MAMAIA SEASIDE

DESIGN COMPETITION
Constanța

Annex 4.5 – Climatic and biotic landmarks in the Constanța area

Due to the reconfiguration and transformation processes of the seaside in the Mamaia area throughout the 20th century, the anthropic factor is predominant in defining the ecosystems and biotope in this area. However, studying the extended natural framework in the area of the Constanța municipality can help us understand the dynamics of this complex ecosystem and the possibilities of recovery and reintegration of the beaches into the new spatiality. We present below extracts from the relevant substantiation studies prepared by SC Quattro Design SRL for the General Urban Plan of the municipality of Constanța in the years 2020-2022 and from the works of Mr. PhD Prof. Marius Făgăraș - Faculty of Natural Sciences and Agricultural Sciences, Department of Natural Sciences of the Ovidius University of Constanța:

Extract from the SUBSTANTIATION STUDIES for the GENERAL URBAN PLAN OF THE MUNICIPALITY OF CONSTANȚA:

Study on the natural and anthropic setting. General aspects

Leisure facilities add a category of cultural services intended for residents and/or tourists, which define innovative urban spaces. Recreational activities can capitalize on the existing natural potential (for example, activities related to beaches or some water sports) or rely on built infrastructures that pursue such goals (sports facilities, amusement parks, restaurants, malls, etc.). In their case, it is necessary to maintain a balance between the services intended for tourists/visitors from outside the city and residents.

Beach areas

The municipality of Constanța, especially through the Mamaia seaside resort, is an important area at national level for summer tourism. The main area

intended for summer tourism is the resort of Mamaia, which has an area of about 245 ha, where there are 96 hotel complexes with an approximate accommodation capacity of 21,782 places, 15 tourist villas with an accommodation capacity of 970 places and 8 residential hotel complexes totalling an accommodation capacity of 3,700 places. The total accommodation capacity within the resort reaches to about 26,000 places. The beach in Mamaia is one of the most attractive at national level, even after its significant extension. Besides this one, the 'Modern' Beach, the 'Trei Papuci' (*Three Slippers*) Beach and the 'Aloha' Beach are also worth noting in the municipality of Constanța. They have a very high level of density in the summer season. It should be noted that the beaches in the municipality of Constanța are mostly used by the citizens of the municipality of Constanța, while those in Mamaia are used almost entirely by tourists.

Biotic characteristics

The territory of the municipality of Constanța is included in the Pontic Bioregion, the ecosystems being influenced by bio-pedological and climatic conditions and anthropic transformations. Thus, the initial ecosystems have undergone deep transformations at the level of the analysed area, being dominated by segetal and ruderal species. The ecological succession processes in the area of the abandoned lands are noted. The saline areas, fairly well represented in the areas with ecological succession within the analysed area, should also be noted, but also the frequent occurrences of invasive alien species (for example, the false sumac). As a matter of fact, the false sumac (*Aillathus altissima*) and the ragweed (*Ambrosia artemisifolia*) are species quite well represented on the abandoned lands.

Hydrophilic (marsh) vegetation develops around Siutghiol and Tăbăcăriei Lakes, being characterized by the presence of the following species: sedge (*Carex acutiformis, C. riparia, C. hirta, C. elata*), reed mace (*Typha angustifolia, T. latifolia*) and especially the reed (Phragmites communis, Ph. natans) in association with the common water-plantain (*Alisma plantago aquatica*), meadow foxtail (*Alopecurus pratensis*), the yellow iris (*Iris pseudacorus*), water fir (*Sparganietum ramose*). One can say that the meadows have an intrazonal (azonal) landscape, since through its structure

there are some interferences with those within which they exist. *Salix, Populus* then *Plantago, Carex, Phragmites* etc, are not missing from the humidity-loving vegetation on alluvial soils, some with a higher degree of over-wetting and soil salinization, hence the characteristic plant species: *Salicornia, Kochia* etc. Many of the native species have been replaced within the green spaces.

