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Wetland Governance: Contested Aspirations and Reflexive Roles of Local Professionals Toward Worlding Cities in Tai Lake Basin

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This paper examines the contested agendas generated by Tai Lake Basin's (TLB) recent wetland constructions and how these dynamics have stimulated the particular aspirations concerning nature among various local actors. Through interviews with local ecologists, landscape architects, and environmental engineers, this paper details how they convergently subscribe to the ethical claims of humans and nature during the decision making in constructing wetlands. I termed these dynamic considerations as 'Ecological Governmentality.' Under the influence of environmental conservation as a global consensus, the idea of 'wetland' has regained prevalence among Chinese cities' plans and policies in recent decades. In the TLB, one of the most developed regions in China's southeast coastal areas, over 800 'wetland parks' have been established. Situated in the basin context, this paper further problematizes three modalities of wetland construction in the case of Suzhou city, namely: National Certificated Wetland Parks propelled by international environmental conservation agendas, Urban Wetland Landscape Parks associated with urban redevelopment, and Engineering Constructed Wetlands generated by the opening niche market for municipal waterworks. The construction of these parks has made prominent attempts to rewild urban environment through re-territorialization, design, and technology innovations intersected with moral claims that go beyond pure scientific concerns of ecology. Building on the concept of 'worlding practices' and 'governmentality,' three cases in this paper illustrate how the mainstreaming of wetlands in Suzhou has been materialized along with the shared notion of city branding from global neoliberal urbanization. More specifically, this paper explores the diverse materialization through the lens of contested ethical aspirations and transferred roles taken by different actors in the local wetland governance. The emerging 'Ecological Governmentality' in wetland construction helps to consolidate the unique ecological imaginary in China and diversify the Chinese cities' globalization in the making.

Keywords: ecological governmentality, wetland conservation, environmental governance, ecological imaginary, globalization, landscape design, moral ecology, Suzhou

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INTRODUCTION

Recent decades have witnessed rapid urbanization on a global scale. The side effects of the increasing number of unregulated development have threatened the environment and ecological capacity. Since the first image of the earth[1] was taken in 1972, the anxiety of environmental conservation has become a global discourse that totalizes human behaviors in the living environment, as we are now in 'a Community of Human Destiny' (Franklin et al., 2000). China, as a fast-developing country, on the one hand, is responding to the fragmented human-nature relationship through a series of reformative environmental practices such as eco-cities, green buildings, and wetlands conservation in developed coastal cites (Li et al., 2014; Sze, 2015; De Jong et al., 2018). On the other hand, these practices are also linked with the competition to build 'world cities,' in which a good environment becomes a city asset able to attract outside investments (Goldman, 2011). While many scholars have focused on the techno-scientific aspects of these practices and the injustices in middle-class environmental ideology (Yeh, 2009; Pow, 2018), few studies have scrutinized the contingent role of local actors in delivering these central projects to local contexts, especially for the recently proliferated wetlands in Chinese cities. Wetlands are critical resources of coastal cities that suffer from climate change and urban development. Its adaptation demands locally based governance which not only relies on science rationales but also human dynamics. Therefore, this paper focuses on the conservation and construction of wetlands in the Tai Lake Basin (TLB) after the proposals made for ecological civilization[2] in China in 2007. The individual aspirations and reflexive roles of local experts in building new wetlands will be reviewed. Wetlands as a shared milieu that is undergoing constant ecological imaginaries and is currently mobilizing different local actors in China.

Asia's Worlding City Practices

The growing value of environmental resources, along with urbanization, is significantly influenced by the developing discourse on globalization. The early hypothesis of globalization developed by Friedmann and Wolff (1982) highlights the notion that global cities are local territories, set up for political and historical reasons to accumulate global capital. When extending attention from social-political influences to environmental consequences, Checker (2011) worries that recent globalization with neoliberal capital will inevitably lead to 'environmental gentrification' where the monotonous urban landscape is generated from top-down forces in order to fit middle-class environmentalism. However, Olds and Yeung (2004) are skeptical about the typical dichotomy between global and local. While market rationalities have gradually played an essential role in current environmental projects, they are not necessarily materialized in the same way as they have been by superior powers. Instead, as Roy and Ong (2011) have described in their book *Worlding cities: Asian experiments and the art of being global*, Asian cities tend to have their own norms toward being global rather than merely copying forms from early western models.

Moreover, the key to that term 'Worlding Practices,' resonating with the discussion of globalization in Chinese cities by Wu (2006), lies in the local contingency brought by specific history and cultures of both the collective and individuals. More specifically, different local actors aim to separate from established urban protocols by reinventing worlding–conjuring projects in their own assembled ways, which sheds light on the neglected aspects of globalization (Ong, 2011). Therefore, building on the idea of contextualized globalization, this paper uncovers the potential of wetland construction in TLB as a 'Worlding Practice' through which local actors such as ecologists, landscape designers, and environmental engineers are contested to reshape the local environment and contribute to the Chinese cities' globalities in the making.

Ecological Governmentality in Modern Wetlands Construction in China

Ecology is the topical concept in the current practice of wetland conservation and construction. The definition of ecology can be traced back to its Greek etymology[3]: the study of the place in which we dwell by German scientist Ernst Haeckel (Bowker, 2005). Ecological thoughts, thus, cannot be separated from the broad discussion of human social interaction, which is reflected in ethics and politics. However, modern ecology became a much more rigorous science in the late 19th century, which focuses on the evolutionism of organisms, biophysical environment, and their interaction together as ecosystems (Worster, 1994). The discussion of ecology is closely related to urbanization, such as the popularization of ecological restoration after the 1980s. Various projects, especially wetland conservation and management, have been set up with the aim of recovering the degraded ecosystem brought by human activities (van Der Heijden, 2005). The United States has developed an advanced wetland banking mechanism[4] to compensate for the wetland lost off-site due to commercial development (Robertson, 2004). In the Netherlands, the restoration of the wetland ecosystem has been legalized with the crucial river basin management through water framework directive (WFD; Coops and van Geest, 2007). Nevertheless, ecology is still an ambiguous term which is understood differently in each wetland project. The approaches to replication, rehabilitation, or regeneration depend on the aim set up by practitioners, which not only from ecological factors but also economic, social, cultural, political, and moral factors (Higgs, 2003).

[1]The Blue Marble is the first complete Photograph of Earth taken by the crew of the Apollo 17 spacecraft on its way to the Moon.

[2]Ecological Civilization was first proposed in 2007 and has becomes the predominant environmental discourse in China, especially after 18th National Congress of the Communist Party of China in 2012. For more information, please see Zhang et al. (2007).

[3]Ecology = 'oikos' + 'logy.' Oikos refer to house or dwelling places while logos refer to the truth.

[4]Wetland banking belongs to the mitigation banking, which is a market system of credits and debits devised to balance the ecological loss in a broad perspective.

The ambiguous definition and unpredictability of ecology create challenges to wetland governance. The existing governance of wetlands, as well as many other sustainable projects in China, has been decentralized mainly to the municipal level with multiple actors involved since opening reforms in the late 1980s. The highest level of administration of wetlands comes under the State Forestry Administration, which is responsible for the national wetland resources. This body sets up and audits three spatial levels of wetland conservation in China, namely: natural wetland reserves of China[5], certified wetland parks[6], and wetland protection districts[7] (State Forestry Administration, 2013). However, the implementation of conservation and the construction of wetlands are all decentralized into the Municipal Forest Bureau, in order to reduce the central government's financial pressures and stimulate the initiative of the local authorities.

Although decentralization can give more flexibility for adapting wetland governance to local contexts, it also poses challenges between what has been planned and what is the reality on the ground. The deficiency of national wetland law and the broad international definition[8] of wetlands means that wetlands have become a panacea to urban problems. Except for the three spatial levels concerning the conservation of national wetlands, different types of wetlands have emerged at localities. For instance, while large scale wetland reserves have been established to rescue the degrading lake ecosystem (Halls, 1997), small scale artificial wetlands have also been constructed to collect rainwater or purify the water in rivers (Shutes, 2001). Moreover, the mainstream of wetland constructions also leads the existing research of wetland governance in China, which is primarily focused on the techno-scientific and managerial dimensions, such as water quality indicator assessment, technological applications, and wetland parks' design and planning (Bai et al., 1999; Yang et al., 2008; Pan et al., 2010; Cronk and Fennessy, 2016). The governance dimension that involves contested mentalities and conflicts of individual actors has seldom been elaborated.

