeni, taking into account the spatial outline of the region. Then, it proposed a general master plan for Vouliagmeni, town plans, and set terms and restrictions on construction (Aravantinos et al, 1971).

In 1985, the General Plan Planning (GPP) was drafted to provide the necessary framework and program for urban development and network infrastructure, in order to achieve their better social and economic operation and the environmental protection of Vouliagmeni (Ministry of Environment and Public Works, 1985).

Through the GPP an effort took place to develop the productive functions of the city (trade, tourism), the regeneration of areas, reconstruction of urban areas at the neighborhood level, as well as the necessary amendments to the extension of the city.

According to a study by Doxiadis, the area along the coast from Glyfada to Varkiza was proposed for the creation of tourist and recreational facilities. The high standard level of tourism development would increase the price of land and attract people with high incomes (Aravantinos et al, 1971).

The legislative framework of the area, which is currently defining the terms and limitations regarding construction, for the proper function of the social and economic fabric, and the protection of natural resources, is presented below.

4.2 Legislative framework determining land use

In 1997, the GPP for the area of Vouliagmeni was approved. The plan included the town planning of the municipality with a population of 3230 residents. The creation of four units - neighborhoods with an average density of housing, and the average rate of building per planning unit are shown in the table below (Official Journal of the Hellenic Republic, 1997).

Building unit	Average density residents/Ha	Average density of buildings
1 (Aghios Nikolaos)	24.5	0.25
2 (Cavouri)	12.5	0.20
3 (Central Vouliagmeni)	26.2	0.40
4 (Shopping quarter)	29.3	0.40

Table 1: Average density and average rate of buildings in the Vouliagmeni area

In accordance with the GPP the following land uses have been determined: a purely residential area, a general area of residence area, parking areas, urban center, open areas, urban vegetation areas, school units, nurseries, tourist facilities, major and minor roads (Fig. 2).

