HYDROBIOLOGICAL RESEARCH

Hydrobiological Research 4(1), 31-37 (2026) https://www.doi.org/10.5281/zenodo.18381232

Review Article

Aesthetic and functional use of water in landscape architecture

Ayşenur Akbana[a], Zeynep Dumanoğlu[b*], İlknur Yazıcı[a]

[a] *Bingöl University, Faculty of Agriculture, Department of Landscape Architecture, 12000-Bingöl, Türkiye*
[b] *Bingöl University, Faculty of Agriculture, Department of Biosystems Engineering, 12000-Bingöl, Türkiye*

Abstract: When the history of landscape art is examined, water initially used primarily for agricultural and hygienic purposes has evolved over time into diverse forms that support both passive and active recreation, exert physical and psychological restorative effects, provide thermal and visual comfort, and in some contexts serve as an indicator of social status. Today, in addition to these traditional functions, water also plays a crucial role in supporting ecological processes and sustaining natural cycles. For landscape architects who seek to integrate natural and built environments, water represents one of the most powerful and versatile elements facilitating this integration. As a fundamental human need, water is an indispensable component of landscape architectural design due to its functional, aesthetic, and ecological properties. This study first examines the use of water across different periods, cultures, and civilizations within the context of landscape art history. Subsequently, it discusses the contemporary aesthetic and functional uses of water in landscape design.

Keywords: Landscape architecture, Landscape design, Water, Water elements

Ayşenur Akbana ORCID ID: 0000-0003-0394-7278
Zeynep Dumanoğlu ORCID ID: 0000-0002-7889-9015
İlknur Yazıcı ORCID ID: 0009-0003-9134-2654

*Corresponding author: zdumanoglu@bingol.edu.tr
(Received: 16.09.2025, Accepted: 29.12.2025, Online Publication: 28.01.2026)

1. INTRODUCTION

Water has been the most important and indispensable source of life since the day mankind came into existence. The first settlements were established around natural water sources, and over time, water from these sources was transported to the settlement areas by means of canals for drinking water, sanitary and agricultural water needs. Apart from these essential needs, with the planned settlement and garden arrangements, water has become one of the most important design tools of gardens for different purposes and purposes, with different forms and formal arrangements (Hein et al., 2019). In the first part of the study, the uses of water in different times, cultures and civilizations were mentioned in terms of landscape art history. Information on the purpose and forms of water use in Ancient Egypt, Iran and Mesopotamia, Ancient Greek gardens, Medieval monastery and castle gardens, Byzantine and Renaissance gardens, Far Eastern and Islamic gardens and traditional Turkish gardens are given. Afterwards, the aesthetic and functional uses of water in today's landscape architecture studies are examined in relation to visuals. While existing studies largely address the use of water in landscape architecture from either historical, aesthetic, or functional perspectives, this study adopts a holistic approach by evaluating these dimensions together within a single framework.

2. MATERIAL AND METHOD

This study was conducted using a qualitative review approach to examine the aesthetic and functional roles of water in landscape architecture. The research material is based on the review of scientific sources such as books, peer-reviewed journal articles, conference proceedings, master's theses and professional publications related to landscape design and water elements. In addition, selected visual examples from historical and contemporary landscape practices were used to support the theoretical background of the study.

The literature review includes national and international publications accessed through academic databases, publisher platforms and university library archives. Keywords related to water use in landscape architecture, landscape history, aesthetic design, ecological functions and sustainable water management guided the search process. Sources were evaluated in terms of their relevance to the research topic.

The information gathered was analyzed from an interpretive and comparative perspective. This study does not involve empirical or field-based analyses; instead, it aims to synthesize existing knowledge to provide an overview of water use in landscape architecture.