Governance is not only a 'take for granted' multi-stakeholder administration but is also about the dynamic power politics among local actors and self-government. Foucault in the 1990s, developed the idea of governmentality, which expands the network of governing to the focus of how the population themselves can internalize a particular regime of practices (Foucault, 1991). Certain mentalities or regulations are easy to reach collectively with the consideration of optimal functioning of society and individual happiness (Rose, 1996). Dean (2010) further develops the governmentality into an analytical framework that consists of studying practices of authorities and techniques, as well as the identities and aspirations of individual actors.

Pellizzoni (2011a) further links the notion of governmentality to understanding the mainstream practices of 'neoliberalism of nature.' It was the idea initially identified mostly by neo-Marxists, which refers to the management of natural resources based on market logic (McCarthy and Prudham, 2004). However, it is different from classical liberalism, which thinks nature is a material that is constrained by overpopulation and economic growth. Neoliberal discourse conceives nature as a persistent existence that can be manipulated by technologies to grow limits (Lemke, 2003; Fuller, 2008). Thus, by using neoliberalism of nature, the state is not only off-loading its power to the private sector, society, and individuals but is also stimulating the economy as a collective mentality (Castree, 2008; Adams et al., 2014).

Some of the increasing local actors in environmental politics are experts. In China's wetland projects, experts are usually people with expertise in ecology and the environment. From literature, different arguments have been developed in the debate of expertise on environmental problems. Experts have been traditionally sought as the representation of neutral science. They speak truth to power, which improves the effectiveness and reliability of policies (Wildavsky, 1979; Ezrahi, 1990; Pellizzoni, 2011b). However, with the complexity of environmental problems in modern society, our knowledge of the environment and ecology are differentiated. Expertise is proliferated to become a knowledge commodity sold to the government, which is tailored with particular values (Pellizzoni, 1999; Sarewitz, 2004; Maasen and Weingart, 2005). Science adapted in policymaking is often subject to various constraints such as political-oriented problem defining and purpose-led data selection (Hausknost, 2014). As a response, Brown (1997) and Fischer (2000) propose the 'lay-local knowledge' where specialists and non-specialists jointly address environmental issues, while counter-expertise also rise among activists to provide grassroots alternatives to scientific solutions (Yearley, 2005; Rootes, 2007). Therefore, expertise is gradually becoming politicized and the terrain of conflicts. Policies and Technologies, supported by 'facts,' intertwine subtlety with the politics of interests and values from experts (Pellizzoni, 2011b).

This article intends to disclose the contested local wetland governance through the lens of individuals' aspirations. As a preliminary study of the larger dissertation project, this paper focuses on one of the cities in TLB (Suzhou) from the lens of local experts. Three emerging wetland cases are investigated: Sanshan Island National Wetland Park, Suzhou Zhenshan Park, and Zhujin Central River Wetland. For each case, qualitative analysis has been conducted on the extent to which the particular history and culture affect the individual actors' aspirations to wetlands, and also how these are materialized in the everyday languages, planning drawings, and instruments. 'Ecological governmentality' is reflected in these intangible transformations. For instance, the findings through interviews and content analysis suggest that three actors (ecologists, landscape designers, and environmental engineers) are the leading actors in local

[5]Wetland natural reserves, resonate with general notions of natural reserves, and aim to build a natural genetic data base for precious species with strictest protecting actions, largest spatial scale, and state investment.

[6]Based on the biodiversity value, it aims to diverse the ecological services of wetlands mainly though eco-tourism discourse.

[7]They are minor spatial managed areas acting as a spatial bond between scattered Wetland Natural Reserves and Certificated Wetland Parks. They are mainly identified by local authorities' aspirations.

[8]Origin as an ecosystem concept in ecology study, wetlands usually refer to a natural or artificial area with marsh or water where the depth of water during low tide reaches a minimum of six meters. From the Ramsar definition of Conventions on wetlands in 1971. For more information https://www.ramsar.org/about-the-ramsar-convention.

wetland construction. They are not only delivering wetlands from the level of central to local but also reflexively transferring their roles in local wetland governance. The transformation is mobilized by particular ethical claims on humans and nature and is deeply influenced by different disciplinary cultures and personal experiences.

HISTORICAL BACKGROUND ON WETLAND TRANSFORMATION IN THE TAI LAKE BASIN

Wetlands have been part of the vital landscape in TLB throughout history. On a larger geographical scale, TLB is a natural wetland habitat that was formed some 40 million years ago. TLB is located downstream of both the Yangtze River and the Qiantang River and flows toward the China East Sea. The collective sediment deposition of the two rivers formed the early TLB (Xia, 1979). The low-lying topography, with a shallow freshwater lake in the center and dense river network surrounding, provides a natural mediation of surrounding regions (**Figure 1A**). The water entering from the western Tianmu Mountain restores Tai Lake with hundreds of swamps as well as flourishing reeds. The water then flows out to the eastern rivers running toward Suzhou and Shanghai. On a medium scale, the traditional dike-pond system, as a productive landscape, also served as an early artificial wetland in the rural areas of TLB. The convergence of water-rich geography and the mild climate serves to shape the classical cultural identity of TLB, which is known as the 'Jiangnan water town,' a name that reflects the prosperous scenarios of the place in terms of harvested fish and rice.

During the last 30 years, the fast industrialization and agricultural development in this region has caused the degradation of the natural wetland system. Severe flooding risks have stimulated the engineering water conservancy projects in the basin. The regional authority[9] started the 11 Backbone Works of the Tai Lake in 1987. The plan aims to defend, control and drain away from the flooded water in the quickest way through the building of elevated dikes and water gates and by widening drainage channels, etc. Eleven hydraulic engineering-based projects have significantly reduced the number of swamps in the basin. Many wetlands have been reclaimed into the built lands, and the soft (natural) edges of the lakes and rivers have been straightened. These 'hard' hydraulic engineering-based projects have sustained and become the dominant approaches of modern water governance in TLB since the early 21st century.

The necessity of revitalizing the wetland landscape in TLB is utmost importance given the algae bloom outbreak in 2007. This catastrophe in the summer of that year left Wuxi city with a lack of freshwater supply for 2 days. Some parties speculated on the price of bottled water, and people started to escape from the city. The environmental crisis catalyzed the rethinking of water management. The former water quantity control has since been adjusted to a quality restoration that is focused on nutrient levels and biodiversity in the whole ecosystem. A series of plans concerning the revitalization of the natural environment of TLB has been established (National Development Reform Commission [NDRC], 2008). The most significant change is the re-naturalization of the waterfront in Tai Lake. This was verified by an elderly resident living nearby. In his comment, 'I can see that those reeds are coming back.' Indeed, local governments around Tai lake have started several Ecological Embankment Reconstruction Projects that aim to recall the 'historical wetland landscape' by changing existing vertical hard dikes into slopes with replanted aquatic plants such as reeds (Ni and Zhao, 2008; Jiangnan Evening Newspaper, 2018; China Natural Resources Newspaper, 2019). Furthermore, as **Figure 1B** shows, over 800 wetland parks' have been competitively established in the eight cities of TLB.[10] Wetlands have regained prevalence among municipalities' development plans because of the assemblage of green aesthetics, ecological benefits, and water treatment ability (Zhao et al., 2005). However, the vague definition and lack of legislation on wetlands have led to different actors subscribing to the ecological rationale through divergent 'wetland' constructions.

CASE STUDY SELECTION AND METHODOLOGICAL APPROACH

This paper focuses on Suzhou city in TLB with three contemporary wetland projects (Sanshan Island National Wetland Park, Suzhou Zhenshan Park, and Zhujin Central River wetland) as the primary case studies. Suzhou is graphically located at the center of TLB, which now constitutes two-thirds of Tai Lake water surfaces and management. The city is known as a historical water town with 21 canals and 314 bridges dating from the Song dynasty, and 40% of existing lands are wetlands (Breitung and Lu, 2017; Suzhou Wetland Protection Management Station [SWPMS], 2019). Except for the rich water heritage, Suzhou is also economically prosperous compared to other cities in TLB. Although Suzhou is a prefecture-level city that joined the modern global network with the overflow effects of Shanghai in the 1990s, it is now the second biggest city in the TLB with a population of over ten million and attracting US$132 billion in Foreign Direct Investment (Suzhou Municipal Government, 2019; Ren, 2020). The growing economy, intertwined with the deeply rooted water culture, has stimulated the endeavor for the city government to plan a Healthy Ecological Wetland City. It has since become the first Prefecture level city in China to legitimize the wetland governance (Suzhou Forestry Bureau, 2016). However, the plan is now mainly focused on strategic planning and demonstration projects with few comparative overviews and reflections. Therefore, in-depth understanding through case studies can shed light on the politics behind existing wetland mainstreaming.

