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Urban Planning and Landscape Projects on Urban Riverbanks in Europe: Comparative Study of the Ebro River, Zaragoza, and the Isar River, Munich

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Abstract: The tension between rivers and cities reaches its highest expression in urban river basins. Given the high level of interaction between natural and cultural factors in many riverfronts, an integral project design is essential. The large number of urban river basin enhancement cases that have been conducted has resulted in a large amount of urban scientific literature. The multifaceted nature of these systems renders their analysis and contextualization a challenging endeavor. The objective of this research is to propose a novel evaluation tool based on a reformulation of Lynch's theory of urban form performance, which has been updated from a landscape urbanism perspective. The conceptual framework provides a comprehensive method for translating diverse design strategies into comparable and meaningful categories. The results illustrate the impact of urban riverbank requalification initiatives on the formal quality dimensions of the city–river socio-ecological system. The assessment tool was applied to two cases: the Ebro River in Zaragoza (Spain) and the Isar River in Munich (Germany). Despite differences between the cases, comparative analysis revealed similar levels of urban landscape quality parameters and common elements that can provide new insights when considering the solutions applied and the degree of improvement in quality and river–city cohesion achieved with these projects.

Keywords: urban riverbanks; Ebro; Isar; Zaragoza; Munich; uncertainties; conflicts; innovation; sustainability

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1. Introduction

In recent decades, the urban planning objectives of many rehabilitation projects of urban stretches of European rivers have not only been to resolve abandoned spaces. From the perspective of landscape urbanism, they have been designed as an opportunity for the regeneration of the city, which, by considering the river, acquires a territorial scale and transcends its limits. The rapid global development of urban systems causes a need to reduce urban sprawl by taking advantage of abandoned spaces that provide functions to their citizens in a more sustainable way. Greenspaces and waterfronts play a key role in the development of compact cities by providing not only various ecosystem functions and services but also a positive impact on health and wellbeing, as well as a significant social construction [1–3].

To enhance and requalify these blue and green spaces according to ecological, social, and urban criteria, adequate indicators and assessment strategies are needed to reflect the multiple functions that urban waterfronts and greenspaces fulfill [4,5]. To date, the post-assessment of the mixed spaces that form natural infrastructures and the city has mostly been based on a partial set of criteria such as cost, functional, aesthetic, ecological or climatic considerations, and social perceptions.

Rivers, especially in urban environments, have been perhaps the most intensely exploited ecosystems since the last century, with negative impacts at all scales degrading the environmental system they comprise [6]. In cities, the main causes of this deterioration,

in addition to overexploitation, have been channeling as a means of protection or facilitation of navigability and transport, the use of the banks to incorporate communication structures and services with a negative barrier effect, and the loss of economic activities located next to the river [2,3,7].

The interests and objectives of urban waterfronts, in general, have evolved since the pioneering interventions of the 1980s in the United States, a model followed for decades, whose main objective was focused on the economic regeneration of urban areas that had fallen into disrepair or whose functions had become obsolete [8]. Representative European examples of this first strategy are the Barcelona waterfront, the Rotterdam waterfront, the Bilbao estuary with the Guggenheim [8,9], and the Tagus estuary in Lisbon [10]. Although successive analyses of these interventions show their benefits as economic attractors, critical aspects have also arisen due to problems of social equity resulting from these urban renovations and, in those that affect the hydrogeomorphological functions of rivers, the denaturalization of these rivers for the sake of safety and aesthetic issues [11].

Numerous projects of the requalification and recovery of urban fronts and riverbanks have sought to restore and improve the relationship of urban space with the natural infrastructure that runs through them [3,6]. These enhancement projects meant an improvement of the state of rivers and their surroundings, aiming at a general valorization of the ecological, social, economic, and aesthetic properties. This new approach has been supported, at the European level, by two important directives, the Habitats Directive [12] and the Water Framework Directive [13], and by the Convention on Ecological Diversity [14], which emphasizes the inextricable links between societies and the ecosystem of which they are part and depend. While naturalness is one of the most important components of ecological status that underlies the Water Framework Directive, it is not the only one. The assessment of rivers from only the requirements of this legislation can lead to an unbalanced view [6,15]. In order to overcome this partial perspective, which is difficult to achieve in most interventions in urban areas, a systemic vision must be adopted in decision making, restoring the compatibility of uses, economy, and natural functions [11]. The new actions since the turn of the century have been approached with smaller, different, creative, and innovative regeneration approaches. They have opted for substantial environmental, cultural, and socioeconomic improvements, ensuring inclusive approaches, the integration of mixed uses, and long-term goals [8]. In this context of the beginning of the 21st century, some of the European projects that stand out as examples of urban riverside interventions are Berges du Rhône and Rives de Saône in Lyon; Quais de la Garonne in Toulouse; le Lez vert in Montpellier; Madrid Río in Madrid; Parque Fluvial del Besòs in Barcelona; the Riberas del Ebro in Zaragoza; the Isar Plan in Munich; or the most recent one, the Beach Park in Bremen. The changes in recent decades propose considerations for rivers of conservation, protection [16], and integrative issues from landscape urbanism [3], procuring the scientific basis for integrated watershed management incorporating scale and connectivity from the traditional hydrological and ecological perspective [6]. Regarding landscape urbanism, to scale and connectivity across the breadth of approaches cited, we add time as a dynamic factor, a necessary inclusion to incorporate the uncertainty generated by climate change and the impacts generated by our interventions in the unstable and complex systems that are the rivers [17].

The complexity of both the planning and the necessary evaluation of projects and interventions for the requalification of urban rivers comes from considering them as evolutionary processes and not as final scenarios, requiring the use of tools in an open, dynamic, adaptable, and flexible decision-making system in order to achieve sustainability over time [18–20]. Landscape urbanism, which is linked to different traditions in the field of urbanism, brings an integrative look and paradigm shift in planning [19–22]. Today, the restoration of river sections in urban areas is taking on a new dimension due to the scale of the interventions, the richness and complexity of the elements involved, and the change in paradigm with which the relationship between green infrastructures and the rest of the urban infrastructures is being addressed. In any case, before initiating any action or project,

it is necessary to analyze all its aspects from an integral perspective: hydrological, geomorphological, ecological, urban, sporting, recreational, tourist, landscape, and symbolic, seeking compatibility and complementarity.

The large number of actions in the urban sections of rivers has aroused interest in the scientific and academic field of urban planning, producing a large amount of literature trying to analyze, criticize, learn, and develop support mechanisms to improve future interventions. The analysis and evaluation of cases have been addressed from different approaches focusing on results obtained in fields as diverse as ecological and hydromorphological [11,23,24], social, cultural, aesthetic, and environmental studies [25–28]; considering communication and the movement of people, goods, ideas, and cultures connected through rivers [16,29], economics, land use and accessibility [30,31], and ecosystems and socio-ecosystem services [16,32,33]; and, finally, considering planning design, methods and projects [34], and project typologies and management [9]. This breadth of analysis issues corresponds to the diversity of projects regarding scales, budgets, deadlines, and objectives. In addition, the difficulty of establishing parallels in the studies is that they start from different initial contexts, and their results cover aspects with levels of scope that depend on the initial limitations. This includes the cases of "urban gardening", when a return to the river conditions cannot be assumed due to the high cost for the city, as opposed to those that propose the renaturalization of the river [9,25].

Studies that analyze the trajectory since the first cases point to a conceptual change in the strategies, which have become multifaceted and committed to environmental improvement but whose scope, they confirm, is conditioned by the degree of initial alteration of the city's riverbanks [8,9]. They also find creative solutions with common characteristics that, although formally and materially solved in different ways, provide answers to multiple problems from innovative and evolutionary approaches [34]. These solutions, which are constantly changing, also require new creative views to evaluate them. The studies cited above, although only a small sample, offer valuable information on specific aspects or strategic issues. The most common analysis methodologies related to the field of urban planning in evaluating actions on urban riverbanks range from bibliographic reviews treated statistically [9], fieldwork or expert evaluation, the identification of structural parameters, the classification and categorization of elements [7,29,34], the relationship with indicators and multicriteria analysis [5,35,36], spatially located questionnaires [16], or surveys supported by images [27].

In short, the breadth of the visions adopted to analyze the cases represents the complexity of the problems, aspirations, and strategies with which the interventions for the requalification and regeneration of the city–river interface are approached. Likewise, this complexity hinders a synthetic post-evaluation that facilitates the reading of the contributions made to the complex city–river system, together with the trend in the evolution of the intervention. This would make it possible to recognize the actions that favor resilient solutions in the face of changes, both those introduced for the regeneration of the city–river system, as well as those not foreseen and that arise over time.

This work analyzes two cases that are particularly significant due to their complexity, typology, and scale of intervention to recognize the tools and decisions that have facilitated a positive evolution of the system and detect those that have been critical and unfavorable from the perspective of the formal quality of landscape urbanism.

