Finding space for flowing water in Japan's densely populated landscapes

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Abstract: With its rapidly flowing rivers and plentiful summer rainfall, twentieth-century Japan has a history of frequent flooding. The effects on its densely populated flood plains have often been devastating. Japan also has one of the world's landscapes most heavily covered in concrete. In recent decades, however, the Japanese state has turned hesitantly to new techniques of releasing of water into the sea buttressed by a concern for ecological well-being. Its 'nature-oriented' river landscaping programme is an attempt to find a more sustainable balance between flowing water and the built terrain, allowing water to make space for itself. Our paper sets this programme in its historical context, relating it back to the pre-modern period and juxtaposing it to prevalent modernist twentieth-century practice. Throughout this paper, we focus on the interweaving of discourse and practice, drawing attention to the 'idiom' of river landscaping as well as to the role of the state in defining this idiom. We argue that a sort of reconciliation is occurring between the contrasting discourses and practices of 'hard' and 'green' engineers.

The salience of flowing water

This paper introduces a campaign of unusual vigour and longevity to transform Japan's river landscapes. It is known today in Japanese as *ta shizen kawa-zukuri*, which translates literally as multi-nature river building but has been given the English title of Nature-Oriented River Management (NORM). It originated with a ministerial decree in 1990, and twenty years later, is still going strong. Our paper sets the movement within its context, both historical, of changing policies on water and landscape, and contemporary, of diverse pressures on policy and environment.[1]

The Japanese landscape is particularly fertile ground for this type of study. Japan is a mountainous country with narrow valleys and fan-shaped alluvial flood plains; seventy-five percent of its territory contains mountains with slopes too steep for safe human habitation. It has a history of landscape intervention, its mountains denuded of trees for construction, river courses diverted, marshlands reclaimed, and later its river beds stripped of gravel for concrete. But more than this, it exhibits a set of circumstances that give an exceptional resonance to issues of water management. Average annual rainfall in Japan stands at 1800 mm, which is somewhat above the global average, but on a per capita basis, well below. At the same time, per capita demand for water is high (Ven *et al.*, 2008, page 8). This is in a country characterised by a number of outstanding features: a population concentrated in small and densely populated flood plains (nearly three-quarters of Japan's population lives in the corridor stretching from Tokyo to Fukuoka in the north of Kyushu), rivers that flow precipitously down narrow valleys before disgorging lethargically through wide part-stony and part-vegetated beds in the flood plains, rainfall that can occur in extremely heavy and prolonged downpours, and as a result huge disparities between normal flows and peak

[1] This paper draws on field work conducted over the last twenty years, and involving longer visits to Japan in 1995 and 1996, and more recently in 2008 and 2010. Numerous interviews were conducted with local and central government officials, academics, campaigners, environmentalists and many 'non-expert' citizens.

discharges. What is more, a century and more of construction of dams, barrages and weirs has led to all sorts of changes in flow volumes. It is this highly unusual set of pressures that lends such great intensity and fascination to Japanese attempts to resolve tensions around the passage of water into the sea and the landscaping of its rivers.

Over the last hundred years or so, there has been a transformation of the alluvial flood plains, not just as a consequence of industrial urbanisation but also of the complete re-design of rice fields and irrigation systems. Three times the rural landscape of rice paddies has been re-engineered in modern times, with rice fields redesigned and new irrigation channels dug (Kelly, 2007; Kase, 2003). Mountains have been denuded and reforested in campaigns that carried strong nationalist propaganda messages (Komeie, 2010). The process of covering in concrete the landscape (coastline, banks and beds of river and irrigation channels, forestry tracks, hillsides) reached its apogee in the post-war decades with an orgy of dam building that has continued until very recently because of time lapses and bureaucratic intransigence. While most dams are small, they have had drastic effects on water flow, and many of them have silted at far higher rates than anticipated. The blocking of sediment behind the walls of dams is deeply ironic in a country in which nearly all the population lives on alluvial flood plains originally brought into being through processes of siltation. The post-war era of rapid economic growth and development in concrete was also one of unprecedented damage and loss of life through flooding. Pollution crises at home and a new international context of concern over environmental degradation and global warming have been reflected within Japan through, on the one hand, an emphasis on technological 'green' fixes and on the other a policy of greater openness to environmental issues, manifested in an appreciation of rivers as natural systems and recent reforestation campaigns based on affection not function (Knight, 2000, page 355). But this is set within a difficult social, political and indeed existential environment of agricultural decline and aging population.