The first case, Sanshan Island National Wetland Park, is one of the first generation of national certified wetland

[9]Taihu Basin Authority is the current watershed governance institution. For more information please see http://www.wujiangtong.com/webPages/DetailNews.aspx?id=15206.

[10]The outcomes were from google search of keywords 'Wetland Park.'

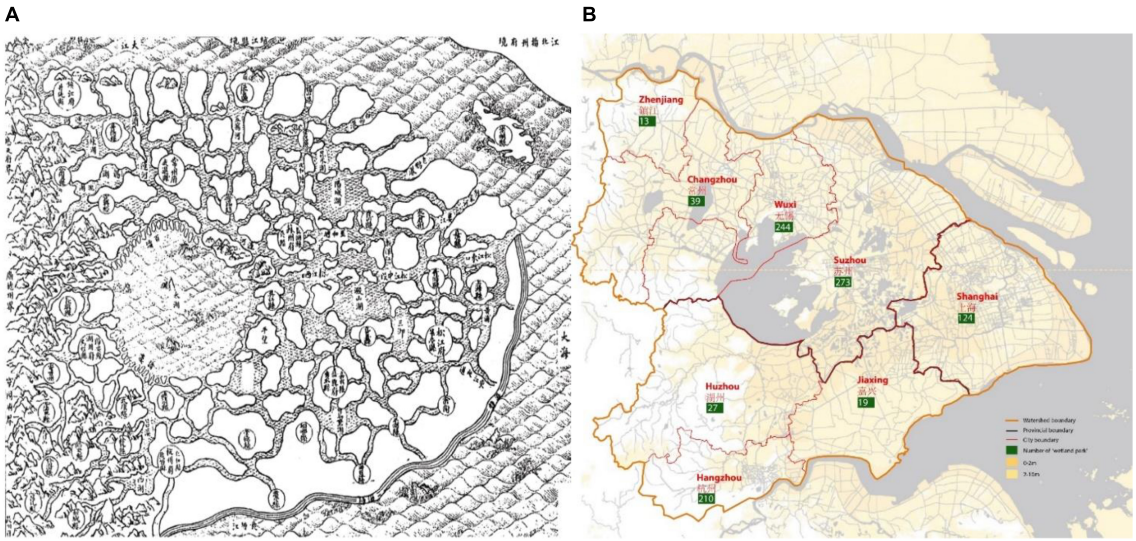

FIGURE 1 | Historical transformations of Tai Lake Basin (TLB). **(A)** Map of seven prefectures of Southeast China showing the 'soft edge' archipelago water morphology and lougang (dike-pond) around Tai Lake (Source: Zhang, 1639). **(B)** Existing jurisdiction plan and numbers of 'Wetlands Parks' on the low-lying typography of TLB (Source: data from the google map searching with a based map that was adapted from Nolf et al., 2020).

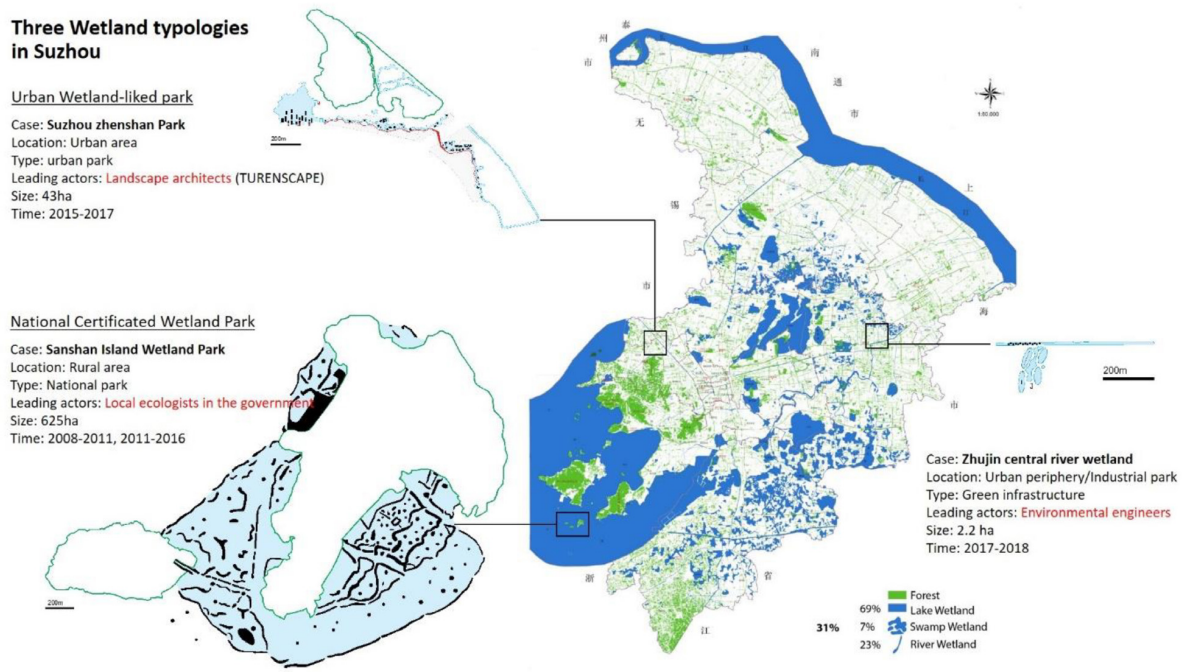

FIGURE 2 | Location map of three case studies in Suzhou, Source: made by author based on the Map of Suzhou Wetland resources (Suzhou Wetland Protection Management Station [SWPMS], 2019).

parks in Suzhou with transnational cooperation on biodiversity improvements. According to the current three spatial levels wetlands conservation regulations in China, most of the national wetland parks are more substantial in size and located in rural areas where potential biodiversity value is higher (**Figure 2**). The park is co-managed by the local government authorized park management office and Suzhou Wetland Protection Management Station (SWPMS). SWPMS is a unique semi-independent local institution under the supervision of the Suzhou Forest Bureau. It is the primary institution that provides the industry guidance to wetland park construction in China now. The second case, Suzhou Zhenshan Park, is an urban wetland landscape park constructed in association with the urban regeneration and boom of park building. Different from national wetland

parks, these landscape parks are incorporated in a different system, which is supervised by a local planning bureau. Suzhou Zhenshan Park is located in urban areas that prioritize wetland aesthetics and recreational value for surrounding residents. Landscape designers thus became the main actors in leveraging the wetland design with developers and governments. The third case, Zhujin Central River wetland, is an engineering-constructed wetland that was specially designed for collecting and purifying wastewater before it goes back to the river. It is the smallest size of wetland with highly functional plants and bio-engineering techniques. The environmental engineering company is the leading actor and claims that the constructed wetland can be an eco-tech solution to water degradation in China (Stokman and Jorg, 2013).

Although the three cases are distinguished in terms of location, size, and leading actors, they are all key projects that contribute to wetland decentralization governance practices in Suzhou. They share similar local aspirations to create a world city with a good environment through the innovation of wetland constructions.

The research mainly adopts qualitative methodology, which includes content review, site visits, and semi-structured interviews (see **Table 1** for the 20 interviewees and their roles). Interviews were conducted with the main stakeholders, such as experts (i.e., ecologists, landscape architects, engineers, and other specialists) and local government officials. Interviewees were selected based on the snowball sampling method recommended by initial informants in the local government. Those interviewed were asked about their experiences and opinions on developing these wetland projects. The author has built long term relationships with these critical stakeholders and visited each of the three sites three times during the last two years. Data collected from documents, observations, and interviews are analyzed based on the interpretative approach, which acknowledges the contextual and constructiveness of people's knowledge. Based on that, the following section synthesizes the unique wetland governance in Suzhou into three modalities with distinct forms, approaches, and purposes. The underlying aspirations of individuals to the wetland and ecology are analyzed.