In this section, we describe the evolution of the strategies and objectives of urban riverbank requalification interventions up to the present day based on the references analyzed. Additionally, we discuss the difficulty of establishing parallels in the case studies, noting that the difficulty is due to the different initial situations and the improvement objectives proposed in each case. In the second section, we then outline the proposed methodology, which is based on a paradigm shift in requalification interventions—a concept already assumed in other case studies—and the design of a tool based on the reformulation of urban quality theories considered to be classical. This section concludes with the presentation of the selected case studies. The third section, dedicated to comparative analysis, describes

the two interventions and presents the results obtained using the evaluation tool. In the final section, which provides a discussion and conclusions, we analyze the achievements, limitations, and opportunities for improvement of the comparative assessment tool. We also discuss the results of the evaluation of the cases and conclude with issues to be considered in urban riverbank restoration projects.

2. Methodology for the Comparative Analysis of Riverbank Requalification Projects in Urban Contexts

A background study is necessary for planning and intervention in urban river sections. To combine theoretical reflection and concrete project experiences, this research proposes a working methodology based on the review of two riverbank enhancement projects in urban environments of cities with a marked historical heritage character in relation to the river. This review began with the recognition of the two interventions at different times. It is supported by data from other studies and interviews with agents involved in management. It follows the structure of methodologies widely applied in case comparison, fieldwork, and expert evaluation; the identification of structural parameters; the classification and categorization of elements; and a comparative analysis according to the criteria. The novelty that we propose is the approach to the classification and categorization of actions that starts from a reformulation of the already classical theory of evaluation of the quality of urban form by Lynch [37], capable of incorporating the socio-ecological vision [22]. Moreover, being a general theory, it can provide a joint vision and translate the results of diverse and complex projects into common and comparable values.

2.1. A New Paradigm for Intervention in Urban Riverbanks

Fortunately, in the 21st century and in many cities around the world, the paradigm of dominion and imposition ("dominating the land" and "fighting against") on rivers is changing. Today, we are still seeking to *Design with Nature* [38] by incorporating river dynamics, biodiversity, and improved environmental quality of water bodies in restoration, recovery, and renaturalization projects of urban river systems, including human beings and their recreational and sporting activities. In short, it is a question of using rivers to create healthy and peaceful city environments. Thus, currently, studies underline the need to understand the dynamics of a river, that it is part of a more complex system, and that these spaces should not only be considered as drainage channels nor spaces for landscaping.

The regeneration of riverbanks in urban areas has yielded many achievements and projects in Europe. However, experiences in other cities and rivers over the last decades show the difficulties in public decision making regarding riverbank development. The dilemma immediately arises of, on the one hand, maintaining and ecologically revaluing these spaces by trying to gradually restore the rivers to their original state, which is completely impossible due to the multiple historical, social, and economic constraints in most European cities. On the other hand, there is evidence that even very partial restoration of river ecosystems is associated with an increase in the number of users and the consequent environmental impact.

As a result of the large number of interventions to improve urban river basins in Europe, in the first decade of this century, a European research group carried out a project to establish a methodology to evaluate existing or potential cases of urban riverbank rehabilitation and determine their success or feasibility. This project, Urban River Basin Enhancement Methods (URBEMs), stresses the importance of this evaluation to verify the effectiveness of the interventions and to promote the continuity of these actions from the perspective of both the city and the natural river. The evaluation parameters it proposes are grouped into the fields of ecological, social, and economic impact. Our study is largely inspired by the URBEM research project [35]. The main objective is to establish a comprehensive framework to facilitate the rehabilitation of urban watercourses considering regional differences in modifications and uses across Europe.

To deal with the breadth and complexity of perspectives, we proposed the establishment of an assessment framework for the intervened space based on formal urban theories, such as the aforementioned *A Theory of Good City Form*, published by Lynch in 1981 [37] and based on the connection between human values and the physical context. The hypothesis is that these same theories of analysis can be adequate to evaluate the mixed river–city interface, considering the river as a dynamic element that requires space for movement and the balance that the city must play with to protect itself and enjoy the benefits it brings and the values it generates in its interaction. For this approach, first, we limit the analysis to the actions carried out in the requalification interventions in the case studies without considering quantitative issues, such as quantity or extension. Second, we consider strategic, structuring, or constructive issues equally, decisions that, regardless of their different scales, influence the result. Third, the effects on the initial state are assessed as positive, neutral, or negative depending on the contributions to the characteristics of the framework of dimensions described below. This analysis is depicted in Table S1.

We structured the comparative tool of the cases based on the dimensions of good formal quality [37], considering (a) vitality, understood as the state of the environment to sustain life in safety and health; (b) sense, as the creative capacity of the environment through perception; (c) fit, as the possibility of change, adaptation, and resilience; (d) access, as the capacity of the environment to connect opportunities and favor flows; and (e) control, understood as the balance in coexistence. This assessment can be innovative by transferring the formal quality performance—traditionally applied exclusively to the urban environment—to a mixed context, city, and river while incorporating the eco-systemic vision, which relates to the complex interactions between living organisms and their physical environment in a dynamic system. It facilitates the evaluation of the environmental and urban regeneration potential of actions on riverfronts. The data we obtained from the comparative analysis of cases allows us, based on real transformation experiences, to highlight favorable actions, even from different regional contexts, contributing to improving the knowledge of good practices to be implemented in future projects. Regarding the first field—vitality—we analyze aspects such as the measures adopted to ensure safety against river floods, as well as the improvement in the sections of the riverbanks that favor hydraulic processes and the restoration of ecological functions. All these achievements together are substantial environmental improvements in the cities. In the second field—sense—we analyze the actions that favor the integration of heritage and the enhancement of the value of nature, promoting the creation of new meanings and culture related to the care and respect for nature. The third aspect—fit—is evaluated in those actions whose versatile nature facilitates their integration into the context, both for their ability to take on various functions in a progressive or modular manner, such as flood-protection elements designed as paths, grade-rivers, or green slopes, and for their ability to evolve autonomously, such as flood plains or riverbank consolidations with high ecological value. The analysis of the fourth field—access—provides data on the diversity of activities offered by the riverfront, including recreational and sporting activities, and the possibility of flows, be they communication, connection, or relationship flows, relevant aspects in the longitudinal and transversal continuity of the rivers and their ecosystem. Finally, the fifth field—control—highlights the limits and extremes to which the equilibrium of the socio-ecological system is or may be subjected.

In short, we evaluated the requalification of the riverbanks while considering them as a natural element integrated into an urban system. The elements we analyzed in the categories proposed for the evaluation of the interventions showed a positive trend that satisfies the basic dimensions of quality performance for good urban and landscape form [37], as we justify later.

The projects seek to adopt measures that facilitate the maintenance of natural flows and biodiversity but also consider historical easements, water security, the needs and desires of citizens, and cultural heritage. That is, they must integrate cultural elements adapted to the regime and uncertainties of the river system. The economic and social

profitability of riverside infrastructure is a function of versatility and its ability to satisfy the widest possible range of tastes and needs of the greatest possible number of users. The progress linked to the purification of waters and the regeneration of channels and banks is translating into the return of fishing, boat trips, excursions, nautical sports, or bathing in river beaches and in the use of wide surfaces such as parks. These actions restore ecological functions to rivers while promoting ecosystem services and the meeting of human communities in large open, free, and open spaces. One of the priority objectives is to facilitate public access to the water surface. In the urban river space, there must be steps, stairs, ramps, and any form that allows approaching the water to touch it, enter, and exit it; in short, to use it, and not only for members of private corporations (sports clubs, restaurants, etc.) but the entire citizenry.

2.2. Case Study Selection

The success of each riverbank-enhancement intervention is not comparable with others because of the wide dispersion of the initial requirements and the measures carried out. These are different and often conflicting as they depend on the specific conditions of each site and the interests of the actors involved, with the result that the diversity of cases seems to require a concrete and specific analysis. Nevertheless, the case studies detect the adoption of measures and processes with similar goals that contribute to improving conditions in the eco-social system that makes up the river and city. In this study, we conceptualize the eco-social system as a complex adaptive system in which humans and nature are inextricably intertwined, wherein both the social and ecological elements exert a pronounced influence over outcomes.

The Ebro Riverbanks Plan in Zaragoza and the recovery banks of the Isar River in Munich are two major projects that represent the new paradigm with which the challenges of the river–city binomial are faced in the 21st century (Figure 1).