Conceptually, the paper builds its argument around a number of overarching themes, each of which picks up on and develops themes that have resonance within a wider study of the political ecology of Japan's landscape. The foremost of these involves issues around finding space for water in a never-ending search for equilibrium. There is nothing so unusual about the Japanese experience of covering river channels in concrete. The taming of wild and unruly flows has led to the same resort to control in concrete from Los Angeles to Seville to Seoul (Gandy, 2006; Cho, 2010; Adams *et al*, 2004). The control and exploitation of water has been considered essential in order to make a modern state run efficiently and to enable industry to convert nature into industrial goods. In other words, the taming of flowing water is a fundamental element in the overarching project of modernity (Kaika, 2005). Equally, for the last few decades if not longer, river restoration has been a significant activity in many parts of the world including Europe. Networks such as the European Centre for River Restoration have been formed to disseminate best practice and coordinate networking. Funding sources have become available. All of this is but a part of wider concepts of ecological restoration or environmental repair on the one hand and in policy terms of holistic and comprehensive approaches to catchment management (Nienhuis *et al*, 1998). In Japan, the business of finding space for water -- or allowing water to find its own space -- is a constant engineering and design challenge as well as a pressing need given the frequency and impact of flooding. With its vast number of water courses, the scale of the move from an overlapping border between land and water to a very rigid one and now, hesitantly, back to a fluid one is considerable.

Subverting dichotomies of landscape

The urban political ecology literature sets out to undermine a number of apparent dichotomies. It sees the urban and rural as coterminous and distinctions between them as meaningless at best, misleading at worst (Keil, 2003; Gandy, 2002, page 6). In Japan the

extent of interweaving of urban and rural is remarkable. Urban areas splash out in unpredictable ways and spread out along a dense grid of roads. Rice fields are girdled by concrete irrigation channels where they have not already been converted into hard-surface car parks. Any distinction between urban and rural is lost in the landscape (Heynen, Kaika and Swyngedouw, 2006, page 11). Equally, the nature-culture dichotomy has been attacked in a number of different intellectual terrains. In the context of Japan there is a longstanding critique that starts with a recognition of the different derivation and connotations of the word used in Japanese for 'nature', *shizen*. Japanese *shizen* is seen by many writers as dispensing with dichotomies of self-nature and nature-culture (Tellenbach and Kimura, 1989; Kalland, 1995). Others, while recognising a non-Cartesian essential starting point, warn of the dangers of an idealist perspective built around the concept of a 'nature-loving' people (Waley, 2000b).

Just as this paper seeks to subvert binaries of urban-rural and culture-nature, so too it interrogates dichotomies of real and discursive. We argue here that language frames our conceptual and material approach to nature and to its restoration (Swyngedouw, 2004; Cho, 2010). Finding an appropriate idiom for landscape change takes us beyond dichotomies of nature and culture, and at the same time reminds us of the importance of the discursive framing of landscape. The search for appropriate terminology -- are we doing river restoration, river rehabilitation or river repair? -- reflects deeper levels of uncertainty and raises questions about the nature of ecosystems, and human agency as part of ecosystem. The discursive reference defines the material activity; material practice calls for translation into culturally inflected idiom (Swyngedouw, 2004, page 23). The two -- discourse and material practice -- are symbiotic.

