Regarding Basics of Interaction of Anthropogenic and Natural Carcass as Exemplified by Rostov Agglomeration

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**ABSTRACT**

The article is devoted to the analysis of interaction between natural and anthropogenic landscapes of Lower Don; this is an attempt to see this process in perspective. It describes planning structure of natural-landscape axis of Rostov agglomeration, the zones are named where interaction of natural and anthropogenic factors is most active; the conditions of optimization of this process are defined.

**INTRODUCTION**

Particularities of geographic location of Azov region and Lower Don territories and their resource abundance are so peculiar [1] that since XVI century A.D. and until now the process of formation of the systems of population distribution at these territories was able to endow the region with cellular, valley, disperse and group types of population distribution [2]. Today high activity of urban process is observed here. If we consider Lower Don as huge latitudinal natural-landscape axis of Rostov Region connecting the mirrors of Taganrog Gulf of Azov sea and Tsimlyansk water reservoir it is easy to notice that it is accompanied all the time by north and south urban belts. Meridian axis of urbanization is biased to the M-4 Don federal highway. The point of intersection of these axes is Rostov-on-Don, in suburb zone of which we observe special variant of population distribution characterized by availability of strong nucleus and peripheral, strongly biased to it, zone isolated from surrounding districts [3]. The most active point of urban processes is the nucleus of Rostov agglomeration – Rostov-on-Don - at the moment is ready to transit to sub-urban model of development. City population of Rostov agglomeration is characterized by very high level of urbanization of territory determined by high coefficient of agglomeration [4].

By landscape regionalization the territory of Rostov agglomeration refers to the type of Eastern-European subboreal semiard (steppe) landscapes of southern sub-type. Landscapes of Don delta are meadow-swampy and plavnev, strongly swamped. The soils are mainly swampy and saline [6]. The advantages of Rostov agglomeration’s geo-political location - it lays on the way of mass migration to the south – allow to explore the landscapes of Taganrog Gulf approaching by their natural parameters to the popular resorts of Black sea coast. The foundation of natural carcass of Rostov agglomeration is formed by the system of water objects: Taganrog Gulf of Azov sea and river Don with numerous confluents. Sandy beaches of Taganrog Gulf and Don have highest recreation value because hydrological conditions allow to develop here any kinds of by-water resorts.

**Main part:**

The structure of natural landscapes of Rostov agglomeration the key place is formed by Lower Don valley saturated with urochishches on its slopes. The system of especially strictly protected natural zones allows to keep most valuable sections of landscapes. In Rostov agglomeration these zones are as follows: natural park
Donskoy (Don delta section) [7], numerous monuments of nature [8]; water-swampy land Veselovskoye reservoir [9] (partially).

Historically established way of use of flood-lands of Don is recreation and hunt. In summer coastal territories of Taganrog Gulf of Azov sea are used as water resorts.

Mutual impact of anthropogenic and natural carcasses is restricted to the following aspects:
- aggression of anthropogenic landscapes in regard to natural one;
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- random or forced formation of zones of their complementarity in regard to each other.

Co-existence of natural and anthropogenic landscapes is co-existence of antipodes, that is why search for ways of their mutual satisfaction demands individual approach in every new case. At the territory of Rostov agglomeration the zones where anthropogenic and natural factors struggle most fiercely are as follows:
- northern and southern coast of Taganrog Gulf of Azov sea where the processes of water erosion of coastline take place, blooming of bay water, development of ravine network, of landslide processes, on the other hand - discharge of non-treated (sewage) waters into the bay;
- in the left part of the Rostov-on-Don city underflood and flood of bank zones take place, the threat of breaking natural-landscape axis because of broken terrain crossed with big number of engineering facilities and transport links;
- flood-lands of Don in Bagayev region where big areas of lands intended for agriculture are occupied with irrigation systems demanding reconstruction;
- northern and north-west outskirts of Rostov-on-Don, where oil spill continue to expand.

The boundary between nature and cultural landscapes is never set distinctly: “residential zones and fields (anthropogenic element of cultural landscape) met haymaking zones and pastures (anthropogenically changed elements) i.e. with elements very lightly influenced by man ... in such a way during many decades popularization of landscape took place” [10]. That is why the most perspective zones of search for the balance between struggling interests are natural zones and some rural populated places able to become the growth point or future supporting centers of tourism and recreation.

