RESEARCH ON THE SUITABILITY OF URBAN BLUE LINE DELINEATION UNDER THE TERRITORIAL SPACE PLANNING SYSTEM

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1.Introduction

Urban river and lake systems are an important factor in maintaining the balance of urban habitats, and are of great significance to the improvement of urban habitat, urban economic development and urban construction. However, with the accelerated urbanisation process, the excessive pursuit of land development dividends and the long -term inappropriate urban development model have led to the over-expansion of construction land and the destruction of the water system environment and ecology, resulting in the phenomenon of "city into water" in many cities today.

The urban blue line (hereafter referred to as the blue line), as the core control line for planning the protection of urban water bodies in the Chinese context, contains the territorial boundaries for the protection and control of urban surface water bodies such as rivers, lakes, lakes, reservoirs, canals, and wetlands. Today, blue line planning is still generally oriented towards water management by water conservancy projects, and its content is mostly developed to focus on the engineering and functional characteristics of water as a resource and safety risk (Wu Yan et al., 2020), to address water facilities to manage water system pollution and water system flooding and drainage, and to enhance water system safety and water sensitive area conservation through cross -sectional design and plan zoning (Song Wanzhen et al., 2019). In recent years, the academic community has conducted some in -depth research and practical exploration on urban blue line research, mainly focusing on the objectives of blue line planning, design concepts, planning elements, alignment delineation, as well as the exploration of the main body of blue line preparation and management and reflections on river use and management, and has gained some control experience in the practice of cities such as Shenzhen, Guangzhou, Shanghai and Beijing (Yang Peifeng and Li Jingbo, 2014;Yu Lu and Ding Nian, 2010; Chen Yewei, 2018), but the existing studies are insufficient for the delineation of the specific blue line and the blue line management system, and the delineation of the existing blue line still presents the realistic problem that the delineation differs from city to city, from department to department, and from normative ordinance to normative ordinance, which needs to be solved urgently. This paper responds to the existing problems to a certain extent by constructing a blue line delineation system of "three zones and two lines" and clarifying the management authority and responsibility system of water -related departments in the context of territorial spatial planning, in order to effectively solve the problems related to the delineation and implementation management of the blue line.

In China, there is a multiplicity of water -related laws and water -related authorities, which has led to the problem of overlapping authorities and intertwined water -related regulations. Most water -related authorities draw various blue lines based on their own interests. Throughout the national governance system,“Flood Control Law of the People's Republic of China”“Water Law of the People's Republic of China”and“Urban and Rural Planning Law of the People's Republic of China”are the fundamental laws that guide the delineation and management of the urban blue line. Under this, “Regulations of the People's Republic of China on River Management” issued by the State Council delineate the scope of river and lake management from the perspective of state administration and constrain the management of urban water

systems. Furthermore, the “Guidelines for the Preparation of River” and “Lake Shoreline Protection and Utilisation Planning”, the “Specifications for the Preparation of River Basin Planning”“Specifications for Urban Water System Planning” and “Technical Rules for the Management of National River (Lake) Shoreline Utilisation promulgated” by the Ministry of Water Resources and the Ministry of Housing and Construction propose in more detail the delineation of the relevant water system control line with flood prevention and drainage as the core principle. In contrast, the "Urban Blue Line Management Measures", a guiding document that points to the core of the Blue Line, has a vague textual semantics that allows localities to exercise discretion in the preparation of Blue Line plans, determining the line types and names of various urban water system control lines. This has led to inconsistencies in the interpretation of water -related norms and terms between the planning and water conservancy departments, and major differences between the two systems in terms of how water bodies are delineated and defined. Reflecting this in the territorial space, the delineation of the local planning blue line often varies between the urban water control line and the urban waterfront green area (urban green line), resulting in different names, types of control lines, and departments responsible for control line management in the local urban blue line preparation system .

2 From a "multiple" to a "unified" regulatory system

The formulation of blue line planning is an effective means of managing urban water systems, but the actual preparation of blue line planning is not yet regulated and guided by special rules for the preparation and implementation of planning (Qiu Qiang, 2009), and the implementation process suffers from a single element of blue line control, lack of systematic integration with planning, and overly broad delineation. There is an urgent need to establish unified norms and standards for the delineation of the blue line, to coordinate the affairs of water -related departments,to implement the integration of multiple regulations in the territorial spatial planning system, and to ensure the blue line coverage and effective control of water systems within the city.

