# EVALUATION OF VISUAL LANDSCAPE QUALITY IN THE WETLANDS NORTH OF SIVAS (TURKEY)

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(Received 27th Apr 2018; accepted 20th Jun 2018)

**Abstract.** Wetlands are points of interest for social scientists as much as they are for naturalists. Due to their ecological importance, they have been in contact with human communities throughout the history and as a result of this, they also became ecosystems that shape cultural periods. The main reason for choosing wetlands in this study was that Turkey is rich in wetlands as a result of its geographical location. On the other hand, in order to have a sustainable environment, significant steps should be taken in preserving and developing the wetlands. In the scope of this study; the significant wetlands in the immediate vicinity of Sivas were used as material with a holistic view. These wetlands are located to the north of Sivas are Hafik Lake (Koçhisar Lake), Lota Lakes and Tödürge Lake (Demiryurt Lake). The images representing the condition of the study area together with the necessary information and the score card, were submitted to the experts for their evaluation. The aim of this study was to find out wetlands of landscape photographs in terms of potential differences (water property size, plant existence, topographic diversity, neighbors views, natural elements, cultural existence) and was to develop sustainable recreational areas in terms of visual preferences. The results were evaluated with a Q-sort analysis. Suggestions are offered about the visual landscaping quality and the development and preservation of recreational application potential within the scope of sustainable landscaping.
**Keywords:** *wetlands, landscape quality, q-sort analysis, expert opinion, sustainable landscape*

## Introduction

In modern societies, environmental consciousness started with the "Urban ecology" in 1970s, as a result of the worldwide environmental crisis. It continued developing in 1980s (Özgüner, 2003) and in the Rio Conference of Environment and Development held in 1992, the notion of "Sustainability" came up for the first time. Within the scope of this notion, with the aim of having sustainable cities and ecological balance, developing and preserving urban ecosystems gradually became significant. This tendency named as ecological approach in landscape designing and administration, brought a different point of view to the applications of our day (Erdoğan Onur, 2012; Ankaya and Gülgün, 2009; Türkyılmaz et al., 2007; Gülgün et al., 2009).

Wetlands, as one of the most fertile ecosystems of the world, have been the focus of human settlement choices for thousands of years (Tırıl, 2006). Throughout the history, it has been seen that the first settlement areas of humans were concentrated on places that can be defined as wetlands like deltas, floodplains, lakesides or riversides. The water elements that can be listed within the extent of wetlands are swamps, peat bogs, floodplains, rivers, lakes, salt marshes, mangroves, sea grass beds, corals, seaside areas with a depth of no more than 6 m during tides, shore wetlands and man-made areas like water treatment pools and dams. Wetlands have direct and indirect usage values. Direct usage value examples can be; salt production, aquaculture production, reed harvesting, agriculture and stock breeding,


http://www.aloki.hu ● ISSN 1589 1623 (Print) ● ISSN 1785 0037 (Online)
DOI: http://dx.doi.org/10.15666/aeer/1604_41834197

being used as grazing or timber supply, being used as drinking, municipal or irrigation water, being used for transportation or tourism activities. It is crucial to establish a planned recreational usage in order to develop tourism opportunities and create a sustainable environmental value.

Many methods can be used to evaluate and improve wetlands recreationally. In this study, Q sort analysis was used to analyze the visual quality and to determine the important criteria of each wetland. Q- sort analysis or Q factor analysis as it is named in the foreign literature, is a relatively new tool not only as approach but particularly following the quite recent rediscovery of its usefulness in those fields where psychometric knowledge of individuals have thorough implications (Pitt and Sube, 1979; Kramer et al., 2003).

## Review of literature

It is an undisputable fact that the increase in water existence and water surface in terms of recreational activities are important factors in raising the preferability and attractiveness of an area. In many studies (Schroeder, 1982; Arriaza et al., 2004; Özhancı and Yılmaz, 2011; Bolca et al., 2007) it was mentioned that the existence of water positively affects the aesthetic landscaping quality (Aşur, 2017). Despite the various initiatives in Turkey on the preservation and sustainability of the wetland views, especially in the Eastern Anatolia and Southeastern Anatolia regions, these landscapes are under the threat of existing financial activities as well as regional and local development plans prioritizing financial improvement (Baylan et al., 2013).