This paper follows the evolving discourse of a restorative approach (to use yet another term) to flowing water in Japan and it reflects on the issues that arise when this package of discourses and practices seeks to reconcile itself with an apparently contrasting set of discourses and practices that privileges a marshalling of water behind a rhetoric and practice of disaster (flooding) prevention. The tension between competing visions of riverine stewardship has been, and continues to be, wrapped up in a Confucian vocabulary of *chisui* and *risui*, 'controlling water' and 'using water'. In more recent years, an idiom of proximity to and affection for water has evolved in terms like *shinsui kōen* (affection-for-water parks) or been resuscitated in older expressions that refer back to Tokugawa-period practices of summer boating that have become popular once again. And more recently still, a new cluster of terms has made its way into the public consciousness as part of the NORM programme.

Elsewhere in East Asia too, river works are dressed up in green discursive clothing. In South Korea, rather than reconciliation we find a triumphalist fusion; the Seoul government's Four Rivers project uses a discourse of restoration to justify developmental projects based on construction in concrete. In Seoul itself the earlier removal of an urban motorway and 'reinstatement' of a 'natural' stream in its place was 'discursively created by a social experiment on the idea of restoration' (Cho, 2010, page 151). In China too, an ambiguity is apparent between a discourse of ecology and restoration on the one hand and a continuing adherence to a practice of large-scale harnessing of water within concrete.

Another conceptual thread that runs through this paper is the role of the state as guardian and steward of the environment. In the context of East Asia, a long history exists of linking water management to state power. Indeed, Karl Wittfogel, although critical of the ideas on this subject of Marx and Weber, framed a theoretical *Weltanschauung* around the notion of a hydraulic society controlled through a system of 'Oriental despotism' (see Bray, 1986, page 65, for a critique). One might argue that the activities of the former mayor of Seoul and later president of South Korea Lee Myung-Bak represent a latter-day adaptation of these views. Not only did Lee build his career as mayor around the project to 'restore' the Cheonggyecheon in Seoul, but in his later Four Rivers project he has used the discourse of

river restoration as a vehicle for the ideas and methods of leading civil engineering companies on a nationwide basis.

It is, however, an Orientalist fallacy to see something peculiarly 'Asian' about strong state control over water resources and their distribution. Eric Swyngedouw (2007) has shown, for example, how Franco manipulated political power through the control of water resources in Spain. But it is not only the state, nor necessarily the state on its own, that exercises control over water. Frequently, monopoly capital dominates the process and exerts control over water resources, and Swyngedouw proposes the "power/money/water nexus as a conceptual triad" (2004, page 2). It is in this context that we consider the role of the Japanese state in designing the country's riverine landscapes.

Transformations of the archipelago

The central argument of this paper surrounds the changing idioms and practice concerning the making of space for and by water in the contemporary period. The discussion moves on from a brief contextual review of the history of river planning in Japan to examine the partial departure from hard engineering techniques and move towards comprehensive river planning, celebration of 'river culture' and 'nature-oriented river management'. The text moves in more or less chronological fashion but emphasises throughout the overlapping nature of changing ideas and practices and the tendency in recent decades to hark back to a sort of unblemished and unitary Tokugawa period. However, great changes to the Japanese landscape occurred during the two and a half centuries of Tokugawa rule (1600-1868). Periods of exploitation of forests and drainage of marshlands were followed by retrenchment and conservation (Totman, 1989). Totman writes of a perpetual struggle and investment of human energy to counter the energy of water (1992, page 76). Irrigation and transport (in other words, *risui*) tended to have priority over water control (*chisui*), while flood waters were absorbed in retention ponds (Ōkuma, 1994, page 20). Much work was done to deepen river flows for navigation purposes. Despite the occasional and partial establishment of an equilibrium, it was a constant struggle to combine agricultural expansion with conservation of resources (Komeie, 2010).

