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Landscape Assessment of the Dam and Motorway Networks that Provide Visual and Recreational Opportunities: Case Study of Artvin, Turkey

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***Abstract*—**Nature constantly changes as a result of human necessities. This change mostly feels in natural water sources which are reconstructed with an effect of dams and motorways. In other respects, visual quality of the landscape gets a new and different character during and after the construction of dams and motorways. Changing and specialization new landscapes will be very important to protection-usage balance to explore sustainable usage facilities. The main cause of the selection of Artvin city is that it has very important geographical location and one of the most attraction points in the World with its biodiversity, conservation areas and natural landscape characteristics. Many hydroelectric station and 7 dams are situated, 3 of them have already been built on the Çoruh River in the province of Artvin. As a result of dams, motorways route were re-shaped and the ways which have already changed because of elevation is directly affected several of natural destruction. In contrast, many different reservoirs in Coruh Basin provide new vista point that has high visual quality. In this study, we would like to evaluate with sustainable landscape design in 76 km river corridor, which is mainly based on Deriner, Borçka and Muratlı Dams and determination of their basin-lakes recreational potential and opportunities. Lastly, we are going to give some suggestion about the potential of the corridor.

***Keywords*—**Artvin, dam reservoirs, landscape assessment, river corridor, visual quality.

I. Introduction

APPROXIMATELY 70% of the world's rivers are regulated by dams, which can provide great socioeconomic benefits for human development [1]. However, construction of dams results in serious negative consequences for the environment [2], such as reduced river connectivity [3], [4], altered hydrologic processes [5], [6], changes in riverbed and bank morphology [7], [8], degeneration of water quality [1], [9], and changes in the composition, function, and structure of river ecosystems [10]-[12]. On the other hand, dams and motorways demolish and re-shape nature while the visual quality of landscape gets a new character. In the outer river area, landscape changes associated with land use and land cover change are the most obvious impacts of dam construction [13] and have a fundamental reciprocal relationship with ecological processes [14], [15].

With the completion of Muratlı Dam, Borçka Dam and Deriner dam, Muratlı-Ardanuç motorway code around these dams has changed and now runs along higher lands.

Highways play a vital role in the functioning of human society. From ancient times to the present, highways have functioned as the arteries of human civilization providing pathways for human settlement, commerce, culture, and adventure. Highways have also proven to be a powerful force with their potential to create and alter human patterns of development on the landscape. In modern society, highways not only provide the means for commerce, they provide access to more natural landscapes for multiple values and leisure activities [16].

Recreation includes activities that people perform in their leisure time, away from work, for relaxation and entertainment [17], [18]. It is also the sum of physical and intellectual activities related to an individual's social, economic and cultural capabilities, fulfilling an individual's self-desire and refreshing him/her physically and mentally [19], [20]. Identification of significant distinct qualities and preference of landscape characters of highway landscape must be done to ensure people's satisfaction. Different people like and perceive landscape differently [21]. Cultural additions (land uses, historic structures), transportation concerns (motivations for travel, travel speed, frequency of use) and transitional relationships (environmental shifts, elevation changes) all impact the viewer's experience. Further, the linearity of a corridor reinforces the importance of spatial arrangement and visual sequencing [22]-[26].

The objective of this study to assess the recreational suitability and aesthetic visual qualities of 76 km river corridor, which is mainly based on Deriner, Borçka and Muratlı Dams and their basin-lakes.

II. Material and Method

The study area is the North east of the Turkey in Artvin and consisted of 76 km Muratlı-Ardanuç motorway corridor, which is mainly based on Deriner, Borçka and Muratlı Dams and their basin-lakes (Fig. 1). We choose this area cause of the Çoruh Valley's rich flora and fauna, fascinating topography, extraordinary natural landscapes and cultural-historical values.

Çoruh River begins with Erzurum and falls into the Black Sea in Batumi in Georgia, many dams, and hydroelectric station are located during this basin. Borçka, Muratlı and Deriner dams have already been built. Moreover, Deriner dam is 6th highest dams all over the world. Çoruh River is one of the most significant landscape identity element of Artvin.

With the completion of dams, tunnels and viaducts were

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formed as well as motorway code has changed and many different reservoirs in Çoruh Basin provide new vista point that has high visual quality.