There were studies showing that areas with architectural aspects compatible with the nature in terms of vegetation, fabric, color and form together with characterizing the aesthetic and visual aspects of water in landscaping; increase the visual quality and are preferable to the users in recreational objectives (Özhancı and Yılmaz, 2011; Özgeriş and Karahan, 2015). According to Ak (2010) visual quality studies should be used as an important leading tool in planning and designing rural and urban areas in terms of the visual data created by the changes in physical environment. They should also be used in forming some of the administrative policies. Criteria for monitoring and defining the landscaping in survey forms used in reviewing the visual landscaping evaluation as published in the Scotland Natural Heritage Environmental Evaluation guidebook (SNH, 2013): Visible physical components: land form, land cover, utilities on the land, water existence, forest land, coppices, woodlands, agricultural areas, animals, settlements, other usages of the land (like area or city parks), linear features (highways or coastal line) or point features (like castles of monuments). In order to reveal the landscaping quality of an area, a visual landscaping evaluation should be conducted. To determine the visual landscaping evaluation parameters, these parameters were grouped under cognitive/emotional/biophysical titles according to studies conducted on the visual perception, preference and evaluation of the landscaping. according to Clay and Daniel (2000), Wu et al. (2006), Arriaza et al. (2004), Sevenant and Antrop (2009), Uzun and Müderrisoğlu (2011), Jahany et al. (2012), SNH (2013), Huang (2014). Biophysical parameters were evaluated as visual field width, form of clarity limits, silhouettes, land silhouette, width, slope, exposure (to sun), land form, relief, land cover, adjacent view, cultural variables, vegetation, richness in species and water existence.


http://www.aloki.hu ● ISSN 1589 1623 (Print) ● ISSN 1785 0037 (Online)
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The categories were obtained using the Q-sort method like described by Pitt and Zube (1979). In particular, participants were asked to sort the 74 landscape photographs into 5 classes of urbanization. As each person's interpretation of urbanization may vary, we used a more objective criterion to perform the sorting: the presence of built area in the image. For the sorting task, the participants were presented with all photographs on a desk and were asked to first remove the 12 scenes which they thought were least characterized by built area. These landscapes were classified as 'Rural'. The second task consisted of picking out the 12 scenes in which they thought the most built area was present (Urban'). For the remaining 50 photographs these two steps were repeated but at each time selecting 16 photographs instead of 12 (respectively 'Semirural' and 'Semi-urban').

Fairweather and Swaffield (2001): This paper reported on an interpretative study of visitor experiences of landscape in Kaikoura, New Zealand and focuses on how these experiences vary among different groups. Photographs representing different landscape experiences were Q sorted by a non-random sample of both overseas and New Zealand visitors. The data were factor analyzed to yield five groups each describing a distinct visitor experience, and the results were interpreted on the basis of the photographs most and least liked, and the comments made about them by the people interviewed. The eco-tourist experience is characterized by being close to marine mammals in a spectacular setting.

Naspetti et al. (2016): Visual Q methodology is particularly suited for the assessment of such perceived impact of photovoltaic systems. A selection (concourse) of landscape images with photovoltaic elements was collected and used during this Q-sort analysis. The final Q sample included 54 images of various photovoltaic plants in urban and rural settings. The P set was composed of 34 participants, including landscape and photovoltaic professionals. This analysis identified three distinctive factors that are representative of the different viewpoints on the integration of photovoltaic systems within the urban and rural landscapes. We conclude with a discussion of the wider land-use policy implications of this analysis.

According to Dupont et al. (2017), the remaining 18 landscape scenes formed the last 'Mixed' class and used Q-sort analysis. Scores of for each photograph were summed across participants and an average urbanization score was calculated. These means determined to which class of urbanization each photograph was assigned. However, a number of photographs seemed to balance between two categories (scores close to e.g., 1.5, 2.5 etc.) and could therefore not be unequivocally assigned to one class.

