

Ecological Planning Strategies on Bartın River Region

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Abstract: -Areas around rivers where human beings settled down have been of great importance. The rivers both have been a good source for settlements and have had important visual and aesthetic values. Although rivers and their environs have natural and cultural values, they have been contaminated due to misuses of lands. In planning process of settlements, it is essential for sustainability that river basins should be considered as the major natural resource. Recently, urbanization and urban growth has been major danger against to conservation. While providing contemporary services in the process of development, urbanization and misuses of lands have led to the construction of industrial units at various scales along the rivers, causing rivers to lose their characteristics and ecological values. Bartın River Basin, chosen as the research area because of its specific ecological characteristics has an important role at local, regional and national scales. In this paper Bartın River's current ecological characteristics and the factors having negative effects on these characteristics have been introduced and the relationship between planning and ecological characteristics has been highlighted. Finally ecological planning strategies for sustainability of the Bartın River Basin have been discussed.

Key-Words: - Bartın River, ecological planning, river landscape, strategic environmental assessment.

1 Introduction

In the process of urban development, while spatial planning is performed to provide humans comfort, natural resources are being destroyed. In planning process, the whole natural resources should be considered and ecological approach should guide all process [1].

Rivers, one of natural resources, are the most important elements that constitute the landscape characteristics in rural and urban areas. The landscape values of river valleys are important in terms of protection and recreation. In addition to being part of fragile ecosystems with special geomorphologic formations, river valleys contribute to visual values of natural environments. Therefore, rivers and the areas near rivers that are one of the most important components of landscape, should be used wisely in order to maintain sustainability and allow future generations to benefit from them.

Throughout history, rivers are used as the source of irrigation, drinking, food, energy and transportation. Besides, people have settled down near rivers in the world since ancient times such as

Rome near Tiber, London near Thames, Paris near Seine in the world and Adana near Seyhan, Amasya near Yesilirmak, Antakya near Asi, Diyarbakır near Dicle, Edirne near Meric, and Eskisehir near Porsuk in Turkey.

The surface structures and landscape features of the valleys surrounding rivers constitute river valley systems which has a potential for recreation and tourism based on natural resources. The rivers that flow on a wide and smooth bed create special landscapes with their water capacity, providing opportunities for various sports such as rafting, swimming and hunting. Moreover, rivers flowing through slopes gain importance due to the fact that they increase the landscape value of the areas with waterfalls and lakes created.

Due to their low water quantity and narrow and shallow beds, most of the rivers in Turkey cannot be used for transportation. Bartın River is one of the few rivers in Turkey on which water transportation is performed owing to its hydrological properties.

Bartın River is one of the important rivers in Turkey. It greatly contributes to the natural and

cultural landscape due to its ecological features. While the river has provided commercial and recreational facilities to the people in Bartın city, now its natural and ecological structure is in danger.

In this study, the Strategic Environmental Assessment of Bartın River and the areas around it, which are important in terms of the natural, historical and cultural values of Bartın city, is performed and the ecological planning strategies are determined according to the natural resources of the river.

2 Method

Bartın River Basin has been assessed under three major topics. First of them is strategic environmental assessment determining of the factors having negative effects on Bartın River. The second is consideration of the potentials to be improved. Under the last topic, ecological planning strategies regarding Bartın River Basin have been developed.

3 Bartın River Basin

Bartın, which became a city in 1991 with a population of 36 000, took its name from the Bartın River which, in ancient times, was called “Parthenios” meaning “God of Water” and “Young Virgin”. Two main branches of Bartın River, join in Gazhane Burnu (Cape Gazhane), located in the city center, and after 12 km, the river flows into the Black Sea in Bogaz.

Bartın Basin is located in the West Black Sea Basin in northern Turkey. Bartın River has a 2100 km² drainage area in where it joins Black Sea. Bartın River flows at a rate of 720 m per hour through the city. Every year it carries 1 billion m³ water into the Black Sea. Bartın River is an important source for transportation because of its hydrological properties.

3.1 The factors having negative effects on Bartın River

Bartın River has historical and cultural importance and is a natural resource that enabled settlement. However, nowadays, it has been threatened by various factors. The major factors influencing the

Bartın River ecosystem negatively are disorderly settlements resulted from unwise use of the land, urban waste, industrial developments, wrong agricultural activities, transportation and the risk of flooding.