The titles of the interventions, in Munich the Isar Plan, “New life for the Isar”, and in Zaragoza, “Recovery of the banks of the Ebro”, give a clue to the ambitions of both. The character of the renaturalization of the Isar set very definite aesthetic conditions and environmental lines of action. It started with a strong alteration, a rigid and linear canalization of the 19th century with an esplanade in an asymmetrical distribution up to the walls of protection of the city, in addition to the diversion of the current using several weirs and a channel for the supply of hydroelectric power stations. In the case of Ebro, the project for the recovery of the banks proposed a mixed character, one of the objectives of the project being the generation of a new central axis of the city due to the symmetry achieved on both banks with the development of the late twentieth century and the integration of the nearby cultural heritage. The Ebro River, as it passed through Zaragoza, suffered from the limits imposed by the occasional protection walls in the exposed urban areas, obsolete and abandoned installations that left the riverbank inaccessible from the city, and landfills that reduced its section. Despite this, it maintained a high degree of naturalness on the banks.

Both cases differ due to their ecogeographic conditions, relating to both ecological and geographical aspects of the environment, their historical–temporal trajectories, and their different cultural and socioeconomic contexts. Still, they obey the same conceptual melody that integrates multiple elements and does not avoid complexity, chaotic behaviors, or uncertainty (Table 1).

Table 1. The cases' main characteristics: previous context and intervention.

Characteristics		Ebro River—Zaragoza	Isar River—Munich
River background	Basin	85,000 km^2 (Zaragoza upstream basin > 40,000 km^2)	8300 km^2 (Munich upstream basin 2838.40 km^2) *
	Discharges (low–maximum flow)	30 m^3/s–3000 m^3/s	30 m^3/s–1440 m^3/s
	Flood control	Dam-regulated	Dam-regulated
	Flood hazard safety (initial study)	1997	1995
Urban river background	Length of river within the city	9 km	13.7 km
	Width between main built-up/flood limits	>200 m	>150 m (300 m Flaucher)
	Number and type of previous river infrastructures in the area	1 weir (Stone bridge)	3 weirs and some lamination weirs
		7 bridges (1 railroad bridge)	9 bridges (1 railroad bridge and 2 footbridges)
		-	1 canal + 2 hydroelectric power station
	Constraints	Dikes and embankment walls + occupations of the riverbed + derelict spaces on the shores	Channelized riverbed + flood plain+ dikes and embankment walls
Enhancement intervention	Main goals	Recover and requalify the riverbanks and green spaces, revitalizing the activity as a public space. Increase flood safety with hydraulic and environmental integration. Dialogue with the local fabric of adjacent neighborhoods. Eliminate and decontaminate landfills on the shore	Renaturation of channelized sections where possible and facilitating the recreational use of urban floodplains. Increase flood safety with hydraulic and environmental integration. Integrate naturalization with historical preexistences. Improve water quality and decontaminate the shore
	Intervention length	11 km	8 km
	Duration: participatory design, work development	2000–2008	1995–2011
	Cost	Urban riverfronts: EUR 128.8 million + the Water Park: EUR 144.1 million (70 M land acquisition cost)	EUR 35 million
	Cost sharing	Ebro Hydrographic Confederation (CHE), City Hall; the Expoagua company owned by the City Hall, CHE, the regional and Spanish Governments	State of Bavaria: 55%. State capital of Munich: 45%
	Number and type of new river infrastructures in the intervention area	1 weir + 1 hydroelectric power station (not working)	-
		7 bridges (4 footbridges)	-
		-	-

* https://www.gkd.bayern.de/en/rivers/waterlevel/bayern/muenchen-16005701 (accessed on 26 January 2024).

Figure 1. Orthophotos. Above: Munich and the Isar River; below: Zaragoza and the Ebro River.

3. Large-Scale Urban Riverbank Requalification Projects in Two European Cities: Zaragoza and Munich—Comparative Analysis

3.1. Zaragoza's Ebro Riverbanks

The city of Zaragoza, taking advantage of the opportunity of the 2008 International Exhibition, proposed a new relationship with the Ebro River that would transform the empty, inaccessible, degraded, and insecure riverbanks into attractive places for meeting, exchange, and representation [39]. The public works on the Ebro were conceived as strong, structuring facilities in which the complementarity of different functions would be a priority. Since its very foundation in the vicinity of a ford, Zaragoza has tried in a thousand ways to establish a safer, more productive, or more pleasant relationship with its rivers, particularly with the Ebro. Many symbolic, affective, and identity elements are rooted in its rivers and canals. However, it was not until the 1980s that the city took the leap and extended along the left bank, giving the Ebro corridor a marked centrality that had never been seen before. Two great challenges for the city of Zaragoza came together on the banks of the Ebro: the integration of large urban spaces on the left bank and the revitalization of the historic center of the city, located on the right bank. To this end, a balanced project was proposed to stitch the two banks together, configuring a new centrality y fostering ecological, social, and economic vitality (Figure 2).

The planning of the Ebro River areas sought to favor formal and functional diversity, sustainability in energy consumption, the generation of exchange opportunities, and the quality of complex and diverse ecosystems. The aim was to integrate environmental, urban, landscape, social, and economic objectives in the project. The urban river section was defined from the outset as clean, green, continuous, accessible, diverse, approachable, flexible, and attractive [3,39].

The Ebro drains, upstream from Zaragoza, a basin of more than 40,000 km^2, and its flows fluctuate from less than 30 m^3/s in low water and 2000 m^3/s in ordinary floods to well over 3000 m^3/s in extraordinary floods. Respect for the channel through which the large flood flows must flow and the protection of the consolidated city against flooding was an essential starting point. It was necessary to reprofile the riverbed section, set back the banks where possible, and strengthen a continuous system of hydraulic defenses. These elements were integrated into linear parks with longitudinal corridors, leisure and recre-

ational facilities, artistic interventions, pedestrian and cycle paths, and the development of spontaneous vegetation inspired by nature itself.

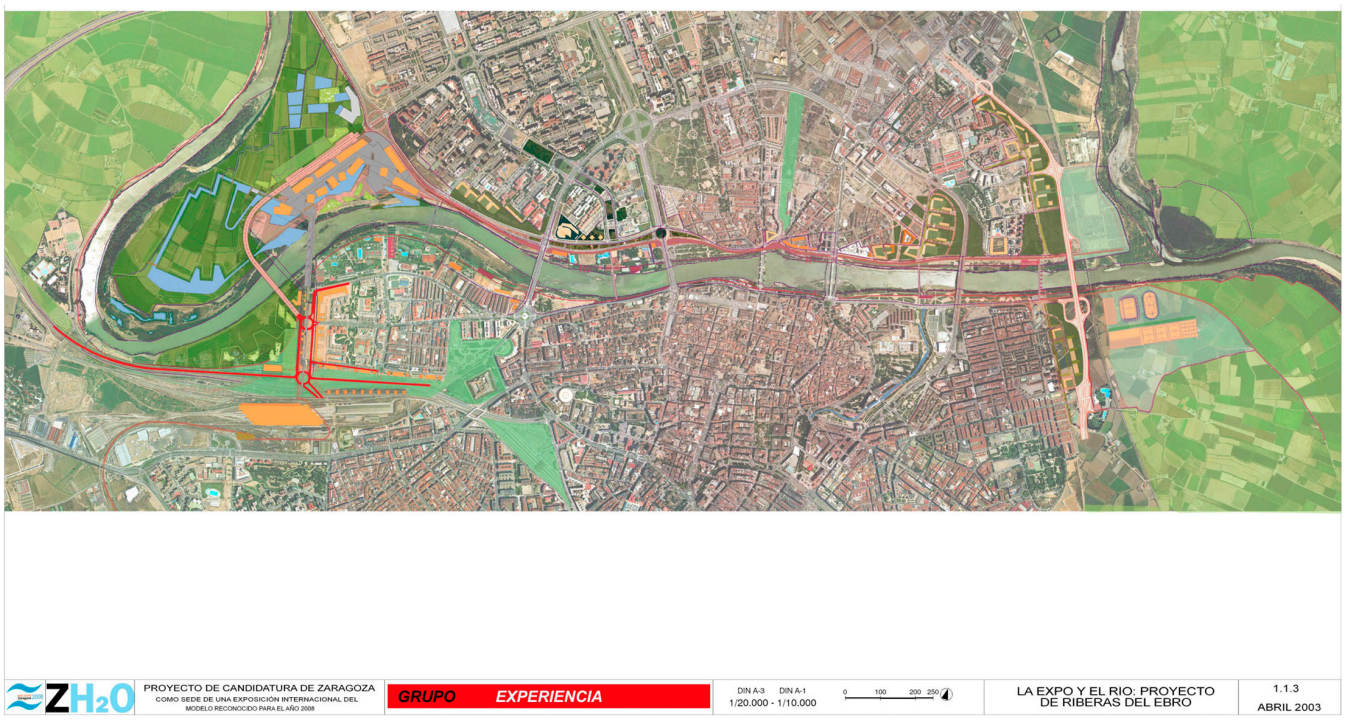


Figure 2. Expo site project and the Ebro riverbanks project in Zaragoza. 2003. Source: Grupo Experiencia 2003 (modified to improve scale legend legibility).