Q-Sort analysis method was used for this study and the mentioned wetlands which were considered to be important in the close vicinity of Sivas were; Hafik Lake (Koçhisar Lake), Ulaş Lake, Gürün Gökpınar Lake and Tödürge Lake (Demiryurt Lake). The aim of this study was to evaluate the visual landscaping quality and recreational usage potential of the wetlands with different sizes and located to the north of Sivas-Hafik highway. Therefore some parameters were examined (water property size, plant existence, topographic diversity, neighbors views, natural elements, cultural existence). A second aim of our study, these wetlands was to bring suggestions to protect in sustainable landscape.


http://www.aloki.hu ● ISSN 1589 1623 (Print) ● ISSN 1785 0037 (Online)
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## Material and method

### *Material*

The study material consisted of the wetlands in the immediate surroundings of Sivas (*Fig. 1*). They are wetlands with different sizes and located to the north of Sivas – Hafik highway: Hafik Lake (Koçhisar Lake), Gürün Gökpınar Lake, Ulaş Lake and Tödürge Lake (Demiryurt Lake). Photographs of these wetlands were taken with a digital camera between 11.00 and 17.00 h. When images were taken, active uses are taken into consideration and areas that people observe individually were taken as basis. In order to allow for the assessment of the areas from all angles, 48 photographs were taken and a total of 16 images (4 photographs for each wetland) were selected for selection.

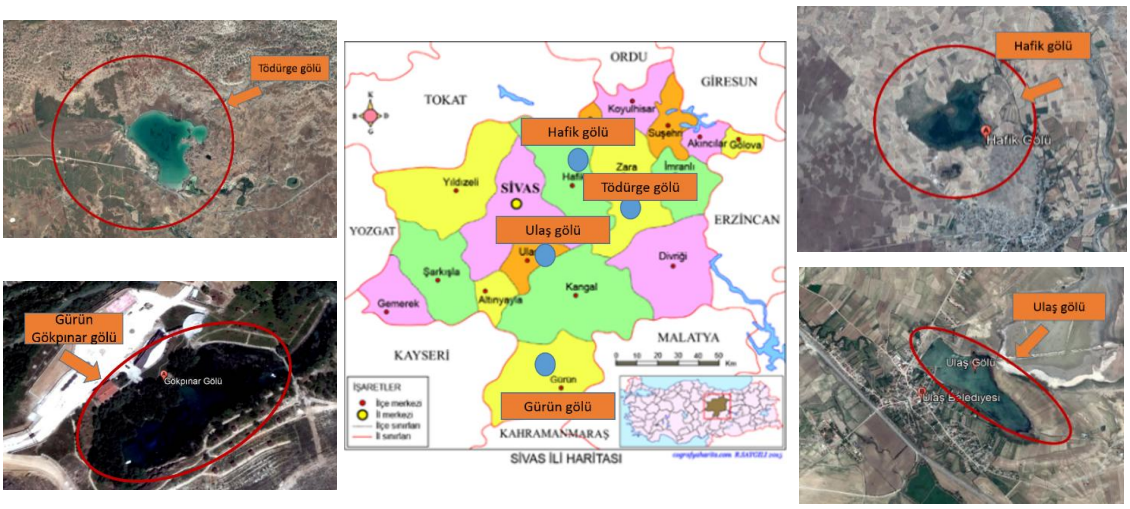


***Figure 1.*** *Satellite images of wetlands in the study and Sivas map (Turkey)*

Gökpınar Lake is located in Gürün County. It is used as a recreational area. Gökpınar (Gürün) Lake has a surface area of 3.000 $m^2$ and the trout facilities established on the brook flowing from the lake is a source of livelihood for the people living in the area (*Table 1*). Gökpınar has its name because of its structure resembling an aquarium, its water being soft and cold, its color being turquois and azure blue. On the other hand; Hafik Lake is 36 km far from Sivas city center and it is a karst lake. It has a surface area of 7.5 km and its volume is 2.250.000 $m^3$. It has eutrophic characteristics and has an average depth of 2 m (Çepken, 2008). Ulaş Lake is located in Ulaş County. It has a surface area of 0, 79943 km. It has been recently put into service as a recreational area by the local administration.

Tödürge is a mildly salty lake located on the upper Kızılırmak basin. It is on the Sivas – Erzurum highway, 50 km far from Sivas, between the counties Hafik and Zara. There is a village with the same name in about 1-km distance. The word "Tödürge" is a changed version of the name belonging to one of the old Turkish tribes; Dodurga (*Table 2*).