Taganrog Gulf and river Don are included into Big Water European Ring. Together with their coastal territories these water objects form natural-landscape axis of Rostov agglomeration with its microstructure resembling sand clock pulled in latitudinal direction. This grandioso element of natural carcass is represented by 3 big territorial formations. These are Western, Central and Eastern natural-anthropogenic complexes differed by their form, area and structure.

Western natural-anthropogenic complex is least urbanized and includes natural park Donskoy, fish-breeding ponds and forest economies. This territory is characterized by disperse type of population distribution. Key advantage of this territory is high degree of intactness of nature on huge area; absence of urban barriers; smoothness of mosaic combination of natural and anthropogenic structures; geographic and ecological autonomy.

Key problems of Western natural-anthropogenic complex are underfloods and floods, high risks of emergency situations triggered by the accident at Tsylmyskansky hydro power system; undevlopment of engineering-transport infrastructure; low investment attractiveness of natural ecological scenarios of territorial development.

The levers to maintain natural-landscape specialization of this territory must be: development of the system of measures aimed for protection of the territories from underflood and flood; refusal from location of new residential zones because of the threat of emergency situations at Tsylmyskansky hydro power system; creation of natural park with nature-oriented kinds of tourism [11]; attraction of enterprises from the other regions into the sphere of eco-tourism [12]; creation of the system of berths for small ships, system of transport joints and river-crossings for access to natural park; creation of tourist-recreation infrastructure at the territory of natural park: organization of beaches, pedestrian and cyclist paths, view platforms, recreation playgrounds etc.

Eastern natural-anthropogenic complex is characterized by highly mosaic territories: they are of different sizes and functions. Side by side with natural landscapes there are artificial water objects, agricultural lands equipped with reclamation network, many objects of tourist infrastructure. There are also objects and territories connected with the history of Don cossacks. Key advantage of this territory is possibility of historical-ethnographic scenario of development. The whole set of problems of this territory can be restricted to the key moments: damage incurred to the territories by floods; risk of emergency situations; undevlopment of transport infrastructure; dilapidated state of irrigation systems. Development of Eastern group of territories necessitates the following: to prohibit new residents in the zone of possible flood; to organize the system of berths and river-crossings; to create historical-ethnographic park between Don and Aksai.

Central group of territories is located in the intersection point of natural and anthropogenic corridors: natural-landscape axis of Rostov agglomeration and transport corridor M-4 Don. It is characterized by high degree of urbanization. Here natural and artificial landscapes can be found side by side. High degree of hierarchical significance of this territories, concentration of both available and planned objects of regional,
interregional, and world significance demand transfer of the section of M-4 Don highway and creation of powerful communication joint putting together different kinds of external and city transport. By 2018 significant increase of anthropogenic load on the landscapes is expected: football stadium of world class is being built here. In order to keep landscapes it is necessary to organize huge zone for flood water passage, Building of capital objects demands soil adding - by 1 - 1.5 m at average [13].

Conclusion: 
Further town-planning development of Rostov-on-Don must be performed in accordance with sub-urban model [14] which will enable to keep natural landscapes on its outskirts intact through formation of green wedges situated between urban rays. And in spite of the fact that “small number of democratic societies will agree to trust fully in planned end state which can be achieved in 20 years or more” [15] today we want to hope that this model will remain spotless for long time. Natural-landscape carcass of Rostov agglomeration is saturated with the elements of high hierarchical level (regional and interregional) that is why it is important to keep it not only for the agglomeration or the region but for our country as well, which must regain its power [16].

Inference: 
Regulation system aimed to balance interaction of natural and anthropogenic carcass of town-planning structures must be based on the following principles:
1) maintenance of continuity, commutative penetration of natural carcass of territories;
2) ordering and involvement of the system of strictly protected territories into nature-protecting activity;
3) formation around big cities of sub-urban belt including big sections of natural territories;
4) formation on the base of most suitable rural populated places of the system of growth points - supporting centers of tourism and recreation.

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