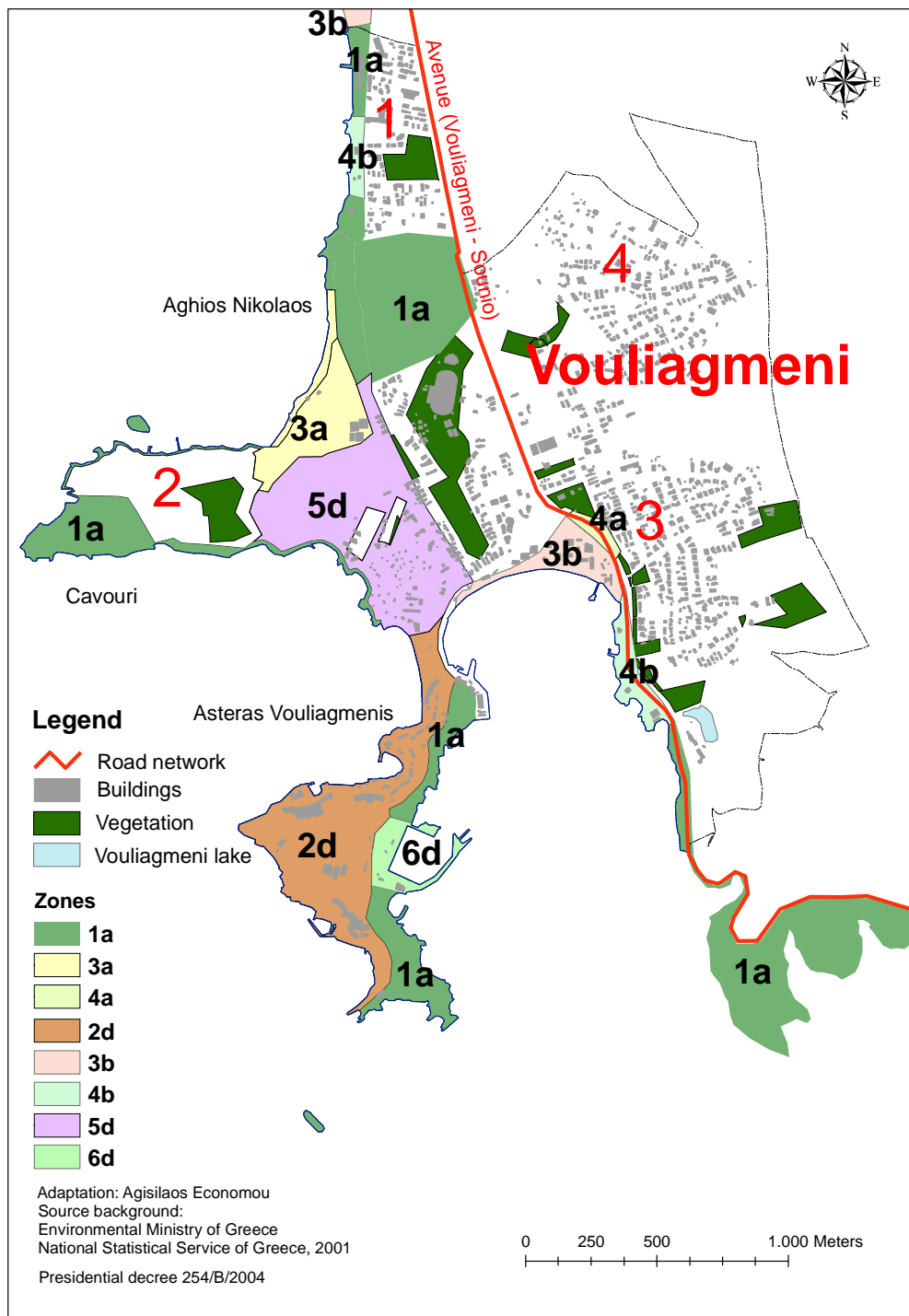


Fig. 2: Zones in the Vouliagmeni area.

In particular:

- a1 Zone : a) landscape recovery areas for flora and fauna. b). Within these areas the natural topography of the area is maintained and any construction is prohibited. Walking and cycling and outdoor seating configurations are allowed. c) car parks after consultation with the Management of Highway Studies Project are allowed.
- 2d Zone: Protection areas for natural and archaeological elements and re-development of existing tourist use at the Astera Vouliagmeni (in this zone, renovation of existing tourist facilities, an underground conference center, underground parking are permitted. The building factor is 0.20 throughout the property of Astera Vouliagmeni. Also, other applicable building terms determined by the Presidential Decree (Official Journal of the Hellenic Republic, 1976).



- a3 Zone: This zone includes free swimming beaches. This zone allowed locker-room facilities, sanitary facilities, medical centers, outdoor parks, bars - restaurants, outdoor sports and playgrounds. In the area of Vouliagmeni, the Building Factor is 0.005 and the maximum allowable building area is 250 m².
- 3b Zone (regulated bathing beaches): This zone permitted facilities such as changing rooms, toilets, bars and restaurants, shops with a maximum area of 20 m². In the area of Vouliagmeni the maximum exploitation limits of the coastline is 2000 m².
- 4a Zone: (includes areas outside the building plan). In this zone free green spaces, outdoor seating, playgrounds, bicycle and walking paths and places for outdoor cultural events, small-scale toilets up to 20 m² and parking facilities are allowed. The cutting of trees is prohibited.
- 4b Zone (except construction planning). In the area of Vouliagmeni the legally existing bars - restaurants remain without the possibility of extension but only restoration. The operation of existing piers is also allowed (2 in the coastal zone of Aghios Nikolaos and 2 on the eastern beach).
- 6d Zone (Vouliagmeni marina): This zone allowed for onshore support facilities such as offices, postal offices, bar - restaurants, hygiene facilities and outdoor parking facilities. The conditions and building restrictions are as follows: Building factor 0.01 with a maximum total allowable building area of 350 m², maximum height of 4.50 meters of erected buildings and minimum allowed distance between buildings on the foreshore line of 5 meters. In the case of sailing facilities the building terms for the area of Vouliagmeni are: Land acre/ %coverage = 15.5/0.3%, Building factor / m², maximum total building = 0.1/1500, Ceiling / maximum number of floors = 6.0 / 2.