The surface area of Tödürge Lake is 5 $km^2$ and it is fed by the waters emerging from the bottom, springs in the surrounding area and Acısu brook. Tödürge Lake is not very deep in the sides and its average depth is 20 m. In its deepest spot, it is


http://www.aloki.hu ● ISSN 1589 1623 (Print) ● ISSN 1785 0037 (Online)
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around 45 m deep. It flows into Kızılırmak with an outgoing channel from the west side. The average depth of the lake is 4 m and there are small reeds on its shores. Keşan Island located to the east of the lake is a favorite spot for cranes. To the west, there are large meadows used as grazing for the cattle.

***Table 1.*** *Expert assessment of images (Hafik and Gürün Lake)*

| Wetlands | Image 1- Sivas Hafik Lake | Image 2 |
|---|---|---|
| Hafik Lake (Code: HL) |  |  |
| | Image 3- SHL3 | Image 4- SHL4 |
| |  |  |
| Gürün Lake (Code: GL) | Image 1- Sivas Gürün Lake | Image 2 |
| |  |  |
| | Image 3 | Image 4 |
| |  |  |


http://www.aloki.hu ● ISSN 1589 1623 (Print) ● ISSN 1785 0037 (Online)
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***Table 2.*** *Evaluated images by expert (Tödürge and Ulaş Lake)*

| Wetlands | Image 1- Sivas Tödürge Lake | Image 2 |
|---|---|---|
| Tödürge Lake (Code: TL) |  |  |
| | Image 3 | Image 4 |
| |  |  |
| Ulaş Lake (Code: UL) | Image 1. Sivas Ulaş Lake | Image 2 |
| |  |  |
| | Image 3 | Image 4 |
| |  |  |


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## *Method*

The data obtained from the questionnaires of every 30 experts for each of the 16 images were recorded and separated for 4 wetlands. Then the biophysical parameters of the visual landscape were studied, evaluated (*Table 3*) and scored numerically (very beautiful +2, beautiful +1, ordinary 0, ugly -1, and very ugly -2). The results of this study were set in a separate table. The number of experts are obtained in light of the data of landscape architects living in Sivas according to UCTEA Chamber of Landscape Architects. The score of each landscape characteristic got based on experts' opinions, was calculated. High score of each wetland suggests photo's desirability and higher priorities of public preferences. In order to calculate the score of each photograph, the following method was used: Scoring was done for each building according to five point Likert scale as +2, +1, 0, -1, -2 and the recreationally significant areas are designated by a Q-Sort analysis formula was used and the resulted findings are listed in *Tables 4, 5, 6, 7, 8, 9* and *10.*

$$N = \sum_{i=1}^{5} n_i (3 - i)$$

Total points of every photo = N
The number of selectors with the quality of very beautiful = n1
The number of selectors with the quality of beautiful = n2
The number of selectors with the quality of ordinary= n3
The number of selectors with the quality of ugly = n4
The number of selectors with the quality of very ugly = n5 (Golchin et al., 2012).

***Table 3.*** *Evaluation chart according to visual landscape biophysical parameters Çakcı (2007), Uzun and Müderrisoğlu (2011), SNH (2013)*

| **Points Criteria** | **+2** | **+1** | **0** | **-1** | **-2** |
|---|---|---|---|---|---|
| **Water property size** | Very dominant and clear water surface | Water surface is very visible but non-clear water | Water surface obvious | Water surface is obvious and dirty | The physical quality and appearance of the water is very bad, dirty |
| **Plant existence** | Very various | Various | Little variety | Not various | No vegetation |
| **Topographic diversity** | Very clear | Clear | Little clear | Not clear | Not at all clear |
| **Neighbors views** | Very clear | Clear | In the middle | Little clear | Not at all clear |
| **Natural elements** | Natural elements are very dominant | Natural elements dominant | Natural and structural elements are balanced | Structural elements dominant | Structural elements are very dominant |
| **Cultural existence** | Near, varied and clear | Near, less varieties | Far away, less clear | Far away, not clear | Not available |


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## Results and discussion

Following the study conducted, 6 parameters on the visual landscaping character and general expert opinion were evaluated with a Q-Sort analysis. In light of the data gathered, it is seen that Gürün Lake had the first place in "attractiveness". Tödürge Lake also had an important point. As seen in *Table 4*, 2 out of 4 wetlands in different locations had high points. While it is significant that recreational area works of Ulaş Lake continues, the area also must be protected against destruction. The *Table 4* indicated Gürün Lake had 48 points as the general view of expert. Also Tödürge Lake had 39 point second rank in terms of general view.