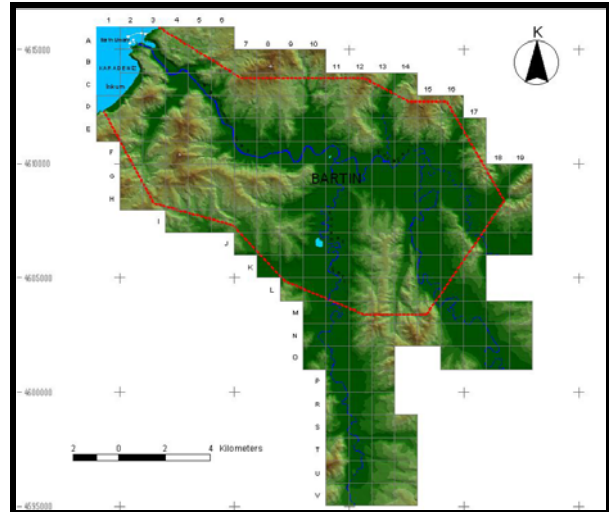


Fig.1 3D aspect of Bartın River Basin

3.1.1 Settlements

Garbage from homes in the settlement areas along Bartın river causes water pollution. In the urban and rural areas in Bartın city, all kinds of waste is thrown into the river beds. For this reason, the river quality is considered to be low. The pollution in Bartın River is caused by human settlement as solid and liquid wastes are discharged into the river bed and the fields are not used in accordance with their ability classes.

In the basin consisting of Bartın River and its branches, the pollution load resulting from human settlement and activities is 2.305 ton BOI/year. The 22% of this pollution is caused by Bartın city. In the basin, an average of 40.150 ton solid waste is discharged into river beds by both municipality and rural settlement in a year [2].

3.1.2 Industrial Usage

The industrial establishments by Bartın River are cement factory, lime factory, forest products industry, textile factory and brick factory. The waste water from these factories causes Bartın River to become polluted both physically and chemically.

In the analysis of the waste water from Bartın Cement factory and Barkisan Lime Factory, which were built near Bartın River, some parameters were higher than the threshold values. In the analysis of waste water from the textile factory in the Bartın River Basin, it was determined by the Environment and Forest Directorate of Bartın that biochemical oxygen need (BON5), chemical oxygen need (KON), sulphite, oil, gres and pH parameters were much higher than the threshold values. Although none of the industrial units have a permission to discharge waste, every year these units discharge 43 ton BON, 136 ton KON, 1.976 ton oil and gres, 2.986 ton solid waste into the river. Thus, the amount of the sediment and solid waste carried to the Black Sea prevents the regime of the river [2].

There is a high amount of coliform bacteria, which causes microbiological pollution, in Bartın River. The two major causes of this are:

1. The city centers discharge sewage directly into the river
2. The animal excrements and wastes reach the river through the surface waters resulting from rain water

Bartın River and its basin is being polluted by physiological wastes, most of which is produced by human activities, industrial wastes and misuse of land and thus its water quality is decreasing day by day.

Furthermore, the material supply mines located in the slopes of the hills near Bartın River have negative influences on the soil and biotope potential and damage the river.

3.1.3 Agricultural Activities

The usage of chemical substances such as chemical fertilizers and pesticides in the agricultural activities in the fields near Bartın River not only has negative effects on soil and biotope potentials, but also pollutes Bartın River by joining groundwaters.

3.1.4 Transportation

Bartın-İnkümlü highway that lies parallel to Bartın River is an important transportation road connecting Bartın city to İnkümlü, a holiday center, and Bartın Harbour.

Transportation activities increase in this highway during summer and thus the amount of

lead in the soil near this highway increases. Lead flows into Bartın River through rainwater and ground water.

Moreover, this transportation road goes through the natural conservation area near Bartın River and influences the natural and ecological medium around it negatively.