3. RESULTS

3.1. The Use of Water Across Different Periods, Cultures, and Civilizations from the Perspective of Landscape Art History

In early ages, water was mostly used for functional purposes, and it has become one of the most important aesthetic elements of gardens as well as having different functions over time. In ancient Egypt, with the effect of hot and arid climatic conditions, large canals were opened from the Nile River to the settlement areas in order to meet the water needs in the settlement areas and for agricultural irrigation. In the villas in the residential areas, rectangular or T-shaped pools were built, which came to life with the water delivered by these canals. These pools, which were initially built for irrigation purposes, later turned into decorative elements of the garden where funeral ceremonies were also organized and boat rides were organized (Düzenli et al., 2019). In the Iranian (Persian) period, water was used in the form of pools with fountains in geometric forms as an element determining the garden plan in addition to open canals, and it was aimed to benefit from the cooling effect of water (Kavaklı, 1994; Düzenli et al., 2019). In the Mesopotamian period, especially in the Hanging Gardens of Babylon, the most famous garden of that period and considered one of the seven wonders of the world, water is one of the indispensable elements of the garden, animated by fountains. In the Ancient Greek period, the use of water elements in the form of grottoes as well as fountains and pools are widely seen (Düzenli et al., 2019).

In the Middle Ages, garden art studies generally developed in monastery and castle environments (Nurlu & Erdem, 1994). In castle environments, water was used especially in the form of water channels (moats) created for protection, while wells, small pools and water bowls were used in interior gardens. Water is also an important element in Byzantine Garden art, and decorations made with precious stones and metals stand out in water facilities (Akdoğan, 1972).

Islamic gardens were shaped on the image of paradise depicted in the Qur'an, and hot and arid climatic conditions were another determining factor. Although water is used in different ways and for different purposes, it is the most important and remarkable element in gardens. Water was sometimes used in the form of completely still large pools forming a water mirror, sometimes in the form of geometrically shaped pools or long canals animated with fountains to give sound and coolness to the space (Akdoğan, 1972).

In Far Eastern gardens, especially in Chinese gardens, water was used to reflect nature. For this purpose, water was sometimes used in the form of stagnant pools, and sometimes in the form of meandering streams and waterfalls (Düzenli et al., 2019).

The use of water in Renaissance-era European gardens was mostly for decorative purposes. In French Baroque gardens, in addition to huge reflective still water surfaces, large water surfaces animated with sculptures and fountains were also used as a means of reflecting the glory and splendor that came to the fore at that time. In English gardens, naturalness and simplicity were at the forefront with the influence of the naturalism movement, and water was widely used in its natural forms (Akdoğan, 1972).

In traditional Turkish gardens, water was used in different forms such as fountains, fountains, fountains, fountains, pools with cascades or fountains and water elements in natural forms, and the cooling and musical effect of water was often utilized (Düzenli et al., 2019).

3.2. Aesthetic and Functional Use of Water in Landscape Design

In outdoor design, water has been an element that affects people's aesthetic perception and spatial experiences for centuries. Since ancient times, different cultures have used water as both a symbolic and visual tool. The proper use of water in landscape design creates an emotional connection between users and space; it can evoke different sensations such as peace, vitality, serenity or movement.

Other structural materials used in conjunction with water elements, the variety of plant species and varieties used in and along the water, and the correct use of light and lighting elements are other elements that strengthen the aesthetic effect of water.

In landscape architecture, the use of water can be systematically evaluated by categorizing it according to its aesthetic, functional, ecological, and recreational roles. In this study, water elements are examined within these four main categories based on their dominant functions and design characteristics. Table 1 presents the classification of water elements used in landscape design and summarizes their primary functions.

Table 1. Categorization of water elements and their main functions in landscape design

Category	Water Elements	Main Functions
Aesthetic	Reflecting pools, fountains	Visual quality, symmetry
Functional	Waterfalls, water curtains	Cooling, soundscape
Ecological	Rain gardens, bio-ponds	Stormwater management
Recreational	Pools, interactive fountains	Physical activity, social use

3.2.1. Aesthetic use of water in landscape design

Still water surfaces create a visual depth by reflecting the surrounding elements. While such uses are preferred in formal gardens to emphasize symmetry, the reflective effect of water frames architectural structures and natural elements. This design approach is particularly common in classical European gardens (Jellicoe & Jellicoe, 1995). In Figure 1, on the left is an image from the Taj Mahal, which is the most common example of water reflectivity, while on the right is the use of water in the garden of the Palace of Versailles, one of the most important examples of the Renaissance period, emphasizing formal order and symmetry.