4.3 Vouliagmeni Lake

Specifically, the Vouliagmeni Lake is declared:

- As a place of great natural beauty with the decision of the Ministry of Culture (Official Journal of the Hellenic Republic, 1981)
- As a place of special historic interest by the Ministers of Agriculture and Environment (Official Journal of the Hellenic Republic, 1989)
- As a monument of nature (Official Journal of the Hellenic Republic, 2003)

4.3.1 Protection zones in the region of Lake Vouliagmeni

Zone A1. (Area of absolute protection). Only interventions for upgrading and restoring elements of the natural environment are allowed. Configurations of trails is also allowed while lighting with spotlights is prohibited in order to protect the birds.

Zone A2. (Protected area and operating bath facilities).

Zone A3. (Area of landscape restoration and protection of Attic flora and fauna). Only interventions aimed at upgrading the existing vegetation are allowed.

Zone A4. (Special purpose areas). In this zone the operation of the existing cemetery and parking facility is allowed. In these zones the passage of medium-voltage electrical network and the corresponding telecommunications network is allowed exclusively underground, only to serve local needs in the area of Vouliagmeni. Every fire season, the PPC and the Hellenic Telecommunications Organization is obliged to clear the transit zone lines.

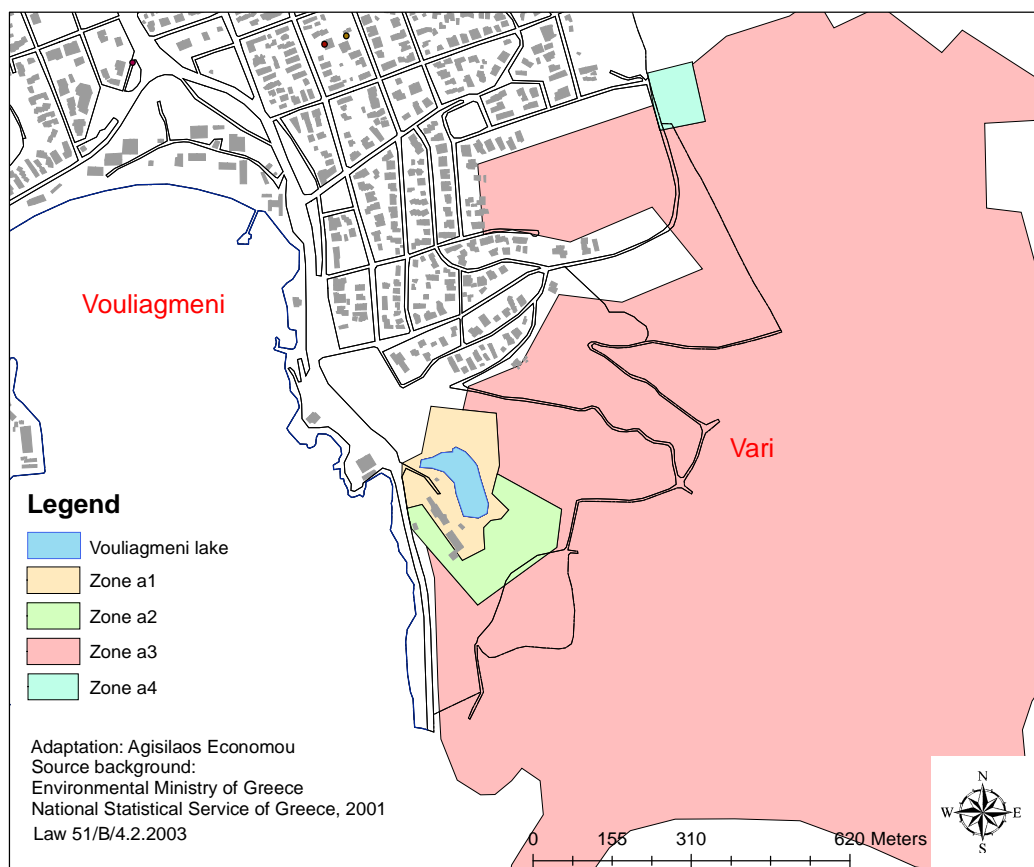


Fig. 3: Vouliagmeni Lake

4.4 Environmental problems

The survey showed that: Nowadays the area of Vouliagmeni despite the existence of land use planning faces several problems such as:

Circulatory problems: The area of Vouliagmeni is crossed by the coastal road linking the central of Athens with the southern suburbs. The area due to good climatic conditions, vegetation and tourist development attracted a significant number of tourists during the summer months (Fig 4, Fig 5). As a result there is a substantial vehicle movement in the region, accompanied by problems of noise and air pollutants. The buildings that are close to the road (Vouliagmeni – Sounio) have more serious noise pollution problems. Also, there is no protection from the noise, except for some trees which appear on both sides of the road.

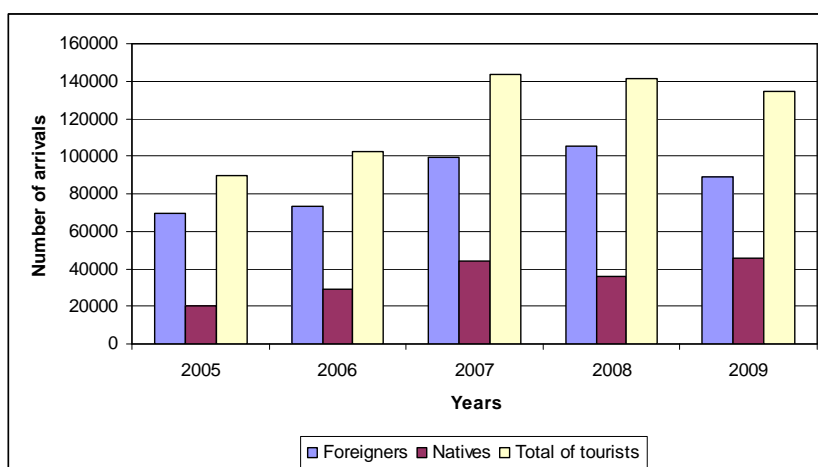


Fig.4 Tourist movement in the Vouliagmeni at time interval 2005-2009 (Source: National Statistical Service of Greece)



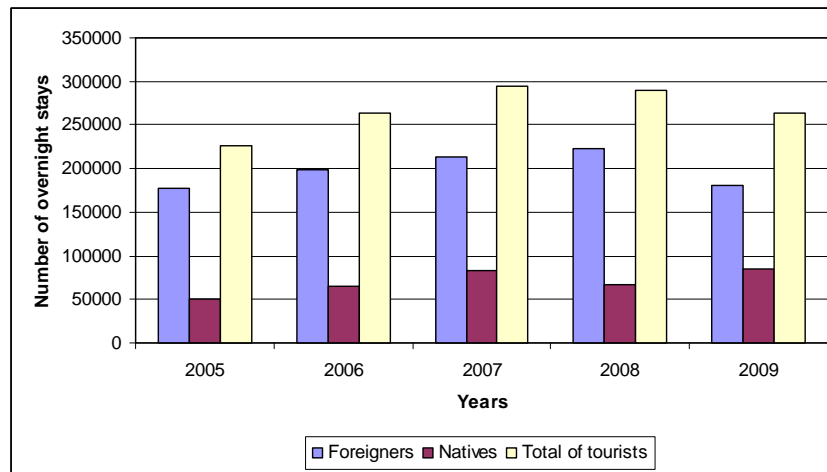


Fig. 5 Overnight stays of tourists in the region of Vouliagmeni during the 2005-2009 (Source: National Statistical Service of Greece).