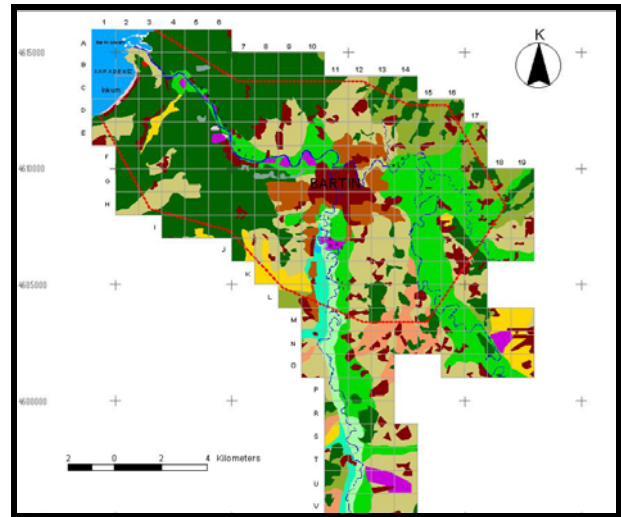


Fig.2 Existing land uses in Bartın River Basin

3.1.5 Flooding risk

In addition, there is a risk of flooding in the areas near Bartın River. The areas on both sides of Kocaçay and Kocanaz Streams, which consists of Bartın River, are in the overflowed areas. Since streams and rivers do not have a regular regime, they often overflow. For instance, in May 1998, a big flooding which hadn't been seen for long years occurred and water levels increased 12.5 m and 80% of the plain area was underwater (Fig.3). The major causes of this is that the river beds were not improved the water hold capacity of the soil decreased due to deforestation in the upper basins of the rivers flowing through Bartın city into the sea. Before flooding, there was heavy rain for a long time and the narrowed riverbeds could not carry the rapidly flowing water. Consequently, the water level of Bartın River increased in a short time and the biggest flooding of the century occurred in the city.

As a result of the landslides caused by heavy rainfall and overflows, a great amount of sediment precipitated in the riverbeds and agricultural fields and some river beds were clogged with sediments.

Landslides caused damage in roads, bridges and settlement areas. Moreover, collapsed bridges increased the negative effects of overflow and sediment accumulation, and overflow protection infrastructure was seriously damaged [3].

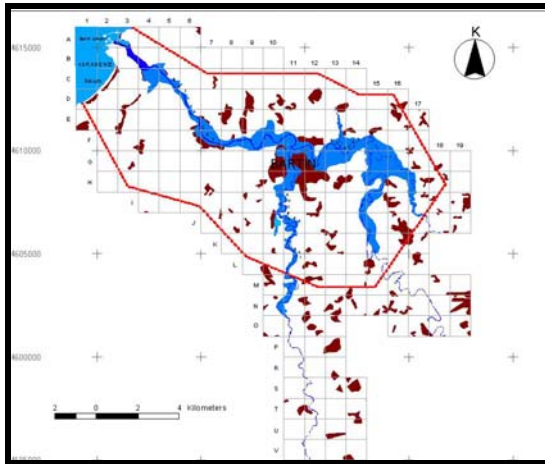


Fig.3 Flooding risk map

Because overflow protection and improvement studies have not been sufficiently carried out, settlement and agricultural areas are damaged and engraved edges of the river and land loss occurs.

3.2 Potentials to be improved

Bartın city is categorized as a living city through which a river flows due to Bartın River's landscapes with urban and rural characteristics.

Bartın River creates an important biotope because of the variety of vegetation in its riverside zones. In addition to its unique natural beauty and ecological and biological variety, Bartın River has historical and cultural values.

The areas in both sides of Bartın River have been declared a first degree natural conservation area by the Committee of the Protection of Cultural and Natural Heritages of the Ministry of Culture and Tourism. First degree conservation areas are those that have interesting features, beauties and a universal value in terms of scientific conservation, and that have to be protected for public benefit since such areas exist rarely.

Kocacay and Kocanazcay, two main branches of Bartın River, join in Gazhane Burnu (Cape Gazhane) and surroundings a settlement area with a shape of a peninsula. Halatçıyaması Hill

(109.71 m.) and Kırtepe Hill (61.6 m.), which are located in the settlement area, constitute a cradle ridge combining at about 20 meters high in the city center. Bartın settlement area is also an urban conservation area and there are examples of civil architecture on the sides of Bartın River. The peninsula-shaped settlement area and the developing areas are connected through bridges.

The rock graves located in Akgöz village near Bartın River are protected as the first and third degree archeological conservation areas. For this reason, it has a tourism potential.

Bartın River and the surrounding areas have also potentials in terms of tourism and recreation. In addition to enabling commercial load transportation with 500-ton ships, 12 km long Bartın River provides opportunities for recreational activities based on water. There are areas near the river which can also be used for terrestrial recreational activities [4].