***Table 4.*** *The general view of visual landscape value assessment by experts in working area of lakes*

| The number of the photo selectors of different qualities (from 30 experts) - the general view | | | | | | |
|---|---|---|---|---|---|---|
| **Photo name** | **Very Beautiful n1** | **Beautiful n2** | **Ordinary n3** | **Ugly n4** | **Very ugly n5** | **Photo points N** |
| Tödürge Lake-(TL) | 12 | 16 | 1 | 1 | 0 | 39 |
| Hafik Lake (HL) | 2 | 12 | 9 | 6 | 1 | 8 |
| Gürün Gökpınar Lake GL) | 19 | 10 | 1 | 0 | 0 | 48 |
| Ulaş Lake (UL) | 0 | 11 | 15 | 4 | 0 | 7 |

Gökpınar Lake which is one of the important picnic areas of Sivas, has a depth of 15 m. Its water is quite clean and clear. The lake is famous for its trout and it is fed by the waters emerging from the bottom. There are motels and restaurants on the lakeshore and the opportunity of boating on the lake affected its scoring positively (*Table 4; Figs. 2* and *3*). Ulaş Lake is located in Ulaş County. It used to be idle but after the work conducted by Ulaş Municipality, the lake became active again and there was a picnic area constructed on its shore. There are gazebos installed around the lake for the visitors, however the wetland is not under adequate protective measures.

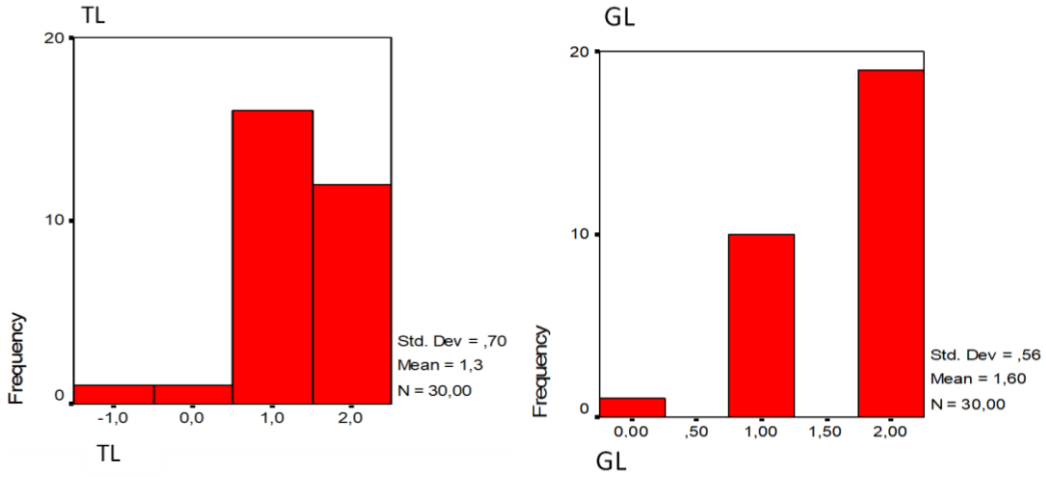


***Figure 2.*** *Standard deviation values of general opinion evaluation by experts of visual landscape value of Tödürge, Gürün Lakes*


http://www.aloki.hu ● ISSN 1589 1623 (Print) ● ISSN 1785 0037 (Online)
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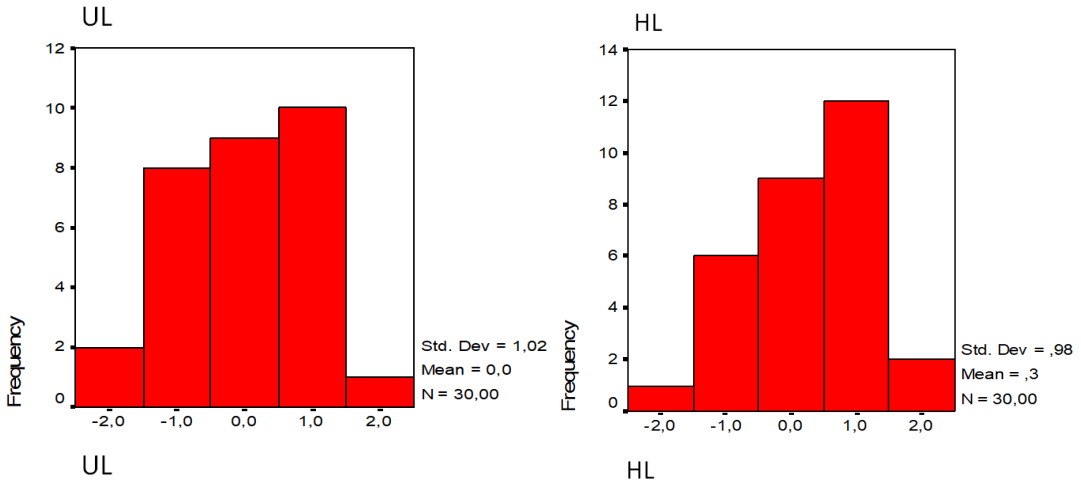