2.1 Multi-objective integrated planning as a guide

As a multi -objective comprehensive plan, the river blueline plan needs to integrate the three major aspects of natural ecological conservation, socio -economic development and cultural landscape enhancement. The planning strategy for water management in the Dutch Delta aims to "create space for rivers and lakes", and the scope of river and lake management extends from the traditional physical boundaries to the ecological corridors around rivers and lakes, industry and culture, and the upstream and downstream boundaries of rivers. "originality" and tapping into the economic and cultural elements of the river and lake system to bring positive benefits to the city, and proposes Perception value, Use value and Potential value, emphasising that river functions and coastal land use need to adapt to the needs of time and function (Cao Zhejing, 2018).

From the perspective of comprehensive integration of urban-water relations, the delineation of the Blue Line also needs to be combined with the planning and design of waterfront space, and the use of shorelines within the control line should move from traditional rigid management to a combination of rigid and flexible multi -governance, actively interacting with the use of shoreline space. In the case of flood control and shipping safety, the shoreline should be made more hydrophilic, and local "straightening" or "straightening" should be carried out as appropriate, so as to create a diversified shoreline and achieve a better relationship between the city and the water.

2.2 Clarifying "Horizontal and Vertical" management responsibilities

In the context of the sectoral reforms introduced at the 18th National Congress, the newly established natural resources department has incorporated water resources management and registration functions as its basic functions, and is responsible for co - ordinating the planning of surface water and groundwater resources in rivers, lakes and seas, but in practice the main authority for river management remains with the water resources department, and the natural resources department has not yet been able to incorporate The natural resources department has not yet been able to fully integrate urban blue line management into its functions. The fact that there is no unified body to guide the implementation of the Blue Line is also a reason why the Blue Line planning needs to focus more on strengthening the collaboration mechanism between departments.

River and lake management and protection is a complex system project involving upstream and downstream, left and right banks, different administrative regions and industries, so the State Council issued the Opinions on the Comprehensive Implementation of the River Chief System, which specifies the river chief system as the core and promotes a coordinated management system among water resources, housing and construction, and natural resources. Although this vertical management system for water -related matters has been relatively well developed, there is still a mismatch and lack of clarity in the 'central -local' authority and expenditure responsibilities (Research Group on Improving Water Governance System,2015). Therefore, it is still important to clarify that the lower-level natural resources and water resources departments are the responsible units for the joint delineation and management of the Blue Line within the framework of the river chief responsibility system, and to submit the results of the Blue Line compilation to the higher-level river chief office in a timely manner for reporting.

The division of powers and responsibilities between departments should follow the principle of integration of implementation and delineation, management and approval (Bao Cunkuan, 2018). In addition to the top -down hierarchical transmission from the Ministry of Natural Resources, a unified delineation approach and outcome requirements, the new round of territorial spatial planning still requires collaboration with functional departments at the same level, such as water conservancy, urban construction and transportation, as well as experts, scholars and the public, to form a synergy of social governance.

3 Blue Line integration under the territorial spatial planning system

As a guideline for planning in the new era, "ecological civilization construction" runs through the whole process of territorial spatial planning, and the effective promotion of urban development needs to achieve a win-win situation for both the environment and the urban economy (Niu Shuai and Sun Yanqi, 2019). The selection of control lines for territorial spatial planning, while emphasising uniformity, should also control the flexibility of the control rules and the rigidity of the control content, and the management of the traditional urban blue line needs to be inherited and continued (Zhang Xiaodong et al., 2020); for the preparation of water- related special planning content, the mandatory conditions of the overall territorial spatial planning need to be strictly followed, and the water -related planning specialties should be incorporated into the For the preparation of water -related special plans, it is necessary to strictly follow the mandatory conditions of the overall territorial spatial plan and incorporate water -related special plans into the detailed planning (Pan Haixia and Zhao Min, 2019).

3.1 Construction of a Blue Line system controlled by “Three lines and Two zones”

In addition to the planimetric elements of urban surface water control, there are also vertical elements such as river bottom elevation and river section form, which need to be clarified in the special water system planning as a complementary part of the improved blue line delineation (Song Xuan and Zhao Yihan, 2018). Here, we discuss the co - ordination between the planning and water conservancy departments in terms of planimetric control, integrate the

existing control line types, optimise and unify the urban blueline delineation, and compose the urban blueline planning system by delineating "three lines and two zones" (Figure 1 - Figure 2).