On the other hand, the future of the river–city relationship largely rests on public access to the sheet of water using steps, stairs, ramps, footpaths, and any form of access to the water. While this was one of the priority objectives, it was also one of the main sources of conflict. The lack of respect for the public water domain on the part of the private interests installed on the banks (private clubs and corporations that plunged their fences into the water itself) meant an additional effort to achieve the continuity of the routes and the unitary character of the public operation [36]. (In Spanish legislation, the Public Hydraulic Domain is considered to be the space of the riverbed and banks covered by the waters of the maximum ordinary flood. The ownership and competences exercised in this space correspond to the state.)

In addition to using large areas as parks, the aim was to achieve the return of sporting and recreational activities linked to progress in water purification and the regeneration of watercourses. These actions restore the ecological functions of the rivers and simultaneously bring together human communities in large, open, free spaces (Figure 3). The economic and social profitability of riverside infrastructures depends on their versatility and ability to satisfy the widest possible range of tastes and needs of the greatest possible number of users, who thus become the recipients of the services offered by the site.

Finally, in the regeneration of the Ebro and its banks, in recognition of the ecological diversity, an effort was made to conserve the existing natural spaces and create large planned spaces that could evolve naturally, i.e., with no other contributions than those provided by nature, responding to present and future needs. Thus, for example, one-third of the surface area of the Water Park (40 hectares) is part of the Ebro flood course and requires little maintenance (Figures 4 and 5).

(**a**) (**b**) (**c**)

Figure 3. (**a**) Water sports on the Ebro; (**b**) merging of the city with the countryside and nature in the Water Park; (**c**) beaches in the Water Park. Sources: (**a**,**b**) the authors; (**c**) Water Park Archive.

Figure 4. Zaragoza and the flooded Water Park. 2008. Source: eNVuelo.

Figure 5. The self-dynamic evolution banks on the Water Park in Zaragoza. 2018. Source: the authors.

Since 2008, the urban corridor of the Ebro has been the integrating spine of the historic city and the new neighborhoods on the left bank. The river has become a place of confluence between the different urban forces that have ended up turning what was once a riverbank into a meeting place for people from all walks of life, the empty riverbanks into intensely occupied spaces, and the necessary dykes against flooding into linear parks. The project was developed in coherence with very clear objectives: to guarantee the evacuation of flows from the upper basin; to defend the population and assets of the city spread over the flood plain; to restore the naturalness of the landscape; to harness the energies of the natural system; to maintain and enhance the cultural heritage; to ensure diversity in the form and treatment of the different sections according to their natural and cultural characteristics; to facilitate accessibility to the space and the longitudinal and transversal continuity of the walks; and to promote and integrate multiple and compatible functions to satisfy the tastes and needs of citizens and guarantee their profitability in ecological, social, and economic terms [40].

The natural spaces and the restored riverbanks are in excellent condition thanks to the successful design and execution of the works, which have incorporated the natural dynamics, considering the forces inherent to the place and ensuring a natural evolution with hardly any economic contribution. The works to reprofile the riverbed section, recess the banks, and consolidate the hydraulic defenses carried out with the Expo Accompaniment Plan were performed to protect Zaragoza from floods with a return period of 100 years. They were based on studies by the most advanced and rigorous research center of the time, the CEDEX, in 1997. The city of Zaragoza is currently reasonably well-defended against extraordinary floods [41]. However, the studies for the 2016 Flood Risk Management Plan (PGRI) for the Ebro show that the defenses built in 2008 will not be sufficient for floods with a return period of more than 50 years.

The defense works have a markedly multifunctional character so that they are integrated with the linear gardens, the recreational facilities, and the network of walks and paths that connect the city with the river. The longitudinal continuity of the paths and transversal continuity (bridges and footbridges) are strong points of the intervention on the riverbanks. They can be followed in their entirety along both banks in the entire urban section of the Ebro and even extend as far as the old meander in Juslibol and the old meander in la Alfranca. The recovery of the Public Water Domain as a guarantee of the continuity of the parks and the routes has been one of the main conflicts. Private corporations asserted old privileges and occupations that have subsequently been validated by the judiciary, forcing Zaragoza to pay millions in compensation. However, in no case did they manage to break the continuity of the riverside public spaces [36].

One of the interventions that has generated the most scientific, social, and political conflict has been the construction of the weir called Azud de Lorenzo Pardo, a municipal project with a very long history demanded by the users of the river and sports associations. Its environmental, social, and urban dimensions were analyzed, studied, and included in the General Urban Development Plan (2002) with unanimous approval by all the political forces of Zaragoza City Council, despite the rejection of some environmental organizations and parties without representation in the consistory at that time. The weir is a dam with hinged gates, with a height of 2.67 m from the riverbed to the crest of the gates and a foundation of 7.17 m from the base. It has a length of 207.80 m and seven oleo-hydraulic hinged gates. It is overflown by a 10.10 m wide footbridge that connects the neighborhoods of Las Fuentes and Vadorrey. The hinged sluice gates allow for proper flow management and do not represent any obstacle to the passage of sediment–water during floods.

The maximum normal level of the sheet of water is 189.67 m, lower than that foreseen in the initial project. It constitutes the reference level for the river port and the lower longitudinal promenades, but it limits navigability to 1600 m in length. It has been the main impediment to the longed-for tourist navigation. However, the backwater provided by the weir is highly appreciated by water sports enthusiasts and riverbank users of the Ebro [36]. The integral project for the banks of the Ebro was truncated by the economic, political, and social crisis of 2008, which prevented the development of the eastern section supported by the Horticulture Exhibition of 2014, known as *Expopaisajes*, which, in the end, could not be held. Thus, the intended balance with two peripheral poles to the west (Parque del Agua) and east (Desembocadura del río Gállego and Orla Este—Gállego River mouth and Eastern Border) of the city could not be achieved. The neighborhood of Las Fuentes, traditionally located on the market garden that gave it its name, was drastically separated from it with the construction of the railway ring road and the third ring road. For decades, there have been calls for the creation of an agricultural park and a green ring to generate dynamics of functional and spatial reconciliation between these two rural–urban conditions that should never have been amputated so drastically.

3.2. Munich's Isar Riverbanks

It is not surprising that the idea of controlling the Isar River has a long history—historically, flooding of the river in Munich caused many deaths and destroyed infrastruc-

ture and bridges. In the 19th century, Bavaria became a state with Munich as its capital. The city grew, shedding its obsolete city walls, incorporating new residential areas, and creating a new city center around the royal residence. The Maximilianstrasse boulevard was opened, and the river became a central feature, transforming into a large riverside park. The flooding of the Isar forced important defensive and canalization works, which, on the other hand, favored the occupation of both banks and the construction of institutions on the islands, such as the Deutsches Museum, founded in 1903 [42]. Under the protection of technological advances, the canalization and channeling projects of the time began with a canal with a constant cross-section of 50 m. The new hydraulic dynamics were controlled by constructing small transverse dams every 200 m. The river was thus confined to a constant and immobile section.

At the beginning of the 20th century, work continued on the river, and new canals with hydroelectric dams were built to supply power to the factories along the banks. In 1959, water control was increased with the construction of the Sylvenstein dam, 80 km upstream, with the dual function of storing water and flattening the peak of the floods. However, as the river was dominated by dams, walls, and constant flows, water quality, the river ecosystem, and the landscape were degraded. In the late 1950s, Munich passed the threshold of one million inhabitants, and growth required integrated urban development planning based on scientific and technical criteria. From the 1960s onwards, citizens affected by high housing prices asserted their needs and wishes to the planners. Soon, the Munich Forum for the Discussion of Urban Development Issues emerged. Public participation, partly financed by public administrations, gained specific weight. Especially from 1973 onwards, the urban development model was strongly influenced by the social sciences [42].

Bavaria has set itself up as a role model for water and river management in accordance with the principles of Agenda 21 of Rio de Janeiro (1992), intending to work together with administrations, companies, and the public [43]. In 1995, the restoration project was launched under the slogan "New life for the Isar" to guarantee and improve protection against flooding, recover the good ecological state of the river, improve water quality, and provide banks where citizens could enjoy leisure and recreational activities. The result of a growing demand for urban environments closer to nature, the restoration of the Isar River along 8 km in the city of Munich is a spectacular achievement in its ability to adapt to both the high flooding that regularly affects the area and the high recreational use while enhancing biodiversity.