The urbanisation of its alluvial flood plains was the great central change in Japan's landscape in what one might call Japan's long twentieth century, starting in the 1870s and tailing off in the 1980s and 1990s. The significance of this process cannot be underestimated. It caused a precipitous decrease in area of water retention and infiltration and a concomitant increase in impermeable surfaces, and it created a material and human infrastructure prey to damage and destruction. The Japanese landscape was placed under ever more intense pressure. These pressures invariably involved water, with vastly increased demand for water for irrigation, for industry and households and for hydro-electric power. In the face of these challenges, the state soon came to see itself as the only agent able to control and manage 'water' in its various capacities. The River Law, enacted in 1897, was principally concerned with flooding and the role of the state. Under the law, central government undertook to carry out flood prevention work (Matsuura, 1989, page 113). The focus of the law was on flood prevention, to the point where it came to be known as the 'water control law' (*chisui hō*). Water use (*risui*) by now was limited primarily to irrigation, as the railways had begun to make serious incursions into the role of water-borne transport.

By around 1900, the growth of urban areas in flood plains had begun to give rise to serious flooding, exacerbated by the neglect and dismantling of the earlier water retention features. Political pressures were now being brought to bear on the government by newly elected national representatives, many of whom were landowners, to do something about flooding. Early riparian work was carried out on the main rivers of Tokyo and Osaka, but without significant effect. Indeed, the newly industrialising east of Tokyo suffered severe flooding in 1907, 1910 and 1911. In response to these floods, the Japanese government

established in 1910 the First Water Control Plan, and flood control was put on a par with Korean and fiscal policy (Matsuura, 1994, page 142). Japan's first concrete dam was built in 1900, supplying drinking water for Kobe. In 1924, its first two dams were built specifically for the purpose of generating electricity (Ōkuma 1988, 181), but the major projects of the pre-war years involved the construction of new outlets, broader but encased within concrete, for most of the country's major rivers.

The post-war years saw an intensification of state control over resource management. In particular, the two decades following the end of the war witnessed an escalating and deadly dialectic between damage and casualties caused by flooding and a desperate attempt to counteract the flooding through the construction of dams, barrages and concrete supports. With the disappearance of riverside shrubs and trees and the neglect of the upkeep of river banks, especially during the period of militarisation and the immediate aftermath of the war, it is hardly surprising that the post-war years witnessed frequent and devastating floods followed by a period of acute water shortages (Takahashi, 1995, page 46; Takahashi, 2004, page 101). In almost each of the fifteen years from 1945 to 1960, over 1,000 people were killed as a result of flooding (Stalenburg and Kikumori, 2008, page 97). Ironically, these floods were greatly exacerbated by the flood protection works that had been undertaken in the earlier decades of the century, which served to augment peak flood discharges in downstream areas to a point where they could no longer be contained by the levees (Takahashi, 2009, page 549). The most devastating of these floods was caused by the Ise Bay typhoon in 1959, when over five thousand people lost their lives, mainly in an industrial zone in south Nagoya built on reclaimed land. The recurring disastrous floods can be seen very much as a component of the range of environmental and pollution catastrophes that struck Japan in the 1960s as a result of poorly regulated industrial development.

A New River Law was enacted in 1964. It moved river planning away from a priority on water control back towards a dual emphasis, water use alongside water control. The law was one of a number of measures introduced around this time which Igarashi Takayoshi (1997, page 91) sees as being designed to enhance central bureaucratic control. He points to the creation in 1961 of the Water Resources Corporation, now known as the Water Agency, to manage the infrastructure of water for supply from multi-purpose dams. Igarashi draws a picture of legislative acts and bodies designed to enhance central bureaucratic control over the construction of dams. A pivotal role, he argues, was played by the Erosion and Flood Control Emergency Measures Law of 1960. This law set out 16 different types of public works, including roads, airports and ports, each with its own five-year plan, drafted by central government officials, with local government being informed post facto of their contents (1997, page 84). The plans were normally approved as a package, leaving next to no opportunity for discussion about the merits of a specific project. Meanwhile, central government's responsibility for management of Japan's 109 major river basins was written into the New River Law. In many ways, this can be seen as the high water mark of modernity in Japan.