River (lake) water control line is the original water conservancy department provisions of the outer edge of the control line and the upper mouth of the river, that is, divided into the river (lake) in the embankment belongs to the outer edge of the river embankment backwater boundary, in the river (lake) without embankment design flood level line or the highest historical flood level line to determine the water control line. The role of this line is to clarify the scope of control of water conservancy departments and waterfront demarcation, is the baseline of river (lake) protection, is a rigid control line. The river (lake) shoreline control line is a control line type that is incorporated into the management of the planning department with the objective of building an ecological buffer zone, and is also the control line that determines the largest water corridor in the delineation of the blue line, generally with the waterfront first municipal road waterfront side as the boundary. The waterfront grey -green infrastructure line and the green line are among the control lines whose lines are considered for setting the width, based on different levels of rivers (lakes) for delineation, and are flexible control lines.

The river (lake) centreline is a line to meet the needs of river navigation, similar to the road centreline, and the water control line and shoreline control line are established as the central axis of symmetry. It includes the main stream and the centreline of the river, and serves to clarify the course and location of the river, and is convenient as a basis for the construction of new rivers, widening, dredging and other water conservancy projects, and can be used as an administrative boundary for some provinces and cities (counties) along the river, and is a rigid control line.

The area between the river (lake) shoreline control line and the river (lake) water control line is part of the waterfront ecological shoreline area, where access to municipal roads and waterfront development should be strictly controlled, but reasonably limited landscaping and facilities can be built. By introducing positive shoreline planning concepts such as sponge cities or floodable landscapes, positive interactions between people and water bodies are created to enrich the urban waterfront and shape vibrant public open spaces.

Those between the water control line of the river on both sides belong to the water body protection zone (the lake is the area within the water control line), which is managed by the water resources department, and the necessary water facilities can be built within the zone, subject to the approval of the water resources department.

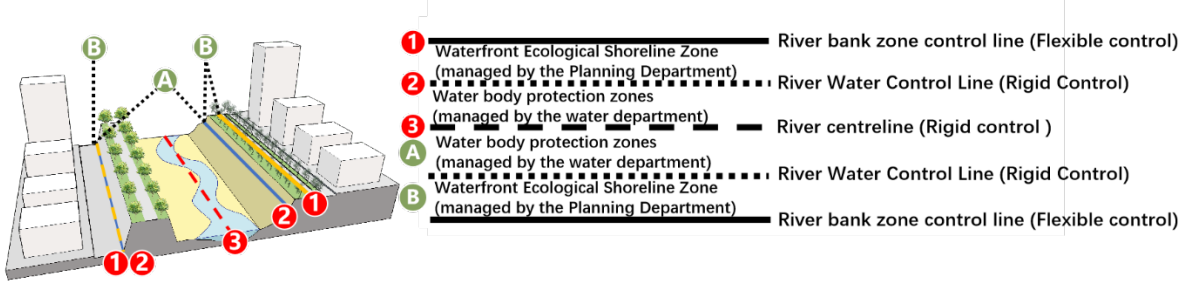

Figure 1: Schematic representation of the "Three lines and Two zones" of the river