WETLAND GOVERNANCE IN SUZHOU: MATERIALIZATIONS, APPROACHES, AND ASPIRATIONS

New Guardians of Biodiversity: The Rise of Local Ecologists

To investigate how the wetland conservations have been realized on the ground, I first approached Suzhou government officials who are constructing the National Certificated Wetland Park as the direct materialization of the top-down policies. These local officials are associated with the SWPMS, which was established in 2009. SWPMS stands out as an innovative institution among other cities in TLB and is focused explicitly on urgent wetland conservation. Officials in SWPMS are recruited mainly from the field of ecology. SWPMS has its own research labs that

TABLE 1 | Summary of data collection (Made by author).

Cases	Interviewees	Roles	Point of views
Sanshan Island National Wetland Park	Local government officials (5)	Ecologists from (SWPMS) who are managing wetlands in Suzhou	• Wetland is designed for increasing local biodiversity, especially for the co-existence of migratory birds and humans.
		Managing fishing and transportation in Tai Lake	• Confirmed the re-naturalization of banks in Tai Lake in recent years.
	Residents (2)	Nearby residents	• Witness the re-planting of reeds in Tai lake waterfront.
	NGOs (2)	Participated in the Nature Wetland School program in Suzhou	• Nature education is a curial step to establish the awareness of environmental protection in society.
Suzhou Zhenshan Park	Landscape designers (3)	Employees of the landscape company (TURENSCAPE). Two of them are the major designers of the case	• Wetlands consist of a series of ponds that can help the site to contain rainwaters and mitigate floods. • Use large scale master plan as an initial step to support the feasibility of the wetland park. • ·Wetlands with the beauty of weeds are cultural landscapes that connect humans and nature in cities.
	Local government construction and development company directors (2)	Design director and construction director	• Wetland parks as a public landscape work should also keep economic and low costs.
	Urban planners (2)	Local planners who are aware of TURENSCAPE's wetland approach	• Agree with wetlands as a cultural identity of water town (Suzhou).
Zhujin Central River Wetland	Environmental engineers (3)	Responsible for the case from planning to design, construction and maintenance	• Difficulty to acquire lands for constructed wetlands. • ·The importance of residents to understand wetlands in order to reach a balanced local ecosystem.
	Local government officials (1)	Ecologist from (SWPMS)	• Constructed wetlands are an emerging type in China. Its impacts still need long time observation.

SWPMS, Suzhou Wetland Protection Management Station.

monitor the wetland ecosystem in Tai Lake. They are pioneers in establishing local wetland laws, regulations, and plans for Suzhou, which have since set the standard for other cities in China. The conservation rate of wetlands in Suzhou has risen from 8% in 2010 to 58.5% in 2018 (Suzhou Wetland Protection Management Station [SWPMS], 2019).

As noted by those currently working in the SWPMS, National wetland park governance in Suzhou shows both input from transnational corporations and the gradual strengthening of local ecologists' roles. As is the case in many of China's cities, the idea of establishing national wetland parks in Suzhou was affected by international agendas on biodiversity conservation, for example, in terms of birdlife and other species. The State Forestry Administration often organized study trips for high-level government managers to other well-acknowledged wetlands since the 1980s.

'We have learned advanced wetlands management system in those wetland parks. Most of them are operated by international Environmental non-governmental organization (ENGOs) such as World Wide Fund for Nature (WWF).'

'After we established the SWPMS, we are keen to visit Mai Po wetland reserve in Hong Kong because of its high reputation in wetland conservation and management. I paid a self-trip to Mai Po with a professional team of bird watching around 2011. It was my first time to see the endangered Black-faced Spoonbills. I was impressed by how the wetland has been well managed by a professional team and can reach coexist between birds and humans. This experience strengthened my confidence in the protection of Suzhou wetlands' from an interview with a local government official in SWPMS.

Meanwhile, international ENGOs are also actively transferring environmental conservation ideas into China by setting up their offices since the 1980s. In the case of WWF, it is the first international NGO invited by the Chinese government to work on nature conservation. In 2007, WWF set up a Shanghai Office. The initial cooperation between WWF and local governments in TLB includes Water source protection of the Huangpu River and east Tai Lake, Yangtze protected area network in Chongming national nature reserve, and Low carbon city initiative. The international reputation and local practices of WWF attract the attention of SWPMS.

'*SWPMS has 8 years of cooperation with WWF. However, gradually I feel their progress is often limited by their inability of publicly raise funds in China. Therefore, the most effective cooperation for wetland conservation in China is often learning concepts from international ENGOs while implemented by local government bodies.*' From an interview with an official in SWPMS.

The best case is the Sanshan Island National Wetland Park, which bears witness to 8 years of progressive cooperation between the Suzhou government (SWPMS) and WWF. The focus of initial cooperation was improving the sustainability of wetlands as well as the livelihoods of those living in surrounding villages, which was marked by the first agreement of 'wetland 1 + 1' signed by the local government, private enterprises, and WWF in 2012. The SWPMS hopes WWF becomes the bridge between wetland villages and enterprises to form water stewardship, which in turn will broaden local funding channels for wetland conservation. One enterprise will be paired with one wetland village in Suzhou to invest in wetland technologies, promoting organic agriculture and ecological tourism. However, WWF seems more to be adhering to the agreement format rather than actually investing human resources and capital in the project.

The wetland 1 + 1 of Sanshan Island ended with no clear progress. The experience, however, has led to a critical shift in later transnational cooperation toward the construction of 'Wetland Nature School' in Sanshan Island. Wetland Natural School is a practical alternative in wetland governance that is reshaping human and natural relationships. Under the existing wetland park plan, for example, Sanshan Island National Wetland Park has been divided into six functional zones: wetland conservation areas, a restoration and reconstruction area, an educational exhibition area, a rational utilization area, a management service area and a community co-built area. The national wetland park has now been mobilized as a spatial milieu to convey the ecological governmentality not only to the government and private sector but also to the broader public through wetland education. Volunteering, teaching, and public participation programs have been developed in the park with the help of WWF Shanghai and local efforts. Based on the long term development of wetland parks in Suzhou, SWPMS has also invented new assessment criteria for certified national wetland parks in Suzhou. They synergized complex technical data into three indicators: water transparency, bird biodiversity, and education programs. These criteria have subsequently been adapted by WWF and spread to wetland management in Guangzhou and other cities in China. These growing aspirations of reshaping an alternative future for the city through wetland construction are also reflected in the views from Secretary Wu on the Sanshan Island. According to the online news, Secretary Wu built the Sanshan island wetland park from scratch long before the national system certified it. Since 2008, he has initiated the existing layered wetland design approach in the Sanshan Wetland Park (**Figure 3**). It was a tough decision at that time as he faced issues such as the degraded water quality caused by early tourism development, needs for sustaining tourism, and limited village funding. Many people were skeptical about his approach at that time, but secretary Wu persisted in his endeavor. He stated in the news that if the island could not attain clear water in Tai Lake, it would gradually lose its charm and attraction. A pleasant environment, meanwhile, would have a positive effect on tourist development (Wang and Song, 2012).

Those claims were clearly based on his experience and observations as a local resident. As a self-educated local ecologist, he thinks that building layered dikes in the wetland can be useful in mitigating algae bloom on the lake, preventing soil erosion on banks, and, more importantly, forming a natural ecosystem for birds, plants and fish. The success of this typology raised the attention of local government officials, such as the director of SWPMS. Since then, it has been developed as a 'multi-layered cofferdam' approach that has been adapted in many other national wetland parks in Suzhou (Suzhou Daily, 2019).

Although local officials in SWPMS and the village secretary may seem to be the end recipients of globalizing wetland

FIGURE 3 | Layered artificial islands in Shanshan National Wetland Park [Source: provided by Suzhou Wetland Protection Management Station (SWPMS)].

governance, they are all committed to the local wetland construction. They not only serve as traditional local officials facilitating orders from above, but more as initiators answerable to the public who take brave actions based on local ecological values and ethics. Their roles in local wetland constructions are reflexive under the seemingly international agendas and state regulations. This shows the collective vision in which wetlands can sustain biodiversity and build a better future for both humans and nature.