Although some dams had been built on Japanese rivers before the Pacific War, it was in the years after the war, and in particular from the 1960s on, that large numbers of multi-purpose dams were built (Shimazu, 1991, page 9). These dams were an attempt to harness power generation with the orderly supply of water for agriculture, industry and domestic use, alongside flood control functions. Dams were, however, only part of the picture. "[They] were", writes Takahashi Yutaka, "constructed mainly in upstream areas. In the mid- and downstream areas, constructions concentrated on levees, levee revetments, barrages, waterways, saline barriers, training levees and coastal protection works to control erosion and protection from tidal waves" (2004, page 101).

Most dam construction projects in the 1950s and 60s were accepted by a compliant population. It was only after the epochal struggles that started in the late 1960s against mercury poisoning and other extreme forms of pollution in Minamata (Kyushu) and other parts of the Japanese archipelago that local residents started to manifest unhappiness with the role of the state and its environmental policy. But it was not until after severe flooding in 1972 that residents first brought lawsuits against river administrations (Takahashi, 2004, page 103). With other large rivers breaking their banks in urban areas, including the Tama River, which flooded houses in Tokyo in 1974, court cases proliferated (Ōkuma, 1988, page 232). These took place against a backdrop of protests against pollution, of citizens' movements formed to fight specific projects, and of victories for reformist parties in local government elections. And it was these court cases that prompted new thinking about ways to bring people closer to rivers and water and counter the damage from flooding.

Comprehensive river management and new approaches to flood management.

There is no one major event that ushers in a new approach to flowing water. It was not an instant nor a total change of direction, but rather, a realisation that the state needed to bring in civil society and concerned residents, that it needed to relax its hold on water management and move away from a unilateral reliance on concrete and hard engineering towards a more holistic approach. There are three basic elements to this new approach. The first is a more flexible and holistic set of policies to flooding, recognising the need to pull together different administrative units through which rivers flow. The second is celebratory: an attempt to attract people to riverbanks and waterfronts and make these more attractive places. And the third is the introduction of eco-friendly techniques -- or green engineering -- to riparian works. As the state brings in partners to work with it on river-related issues, so the existing idiom of river landscapes is extended and enriched to reflect new activities, attitudes and policies.

In 1976, the minister of construction asked the ministry's advisory council on rivers to recommend policies for a comprehensive policy on water control, *chisui* (Ōkuma, 1988, page 232). The council recommended a series of 'soft' policies to limit (rather than eliminate) the damage caused by flooding as part of a 'comprehensive *chisui* strategy', a concept similar to the integrated river basin management that came to occupy centre place in river management policy in Europe (Nienhuis *et al*., 1998). The council recommended the formation of advisory bodies for each of Japan's river basins. This new thrust was accompanied by policies to improve water quality and was reinforced in subsequent reports. In talking about minimising the damage from flooding, this new policy shifted emphasis (back) towards floodplain management, water retention ponds and riverside plantations. This new policy approach has been seen as "a rediscovery of the thought current three-hundred years ago" (Ōkuma, 1988, page 246).

The new emphasis in policy was bolstered by the passage in 1997 of a revised River Law. There were three new provisions that were designed to catch the eye. The first was the inclusion of the environment (*kankyō*) as an aim of river policy alongside *chisui* and *risui*; the second was the participation of local residents in the drafting of river basin management plans; and the third was the incorporation of nature-oriented river management in all river engineering projects. The promotion of the 'environment' as a key element in river planning was announced with a flourish, but its impact on the practice of river engineering has come in for some criticism. Its critics saw it as little more than ministry 'sloganeering' (Momose, 1997, page 153). The greater role for local residents alongside 'experts' was reflected in the new mood of celebration of not-for-profit civil society organisations (NPOs), whose activities were growing in the wake of the 1995 Kobe earthquake and who were regulated in a new legislative structure, the NPO Law of 1998.