***Figure 3.*** *Standard deviation values of general opinion evaluation by experts of visual landscape value of Ulaş and Hafik Lakes*

When the parameter of water existence was reviewed; Tödürge Lake being on the migration route of the birds and coming in the first place according to area size (4.340 ha) support the result of Q-Sort analysis. As seen on *Table 5*, Tödürge Lake had the highest point in terms of water existence. When we look at Gürün Lake on the other hand, it was seen that running water being used as drinking water supply by the locals was a significant advantage. It was remarkable that the water was clean, healthy and cold at the same time. The effects of this situation could also be seen on the scoring. Hafik and Ulaş lakes had close points. None of the 4 wetlands had negative point in terms of water quality and wetland distinctiveness (*Table 5*).

***Table 5.*** *The visual landscaping items of the lakes assessment according to the "Parameter of water presence"*

| **The number of the photo selectors of different qualities (from 30 experts) - water presence** | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Photo name** | **Very beautiful n1** | **Beautiful n2** | **Ordinary n3** | **Ugly n4** | **Very ugly n5** | **Photo score N** | **Standard dev.** |
| Tödürge Lake-(TL) | 12 | 18 | 0 | 0 | 0 | 42 | ,49827 |
| Hafik Lake (HL) | 11 | 14 | 3 | 2 | 0 | 34 | ,86037 |
| Gürün Gökpınar Lake (GL) | 12 | 15 | 3 | 0 | 0 | 39 | ,65126 |
| Ulaş Lake (UL) | 9 | 15 | 4 | 2 | 0 | 31 | ,85029 |

When the plant existence parameter was reviewed; it was seen that the points of Gürün, Ulaş and Tödürge lakes were close to one another. Ulaş Lakes' Wetland was registered as "Wetland of National Importance" on 10 July 2016. The area is 79.943 decares big. Ulaş Lakes are small and shallow lakes located to the southeast of Sivas. They are 37 km far from Sivas. There are 48 families, 188 types, 338 species and 345 taxa around Ulaş Lakes and their surroundings. 57 out of 338 detected species are endemic. Gurun Lake also had a decent point (45) (*Table 6*).


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***Table 6.*** *The visual landscaping items of the lakes assessment according to the "Parameter of plant existence"*

| The number of the photo selectors of different qualities (from 30 experts) - plant | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Photo name** | **Very Beautiful n1** | **Beautiful n2** | **Ordinary n3** | **Ugly n4** | **Very ugly n5** | **Photo score N** | **Standard dev.** |
| Tödürge Lake-(TL) | 12 | 17 | 1 | 0 | 0 | 41 | ,55605 |
| Hafik Lake (HL) | 2 | 13 | 11 | 4 | 0 | 13 | ,81720 |
| Gürün Gökpınar Lake (GL) | 17 | 11 | 2 | 0 | 0 | 45 | ,62972 |
| Ulaş Lake (UL) | 18 | 7 | 4 | 1 | 0 | 42 | ,85501 |

When the topographical variety parameter was evaluated; it was seen that the area is rich in topographical variety. It was especially important that there were mountains with different heights that shape up the land view. According to the results of the analysis, Gürün Lake was in the first place in terms of variety. Hafik and Ulaş lakes also had decent points (*Table 7*).