Implementing the Isar Plan in Munich has been a long, complex, and costly process (1995–2011). Still, the results have been excellent, and the Isar project can be said to be a flagship example of river restoration in cities. The Isar Plan project, led by the City of Munich and the Bavarian Water Board, represents an unprecedented level of interdisciplinary cooperation. The municipal and Bavarian state managers, through the Bavarian Water Agency, set up a working group (AG Isar Plan) in which other decision makers from related departments, such as construction, urban planning, and environment, were involved [44]. In the first phases, the State Water Agency undertook a series of actions to widen the channel by creating a suitable hydraulic section, removing concrete walls, and adding gravel [23]. Dead plant matter (logs and stumps) was incorporated to create new habitats for animals and plants. Some meadows were terraced to facilitate people's access to the water. The old cross dykes were replaced by breakwater barriers. Finally, water quality was improved by incorporating ultraviolet treatments, providing a safe river for recreational and sporting uses (Figure 6).

The "Isarplan BA5" competition was launched for the most urban section, and the aim was to reach a public consensus on the balance between "nature" and "artifice" and between a renaturalized landscape and recreational and leisure uses. The winning proposal was led by landscape architect Irene Burkhardt, a great expert on the Isar River. Burkhardt's project values the drama of a picturesque and romantic landscape, somewhere between urban and wild, where the spontaneous vegetation plays with the rapids of the river and the waterfalls of the weirs [45]. It was intended to be a comprehensive landscape design

with a naturalistic but distinctly urban appearance. However, the project generated great controversy, and public opinion rejected the proposal. Finally, a consensus was reached, incorporating the project that had come second, under the close supervision of the City Council and in collaboration with the NGOs. The confluence of the teams was close and enriching, uniting civil engineering and landscape architecture with political leadership and social participation [42].

Figure 6. The riverbed and banks at Willow Island, Isar, in Munich. Source: the authors, 2013.

The results have been welcomed by the public, who appreciate the integration of natural appearance and the restoration of ecological functions, with ample habitat for flora and fauna and recreational areas while ensuring protection against flooding, especially since they have been involved in developing the planning work. However, the solutions adopted in the process present new challenges. The river interacts with the new renaturation works, and the floods wash away the gravel and destroy numerous small infrastructures. The artificial aesthetics of renaturation require sophisticated and costly techniques.

3.3. Results

Based on the analysis of these two interventions, we selected a total of 40 actions undertaken in these riverbank requalification projects, which have remodeled the appearance and improved the conditions of the urban riverfronts. Of these 40, not all have been carried out in the two riverbank reclamation projects. We grouped the actions into six fields (Figure 7), the most numerous being those related to the modification of riverbank and watercourse profiles, the influence on the perception and attraction of the place, and the provision of opportunities.

In the case of the Isar River, the number of actions per group is more balanced. The actions selected for each project are shown in Figure 8. To facilitate comparative analysis, we worked only with the type of action and did not consider the amount or the extension of each. For example, the typologies in the hydrodynamic modification group are fewer than the rest, but this does not mean they are less important or effective.

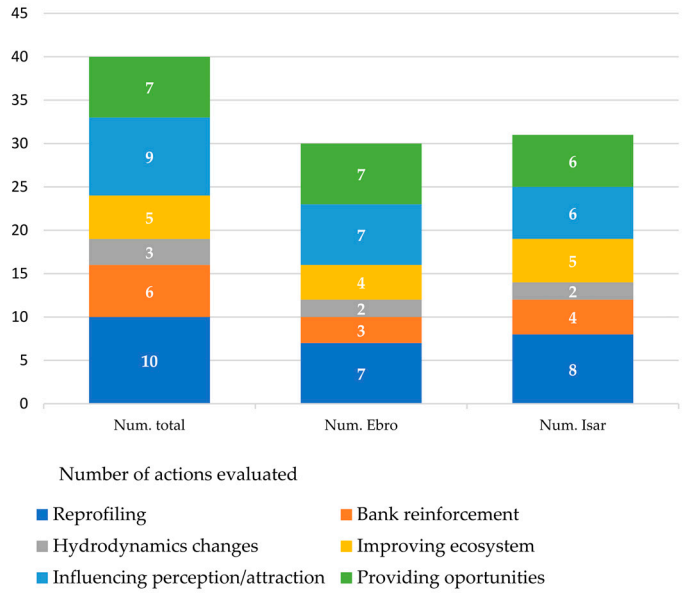


Figure 7. The number of evaluated actions in each group by case study and total. Source: the authors.

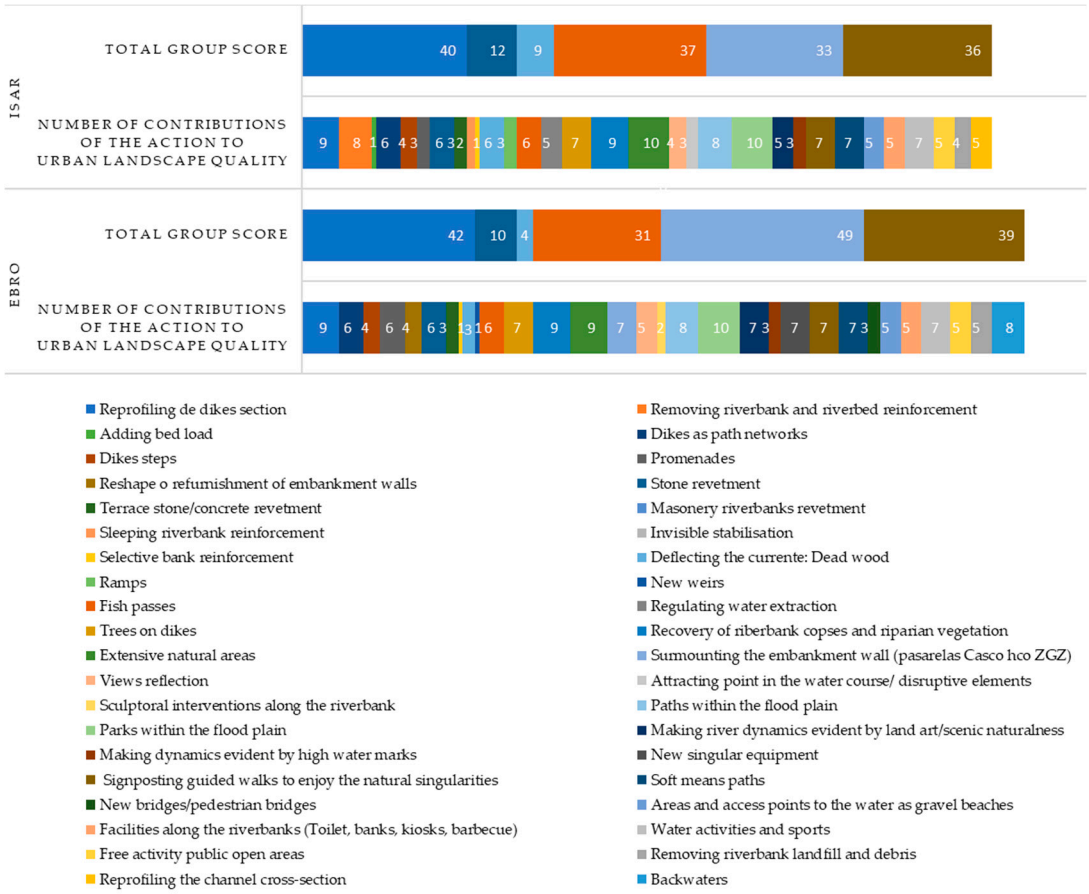


Figure 8. The actions selected and the contribution quality score (number in white) in each case study. Source: the authors.

On the other hand, it has been considered that not all actions provide the same results in each case and for each of the assessed characteristics. For this purpose, we created an evaluation matrix to cross-reference the actions with the quality characteristics. Depending

on the initial state, positive effects have been considered if they imply an improvement in relation to the initial situation, neutral for cases in which the initial degree of quality is maintained, and negative if they imply a previously non-existent effect. In the analysis matrix, the total sum of the positive and negative scores is obtained for each action, according to its contribution to the quality characteristics, and for each characteristic, according to the effects produced by the actions. This assessment is relative and proportional to the previous states. By comparing the two cases, the information highlights the effects and scope of the improvements in the measures adopted in the requalification of these riverbanks. In the following radial plot (Figure 9), the 14 characteristics are represented with the score of both interventions considering the initial and the subsequent situation. Interesting issues arise from the study of this graph. In both projects, the greatest improvements in relation to the initial state were in the dimension of control, both in the limits of cohabitation and sustainability; in access to greater diversity, both for people and the ecosystem; and in an improvement in the sense of an appreciation of nature. The actions that contributed most positively to these characteristics were the redesign of the riparian section, which encompasses upland areas that have a strong linkage to the river, enhancements to the ecosystem, and the provision of greater opportunities. These were followed by improvements in the perception and attractiveness of the place.