Figure 1. The effect of water to reflect and emphasize symmetry (Anonymous, 2025a, Anonymous, 2025b)

Water elements designed with fountain systems can enhance the aesthetic quality of both modern and classical landscapes, while also enabling contemporary landscapes to acquire the characteristics of interactive or playful spaces. Such applications are particularly notable in urban squares, where rhythmic and synchronized water movements attract visual attention and, when combined with nighttime lighting, can be transformed into dynamic visual displays the interaction between light and water creates dramatic effects, especially within nocturnal landscapes. With the integration of LED technologies, these effects can be achieved in a manner that is both aesthetically compelling and environmentally sustainable (Motloch, 2001). Figure 2 illustrates, on the left, an

example of a modern water feature supported by LED systems, and on the right, a fountain-based water feature integrated with classical architectural elements.

Figure 2. Fountain water systems (Anonymous, 2025e, Anonymous, 2025f)

3.2.2. Microclimatic and psychological functions of water

Waterfalls, cascades and small streams emphasize the dynamism of water. They energize the space with fluidity, movement and sound. It also provides coolness by affecting the microclimate. Moving water elements such as waterfalls and streams offer users an ever-changing visual experience, while the sound of water has a relaxing effect on the psychology of the user (Kaplan & Kaplan, 1989). Figure 3 shows examples of moving water elements in natural (left) and modern forms (right).

From a functional perspective, water contributes to microclimatic regulation and psychological well-being by cooling the air, creating soundscapes, and promoting relaxation.

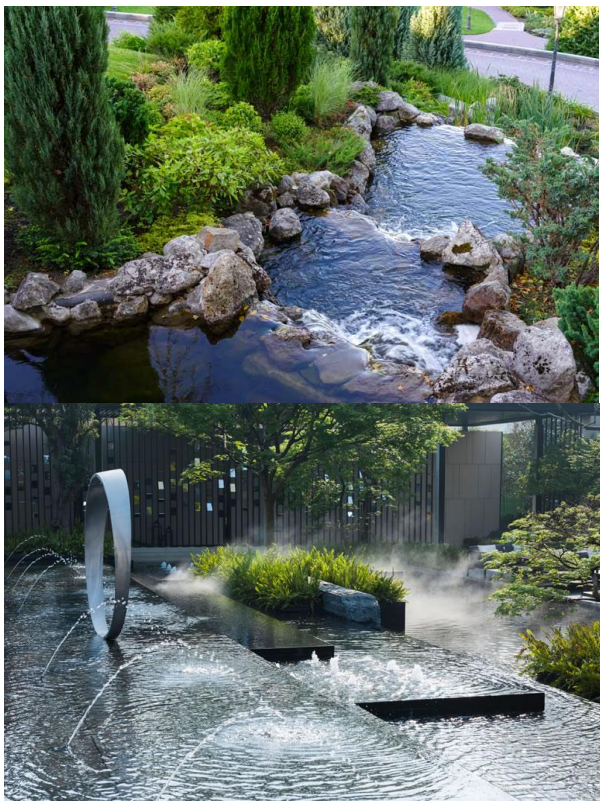

Figure 3. Moving water elements (Anonymous, 2025c, Anonymous, 2025d)

Water elements in the natural environment not only reduce stress levels of people but also create a sense of mental renewal (Kaplan & Kaplan, 1989). For this reason, water elements should be included in the design of resting and meditation areas where natural environments are imitated.

While water surfaces help to cool the air through evaporation, the use of water in the form of ponds and water curtains, especially in hot climates, are natural air conditioning tools that reduce the heat island effect in the city (Motloch, 2001). Figure 4 shows an example of a water curtain.

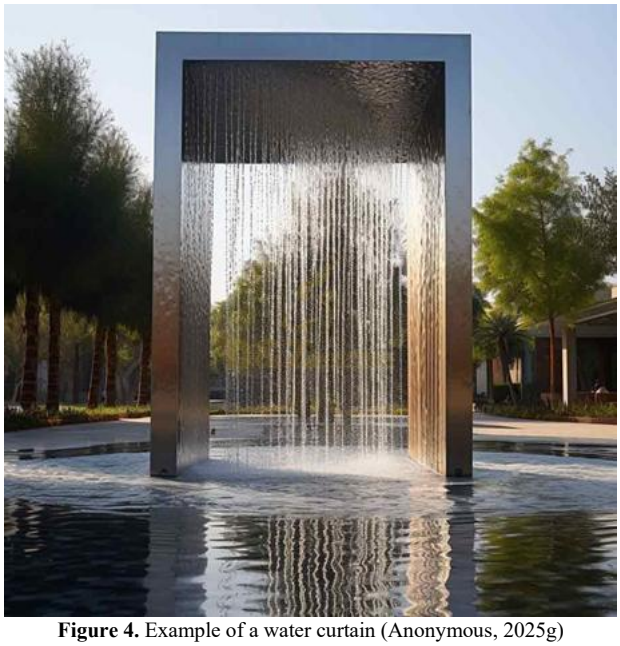

Figure 4. Example of a water curtain (Anonymous, 2025g)