***Table 7.*** *The study area consists of visual landscaping items of the lakes assessment according to the "Parameter of topographic diversity"*

| The number of the photo selectors of different qualities (from 30 experts) - topographic diversity | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Photo name** | **Very beautiful n1** | **Beautiful n2** | **Ordinary n3** | **Ugly n4** | **Very ugly n5** | **Photo score N** | **Standard dev.** |
| Tödürge Lake-(TL) | 2 | 19 | 7 | 2 | 0 | 21 | ,70221 |
| Hafik Lake (HL) | 13 | 14 | 3 | 0 | 0 | 40 | ,66089 |
| Gürün Gökpınar Lake (GL) | 18 | 11 | 1 | 0 | 0 | 47 | ,56832 |
| Ulaş Lake (UL) | 6 | 19 | 5 | 0 | 0 | 31 | ,61495 |

When the neighboring view parameter was reviewed; it was seen that plant diversity and topographical diversity, positively affect the view. Existence of settlements close to the wetland was limiting the view and is also a threat to the area. According to the analysis results; Gürün Lake was in the first place as it had clean and unique water as well as natural beauties in its surroundings. Hafik, Tödürge and Ulaş Lakes also had decent points (*Table 8*).

***Table 8.*** *The study area consists of visual landscaping items of the lakes assessment according to the "Parameter of neighbors views"*

| The number of the photo selectors of different qualities (from 30 experts) - neighbors views | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Photo name** | **Very beautiful n1** | **Beautiful n2** | **Ordinary n3** | **Ugly n4** | **Very ugly n5** | **Photo score N** | **Standard dev.** |
| Tödürge Lake-(TL) | 6 | 20 | 4 | 0 | 0 | 32 | ,58329 |
| Hafik Lake (HL) | 10 | 16 | 4 | 0 | 0 | 36 | ,66436 |
| Gürün Gökpınar Lake (GL) | 20 | 10 | 0 | 0 | 0 | 50 | ,47946 |
| Ulaş Lake (UL) | 3 | 17 | 8 | 2 | 0 | 21 | ,74971 |


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When the natural elements parameter was reviewed; it was seen that for all three wetlands, natural elements were apparent. The existence of a settlement in close vicinity of Ulaş Lake showed that there was a balance between natural element and structures. In case the city started to become a concrete jungle without the notion of sustainable environmentalism, destruction and pollution in wetlands were thought to happen (*Table 9*).

***Table 9.*** *The visual landscaping items of the lakes assessment according to the "Parameter of natural elements"*

| The number of the photo selectors of different qualities (from 30 experts) - natural elements | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Photo name** | **Very beautiful n1** | **Beautiful n2** | **Ordinary n3** | **Ugly n4** | **Very ugly n5** | **Photo score N** | **Standard dev.** |
| Tödürge Lake-(TL) | 12 | 16 | 2 | 0 | 0 | 40 | ,60648 |
| Hafik Lake (HL) | 13 | 15 | 2 | 0 | 0 | 41 | ,61495 |
| Gürün Gökpınar Lake (GL) | 20 | 10 | 0 | 0 | 0 | 50 | ,47946 |
| Ulaş Lake (UL) | 1 | 18 | 8 | 3 | 0 | 17 | ,72793 |

When the cultural existence parameters are reviewed; it was seen that the presence of a historical past surrounding the wetlands had significant effects. There are social facilities belonging to Sivas Cumhuriyet University on the east coast of Tödürge Lake, on a hill overviewing the it. Also, to the north of Tödürge Lake, there is a historical settlement named Tepecik Mound.

When Hafik Lake was evaluated; it was seen that during the drilling excavation on Pılır Mound, the existence of lake houses built on wooden poles nailed to the bottom of the lake was detected and it was concluded that this settlement dated back to Neolithic, Catholic and First Bronze Age. Pılır Mound was the only example of settlement style formed by the lake houses called Palafit in our country. Other examples of these houses were discovered in the Zurich Lake and the Lakes of the Alps in Switzerland (Sivas Provincial Directorate of Culture and Tourism). These historical past effects also affected the result of the analysis. Hafik Lake and Tödürge Lake had the highest points (*Table 10*).