This new thrust of river policy was accompanied by a consciousness of the need to think more holistically and adopt a broader range of measures to tackle multiple issues leading to wasteful and damaging use of water and the continued and even increased danger of flooding. These issues remain at the forefront and are being tackled on a number of fronts. For example, a more flexible approach to water storage in dams and to flow releases has been introduced, at least on some river courses (Harada and Yasuda 2004, page 86; MLIT, 2008, page 18). Local governments have been pursuing a number of measures, among them measures to improve storm water drainage, create new underground channels and separate rain water from waste water. And, over the last two decades various schemes have been introduced to re-supply groundwater tables (Gippel and Fukutome, 1998, page 309). These measures illustrate a discourse of joined-up thinking on the need to adopt holistic approaches to water and river issues. And they are the result of a less exclusionary government attitude, one that reaches out to embrace a wider range of 'expert' opinion.

River re-landscaping: re-integrating rivers into people's daily lives

From the 1980s or thereabouts, a new narrative began that celebrated Japan's river culture through the implementation of 'hometown river projects'. Part of a more widespread 'discovery' of the Japanese countryside, this movement coalesced around a sense of celebration of the spaces alongside water, encapsulated in terms such as *mizu to fureau*, being in contact with water, and *suigō*, or river country. It was encapsulated in the neologism, *kawa no bunka*, river culture. In the context of water and rivers, these projects were built around aesthetics, amenities and access. Writing in 1995, one commentator talked of a new meta-narrative of bringing people and water closer together, replacing the previous one of keeping them far apart (Hagiwara *et al*, 1995, page 261). They were especially designed for the enhancement of urban rivers and aimed to create aesthetic riverscapes of high amenity value (Waley, 2000b). They focused on restoring the cultural values of waterfronts and re-connecting people with their local rivers. The work involved for the main part small, urban rivers or streams. It was undertaken by agencies of local government, and it was uncoordinated.

The hometown river projects were a manifestation of the concept of hometown making (*furusato-zukuri*), which emerged in the Japanese media in the 1970s and 80s as a celebration and representation of 'Japanese-ness'. The term, infused with nostalgia, became popular within a broad spectrum of media such as TV programmes including a long-running television series called Hometown River (*furusato no kawa*), magazines, news reports, and commercials and related events were held in tourist villages and festivals in various parts of the country (Robertson, 1998). The whole re-discovery of 'hometown' was a product of a time of unparalleled prosperity (the 'bubble years'), and a search for cultural distinctiveness (known as *nihonjinron*, 'theories of Japanese[-ness]'). It was part of a landscape of affluence, when prosperity matured into a leisure boom, and resort facilities were constructed around the country (Rimmer, 1992; Ching, 2000). The mood of landscape celebration that ensued was supported through legislation (the Resorts Promotion Law) and through government largesse -- the Hometown Revitalisation initiative, under which all local government entities regardless of size received ¥100 mn to spend as they pleased -- a gesture designed to increase domestic consumption and reduce Japan's trade surplus with the US.

Notions of 'Japanese-ness' were incorporated into the design of Hometown River projects in suburban areas. The projects largely focussed on re-creating a nostalgic image of a landscape scattered with small streams, but long lost in the urban concrete communities. This was both a retrospective reference to a time when rivers played an important economic and cultural part in regional life and an act of communal reminiscence to a time of carefree

childhood summers spent splashing around in rivers hunting for insects and fish (Kalland, 1995; Laurent, 2000; Graburn, 2009).

Firework displays in the hot summer months sponsored by local governments and located along riverside and waterfront areas have become a fixture of summer time in Japan. Lantern boats are hired out along urban rivers in many Japanese cities and have become favoured venues for office parties and all sorts of other get-togethers. At the same time, a whole host of community events are held along (and in) rivers up and down Japan. Some of them involve boats, others sporting contests, and many of them are educational in intent. Indeed, a trip to the waterfront has become a regular feature of school work. These various activities were accompanied by (and sometimes grew out of) government campaigns that had names like My Town My River and Love River (MLIT, 2008, page 66).