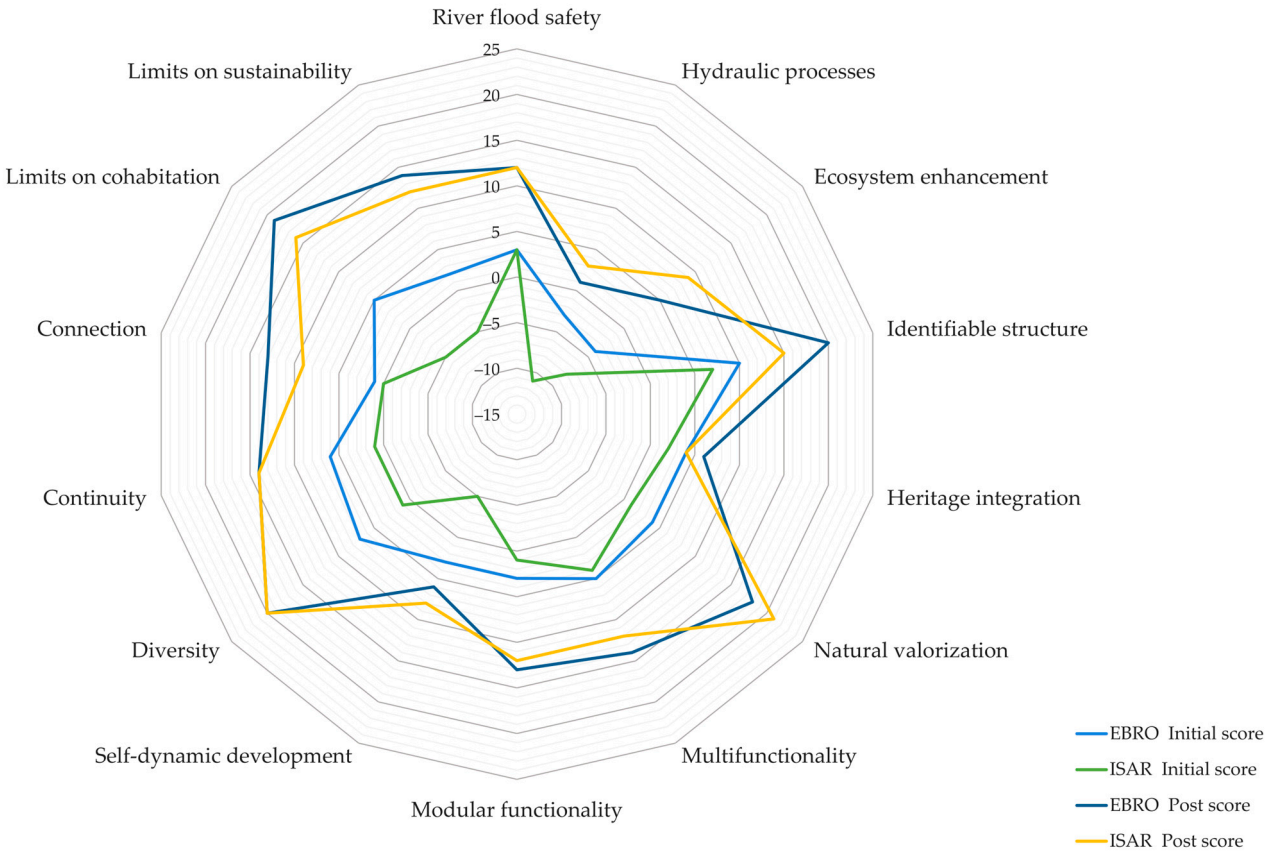


Figure 9. Radial plot. The scope of the dimensional features. The numerical values represent the initial and final quality levels. A comparison before and after the urban river enhancement interventions in Zaragoza and Munich waterfronts. Source: the authors.

In the aspects evaluated within the vitality dimension, both interventions coincide in the same degree of safety against floods. With the measures adopted after the intervention, they also reach the same level of improvement. This can be associated with the equal need to comply with European regulations for flood safety, a condition incorporated in the development of both projects. It should be noted that, despite the improvements, new

flood risk assessment studies have led to a reconsideration of these achievements. In the case of the Ebro in Zaragoza, as indicated above, the requirement set a protection level for a return period of 100 years, a level that current calculations assimilate to a return period of 50 years. This implies constant monitoring and the warning that security against river floods is never complete.

In hydraulic processes and ecosystem improvement, both interventions reach low levels with respect to the rest of the dimensions. It should be noted that, from the perspective of the river, the limitation of the autonomous dynamics imposed by the new riverbank protections, whether visible or hidden, has been considered a negative impact of these actions. On the other hand, they have been measured positively for the safety of the urban space in another field. The groups of actions with negative impacts on the dimensions are shown in the bar graphs summarizing the assessment (Figure 10). In the case study of the Isar River, the difference between the previous value and the score achieved in hydraulics and environmental improvement stands out. This signifies the high degree of initial alteration of the river, unlike the Ebro. Both previous situations have been described above. It should be emphasized that this post-evaluation is limited to the urban sections intervened and does not assess the inherited structures that have been maintained, such as the Isar River lateral channel.

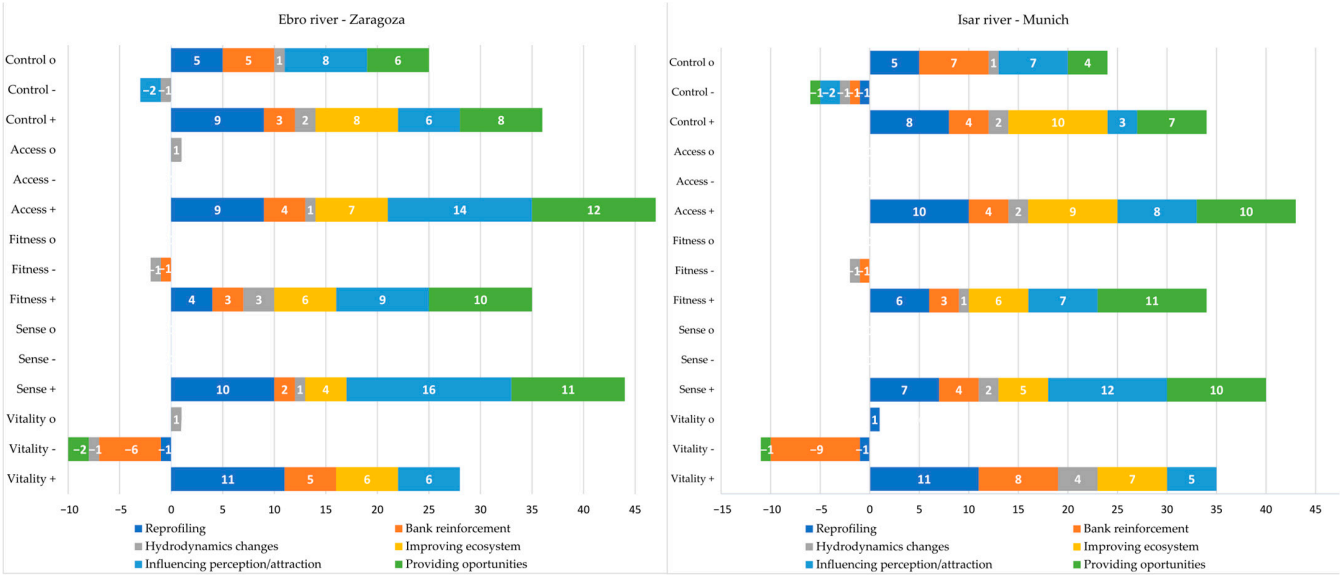


Figure 10. The Ebro River and Isar River. Numbers represent the performance achieved in each characteristic according to positive, negative, and neutral values for each group of actions. Source: the authors.

The actions that contributed the most to the life support dimension—vitality—in both cases were those related to the design of the bank sections, which favored the capacity of the riverbed, and the environmental improvement measures. On the other hand, bank protection treatments must be weighed to maintain a fair balance between the need for protection and avoidance of further negative impacts. Revetments arranged to absorb the energy of the incoming water and prevent bank erosion, such as riprap revetments composed of layers of various-sized rock stones, had a positive evolution in the ecosystem, favoring the development of spontaneous vegetation despite limiting river movements and shoreline erosion.

In the dimension of sense, the good results obtained in both actions in the fields of structural identity and the valuation of nature stand out, in accordance with the recovery of some banks, abandoned and unknown in the case of the Ebro in Zaragoza, which maintain a high level of naturalness, and the recognized renaturalization of the Isar River in Munich for its aesthetic qualities, representation, and homage to the Alpine landscape,

with which the people of Munich have identified themselves [34]. The improvement in the field of heritage integration is small. On the one hand, this study focused on the river–city relationship, giving greater prominence to the actions more closely related to the river and the banks, without considering other types of actions in the more urban context, which may have reduced the number evaluated. On the other hand, we considered actions that stitch the enhancements with the heritage related to the river, such as bridges, historic parapets and promenades, accesses, and views of the urban profiles overlooking the river.