Recall the Balance of Human and Nature Relationships: Cultural Landscape by Landscape Architects

Except for the state wetland conservation governed by local ecologists, landscape architects also adhere to the notion of wetlands through advocating urban wetland landscape parks for local governments. With China's increasing urbanization in the 1990s, landscape architecture became an essential branch of the booming building industry. From their origins as commercial designers for the real estate landscape, many landscape firms can now take on significant commissions in local governments' regeneration projects. Through open bid, national or global landscape architects can provide professional services for the design of local public parks. Wetlands have become a popular design concept for urban parks as the government's priority has shifted from the previous focus on pure aesthetics to ecological security under the central attention to environmental conservation. It needs to be noted that the popularity of wetlands cannot be delinked from the growing notion of environmental commodification, in which a healthy urban environment can increase surrounding land values, attracting investment and further branding cities in a global sphere (Castree, 2003, 2008).

An essential urban wetland landscape park in Suzhou discussed here is Zhenshan Park, which has just been nominated for the world-wide design award (Azure, 2020). The predecessor of the park was a redundant landfill site. It was always a headache for the Tong'an town government as it is located at the entrance of the district. In 2014, the town government decided to regenerate this area for future commercial and recreational use but they don't have a clear vision at that time. The town government secretary approached the TURENSCAPE because of the reputation of its founder, Kongjian Yu, for ecological designs such as sponge cities, wetland parks, and green infrastructures. Thus, TURENSCAP, the leading domestic landscape architecture firm in China, was hired to design a landscape park in this area.

'The first step we usually do is to argue the park location with local governments. While the government might want to fill in the land with more buildings, we would suggest keeping the low-lying areas in the original site and transfer into rain collecting ponds. Thus, the places can be resilient for future floods.' Said by a former landscape designer at TURENSCAPE.

Similar to this process, the design team in Zhenshan Park also negotiated the possibility of ponds with the town government by making a concept plan first for the whole site. The concept plan included the arrangement of surrounding buildings, water systems and showed how the building directions, entrances, and functions fitted with the visitor circulation in the park. Then, the main issue was around the size of ponds. In the initial plan, TURENSCAPE proposed to dig more areas as ponds to connect the water system. However, the director from the Tongan town government construction and development company suggested limiting the new earth excavation in order to keep the balance between excavation and fill, which is a popular strategy to control the cost of landscape work. After reaching the agreement, the concept design was constructed quickly. One year later, Zhenshan Park, a wetland landscape park with naturalized plants and stepping water flow, has been built to collect and purify rainwater. More importantly, the park provides a free recreational function for surrounding residents (**Figure 4**).

Compared with previous national wetland parks, urban wetland landscape parks built by landscape architects are less about biodiversity indicators and more about the aspirations

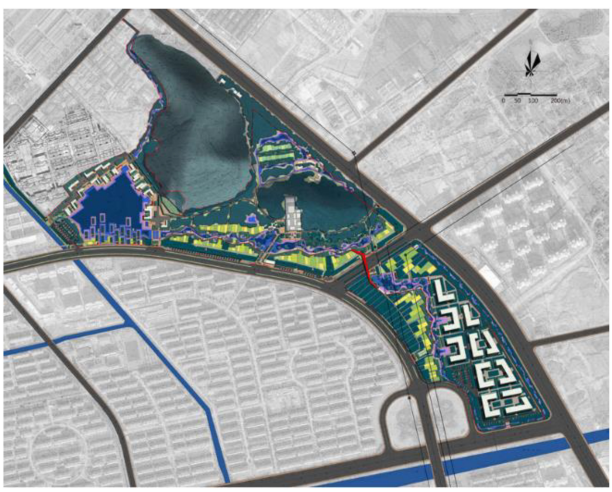

FIGURE 4 | Early master plan of Zhenshan Park made by Turenscape (2018).

of cultural landscape values. This can be traced to a series of ethical claims made by the founder, Kongjian Yu, about Chinese landscape development. Yu thinks the priority of landscape design lies in respect for nature, humans, and local place spirits (Turenscape, 2003; Saunders, 2013). A typical identity that has been acknowledged in TURENSCAPE projects is the nostalgia for 'Beauty of Weeds.' In Zhenshan Wetland Park, productive plants have also been reintroduced, such as paddy rice and sunflowers. The imitation of nature approach has also received criticisms from ecologists who are skeptical about the purification efficiency of these plants.

Meanwhile, a visitor circulation plan guided by striking red-belt seats and public spaces has been integrated into the Zhenshan Park, as well as many other parks designed by TURENSCAPE. While critics, like ecologists in SWPMS, think the iconic design is irrelevant to wetlands ecology and merely serves as a company brand, the founder, Kongjian Yu, thinks the iconic design also serves as clear guidance for humans to explore and form a closer bond with nature (**Figure 5**). Yu thinks that the only path to reach the ideal city is through combining nature and human culture (Yang, 2014). Yu is enthusiastic about restoring naturalized and ordinary landscapes, while he despises the decorative landscapes in traditional Chinese gardening.

While not all landscape architects agree with Yu's radical approach to Chinese landscape design, his enthusiasm for generating public attention to water landscapes and human relations is shared by other local landscape architects and planners. In interviews, they have also stated that people should be able to get close to nature, especially to water in urban parks, which will ultimately strengthen the identity of Suzhou as a Watertown.

The case of Zhenshan Park suggests that landscape architects are on the rise as important actors in transferring ecological notions such as wetlands to local governments under contemporary urban development in China. More importantly, their roles have shifted from being simply designers to being facilitators in local government decision making. The new role is tied to their historical and cultural experiences, which underscores the fundamental moral value of wetlands and their potential as a critical cultural element in reshaping Suzhou's future.

FIGURE 5 | Zhenshan Park after built (Photo taken by author).

Wastewater Purification for the River: Balancing Local Ecosystem by Environmental Engineers

The movement toward a more marketized neoliberal governance in China's environmental regime opens the door for multiple stakeholders from different disciplines to become involved in local wetland construction. While local ecologists and landscape architects are the two main actors in wetland making in China, environmental engineers are also rising as emergent actors in building constructed wetlands, especially for wastewater purification. The growing importance of environmental engineers cannot be delinked from local political missions created by the indicator gap between the existing purification ability of wastewater treatment plants (WWTPs) and the acceptable quality of effluent discharge according to guidelines of the ecological civilization requirement in China. According to the latest Water Pollution Control and Action Plan in 2015, in the context of ecological civilization, China is aiming to improve the water quality in all urban rivers in order to reach Grade V level (State Council, 2015). Since then, the indicator has been increased to Grade IV before all the sewage can be released back to rivers, according to the National Towns and Cities Sewage Treatment and Recycling Facilities Construction Plan released in 13th 5-Year Plan (National Development Reform Commission [NDRC], 2016). However, the current highest level of sewage water after processing in WWTPs is still lower than Grade V (COD 50 mg/L; State Environmental Protection Administration [SEPA], 2002).

The indicator gap creates a niche market for constructed wetlands in China, which have proved efficient in purifying the polluted water from lower Grade V to Grade IV (Bai et al., 1999). Kunshan Zhujin Central River Wetland in Suzhou is a typically constructed wetland that amplifies the bio-purification function of the ecology (**Figure 6**). The original Zhujin River was polluted by discharges from surrounding factories and households for a long time. The town government has received several complaints from residents regarding the black and evil-smelling bodies of water. Several attempts for restoring rivers have been undertaken, such as traditional micro-aeration and planting small scale aquatic plants in the rivers. In 2017, the town government started a new round of open tendering, which aims to look for a new approach to improve the river water. Suzhou Dehua Ecotech Company won the tendering with the support of their strong local experiences in engineering wetlands. The company has more than 20 constructed wetland projects in the TLB with various scales and contexts. Therefore, the company is responsible for wetland construction from initial design to maintenance.