3.2.3. Ecological and sustainable water use

In today's landscape architecture, stormwater management requires water to be considered not only as an aesthetic but also as a functional resource. The Water Sensitive Urban Design (WSUD) approach is one of the leading examples of this approach (Andreucci & Russo, 2021). It is an approach to urban planning and design that integrates the management of the water cycle into the urban development process and addresses natural processes by combining them with landscape design and engineering solutions. This approach recognizes all water flows in the water cycle as valuable resources and aims to manage the quality and quantity of water to better protect the local environment and waterways (Dolman, 2019). In urban areas, rainfall can quickly run off into surface runoff due to dense development and impervious surfaces, which can lead to flooding. Rain gardens and biological ponds contribute to reducing flood risk and saving water (Andreucci & Russo, 2021). Biological ponds also provide habitat for many species such as birds, insects and amphibians, increasing the ecological value of the landscape and supporting biodiversity (Kaplan & Kaplan, 1989). Figure 5 shows an example of a rain garden on the left and a biological pond on the right.

Artificial wetlands consisting of lakes or shallow artificial channels inhabited by aquatic plants make it possible to purify and reuse gray water. Water purification through plant filtration contributes to the preservation of the ecological cycle (Çamuşoğlu, 2023).

Figure 5. Rain garden (left) and biological pond (right) (Anonymous 2025h, Anonymous 2025ı)

3.2.4. Recreational and social functions of water

In landscape architecture, water is also valuable as a dynamic element that sets the stage for sporting and recreational activities. Wind direction, water depth and user safety should be considered in the design of large water surfaces and pools for sporting activities such as swimming and canoeing (Jellicoe & Jellicoe, 1995). Figure 6 shows an example of a swimming pool.

Hydrotherapy pools and water-based exercise areas, which are part of the inclusive design approach in landscape architecture, play a role in supporting physical recovery processes, especially for the elderly and disabled individuals (Kaplan & Kaplan, 1989).

Figure 6. Swimming pool (Anonymous 2025j)

Interactive water areas developed especially for children are equipped with elements such as fountains, water cannons and ground water jets. These areas increase physical development and social interaction and offer the opportunity to cool off in summer (Simonds & Starke, 2006). Figure 7 shows an example of an interactive water area animated with fountains.

Figure 7. Interactive water area designed in a square (Anonymous, 2025k)

4. CONCLUSION

The aesthetic use of water in landscape architecture works gives the space not only a visual but also a multidimensional experience. The qualities of water such as its stillness or flow, its interaction with light, its reflection potential and sound production establish a strong connection between the user and the design. In the landscape designs of the future, it is inevitable that water will be handled more holistically as both an aesthetic and ecological element. The functional use of water is of strategic importance for both environmental sustainability and spatial quality. Water cools, cleanses, nourishes and sustains. With this multifaceted nature, water is not only a visual element, but also the foundation of resilient and healthy cities in harmony with nature.

In the context of global climate change, the role of water in landscape architecture requires a more cautious and responsible approach. Although water elements contribute significantly to visual aesthetics, spatial quality, and functional comfort in outdoor environments, increasing water scarcity caused by global warming makes the indiscriminate use of water unsustainable. Therefore, the incorporation of water features in landscape design should primarily be encouraged in regions that are naturally rich in water resources or where water can be reused through sustainable management strategies. In water-stressed areas, alternative design solutions that create visual and sensory richness without excessive water consumption should be prioritized. In this respect, the conscious and context-based use of water in landscape architecture emerges as a critical design principle that balances aesthetic value, functional performance, and environmental sustainability. In the context of global warming and increasing water scarcity, Water Sensitive Urban Design emerges as a critical approach that enables the aesthetic and functional use of water while minimizing pressure on natural water resources.