The study corridor is dominated by mountain-valley conditions; users can also see pseudomaki samples like *Pinus pinea, Tamarix tetranda, Punica granatum, Arbutus andrachne*. Users can see *Pinus sylvestris* almost all of the corridor and different village settlements.

An initial field study and a subsequent visual landscape assessment were conducted along Muratlı-Ardanuç motorway corridor in Artvin, Turkey to determine suitable areas for recreation and different vista points.

In field study, we determined the suitable areas for recreation and safety was the first criterion. In site survey we classified the area in three sections, Ardanuç- Artvin, Artvin-Borçka, Borçka-Muratlı motorways. In visual landscape assessment we used photographs to determine the different vista points. All photographs were taken in August 2015 under consistent weather conditions using a Canon EOS 550D 35 mm camera with 50 mm lens between the hours of 10:00 a.m. and 2:30 p.m. Panoramic views are generated by using Arcsoft Panoroma Maker 6.0 program. After determining the suitable areas, recreational activities are suggested according to size of the area.

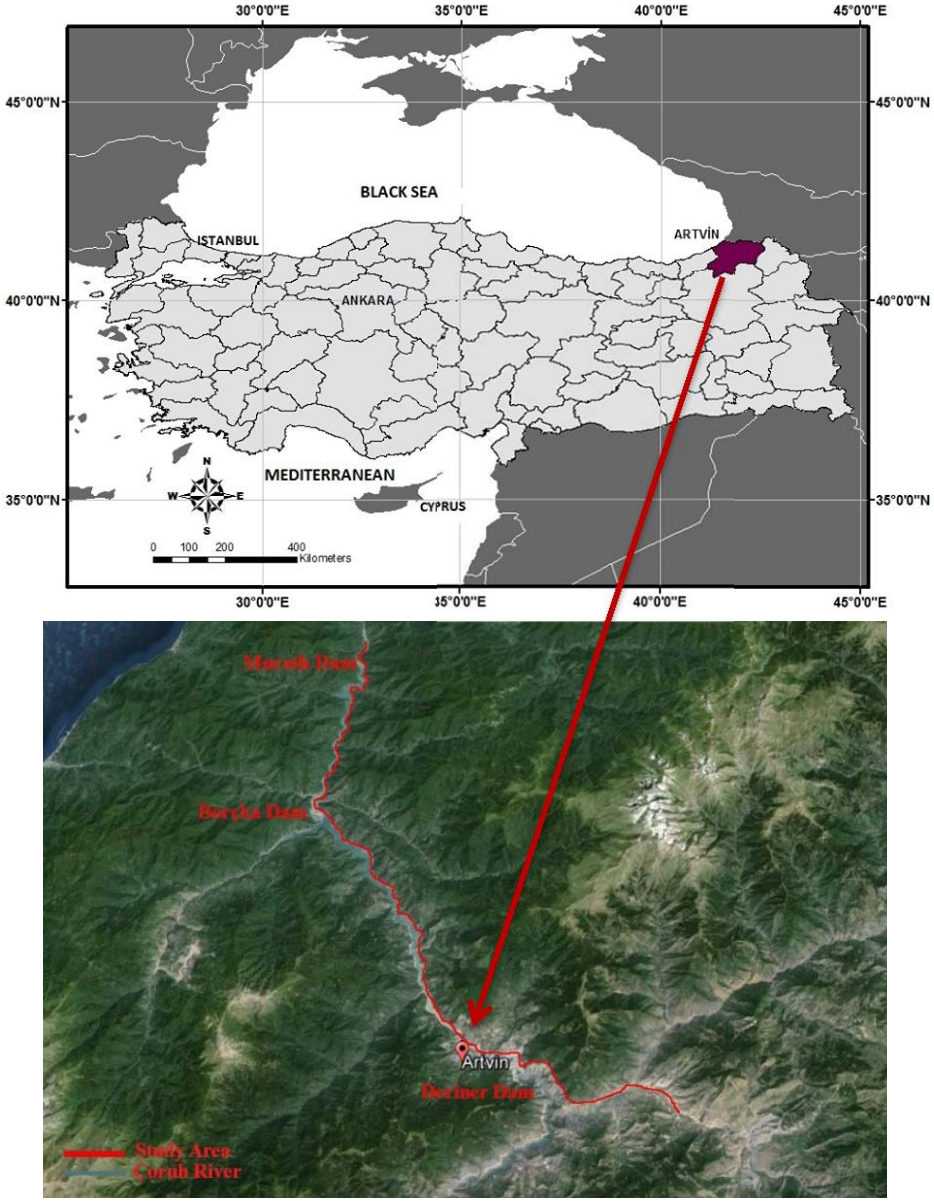

Fig. 1 Location of study area and route in Artvin in Turkey

III. Results and Suggestions

Scenically significant landscapes do not simply benefit the individual who experiences them. They represent an important contribution to the overall desirability of an area and, as such, they can be associated with extended economic benefits for a region [27]. Visual character also affects the overall quality of

a tourist/recreational experience [28], [29].

Denstadli and Jacobsen [30] study results show that roadside facilities play a crucial role in achieving overall satisfaction and loyalty among motor tourists, and that route managers should improve the quality of these and related infrastructure facilities and services. In this respect, we can say this road corridor offer varied visual features and recreational opportunities. In site survey we classified the area in three sections, Ardanuç-Artvin, Artvin-Borçka, Borçka-Muratlı motorways. We determined 24 vista points suitable for recreational activities, 9 of them in Ardanuç-Artvin motorway (Fig. 2), 8 of them in Artvin-Borçka motorway (Fig. 3) and 7 of them in Borçka-Muratlı motorway (Fig. 4) (See Appendix).

Fig. 2 Vista points on Ardanuç- Artvin motorway

Fig. 3 Vista points on Artvin-Borçka motorway

Fig. 4 Vista points on Borçka-Muratlı motorway

Then we suggested recreational activities for these areas according to their size. Our suggestions for these areas are listed below.

Recreational activities like;

- parking, relaxing, taking photos, viewing scenery, picnic, shopping (traditional tastes, fruits etc.) are suggested for vista point 1.