Modularity and multifunctionality reached an outstanding improvement in the fit dimension in both projects. These factors benefit resilience [46]. The actions that contributed positive aspects were mainly those of element groups that influence as attractors and in the provision of opportunities, such as open public spaces capable of satisfying the spontaneous needs of the users, paths, trails, and access to the water at levels that allow various uses in different stages of the current and that were found in both projects. Other actions that favor improved modularity are fish passages in the Isar, the folding weir in the Ebro that allows the passage to be graded according to hydrodynamic needs, and in both, although with a smaller number of actions, but of great scope, the more accessible profiling of the banks. Other common actions that favor multifunctionality are, i.e., the parks and flood plains, open public spaces, the paths that run along them, the services provided along the banks, equipment, and, in the case of the Ebro, the weir that allows the practice of water sports to be maintained in any period.

The wooded areas and riverside vegetation offer greater functionality to the ecosystem in addition to being areas for public use. The improvement in the autonomous development feature is significant in the requalification of the Isar, reflecting the change produced by the elimination of 19th-century canalization and the flow increase in this area. This action restores an autonomous dynamic to the river within the new safety limits integrated into a multifunctional landscape. The Ebro River started with less altered banks, and the natural dynamics were mainly enhanced in the Ranillas meander, recovering backwater spaces with natural filtration. In both projects, the fourth dimension of quality, access, reaches an outstanding improvement in diversity favored, in the case of the Ebro, by the actions of the attraction and new perceptions group and the provision of opportunities one. In the Isar, in addition to this last group, the reprofiling of the riverbank coincides with the elimination of the concrete box. This is the main action that opens new fields of possibilities for both the population and the rest of the ecosystem.

The degree of quality reached by the continuity is similar in both interventions. In the Isar, the greatest increase with respect to the initial state was due to redesigning the banks and improving the ecosystem, i.e., the increase in the flow contributed to the renaturalized section. In both interventions, the recovery of riparian vegetation and the longitudinal paths and trails are noteworthy elements. On the banks of the Ebro, the construction of new bridges and pedestrian walkways improved the city's connectivity. The new accesses to the river, saving the historic parapets, recovering abandoned or misappropriated spaces, and redesigning the banks by eliminating fills restored the lost connection with the river.

The fifth area, control, highlights the limits and extremes to which the social–ecological system is or may be subjected. The actions provided improvements in all the fields evaluated, mainly those related to the redesign of the banks, improvements in the ecosystem, and the provision of greater opportunities. The critical aspects of achieving an adequate balance between the benefits and negative impacts of the actions are outlined. In our study, the degree of maintenance required for certain structures, such as protection, bank stabilization, and hydrodynamic and flow-control structures, was considered critical for sustainability. The forecast of a maintained investment for replacement and good functioning must be considered when choosing the technical solutions in the initial phases, and it implies a clear and sustained agreement. Examples in the cases studied are the continuous maintenance work on the invisible protections or ramp structures on the Isar River banks, the difficulties in reaching a consensus on the maintenance and management of the sheet stabilization weir that was built on the Ebro, or the reinforcement of the breakwater in the central pier

of Zaha Hadid's Pavilion Bridge [47], which the dynamics of the river undermine, just as the strongest floods displace the hidden protections in Munich's banks. The critical points in cohabitation refer mainly to the presence of people in the natural environment, where we considered a neutral affectation in the closest spaces and routes or in the city and a negative impact on the most natural ones. The solutions adopted in both projects promote the free use of these beneficial spaces. However, behavioral problems arise, such as the massive generation of garbage affecting the natural environment and acts of violence against heritage or endowments, which makes the administrations reconsider the imposition of new limits and face costs that are sometimes not foreseen. In short, the control thus evaluated tries to anticipate the conditioning factors for the sustainable development of the complex system.

Finally, the values analyzed in the five quality dimensions are summarized in a radial plot (Figure 11) for each of the riverbank requalification projects in Munich and Zaragoza. With the actions undertaken, the highest quality levels were achieved in access and sense dimensions. These are followed by fit, control, and vitality.

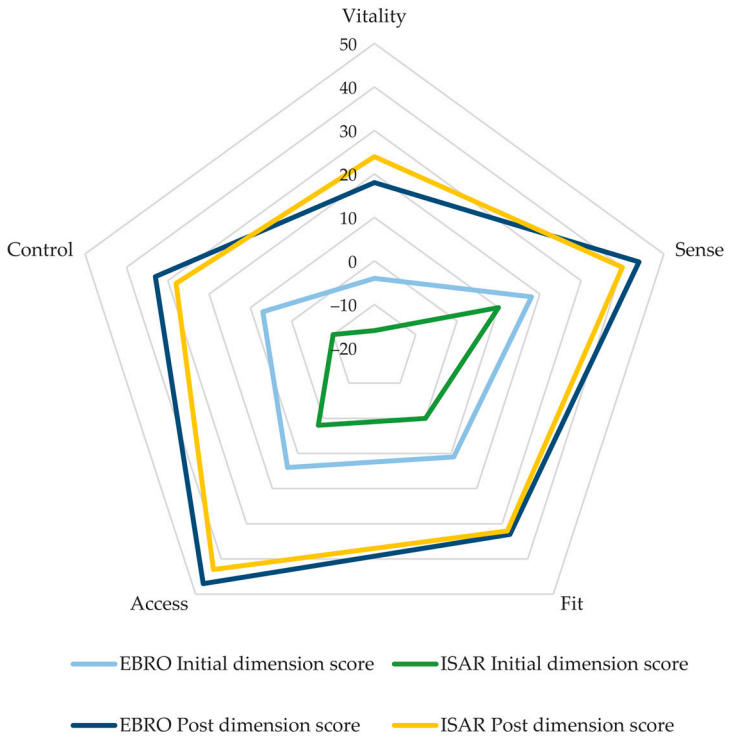


Figure 11. The formal quality dimensions. A comparative analysis. The numerical values represent the initial and final overall quality levels of each riverbank enhancement project. Source: the authors.

The baseline representation gives an idea of the qualitative leap resulting from the interventions. Remarkably, both projects reach similar levels of qualitative quality despite the difference in the initial stages, basins, and river regimes. The Isar, a river with a pluvio–nival regime whose starting point in the urban section of Munich was an artificial machine resulting from the industrial development of the 19th century, has managed to recover, with engineering and landscape actions, improved safety against floods, and less altered flow. This is the image of a pre-Alpine river in accordance with the people's expectations, who participated intensively in defining the ecological and perceptive values. The Ebro, with a larger basin and a more complex hydraulic system upstream of Zaragoza, despite the appropriations and undue occupations of the riverbank, was found to have a good degree of naturalness on the banks but great abandonment and disconnection from the city, as the river is a real barrier between the two banks. The intervention of the riverbank recovery project succeeded in creating a new central linear park that brings the two banks

closer together and extends to the periurban area, where natural spaces connected to the city were recovered and integrated into the metropolitan Water Park. This park recovered a large area to support the dynamics of the river and sustainably works the water cycle with natural processes. In addition, its design reproduces the traces of traditional fields and irrigated land by adopting tools of popular wisdom to provide solutions, i.e., protection against prevailing winds or plant control with grazing.

4. Discussion and Conclusions

The proposed benchmarking tool relates the performance of the actions and management carried out in the urban riverbank requalification interventions to the quality of the good city form. The theoretical review allowed us to integrate the perspective of landscape urbanism in the qualitative parameters, incorporating the joint vision of the river and the city. To gain a better perception of the scope of each of the actions, it was necessary to add the baseline of the initial state prior to the interventions. The evaluation was based on the type of requalification actions whose qualitative results were related to the urban landscape quality characteristics. This disassociates the intervention from its scale or physical dimension, facilitating the comparison between the two selected cases and making it possible to establish parallels even in models that start from different initial contexts. In analyzing the selected cases, the similarity of the levels achieved from different quality indexes is noteworthy. It also makes it possible, independently of the specific project strategies, to detect patterns and trends in the actions employed. In the cases analyzed, of the 40 actions selected, 25 were used in both projects, with the greatest coincidence in the provision of opportunities and environmental improvements, followed by shore reinforcements. The matrix, on the other hand, facilitates the reading of which types of actions provide the greatest returns for each qualitative characteristic or which should be weighed for their negative impacts on any of the dimensions to achieve a sustainable balance.

The proposed evaluation tool has limitations and ample room for improvement. A consensus is required when selecting the actions of urban riverbank requalification interventions and the sign of the contribution to each feature, even based on academic and scientific references. Likewise, the characteristics defined as quality indicators were sought sufficiently broadly following Lynch's methodological proposal [37], but in some cases, they may hinder the evaluation if a common language is not established beforehand. We consider it necessary to continue investigating the adequacy of the method by introducing new cases that may be relevant when recognizing patterns in the actions or expanding and correcting the contributions to urban landscape quality on riverfronts. Interesting questions may arise when comparing performance in urban riverbank interventions where the city has not provided a minimum free space to make its relationship with the river more flexible and improve its natural qualities. Likewise, the valuation system could be revised without affecting the integrating vision nor losing the generality and simplicity that allows it to establish parallels between cases. Another interesting line of analysis that could be included is the conditioning factors resulting from the participatory processes prior to the formulation of the projects. This could yield data on the expectations of the inhabitants and agents in different European cities, their relationship with the initial situation of the river, and the formal results of the interventions.