During conversations with engineers working on this project, it was revealed that there are attempts to treat the constructed wetland as a small part of the whole ecological engineering program for the river water purification. The constructed wetland

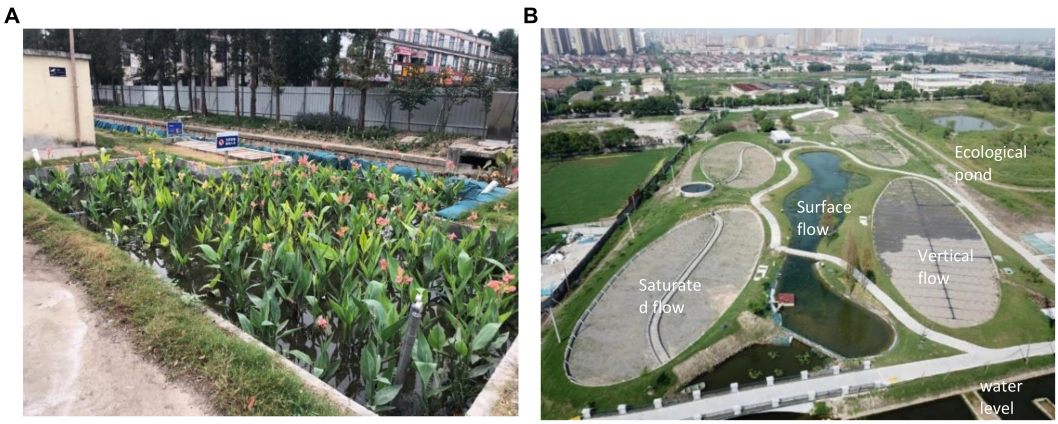

FIGURE 6 | (A) Functional plants in the constructed wetland system (Source: provided by Suzhou Dehua Ecotech company). **(B)** Aerial photo of the constructed wetland after built in 2018 (Source: provided by Suzhou Dehua Ecotech company).

is highly engineered with a series of ponds: water level regulating pool – vertical flow wetland – ecological pond – surface flow wetland – and saturated flow wetland. The different ponds will be planted with different functional plants, such as *Canna indica* and *Arundo donax* 'Versicolor.' The sewage water after leaving the WWTPs will go through these ponds, which are powered by the solar power station, and monitored through the smart remote-control system, in order to achieve the Grade IV level for wastewater before returning into the river.

'Though it is a small-scale wetland whose technology is quite mature abroad, it is never an easy job in the cities of China.' Comment from an environmental engineer in charge of the Kunshan Zhujin Central River Artificial Wetland Project.

The difficulties are concentrated mainly in the negotiations with local government and residents in terms of both acquiring land and wetland management. First, unlike urban wetland landscape parks that have a clear land-use type, small constructed wetlands usually do not have a specified category in the land use planning of China. Most of the constructions built by the company are small areas of left-over land near the river, which have no foreseeable value for local governments. The local government's low expectation of the land value and the remote locations (rural or urban periphery) enhance the cost of wetland construction.

'Local governments think they are neither suitable for building houses or factories nor incentive to do greenery.' Comment by the Environmental Engineer.

Second, under the rising awareness of participation in China, engineers are becoming community coordinators who spontaneously work with local government to negotiate with residents during wetlands construction. Currently, most people in China still treat wetlands as landscaping without knowing the complex ecological system behind them. The low perception among residents has also caused unexpected risks for constructed wetlands. For instance, when the surrounding rivers are flooded, residents tend to discharge floodwater into the constructed wetland, which brings uncontrolled bacterial levels and water quantity to the wetland system. Therefore, as reported by the interviewees, they spend much time on communication with individual households who might be affected by the wetland projects. From a practical point of view, only when no one is objecting to building wetlands on the site, can the government then sign the wetland project contract with the company. On the other side, the engineer also links these endeavors with the ethical perspective rooted in their company's belief. This system illustrates that the engineering company treats humans as a vital component in sustaining a healthy local ecosystem.

'Wetland is a living organism in which the best performance can only be achieved when it is integrated with the local ecosystem circle. Humans are also vital energy flows in the local ecosystem.'

DISCUSSION

Given China's fast urbanization and eco-desires under the latest discourse on ecological civilization, experts and non-experts should understand the notion of ecology in terms of mainstream wetland projects. This paper reveals how the TLB has been transformed from a natural wetland to an agglomeration of wetlands under neoliberal capital rationalities. Focusing on the contemporary wetland construction in Suzhou, the analysis of localities involved in three wetland projects (Sanshan Island National Wetland Park, Suzhou Zhenshan Park, and Zhujin Central River Wetland) reflects three distinct modes of wetland construction in terms of materialization, approaches, and aspirations. Collectively, they also illustrate the local dynamics of wetland governance as a form of worlding city practices. By comparing the findings from the three cases, broad lessons can be articulated toward a novel understanding of wetlands in China.

The first lesson is that wetland constructions are mobilized by the individual's ethical claims around ecology, which are shaped by historical and cultural contingencies. Take the three leading actors in the cases as an example. Local ecologists divided natural wetland parks into different functional areas with disciplined behaviors, either no admittance to the public or participated in ecotourism. This zoning approach fits the

category of 'disciplinary environmentality' described by Agrawal (2005). This illustrates that ecologists are embedded in and are promoting the ethical norms, diffused by international agendas, in which biology-rich wetlands can build a better future for human and non-human species. Landscape architects, on the other hand, argue that wetland construction through rewilding landscapes and public space design is a way of reclaiming humans' essential interconnection with nature, which can be seen as a deep need in human beings (Fletcher, 2009). Finally, environmental engineers not only use their technical ability to oversee the wetlands' capacity to purify wastewater but are also actively involved in the conversation with local inhabitants to help them understand the notion of wetlands. They hope by increasing the people's understand of wetlands, a healthy local ecosystem can be formed, which will increase the efficiency of constructed wetlands to clean the water for rivers in return.

Second, the diverse ecological ethics have led to a convergence in reflexive roles taken by individuals, which in turn has formed the ecological governmentality defined in this article. The notion of ecology has been understood to be muli-faceted as a self-governance for building and restoring wetlands in the current environmental governance regime. This transformation also resonates with the early concept of 'Worlding Practices' and 'global-local nexus,' both of which address globalization as a multifaceted process constituted by different localities in the making. Although wetland conservation is a global consensus not confined to China, local actors have their own aspirations in achieving it. Local ecologists with updated knowledge of ecology and space attachment are prominent initiators in adjusting the environmental governance at stake. Landscape designers, in the context of demanding urban environmental improvements, can be good facilitators in getting ecological notions incorporated in the government officials' decision making. Environmental engineers, under the pressure of public participation, can be good community coordinators who can mediate disputes between wetland management and residents concerned about their livelihoods.

The third lesson can be drawn from the consistent resistances that have happened during wetland maintenance. In the case of Sanshan Island National Wetland Park, it is managed by the local property management company joined by the tourism company, the district government and the village joint committee. The company hires existing local villagers to manage the daily activities in wetland parks, such as maintaining the landscape and collecting fees for recreational activities. The co-management mechanism is a unique participation mode in China and raises contestation about the short-term economic value and long-term ecological value. During my fieldwork in Sanshan Island National Wetland Park, it was found that villagers sometimes played music extremely loudly at the pier used by boat tours in order to attract tourists to take the boat and consume refreshments in the nearby tea house. The overly loud music might terrify the protected birds in that area, which in turn might decrease the ecological value of the wetland park. Instances such as this are also common in other wetland parks and nature reserves where the residents tend to chase the economic profit brought by the recreational business. This of course conflicts with the primary intention of ecological conservation for non-human species. Alongside the previously mentioned flooding resistance in Zhujin Central River Wetlands, this paper reveals the existing limitation of environmental education in China, which mainly focuses on the middle-class population living in urban areas rather than rural inhabitants, especially those people living close to wetlands. It is essential, however, that future wetland experts consider a broad range of users in relation to wetlands, especially local, low-income people, many of whom are not educated.

CONCLUSION

Wetlands are critical resources for coastal cities that suffer from climate change and urban development. Its adaptation demands locally based governance, which not only relies on science rationales but also human dynamics. Through analyzing three wetland construction cases in Suzhou, this paper sheds light on the fact that the current mainstreaming wetland constructions in Suzhou cannot be interpreted simply as the impulse of environmental commodification under neoliberal capitalization, but is instead a contested materialization in which different social actors seek to break away from established norms and reshape urban futures on their own. This underscores the power of moral ecology in wetland governance and highlights the reflexive responsibility that each local actor has, both as a city culture activist and a participant in the future decentralization of wetland governance.