Protected natural areas

In the municipality of Constanța, there are no longer any areas included in protected natural areas of national interest. However, within and in the immediate vicinity there are Natura 2000 sites that preserve habitats and species characteristic of the Black Sea bioregion, respectively:

1. *The avifaunal protection area ROSPA0057 Lake Siutghiol* has an area of 1858.8 ha, being established as a special avifaunal protection area by Government Decision no. 1284/2007 regarding the declaration of areas of special avifaunal protection as an integral part of the European Natura 2000 ecological network in Romania, amended by Government Decision no. 971/2011. It includes the Siutghiol and Tăbăcăriei river-sea harbours, including their shores. This site is home to important flocks of protected bird species. According to the data, there are the following categories: a) number of species from annex 1 of the Birds Directive: 32 b) number of other migratory species (Bonn): 43 c) number of globally endangered species: 4. The site is important for the nesting populations of the following species: *Falco vespertinus Oenanthe pleschanka, Anthus campestris, Aythya nyroca.* The site is important during the migration period for the species: *Branta ruficollis, Pelecanus onocrotalus, Phalacrocorax pygmaeus, Larus minutus, Sterna sandvicensis, Melanocorypha calandra, Sterna hirundo, Mergus albellus, Oenanthe pleschanka, Larus genei, Ardea purpurea, Circus aeruginosus, Lanius minor, Sterna albifrons, Calandrella brachydactyla, Ficedula parva, Chlidonias hybridus, Chlidonias niger, Ciconia ciconia, Egretta garzetta, Alcedo atthis, Anthus campestris, Aythya nyroca, Botaurus stellaris, Galerida cristata*. The site is important for the wintering of the following species: *Larus ridibundus, Podiceps nigricollis, Fulica atra, Larus canus,*

Aythya fuligula, Aythya ferina. During the migration period, the site hosts more than 20,000 specimens of waterfowl, being a possible candidate as a RAMSAR site.

2. *The avifaunal protection area ROSPA0076 Black Sea* has a total area of 149143.9 ha, being established as a special avifaunal protection area by Government Decision no. 1284/2007 regarding the declaration of areas of special avifaunal protection as an integral part of the European Natura 2000 ecological network in Romania, amended by Government Decision no. 971/2011. The protected natural area is entirely in the marine environment, its importance being given by the avifaunal elements that are present. Thus, in the area of the site there are a number of 37 species found in Annex I of the Birds Directive. The bird species listed in Annex I of the Council Directive 2009/147/EC – 37 species: *Anas platyrhynchos, Anas strepera, Aythya ferina, Aythya fuligula, Branta ruficollis, Bucephala clangula, Chlidonias hybridus, Chlidonias niger, Cygnus cygnus, Fulica atra, Gavia arctica, Gavia stellata, Gelochelidon nilotica, Larus cachinnans, Larus canus, Larus fuscus, Larus genei, Larus melanocephalus, Larus minutus, Larus ridibundus, Limosa limosa, Mergus albellus, Mergus merganser, Mergus serrator, Pelecanus crispus, Phalacrocorax carbo, Phalaropus lobatus, Podiceps cristatus, Podiceps grisegena, Podiceps nigricollis, Puffinus yelkouan, Sterna albifrons, Sterna caspia, Sterna hirundo, Sterna sandvicensis, Tachybaptus ruficollis*.

3. The site of community importance ROSCI0073 The marine dunes of Agigea (includes the Agigea nature reserve) has an area of 11.6 ha, being declared by Minister Order no. 1.964 of 13 December 2007 regarding the establishment of the protected natural area regime of sites of community importance, as an integral part of the European Natura 2000 ecological network in Romania. Its main objective is the conservation of the priority habitat 2130 – Fixed dunes with perennial herbaceous vegetation* and the species Testudo graeca and Paracaloptenus caloptenoides. Besides these, one can distinguish the following invertebrate species (Acrida ungarica, Dociostaurus maroccanus, Helix pomatia, Locusta migratoria, Megascolia maculata, Oryctes nasicornis, Myrmeleon formicarius,

Polyphylla fullo, Saga pedo, Xylocopa violacea, Zebrina varnensis), plants (Adonis flammea, Alyssum borzaeanum, Anchusa thessala, Asparagus brachyphyllus, Asperula setulosa, Astragalus varius, Centaurea arenaria ssp. Borysthenica, Convolvulus persicus, Crambe maritima, Echinops ritro ssp. Ruthenicus, Echium italicum, Ephedra distachya ssp. Monostachya, Eryngium maritimum, Euphorbia seguierana, Galium verum, Goniolimon tataricum, Inula germanica, Lappula squarrosa, Leymus racemosus ssp. Sabulosus, Medicago marina, Melica ciliata ssp. Taurica, Melilotus alba, Onosma arenaria, Scabiosa argentea, Psilurus incurvus, Silene thymifolia, Seseli tortuosum, Sisymbrium loeselii, Tanacetum millefolium, Teucrium chamaedrys, Vicia peregrina, Xeranthemum annuum), amphibians (Bufo viridis), reptiles (Coluber jugularis, Lacerta viridis, Podarcis peloponnesiaca), and mammals (Erinaceus concolor, Lepus europaeus).