Class	Hotels	Rooms	Beds
A	4	616	1174
B	3	202	394
C	1	72	134
D	1	38	73
Total	9	928	1775

Table 2: Number of bed and rooms per category of hotels in the region of Vouliagmeni (Source: national Statistical Service of Greece)

- **Building:** Creating the new highway (bypass from the hills to Varkiza) has increased the pressure for expansion of the settlement towards the pine-tree filled slopes of the hills (Fig 2). Thus, the pressure for conversion of fine green spaces to housing areas is in contrast with tourist activities and the high life standard of the residents of Vouliagmeni. In addition, there is an important area of (364867. 4 m²) which has not been built yet, and belongs to Organization for Administration and Management of Church Property (OAMCP). If this area is built it will increase the constructed area and decrease the vegetation area from 954891.6 m² to 590024.2 m² (38.2%) (Fig.4).
- **Natural Unity:** The road from Athens to Sounio, has prevented the natural unity of the area. The vegetation and urban spread is stopped abruptly by the road (Fig. 4).
- **Carrying capacity:** In Vouliagmeni due to terrain and formations variety, there is little capacity. On the other hand, there are building pressures in areas that are inappropriate, while there is overexploitation of the available space. The pressure to expand the area is at the expense of the hills and the vegetation areas, in other words against factors that play an important role in attracting visitors (valued landscape, open spaces for recreation). Also, the tendency to over-exploit available space has resulted in high density areas, reducing the open spaces between buildings, reducing values and increasing unfitness for tourist development. Except for the number of overnight stays and the local residents, there is also a great number of residents of Athens who visit the area for swimming (extent of beaches = 50402.5 m²). This has as a result, the carrying capacity to exceed the limits of saturation during the summer months.
- **Ownership:** Large areas of the region belong to different organizations (Organization for Administration and Management of Church Property (OAMCP), Municipality, private, Greek Public (Ministry of Agriculture, Ministry of Finance). Thus, it is difficult to implement an integrated management.