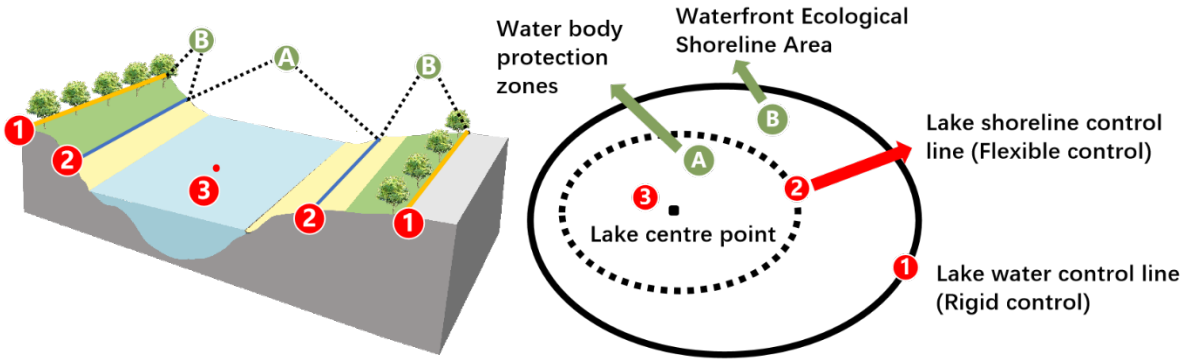

Figure 2: Illustration of the "three lines and two zones" of the lake

3.2 "Line rights" to achieve waterfront synergy under spatial use

Prioritisation of space use: The key to the rational use of water-related space is the prioritisation of water system use rights. Using Maslow's theory of needs as a reference, the use of water space must be prioritised to meet the basic functional needs of water bodies, supplemented by the higher needs of human activities. In general, the right of use should be prioritised to ensure the effective operation of the water space based on flood control and drainage, water resource protection and water source maintenance; secondly, the ecological space consisting of bermed land and ecological shoreline along the water body should have the emergency function of resilience prevention and mitigation in addition to the function of nourishing water and soil, and can be used as a flood storage area in the face of water disasters; furthermore, the construction of waterfront space on a near-human scale and the activation of Industrial space is an important support to promote the economic development of waterfront areas, and is also the most advanced spatial demand in the right to use water system space, which needs to be implemented on the basis of meeting the former spatial demand (Figure 3).

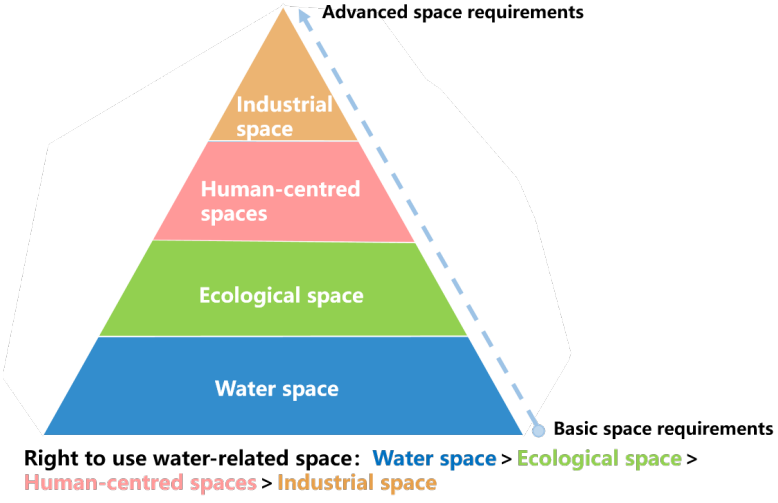

Figure 3: Priority relationships for water -related space use rights

3.3 Rigid and elastic combination to coordinate the "Three zones and Three lines"

The "Three zones and Three lines" of national land space include urban, agricultural and ecological space, as well as the red line for ecological protection, the red line for the protection of permanent basic agricultural land and the boundary

line for urban development. When the blue line conflicts with other spatial elements, a combination of rigid and flexible control and management methods is required. The ecological space contains various types of water systems such as urban wetlands, rivers and lakes, and the results of the Blue Line delineation can present the spatial pattern of urban water systems and provide spatial pre-control for the overall evaluation of ecological functions in the "double evaluation", and serve as a basis for determining ecological corridors.

Urban green line coordination: the shoreline between the land area along the river and the water control line can be greened or created as a park, and the area of waterfront green space can be counted as part of the urban green space rate. There are two types of control accounting for the urban water surface rate: firstly, the area of protected water bodies within the water control line of rivers and lakes in the urban construction zone is calculated; secondly, the water systems connected to external water in non-water sites such as the current parks (G), educational sites (C) and residential sites (R), but without flood control and storage, can be counted as part of the urban water surface rate without changing their original nature, and the implementation of Flexible control.

Urban yellow line coordination: water source protection zones, raw water pipes and drains, water conservancy projects and water abstraction, drainage, flood control and storage and other related waterfront municipal facilities should be allocated to the urban blue line for management; the urban blue line and the yellow line may overlap, with the overlapping parts implementing both requirements.

Road red line coordination: where there is a waterfront road along the water body, the blue line should be articulated with the road red line, and the waterfront road is recommended to adopt the road embankment in one, and the blue line should include the road. Strictly control the road land into the river and lake protection area, river (lake) embankment with construction conditions need to be reviewed by the water conservancy department before intervention and construction, but shall not occupy the area of the water body protection zone. For the bridge and tunnel across the river (lake) also need strict approval link, optimize the design scheme as much as possible to reduce the damage to the water body.

Urban purple line coordination: for the already established historical and cultural districts, if new river networks or diversions and widening are needed in their vicinity in the preparation of the blue line, the existing construction should be respected and reasonably avoided, and for the original historical and historical districts built on the river, the heritage protection line can be overlapped with the blue line (Si Ma Wenhui and Gong Daoxiao, 2015), and the overlapping part should be implemented simultaneously with both The overlapping part should be subject to both planning control measures.