Given the results (Figure 10), there is no dominant group of actions with a contribution of more than 50% to any quality characteristics, which may indicate the multidisciplinary project approaches and the versatility of the measures adopted. These actions are included in those that, since the turn of the century, have been tackled with smaller, different, creative, and innovative regeneration strategies and have opted for substantial environmental, cultural, and socioeconomic improvements, guaranteeing inclusive approaches and long-term goals [8]. The similarity of the degree of improvement and the use of similar strategies may confirm the homogenizing trend suggested by some research [9], although in the cases analyzed, either because of different design teams, the particular expectations of the inhabitants of the area, or the initial differences, the projects turned out to be unique.

In this study, some negative aspects were detected in all groups of actions except for environmental improvements. This confirms that any intervention alters the system, and undesired effects must be anticipated. Their repercussions must be assessed against the benefits, and flexible mechanisms must be established to deal with unforeseen events to maintain sustainability through the processes over time. The monitoring of actions makes it possible to evaluate urban river requalification projects and interventions as evolutionary processes and not as final scenarios to help adopt balanced improvement measures.

Analyzing the cases carried out with this tool allows us to draw some necessarily indicative conclusions since there are no recipes for projects as unique as those dealing with rivers flowing through cities. However, it is possible to outline some general principles, some of which must be respected.

As a starting point, cities should allow river floods from the upper catchment to pass through. Extreme water events such as floods and droughts, increasing in their frequency and intensity under climate change, introduce a growing uncertainty that must be considered a precautionary principle. It is necessary to protect population centers against floods with a return period of 100 years. In response to the performance dimensions of formal quality from the perspective of landscape urbanism, we propose an integrated vision of natural and cultural aspects, as opposed to some conservationist tendencies. Decision making must balance favoring natural processes and limiting threats to heritage and historical easements. Such are the cases analyzed in the Isar and the Ebro, whose interventions have been conducted where the city had room. The city widened the sections of the riverbed —the floor of the river including each riverbank— and made possible the natural dynamics of the river within limits compatible with the city. The success of interventions in urban river space lies in integrating natural forces and defense infrastructures. In the two cases analyzed, the design strategies and formal solutions include spaces allowing natural dynamics. In the areas where protections and defenses are necessary, they include techniques that, although initially invasive, later favor natural developments, achieving an environmental improvement. These decisions have had a great weight in the qualitative improvement of the dimension of vitality, referring to the security and support of life in the social–ecological system of the city and river binomial.

Rivers support territorial green infrastructures and are particularly significant when they flow through cities. The green and blue meshes of watercourses and riverbanks can be used as structuring and necessarily continuous elements to provide the city with a good connection with the rural and natural territory (Figure 12). River corridors are very productive from a natural point of view.

(**a**) (**b**)

Figure 12. Design strategies: diverse banks reinforcement, self-dynamic gravel beaches, and longitudinal paths. (**a**) Isar, southern view from the Brudermühl bridge; (**b**) Ranillas meander, Zaragoza. Source: the authors, 2021 and 2018.

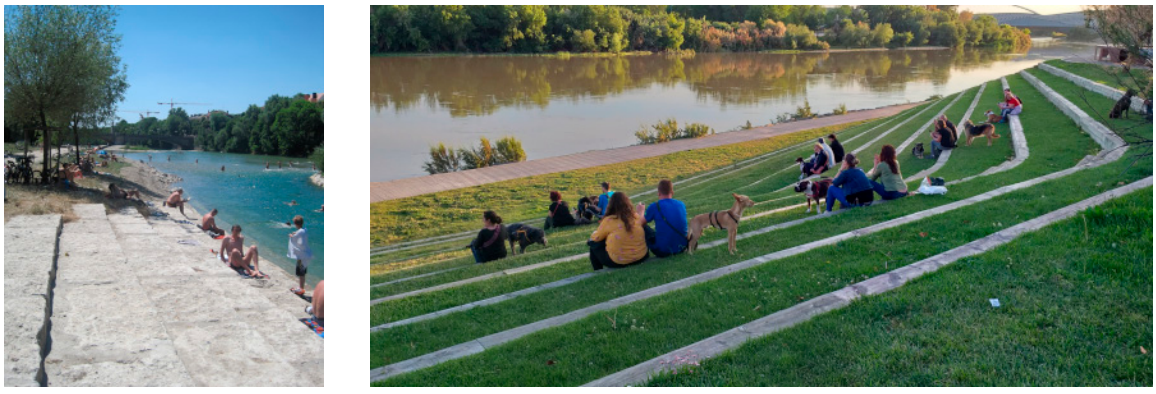
Complex projects for the restoration of river areas in urban environments must consider the whole basin and must have a territorial scope. The polyvalence in the design and exploitation of interventions will impact the best management of the resources available for their maintenance.

The adaptation that favors the natural evolution of the system in an already altered area requires constant management to maintain a sustainable, functional balance, as indicated by the negative values in some of the qualitative fields of the study. These also reflect the nature of the river itself, which implies assuming the foresight of continuous maintenance of the infrastructures imposed, such as bank and structure protection or gravel contributions, which are burdens that the city must assume.

This study highlights the positive contribution of the actions carried out in improving the sense of meaning and identity through the recovery of integrated natural environments, renewing the meaning of the city itself, and expanding its physical and intangible heritage with the recognition of nature as an inseparable part (Figures 13 and 14).

(**a**) (**b**)

Figure 13. Improving the ecological continuity of the existing river and riverbank threshold with the treatment of the banks and the continuity of green spaces along the city: (**a**) Isar River between Cornelius and Reichenbach bridges, Munich; (**b**) the Ebro riverfront in the "Las Fuentes" neighborhood, Zaragoza. Source: the authors, 2013 and 2014.



(**a**) (**b**)

Figure 14. (**a**) Stone steps on the Isar; (**b**) grass bleachers next to the Expo site in Zaragoza. Source: the authors, 2013 and 2022.

The riverbank contour design and the multifunctional integration of the defense and communication infrastructures in a linear park were fundamental tools contributing to improving transverse and longitudinal physical accessibility in the two projects. In addition, these contained solutions provide a diversity of modes for this approach and encourage

many spontaneous activities among the citizens. The whole provides new experiences and perceptions that increase appreciation. The continuity of the reclaimed green spaces and the riverbed contributes to greater habitat connectivity and favors its diversity. Regarding the limits to which these socio-ecological systems may be subjected, interventions in urban river spaces run the risk of dying of success, and an excessive influx of the public and its effects (trampling, noise, overcrowding, etc.) may generate a negative impact. The co-responsibility of citizens through knowledge is essential to promote the proper use and care of these sensitive spaces without having to impose measures of prohibition or limits to access, issues that arise both in the Isar and in the Ebro in certain popular points of the banks.

By regenerating the vital conditions of the river and the ecosystem it nurtures, new public spaces of urban centrality based on nature have been achieved. The proposed tool allows for the assessment of the urban-landscape qualities of waterfronts, thereby reflecting the inherent tensions and repercussions of the plot composed of actions and quality dimensions. It enables the visualization of alterations produced via interventions in each qualitative field, facilitating the adoption of decisions and measures. The scope of this comparative analysis supports the relevance of the successful strategy and execution conducted in each of the cases of urban riverbank regeneration evaluated, the Ebro River in Zaragoza and the Isar River in Munich. Furthermore, a meaningful index of the quality and success of the projects is reflected in the degree of appropriation and enjoyment of the newly regenerated spaces by the population. The creation of functions adapted to the environment must be accompanied by environmental education activities and careful regulation of the use and enjoyment of river spaces.

Supplementary Materials: The following supporting information can be downloaded at: https://www.mdpi.com/article/10.3390/urbansci8040152/s1, Table S1: Case study evaluation matrix based on the actions carried out and their contribution to the selected urban landscape quality characteristics.

Author Contributions: Conceptualization, M.P.S.P. and F.P.; methodology, M.P.S.P.; validation, M.P.S.P. and F.P.; formal analysis, M.P.S.P. and F.P.; investigation, M.P.S.P. and F.P.; resources, M.P.S.P. and F.P.; data curation, M.P.S.P.; writing—original draft preparation, M.P.S.P. and F.P.; writing—review and editing, M.P.S.P. and F.P.; visualization, M.P.S.P.; supervision, M.P.S.P. and F.P.; project administration, M.P.S.P. All authors have read and agreed to the published version of the manuscript.

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