Developed further in the discourse of governmentality, this article elaborates the fact that environmental degradation, along with economic boost, has driven local experts to adopt particular ethical positions in ecology, which they believe are necessary for making Suzhou a better city. These transformed positions as "ecological governmentality" are shaped by individual historical circumstances and disciplinary training. Situated in the previous critical literature of expertise and politics, this article shows another possibility where local experts, under the worlding city mentality, collectively endeavors to contribute to wetland conservation and construction in China. However, it must be pointed out that the existing interactions among three leading experts (ecologists, landscape designers, and environmental engineers) in local wetland governance are constrained by the split institutional structures. Three types of wetlands designed by them belong to different land uses. Thus, they are supervised by different governmental departments such as the forest bureau, planning bureau, and water affairs bureau. Some of them are often skeptical about each other's work due to disciplinary differences. Therefore, the fusion of these disciplinary gaps both in wetland science and wetland governance is needed.

Further research in wetland governance in China can develop further on the use of these ethical claims on ecology. As literature has pointed out, some experts are now being politicized. They are using moral claims as a depolitical strategy to achieve their goals in environmental politics. Therefore, more research is needed to examine to what extent local ecologists, landscape

designers, and other environmental experts in Suzhou are using moral ecology to avoid project disputes and enhanc their powers in the wetland industry. As said, since the decision making in wetland construction has convergence in ecological considerations, whether it can be the leverage point for different actors to work with each other remains to be seen. Moreover, broad local stakeholders can be interviewed in the future, which includes more local residents and users of wetlands. Questions can be asked such as: Are they also using ethical claims as self-government to promote wetlands? How are the values and aspirations of residents on wetlands different from those of local experts? Lastly, spatial scales of investigation can be expanded. Three wetland construction modalities proposed in this article based on the situation in Suzhou can be compared with other cities in TLB, in order to have a comprehensive understanding of the wetland governance in this region.

DATA AVAILABILITY STATEMENT

The original contributions presented in the study are included in the article/supplementary material. Further inquiries can be directed to the corresponding author.

ETHICS STATEMENT

The studies involving human participants were reviewed and approved by Human Research Ethics Committee, The University of Hong Kong. The patients/participants provided their written informed consent to participate in this study.

AUTHOR CONTRIBUTIONS

The corresponding author prepared the manuscript and did all the field works associated with the study.

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REFERENCES

Adams, W. M., Hodge, I. D., and Sandbrook, L. (2014). New spaces for nature: the re-territorialisation of biodiversity conservation under neoliberalism in the UK. *Trans. Inst. Br. Geogr.* 39, 574–588. doi: 10.1111/tran.12050

Agrawal, A. (2005). *Environmentality: Technologies of Government and the Making of Subjects*. Durham: Duke University Press. doi: 10.2307/j.ctv11sn32g

Azure. (2020). *AZ Awards 2020: People's Choice*. Available online at: https://awards.azuremagazine.com/ (accessed on 23 May 2020)

Bai, X. H., Wang, B. Z., Yu, M., and Nie, M. S. (1999). Development of constructed wetland wastewater treatment technology and its application in China. *J. Harbin Univ. Civil Eng. Arch.* 6, 88–92.

Bowker, G. C. (2005). "Time, money, and biodiversity," in *Global Assemblages: Technology, Politics, and Ethics as Anthropological Problems*, eds A. Ong and S. J. Collier (Hoboken, NJ: Wiley-Blackwell), 107–123. doi: 10.1002/9780470696569.ch7

Breitung, W., and Lu, J. (2017). Suzhou's water grid as urban heritage and tourism resource: an urban morphology approach to a Chinese city. *J. Herit. Tour.* 12, 251–266. doi: 10.1080/1743873x.2016.1236801

Brown, P. (1997). Popular epidemiology revisited. *Curr. Sociol.* 45, 137–156. doi: 10.1177/001139297045003008

Castree, N. (2003). Commodifying what nature? *Prog. Hum. Geogr.* 27, 273–297. doi: 10.1191/0309132503ph428oa

Castree, N. (2008). Neoliberalising nature: the logics of deregulation and reregulation. *Environ. Plann. A* 40, 131–152. doi: 10.1068/a3999

Checker, M. (2011). Wiped out by the "greenwave": environmental gentrification and the paradoxical politics of urban sustainability. *City Soc.* 23, 210–229. doi: 10.1111/j.1548-744x.2011.01063.x

China Natural and Resources Newspaper. (2019). *"Ecological Walls" Built Along the Shoreline of Taihu Lake in Huzhou, Zhejiang*. Available at : https://www.sohu.com/a/314159534_822829 (accessed on 15 May 2020)

Coops, H., and van Geest, G. J. (2007). *Ecological Restoration of Wetlands in Europe: Significance for Implementing the Water FrameworkDirective in the Netherlands*. Delft: WL/Delft Hydraulics.

Cronk, J. K., and Fennessy, M. S. (2016). *Wetland Plants: Biology and Ecology*. Boca Raton, FL: CRC press. doi: 10.1201/9781420032925

De Jong, M., Chen, Y., Joss, S., Lu, H., Zhao, M., Yang, Q., et al. (2018). Explaining city branding practices in China's three mega-city regions: the role of ecological modernization. *J. Clean. Prod.* 179, 527–543. doi: 10.1016/j.jclepro.2018.01.098

Dean, M. (2010). *Governmentality: Power and Rule in Modern Society*. Thousand Oaks, CA: Sage publications.

Ezrahi, Y. (1990). *The Descent of Icarus. Science and the Transformation of Contemporary Democracy*. Cambridge, MA: Harvard University Press.

Fischer, F. (2000). *Citizen, Experts, and the Environment. The Politics of Local Knowledge*. Durham, NC: Duke University Press. doi: 10.2307/j.ctv11smwd9

Fletcher, R. (2009). Against wilderness. *Green Theory Praxis* 5, 169–179.

Foucault, M. (1991). *The Foucault Effect: Studies in Governmentality*. Chicago, IL: University of Chicago Press.

Franklin, S., Lury, C., and Stacey, J. (2000). *Global Nature, Global Culture*. Thousand Oaks, CA: Sage.

Friedmann, J., and Wolff, G. (1982). World city formation: an agenda for research and action. *Int. J. Urban Reg. Res.* 6, 309–344. doi: 10.1111/j.1468-2427.1982.tb00384.x

Fuller, S. (2008). The converging technologies agenda: the stakes and the prospects. *Newsletter* 3, 1–3. doi: 10.1007/978-94-017-0359-8_1

Goldman, M. (2011). Speculative urbanism and the making of the next world city. *Int. J. Urban Reg. Res.* 35, 555–581. doi: 10.1111/j.1468-2427.2010.01001.x

Halls, A. J. E. (1997). *Wetlands, Biodiversity and the Ramsar Convention: the Role of the Convention on Wetlands in the Conservation and Wise Use of Biodiversity*. Gland: Ramsar Convention Bureau.

Hausknost, D. (2014). Decision, choice, solution:' Agentic deadlock' in environmental politics. *Environ. Polit.* 23, 357–375. doi: 10.1080/09644016.2013.874138

Higgs, E. (2003). *Nature by Design: People, Natural Process, and Ecological Restoration*. Cambridge, MA: MIT Press. doi: 10.7551/mitpress/4876.001.0001

Jiangnan Evening and Newspaper. (2018). *Wuxi Six Projects to Restore the Taihu Lake "Protection Barrier" Shore Belt*. Available online at: http://js.people.com.cn/n2/2018/0307/c360304-31318752.html (accessed on 15 May 2020)

Lemke, T. (2003). Foucault, governmentality and critique. *Rethink. Marxism* 14, 49–64. doi: 10.1080/089356902101242288

Li, Y., Yang, L., He, B., and Zhao, D. (2014). Green building in China: needs great promotion. *Sustain. Cities Soc.* 11, 1–6. doi: 10.1016/j.scs.2013.10.002

Maasen, S., and Weingart, P. (2005). "What's new in scientific advice to politics?," in *Democratization of Expertise?*, eds S. Maasen and P. Weingart (Dordrecht: Springer), 1–19. doi: 10.1007/1-4020-3754-6_1

McCarthy, J., and Prudham, S. (2004). Neoliberal nature and the nature of neoliberalism. *Geoforum* 35, 275–283. doi: 10.1016/j.geoforum.2003.07.003

National Development Reform, and Commission [NDRC] (2008). *Master Plan for Comprehensive Management of Water Environment in the Taihu Lake Basin, Approved by the State Council, Beijing. (Translated by the Lake Tai Water Pollution Treatment Project 2009)*. Beijing: NDRC.

National Development and Reform Commission [NDRC] (2016). *13th Five-Year Plan of National Towns and Cities Sewage Treatment and Recycling Facilities Construction*. Beijing: NDRC.