Coordination between the ecological red line and the basic farmland protection line: When the Blue Line area is a water source protection zone or a soil and water conservation zone, the watershed control line should overlap with the ecological red line to implement rigid bottom -line control. When the Blue Line conflicts with the basic farmland protection line, the basic farmland protection line should be reasonably revised to meet the balance of occupation and replenishment of basic farmland, while maintaining the Blue Line unchanged.

4 Conclusion

The Blue Line is essentially a means and mode of spatial intervention. In the context of the construction of a new system of territorial spatial planning, traditional planning must also move from relatively flat construction control to comprehensive scientific spatial governance. The newly established natural resources department is responsible for the integration of spatial resources in the national territory, and from the perspective of ensuring water resources and water security for urban development, as well as maintaining the sustainable development and use of national resources, water systems and water bodies should be integrated into a more scientific and rational, as well as more active and

comprehensive planning and management. In the face of the growing urban water conflict, it is important not only to fill in the many problems of the past blue line delineation, but also to place water conservation ahead of planning and design in new areas, and to focus on the restoration of small watersheds in urban regeneration. A detailed environmental resource assessment should be conducted at the planning and design stage, and then a comprehensive blue-green space plan should be proposed (HeYing, 2019;Li Chen, 2012).Through pre-assessment tools such as ecological and environmental assessment of water systems, census of urban river and lake systems, identification of water body values, combing of urban river network structures, and public demand research, water bodies with economic, social and cultural values (not limited to those affecting flood control and drainage) are identified in advance, and the functions of water -related departments are co-ordinated through the River Governor's Office, and relevant departments such as natural resources and planning, water conservancy and water affairs carry out pre This will greatly reduce the cost of implementing the Blue Line and is more in line with the principle of ecological protection as a priority in territorial spatial planning. Through the establishment of a good blue line control system, coupling urban water relations and promoting the optimisation and enhancement of water - related spatial quality to meet the needs of high -quality and sustainable urban development.

References

Bao Cunkuan. (2018). Spatial planning system in the perspective of ecological civilization. Urban and Rural Planning (5), 8.

Cao Zhejing. (2018).Exploring the shift in thinking and management system of water governance in Dutch spatial planning. International Urban Planning, 33(6), 12.

Chen Ye Wei. (2018). Thoughts and Practices on Urban Blue Line Planning Methodology - An Example of Special Planning for River Blue Line in Central City of Shanghai. Shanghai Urban Planning (3), 5.

He Ying. Implications of Singapore's river development experience for river planning and management. 2019 Annual China Urban Planning Conference.

Li Chen. (2012). Exploring green space system planning with "green infrastructure". Green Technology (3), 4.

Niu Shuai, Sun Yanqi. Exploring the Development of Territorial Spatial Planning System in the New Era. 2019 (14th) Urban Development and Planning Conference.

Pan, Haixia, & Zhao, Min. (2019). The history, basic connotation and main features of the spatial planning system of national land. Urban and rural planning (5), 7.

Qiu Qiang. (2009). Exploring the characteristics of special urban and rural planning. Modern Urban Studies (5), 4.

Sima, W. H., Gong, D. H.. (2015). Coordination analysis of urban blueline planning. Water Supply and Drainage, 41(7), 5.

Song Wanzhen, Wei Baoyi,Yang Shuyuan, Wang Jun. Reflections on urban river management:the example of Dayangfang ditch management scheme.2019 China Urban Planning Annual Conference.

Song Xuan,Zhao Yihan. (2018). Methods and technical requirements for the preparation of urban blue line planning. Water Resources Planning and Design (1), 4.

Study Group on Improving Water Governance Institutions. (2015). Current problems and suggestions for countermeasures on the division of water -related affairs between central and local authorities. Water Resources Development Research (8), 4.

Wu Yan, He Xusheng, Yang Ling (2020). Conceptualization of special planning of blue -green space system at city and county level in the context of territorial spatial planning system. Landscape Architecture,27(1),5.

Yang Peifeng, Li Jingbo.(2014).Innovation of rive blueline planning unde ecological orientation: An example of blueline planning for the Liu Xi River (Conghua section) in Guangzhou. Planner, 30(7),7.

Yu, Lu, Ding, Nian. (2010). An overview of urban blue line planning methods: An example of the Shenzhen Blue Line Plan. Journal of Urban Planning (S1), 5.

Zhang S. D., Han H. Y., Zhang Y. L., Cai X. Y.,Zhu S.. (2020). Construction of Important Control Line System for Territorial Spatial Planning. Urban Development Research (2), 8.