- parking, relaxing, taking photos, viewing scenery, fast food (drinking tea, eating corn etc.), and shopping (traditional tastes, fruits etc.) are suggested for vista point 2.
- parking, relaxing, taking photos, viewing scenery, fast food (drinking tea, eating corn etc.), shopping (traditional tastes, fruits etc.) and water based recreational activities like canoe, pedalo are suggested for vista point 3.
- parking, relaxing, taking photos, viewing scenery, shopping (traditional tastes, fruits etc.) are suggested for vista points 4, 11, 12, 14.
- parking, relaxing, taking photos, viewing scenery are suggested for vista point 5, 6, 10, 15, 17, 18, 19, 20, 21, 22, 24.
- parking, relaxing, taking photos, viewing scenery, fast food (drinking tea, eating corn etc.) are suggested for vista point 7. parking, relaxing, taking photos, viewing scenery, picnic, shopping (traditional tastes, fruits etc.), bird monitoring are suggested for vista point 8.
- parking, relaxing, taking photos, viewing scenery, picnic, shopping (traditional tastes, fruits etc.) are suggested for vista point 9.
- parking, relaxing, taking photos, viewing scenery, fast food (drinking tea, eating corn etc.), and shopping (traditional tastes, fruits etc.), water based recreational activities like canoe and pedalo are suggested for vista point 13.
- parking, relaxing, taking photos, viewing scenery, picnic, shopping (traditional tastes, fruits etc.), water based recreational activities like canoe and pedalo are suggested for vista point 16 and 23.

IV. Conclusion

A landscape is a comprehensive functional entity that sustains human life and ecological relationships, as well as a visual scene. The Greenway itself is, therefore, not only a recreational network, a river's edge, a watershed, a scenic highway or an ecological corridor. It is also a collection of working, living places, a spatial continuum of interrelated functions and meanings integral to the landscape as a whole: a "landscape-based greenway" [31].

The motorway corridor in our study offer lots of recreational areas and different vista points including unique views. There is also some infrastructure facilities on motorway but they are not enough for users and not well-kept. We think that suggested activities in this study contribute to not only user's satisfaction but also region economy according to tourism. These suggestions should be considered in the planning process and this motorway corridor should be evaluated a scenic road.

APPENDIX

TABLE I
SCENES FROM VISTA POINTS

Scenes from Ardanuç-Artvin motorway vista points

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Scenes from Ardanuç-Artvin motorway vista points

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