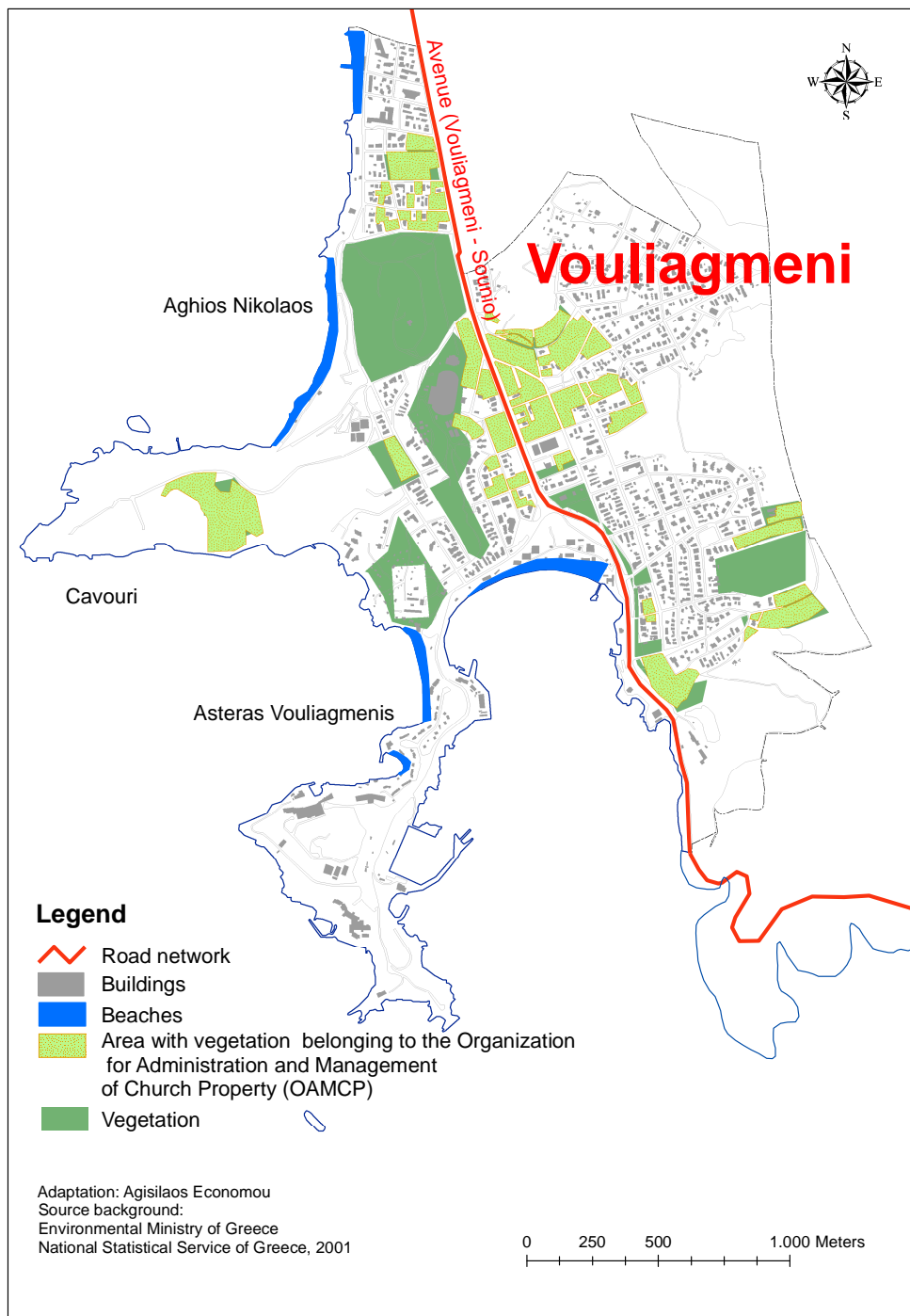


Fig. 4: Vegetation in the area of Vouliagmeni

5 DISCUSSION

Nowadays, large vegetation areas belong to the OAMCP, resulting in the development of the region depending on the proper management of open spaces. On the other hand, the high value of land, the potential for further development of tourism and housing are strong incentives for increased construction and land use change at the expense of the natural environment.

Thus, areas that are pushing for construction are: Tassianis Hill, the hill region of Faskomilia, the small Cavoyri and the Astreras Vouliagmenis.

The conservation and better utilization of natural resources (vegetation, coasts, water resources) are protected to some extent by the existing land use plans. However, the high value of land, good climate conditions and the lack of areas with a high standard level of life, increase pressure to building and overexploitation. Moreover, the fact that many vegetation areas are owned by third parties and not by the

municipality, increases the risk of further expansion of construction against all local residential and tourist activity.

Thus, the areas which must be protected further, by the expansion of the protected areas and the establishment of new terms on construction are: The peninsula of small Cavouri, the hills (Tassianis, Faskomilia), the areas around Lake Vouliagmeni, the coast of the Hellenic Organisation of Tourism, the Asteras Vouliagmeni, areas of vegetation, and places with open views.

We must also protect the characteristics that create the character of the area, such as the rotation of the horizontal and vertical soil crimps.

Also, beaches and water resources should be protected from pollution. This also requires additional measures that deal with the proper management of liquid and solid waste.

6 CONCLUSIONS

The factors that played an important role in the development of the coastal urban area of Vouliagmeni, are the natural capacity, land prices, accessibility, travel time, applicable building terms, climatic conditions and the degradation of surrounding areas.

Nowadays, the strong presence of vegetation areas has increased the quality of life. However, the economic incentives for the reduction of vegetation areas that have not been built yet, threatens the quality of life of the residents and alters the physiognomy of Vouliagmeni. The intensity of land use degrades the natural resources of the region which plays an important role in attracting tourists.

It is obvious that in Vouliagmeni, the intensities of land uses are increasing, resulting in the risk of losing the area's advantages. Consequently, the expansion of protected areas and new restrictions on construction are needed.

Because Vouliagmeni is a coastal urban area, the planning for the protection of natural resources in the urban environment must follow not only directions for sustainable urban development but also directions for an integrated coastal zone management.

A mild natural resource management, in combination with the expansion of protected areas and new restrictions will protect the area from degradation and allow it to maintain the status of an area of high living standards.

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