Most re-landscaping projects have been undertaken on much smaller waterways, and have involved the introduction of traditional landscaping features to create riverscapes designed for aesthetic enjoyment to which the public is given full access. Generally, these re-landscaped stretches are open access, encouraging the passer-by to cross the water over bridges or via stepping stones. The projects are to be found all over Japanese towns and cities and vary from the highly artificial to less intrusive attempts to look natural. As with some prominent early examples in suburban east Tokyo, they have names such as 'affection for water' parks (*shinsui kōen*) (Waley, 2000b).

Alongside these projects that reinforced a sense of waterways as spaces aesthetically engineered for human enjoyment, there was a growing interest in seeing and understanding rivers as habitats for animal life. Here too, however, the celebratory aspect was prominent. This was not just about all or any wildlife. Certain species were singled out for special regard. Among these were dragonflies and fireflies. Fireflies in particular were raised to symbolic status; where fireflies thrive, the water is said to be clean (Miki, 1984, page 12). Fireflies were imbued with a moral purity (Laurent and Ono, 1999). While one should not doubt the power of these projects to appeal to a wide public, a note of criticism has been sounded by a number of writers, who have pointed to the problems caused, for example, by excessive numbers of fireflies and dragonflies (Morishita, 1995, page 159).

The change in attitude towards rivers and waterways was representative of a new period of interaction with and appreciation of the Japanese landscape. In these re-landscaping projects nature, and especially waterfront nature, was packaged and presented to the Japanese public in a way designed to draw people (back) to the river bank and waterfront. A vocabulary of 'affection for water' was created for this purpose, and set alongside an album of images of a symbolised nature. The celebration of rivers was very much a cultural reading. It was -- and continues to be -- based around both festivals and events and an appeal to aesthetic sensibilities, to a landscape and a performance of landscape that contains approved and admired historical referents.

Introducing an eco-aesthetic into river landscaping

A further, almost contemporaneous departure from the concrete encasement of rivers has been the insertion of ecological considerations into engineering work on the country's river banks and beds. Initiated in 1990 with a note of administrative guidance from the Ministry of Construction to restrict the use of concrete and adopt practices that promote animal and plant life, this policy has now been in force for over twenty years and, despite some difficulties translating ideals into practice, appears to be having some considerable impact. This new emphasis on nature, predicated on the importance of protecting ecosystems, developed from a narrow but influential base in the early 1990s and reflected growing worldwide concern about the unsustainability of current development patterns. It was built around the same

geographical spaces as the 'aesthetic' landscaping of the 1980s, and used a similar cultural palette. The idiom, however, differed, incorporating a new vocabulary of ecological care.

The new approach was given the name *tashizen-gata kawa-zukuri* (multi-nature-style river planning). It was, according to one carefully worded and somewhat guarded definition, "a movement away from the hydraulically smooth, hard-lined canals having a very artificial appearance, towards the creation of waterways that appear and function more naturally but have similar or improved flood capacity" (Gippel and Fukutome, 1998, page 307). And it has its limits, as the same authors note (page 313): "Given that providing flood protection and channel stability will always be the major consideration, restoration of rivers to a pristine hydrological, geomorphological and biological condition is not a realistic option". Despite occasional claims to be something slightly different, NORM was and remains a form of what might best be seen as green engineering with a focus on flood protection.

This new approach to river planning with its emphasis on protecting ecosystems can be traced back to a group of interested officials, planners and ecologists in Yokohama in the 1980s. A trial was carried out on the Izumi River near Yokohama. As with later projects, the scale was small, on a 2.8 kilometre-long stretch of river (Åberg, 2010). Other pilot projects soon followed. The energy driving the movement forwards was supplied by a number of individuals, including Seki Masakazu, who served as a senior official in the Ministry of Construction's River Bureau before his early death in 1995 (Waley, 2000a). Seki was instrumental in the introduction of the 1990 circular stipulating that all river works should include some element of nature orientation. He and others involved in the movement were inspired by river restoration projects in Switzerland and Germany (Seki, 1994). The NORM programme was conducted with quasi-religious zeal, through the holding of seminars, festivals, celebrations (notably on River Day, 7 July) and media events.