Beyond its historical continuity and contemporary applications, water should be regarded as a strategic design component that shapes the identity, resilience, and long-term performance of landscapes. Rather than being treated solely as a decorative element, water gains meaning through its capacity to respond to environmental conditions, user needs, and regional characteristics. Future landscape designs should prioritize context-sensitive water use, where aesthetic impact is achieved not through quantity, but through thoughtful integration with topography, vegetation, and climatic conditions. In this sense, the success of water-based landscape designs will increasingly depend on designers' ability to balance visual expression with ecological responsibility, transforming water from a passive visual feature into an active contributor to sustainable and adaptive landscape systems.

REFERENCES

Anonymous 2025a. https://www.indiamart.com/proddetail/taj-mahal-tour-package-20417014873.html (Access Date: 10.07.2025)

Anonymous 2025b. https://travelmagicmoments.com/the-palace-of-versailles-a-glimpse-into-frances-royal-legacy/ (Access Date: 10.07.2025)

Anonymous 2025c. https://riverscapeswv.com/water-feature-design/ (Access Date: 10.07.2025)

Anonymous 2025d. http://www.archina.com/index.php?g=ela&m=index&a=works&id=5475
(Access Date: 10.07.2025)

Anonymous 2025e. https://www.bizimpark.com.tr/hizmet/kuru-havuz-fiskiye-sistemleri (Access Date: 10.07.2025)

Anonymous 2025f. https://www.londontravelcard.it/trafalgar-square-la-piazza-piu-famosa-di-london/ (Access Date: 11.07.2025)

Anonymous 2025g. https://www.dzstatue.com/outdoor-fountains/large-stainless-steel-rectangular-outdoor-fountain-sculpture-for-sale-dz-387.html (Access Date: 10.07.2025)

Anonymous 2025h. https://flowstobay.org/data-resources/plans/sustainable-streets-master-plan/burlingame-donnelly-avenue-rain-garden/ (Access Date: 11.07.2025)

Anonymous 2025i. https://es.pinterest.com/pin/140806228856213/ (Access Date: 11.07.2025)

Anonymous 2025j. https://www.bungalov.com.tr/villa-pearl (Access Date: 11.07.2025)

Anonymous 2025k. https://tr.pinterest.com/pin/265571709271258321/ (Access Date: 11.07.2025)

Akdoğan, G., (1972). Bahçe ve Peyzaj Sanatı Tarihi, Ankara Üniversitesi Ziraat Fakültesi Yayınları, Ders Kitabı:309.

Andreucci, M. B., Russo, A. (2021). Water Sensitive Urban Design: Principles and Inspirations for Sustainable Cities. Springer Nature.

Çamuşoğlu, N. (2023). Yapay Sulak Alanlar Nedir ve Nasıl Çalışır? https://www.ekoyapidergisi.org/yapay-sulak-alanlar-nedir-ve-nasil-calisir (Access Date: 09.07.2025)

Dolman, N., (2019). Water Sensitive Urban Design. 10.13140/RG.2.2.15172.45443/1.

Düzenli, T., Alpak, E. M., Akyol, D. (2019). Peyzaj Mimarlığında Su Öğesinin Tarihsel Süreçteki Kullanım Amaçları. Anadolu University Journal of Art & Design/Sanat & Tasarım, 6(1).

Hein, C., Van Schaik, H., Six, D., Mager, T., Kolen, J., Ertsen, M., ... & Verschuure-Stuip, G. (2019). Introduction: Connecting water and heritage for the future. In Adaptive strategies for water heritage: Past, present and future (pp. 1-18). Cham: Springer International Publishing.

Jellicoe, G., Jellicoe, S. (1995). The Landscape of Man: Shaping the Environment from Prehistory to the Present Day. Thames & Hudson.

Kaplan, R., Kaplan, S. (1989). The Experience of Nature: A Psychological Perspective. Cambridge University Press.

Kavaklı, K. (1994). Su Elemanlarının Kullanımı ve İstanbul Çevre Düzenlemelerindeki Su Elemanlarının Araştırılması, İTÜ, Yüksek Lisans Tezi, Fen Bilimleri Enstitüsü, İstanbul.

Motloch, J. L. (2001). Introduction to Landscape Design (2nd ed.). John Wiley & Sons.

Simonds, J. O., Starke, B. W. (2006). Landscape Architecture: A Manual of Environmental Planning and Design (4th ed.). McGraw-Hill.