The recreational areas in the settlement areas near Bartın River are:

- **Çağlayan Picnic Area:** near Bartın-Amasra Highway, in the area where Karaçay stream reaches Kocaçay stream. There are dams carrying water to the old mill. Moreover, the river is suitable for swimming and fishing.
- **Orduyeri Tea House:** near Orduyeri Bridge, in the riverside of Kocaçay.
- **Yalı Boyu Relaxation Area:** there are sports fields, playgrounds for children, open-closed tea houses in the Kocaçay coastline which is located between Orduyeri Bridge and Gazhane Area.
- **Manucipality Social Institution Garden (Millet Garden):** there are types of *Platanus orientalis* having the characteristic of monument tree in the Kemerköprü area in the riverside of Kocanaz stream.
- **Gazhane Park:** located in the Gazhane area where Kocaçay and Kocanaz streams combine. There are leafed and unleafed trees having the characteristics of monument trees, tea houses and children playgrounds.
- **Karaçay Picnic Area:** on the riverside of Karaçay stream near the Bartın-Amasra Highway.

Throughout history, Bartın River was a center of attraction for the people living in the area in the traditional and cultural activities. With this feature, it still has a cultural value today.

Bartın Harbour connecting Bartın River and Black Sea and the historical quay connecting Bartın River to Bartın settlement area are important transportation centers today as they were in the past.

The plains having alluvial soils and % 0-2 inclination on both sides of Bartın River are agricultural soils having first class field usage ability and high potential of production.

3.3 Ecological planning strategies

Throughout the world, spatial planning strategies which focus on the sustainable development adapt ecological approach and both the regional and urban planning processes are based upon ecological bases. Under the guidance of this notion, also in Turkey, spatial planning strategies should be urgently reviewed and any level of planning process should be directed to ecological bases. Furthermore, in all these steps, natural resources and ecological characteristics should be taken into consideration [5].

The land usage decisions having various functions related to settlement areas influence economic activities in certain areas. Consequently, the economic activities influence physical places, the topography, soil, the natural biotopes such as flora and fauna, and thus ecological structure negatively, creating environmental problems. In this context, considered in terms of benefit-cost theory, it is seen that these decisions and applications providing socio-economic benefits in the short term, lead to the destruction of natural resources and negative ecological costs that will affect the whole society in the long run [6].

When making decisions related to land uses aiming to provide economic development, the main goal has to be conservation of the natural resources and ecological balance and using the natural resources without totally consuming them. This is also the most important principle for sustainability.

First of all, in the planning processes related to Bartın River and the areas near the river, the existing land uses that have a negative effect on Bartın River's ecological and biological features should be finished. Moreover, ecological and

biological improvement studies should be carried out and technical measures should be taken in the areas damaged due to negative effects and the areas having flooding-risk [3].

The overflows and water pollution resulting from misuses negatively affects the fauna and flora depending on the soil around the river [7]. For this reason, immediate protection measures should be taken and the river should be provided with a regular regime. The water pollution resulting from the waste waters from the industrial units and garbage from settlement areas should be prevented and the ecological and biological balance should be reestablished by rehabilitating the biotopes in which the distortion on the riversides is observed.

By enabling Bartın River and its branches, which are an important natural resource for Bartın city, to have a regular regime, the opportunities will be created for fishing and hunting. Furthermore, the natural conservation areas that have ecological and biological variety should be protected and the parts that are suitable for tourism and recreation should be used taking protection-utilization balance into account [4].

The river corridor opening to Black Sea in the dominant wind direction is also the most important element affecting the microclimatic conditions of the settlement. Therefore, the principle of protecting the river valley from negative effects of misuse by creating a green belt in the areas around the river should be adopted.

Throughout history, Bartın River was a center of attraction for the people living in the area in the traditional and cultural activities. With this feature, it still has a cultural value today. This cultural feature of the river should be taken into consideration when studies are conducted in order to enliven Bartın River by incorporating it into the urban and rural lives.

4 Conclusion

Bartın River is a natural resource that have a historical and cultural importance and that serves as a source for settlement. For this reason, Bartın River is the only example of its kind in Turkey. Therefore, the factors leading to its pollution should be eliminated and the wrong use of lands should be stopped, hence the pollution in the river should be cleaned up.

The river pollution should be stopped, the biotopes around the river should be rehabilitated and thus biological balance should be reestablished in those areas.

In the areas along Bartın River that have been declared as the first degree natural conservation areas due to their natural ecological and biological features and variety, the priority should be given to conservation. The archeological conservation areas near Bartın River should definitely be protected.

The parts that have a potential for agriculture, fishing, hunting, tourism and recreation should be used in accordance with conservation-utilization balance.

The overflow protection investments in the city should be accelerated and the natural conservation areas along the river should be protected through taking technical measures against flooding and overflow.

The tourism and recreation potential of Bartın River should be used within the open green area system of the city. The recreation types based on land and water should be determined and spatial opportunities should be created according to its potential.

The fields along Bartın River which have first class field usage ability and high potential of production should be used for agricultural purposes.

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