Nolf, C., Xie, Y., Vannoorbeeck, F., and Chen, B. (2020). "Delta management in evolution: a comparative review of the yangtze river delta and Rhine-Meuse-Scheldt delta," in *Asia-Pacific Journal of Regional Science, Special Issue on Comprehensive Watershed Management: Sustainability, Technology, and Policy* (Springer).

Ni, Y. N., and Zhao, J. (2008). Suzhou Taihu ecological shoreline planning and construction: an attempt of artificial wetland ecological restoration. *Garden* 12, 50–51.

Olds, K., and Yeung, H. (2004). Pathways to global city formation: a view from the developmental city-state of Singapore. *Rev. Int. Polit. Econ.* 11, 489–521. doi: 10.1080/0969229042000252873

Ong, A. (2011). "Introduction: worlding cities, or the art of being global," in *Worlding Cities: Asian Experiments and the Art of Being Global*, eds A. Roy and A. Ong (Hoboken, NJ: John Wiley & Sons), 1–26. doi: 10.1002/9781444346800.ch

Pan, L. L., Cui, L. J., and Wu, M. (2010). Tourist behaviors in wetland park: a preliminary study in Xixi National Wetland Park, Hangzhou, China. *Chin. Geogr. Sci.* 20, 66–73. doi: 10.1007/s11769-010-0066-4

Pellizzoni, L. (1999). Reflexive modernization and beyond: knowledge and value in the politics of environment and technology. *Theory Cult. Soc.* 16, 99–125. doi: 10.1177/02632769922050737

Pellizzoni, L. (2011a). Governing through disorder: neoliberal environmental governance and social theory. *Glob. Environ. Change* 21, 795–803. doi: 10.1016/j.gloenvcha.2011.03.014

Pellizzoni, L. (2011b). The politics of facts: local environmental conflicts and expertise. *Environ. Polit.* 20, 765–785. doi: 10.1080/09644016.2011.617164

Pow, C. P. (2018). Building a harmonious society through greening: ecological civilization and aesthetic governmentality in China. *Ann. Am. Assoc. Geogr.* 108, 864–883. doi: 10.1080/24694452.2017.1373626

Ren, D. (2020). *Chinese Manufacturing Hub Suzhou Eyes Increased Foreign Investment as it Chases Fresh Growth, South China Morning Post*. Available online at: https://www.scmp.com/business/companies/article/3044608/chinese-manufacturing-hub-suzhou-eyes-increased-foreign (accessed on 15 May 2020)

Robertson, M. M. (2004). The neoliberalization of ecosystem services: wetland mitigation banking and problems in environmental governance. *Geoforum* 35, 361–373. doi: 10.1016/j.geoforum.2003.06.002

Rootes, C. (2007). Acting locally: the character, contexts and significance of local environmental mobilisations. *Environ. Polit.* 16, 722–741. doi: 10.1080/09644010701640460

Rose, N. (1996). "Governing 'advanced' liberal democracies," in *Foucault and Political Reason*, eds A. Barry, T. Osborne, and N. Rose (London: UCL Press), 37–64.

Roy, A., and Ong, A. (eds) (2011). *Worlding Cities: Asian Experiments and the Art of Being Global*, Vol. 42. Hoboken, NJ: John Wiley & Sons. doi: 10.1002/9781444346800

Sarewitz, D. (2004). How science makes environmental controversies worse. *Environ. Sci. Policy* 7, 385–403. doi: 10.1016/j.envsci.2004.06.001

Saunders, W. S. (ed.) (2013). *Designed Ecologies: The Landscape Architecture of Kongjian Yu*. Berlin: Walter de Gruyter. doi: 10.1515/9783034611466

Shutes, R. B. E. (2001). Artificial wetlands and water quality improvement. *Environ. Int.* 26, 441–447. doi: 10.1016/S0160-4120(01)00025-3

State Council (2015). *Water Pollution Control and Action Plan 2015*. Farnham: CWR.

State Environmental Protection Administration [SEPA] (2002). *Discharge Standard of Pollutants for Municipal Wastewater Treatment Plant, National Standards of the People's Republic of China*. Bejing: State Environmental Protection Administration.

State Forestry Administration (2013). *Provisions for the Protection and Management of Wetland*. Bejing: State Forestry Administration.

Stokman, A., and Jorg, J. (2013). Strategic approaches to urban wetlands: reconciling nature conservation, engineering and landscape architecture. *Landsc. Arch. Front.* 1, 44–55.

Suzhou Daily (2019). *River Banks are a Bird Paradise with the Establishment of Wetlands and Forests*. Available online at: http://www.suzhou.gov.cn/news/szxw/201904/t20190403_1078426.shtml (accessed on 20 August 2019)

Suzhou Forestry Bureau (2016). *Suzhou Wetland Protection Planning (2016–2030)*. Suzhou: Suzhou Forestry Bureau.

Suzhou Municipal Government (2019). *Statistical Communiqué of Suzhou on the 2018 National Economic and Social Development*. Suzhou: Suzhou Municipal Government.

Suzhou Wetland Protection and Management Station [SWPMS] (2019). *Annual Report of Suzhou Wetland Protection in* 2018. Suzhou: Suzhou Forestry Bureau.

Sze, J. (2015). *Fantasy Islands: Chinese Dreams And Ecological Fears in an Age of Climate Crisis*. Berkeley, CA: University of California Press. doi: 10.1525/9780520959828

Turenscape (2003). *The publishing of Road to the Urban Landscape - Communicating with Mayors*. Available online at: http://old.landscape.cn/special/news/2014spongecity/index.html (accessed 21 July 2019)

Turenscape (2018). *Suzhou Zhenshan Park. Turenscape projects website*. Available online at: https://www.turenscape.com/project/detail/4691.html (accessed 21 July 2019)

van Der Heijden, H. A. (2005). Ecological restoration, environmentalism and the Dutch politics of 'new nature'. *Environ. Values* 14, 427–446. doi: 10.3197/096327105774462700

Wang, S. X., and Song, X. L. (2012). *Sanshan Island: Wu Huisheng's Love Affair with Wetlands*. Available online at: http://news.ifeng.com/mainland/detail_2012_11/27/19582597_0.shtml (accessed 15 May 2019)

Wildavsky, A. (1979). *Speaking Truth to Power: the Art and Craft of Policy Analysis*. Boston, MA: Little & Brown. doi: 10.1007/978-1-349-04955-4

Worster, D. (1994). *Nature's Economy: A History of Ecological Ideas*. Cambridge, MA: Cambridge University Press.

Wu, F. (ed.) (2006). *Globalization and the Chinese City*. Abingdon: Routledge. doi: 10.4324/9780203698716

Xia, Z. N. (ed.) (1979). *Cihai*, 3rd Edn. Shanghai: Shanghai Lexicographical Publishing House.

Yang, S. Z. (2014). *Theory and Practice of the Sponge City From Yu kongjian and Peking University*. Available online at: http://old.landscape.cn/special/news/2014spongecity/index.html (accessed on 15 May 2019)

Yang, W., Chang, J., Xu, B., Peng, C., and Ge, Y. (2008). Ecosystem service value assessment for constructed wetlands: a case study in Hangzhou, China. *Ecol. Econ.* 68, 116–125. doi: 10.1016/j.ecolecon.2008.02.008

Yearley, S. (2005). *Cultures of Environmentalism: Empirical Studies in Environmental Sociology*. London: Palgrave Macmillan. doi: 10.1057/9780230514867

Yeh, E. T. (2009). Greening western China: a critical view. *Geoforum* 40, 884–894. doi: 10.1016/j.geoforum.2009.06.004

Zhang, G. W. (1639). *The Water Conservancy of the Wu District*. Available online at: http://image.cnki.net/Document/ZGLD2011030170003.html (accessed May 1, 2020).

Zhang, L., Mol, P. J. A., and Sonnenfeld, A. D. (2007). The interpretation of ecological modernization in China. *Environ. Polit.* 16, 659–668. doi: 10.1080/09644010701419170

Zhao, B., Li, B., Zhong, Y., Nakagoshi, N., and Chen, J. K. (2005). Estimation of ecological service values of wetlands in Shanghai, China. *Chinese Geogr. Sci.* 15, 151–156. doi: 10.1007/s11769-005-0008-8

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