Climatic characteristics

The general climate is a moderate continental temperate climate, being influenced by the presence of the Black Sea and the expansion of the locality in the Dobrogea plateau, which causes a high thermal inertia. The phenomena of dryness and drought constitute a specific climatic indicator for the coastal area. The general precipitation conditions and high temperatures in the warm half of the year are particularly favourable for their generation. Expressed by the Walter and Lieth climate diagrams, the longest periods of dryness occur on the seaside (about six months/year), of which 3.5 months are with the drought phenomenon.

The average annual temperature is 11.7°C (in July above 22.3°C, and in January 0.6°C). During the year, the lowest average monthly temperature occurs in January on land and in February on water. In summer, the sun shines 10-12 hours a day, totalling an average of approximately 2400 hours annually. As for atmospheric precipitation, it is low, the average annual precipitation being about 412.1 mm. The highest amounts of precipitation fall in June and November (43.6 mm), and the lowest in February-March (25.6 mm in February).

In the wind regime, dominant are those from the W (16.4% in Constanța) and N (13.1% in Constanța) directions. The highest average annual speeds are recorded by the winds from the N (6.5 m/s in Constanța), followed by the winds from the NE direction (6.4 m/s in Constanța). Through its frequency and speed, the wind best reflects the influence of air in advection; in turn, they are reflected in the morphological configuration of the coastline and the seaside zone as a whole, through the modelling processes they generate. Due to the eastward orientation of the coast and specific breezes, summer is longer and cooler (with an average temperature of 21.2°C) compared to the inland area, while autumn is also longer (with an average temperature of 13°C).

Relief and landscape – main characteristics

According to Ion Marin, the Dobrogea landscapes can be integrated into regional landscapes, which overlap the bioclimatic domains of forest, silvosteppe, steppe and local, particular landscapes (the landscape of mountain peaks and hills; the landscape of the wide interfluves of Southwest Dobrogea; the landscape of depressions and of valley lanes; the landscape of pediments and inselbergs; the landscape of littoral and Danube estuaries; the landscape of meadows; the landscape of headlands; the landscape of islands; the landscape of lakes, harbours and lagoons; the landscape of beaches; the landscape of cliffs) (excerpts):

The landscape of the beaches. *Their structure is in full agreement with that of the units or landforms on the basis of which they appeared and were formed either on loessoid, sandy, organic or clay deposits, generally deposits that reach the base of the slopes, feeding the beach, as it is the case of those at the foot of the shores surrounding the Babadag river-sea port, the Agighiol port, etc. Their configuration changes seasonally, sometimes even faster, when the wind and waves exceed certain values.*

South of Cape Midia, the beaches differ both morphometrically (length, width) and genetically. Their shape and size is closely related to the configuration of the shore, but their occurrence is dependent on the position, the distribution of the local sea currents that participate in the formation of lidos, etc. Next to

the seafront, the beach is made of fine shell sand and has widths that are much reduced, for example, next to the limestone promontory of the Constanţa port peninsula or next to the Tuzla lighthouse. The action of waves and winds causes permanent modification of the beach, by its retreat in some places by 3-4 m. To prevent this phenomenon, breakwaters were built parallel to the beach and the seafront, with the help of tetrapods. The constituent sand of the beaches, of shell origin, is transported from one place to another to complete the beach. Banks of shells can also be found on the beach (Pescarie-Constanţa, Agigea, Schitu Costineşti, south Mangalia, Vama Veche), as well as residual sand, especially south of the sectors with strong retreat of the seafront (north of Lake Agigea, north of Tuzla).
The beaches have their own topoclimate, with sensitive thermal variations considering the degree of uncovering with vegetation. The underground water is close to the surface and has a somewhat high degree of salinity. There are beaches that are permanently subject to human pressure, through their occupation even seasonally (e.g. Mamaia, Eforie, etc.), conditions under which the presence of at least grassy vegetation is almost impossible, but there are also beaches where the situation changes.

Woody plants (trees/shrubs) that can be planted in beach areas

(according to PhD Prof. M. Făgăraș):

There are relatively few species with a decorative effect that can grow on sea sands and that can withstand the local coastal climate in the long term, among them we mention: *Elaeagnus angustifolia* (Russian olive), *Tamarix tetrandra/Tamarix ramosissima* (four-stamen tamarisk), *Hippophae rhamnoides* (sea buckthorn), *Salix rosmarinifolia, Rhus typhina* (staghorn sumac).