***Table 10.*** *The visual landscaping items of the lakes assessment according to the "Parameter of cultural elements"*

| The number of the photo selectors of different qualities (from 30 experts)- cultural existence | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Photo name** | **Very beautiful n1** | **Beautiful n2** | **Ordinary n3** | **Ugly n4** | **Very ugly n5** | **Photo score N** | **Standard dev.** |
| Tödürge Lake-(TL) | 18 | 11 | 1 | 0 | 0 | 47 | ,56832 |
| Hafik Lake (HL) | 21 | 8 | 1 | 0 | 0 | 50 | ,54667 |
| Gürün Gökpınar Lake (GL) | 16 | 13 | 1 | 0 | 0 | 45 | ,57235 |
| Ulaş Lake (UL) | 5 | 10 | 13 | 2 | | 18 | ,85501 |


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## Results and suggestions

It is a known fact that building a city causes pressure and destruction on the natural environment. Yet, in order to minimize the destruction, it is important to make guiding plans for benefiting from natural areas within the limits of preservation – utilization balance and determining the limits for structuring (Aşur, 2017; Aşur and Alphan, 2017; Meriç and Çağırankaya, 2013). In wetlands, many physical factors come into play dominantly and it is easier for users to see the interactions between physical and biological environments.

In the studies conducted on wetlands; asides from using wetlands as recreational areas (Osborn and Spofford, 1972; Troost and Altman, 1972), the advantages of using them for educational purposes and their suitability for local, national and global environmental problems were researched. It was also aimed to teach basic ecological concepts and develop motivations that would help stir the feelings of curiosity and attention about environment by making first-hand observations.

City of Sivas which was the subject of this study, had wetlands with various sizes. These could be listed as the Hafik Lake (Koçhisar Lake) located to the north of Sivas – Hafik highway, Gürün Gökpınar Lake, Ulaş Lake and Tödürge Lake (Demiryurt Lake). Among these wetlands, reed field properties of Sivas – Ulaş wetland and Hafik wetland are under threat because of their being in a close distance to the city center. All four of the wetlands, particularly Tödürge Lake and Gürün Lake, receive many visitors coming with recreational purposes. Even though they were relatively far from the city center, their natural structures have started being subject to depredation. It was suggested that the restoration works on the areas of Sivas Hafik Lake and Ulaş Lake were increased and the location should be open to visitors with arrangements compatible to the nature of the area.

Each lake discussed within the scope of this study were reviewed under 7 different parameters regarding the wetlands and the lakes with the highest point in each parameter are designated (*Table 11*).

***Table 11.*** *The highest values of examined the parameters in the wetlands*

| Parameters | Wetland name | Point |
|---|---|---|
| General view of experts | Gürün Lake | 48 |
| Water property size | Tödürge Lake | 42 |
| Plant existence | Gürün Lake | 45 |
| Topographic diversity | Gürün Lake | 47 |
| Neighbors views | Gürün Lake | 50 |
| Natural elements | Gürün Lake | 50 |
| Cultural existence | Hafik Lake | 50 |

*Table 11* can be summarized as follows: In neighboring view, natural elements, topographical diversity and plant existence parameters, Gürün Lake had the highest point by a narrow margin. In cultural existence parameter, Hafik Lake had the highest point. In water existence parameter, Tödürge Lake had the highest point. The result of the evaluation conducted according to the general view of the experts, the overall highest point belongs to Gürün Lake.


http://www.aloki.hu ● ISSN 1589 1623 (Print) ● ISSN 1785 0037 (Online)
DOI: http://dx.doi.org/10.15666/aeer/1604_41834197

In order to preserve these beautiful and natural structures existing in Sivas and many other cities alike; shore protection plans should be constituted in order to prevent the destruction caused by the structuring done against building codes and pollution of solid wastes and waste waters. It is suggested that by staying within the limits of Shore Protection Act No. 3621; public-minded facilities on recreation, culture, sports, entertainment, relaxation, health and social life should be established and the natural habitat areas should be protected. Each of the wetlands located in the city of Sivas and its immediate surroundings of shore areas, have high ornithological importance thanks to the significant potential as wetlands and being on the important bird migration routes. Among these wetlands, Kızılırmak Delta has international preservation status. Ulaş and Tödürge Lakes are designated as RAMSAR areas. Sivas has visual landscaping resources and to preserve the landscaping quality of wetlands in Sivas and maintain ecological sustainability, local authorities of Directorate General for Nature Conservation and National Parks and Turkish Republic Ministry of Forestry and Water Affairs should have precedence in the development of human resources and corporate capacity. Studies conducted should be supported with awareness raising activities done by local decision makers and local community, together with preparing integrated wetland administration plans. One of the most important conditions of preserving the wetland sceneries of Sivas was considered to be corporate collaborations aimed at the protection of wetland areas' visual landscaping quality.

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