The programme was led by a group of like-minded people drawn from government, universities and environmental consultancies, an alliance described in detail elsewhere (Waley, 2005). Much of the organisational direction was provided by the Foundation for Riverfront Improvement and Education (FRIE; *ribaafuronto seibi sentaa*), a body inaugurated in 1987 and affiliated to the Ministry of Construction (MOC). So while leadership and direction came from the state, members of the relevant state agencies were careful not to be acting on their own. Instead, they drew on the support and active engagement of influential experts and practitioners with whom they have acted in close concert. Together, this 'soft elite' of stewards of the environment have with some success harnessed local energies into forming river-based campaigning groups. National leadership of local groups is provided by bodies such as Mizukan (the National Association for Water Environment Groups), independent from the state but working in close partnership. At a local level, public awareness and support is seen as vital for a number of reasons. Local residents are needed for purposes of river cleaning and maintenance, and they can thus be used as instruments to promote community cohesion and responsibility. This has been effected with considerable success in the case of the Izumi River in Yokohama (Åberg, 2010).

The nature of green river engineering in Japan can be discerned through the idioms used in Japanese to describe it and give it substance. Tellingly, the campaign has been conducted under the overall rubric of river building (*kawa-zukuri*) and, latterly, river repair (*kasen kaishū*), although the sense of 'repair' is present from the start. River building might sound a strange expression in this context, but it reflects the centrality of riparian work for flood prevention in the history of state intervention in the environment. A series of publications, most of them edited and authored within the FRIE, have defined the parameters and direction of NORM. These books are, by and large, best practice manuals produced for the benefit of practitioners, that is to say, engineers in regional and local government offices, community and local government officials, and environmentalists. Earlier volumes, published

in the early and mid 1990s, start with short texts on riverine vegetation and wildlife. They provide examples of best practice abroad, chiefly in Switzerland and Germany (FRIE, 1992, page 80). Traditional Japanese riparian techniques are introduced, alongside a recognition that in many parts of the country they fell a long time ago into desuetude (FRIE, 1992, page 86).

The earlier volumes are coloured by a language of landscape repair. Readers are informed of the importance of respecting and re-fashioning riverine features such as pools (*fuchi*), riffles (*se*) and backwaters (*wando*) ('in natural rivers there are riffles and pools' -- 1992, page 16, our translation). Concepts such as biotope are explained and illustrated. Through the illustrated presentation of numerous examples, the aim is 'to re-create the natural quality of rivers' (1992, page 104) and 'to make a natural-looking landscape along rivers' (1992, page 105). Elsewhere in the same volume, according to a chapter heading, the goal is 'to make rivers that are amenable [literally, gentle] to insects and birds' (1992, page 130). Later volumes cover issues such as the correct (in other words, random) placement of stones in river beds, the best ways to use wooden stakes to support river banks and the most appropriate use of fish ladders. While the 1990 administrative guidance called for a move away from concrete, it is recognised that concrete cannot be entirely removed. So there is much attention devoted to how best to cover concrete with earth to ensure that plants bind earth to bank. Photographs show banks where grass or plants have failed to grow, leaving it prey to erosion (FRIE, 1996, page 36).

Ultimately, the landscapes created by nature-oriented river management, at least in urban areas, elicit discursive responses from local residents. In a survey of people living in the vicinity of the Izumi River, even though 'natural feeling', 'greenery' and 'wildlife' were among the most important features perceived to characterise an attractive riverscape, most respondents rated a more elaborately landscaped stretch slightly higher than one rehabilitated according to a closer reading of the precepts of NORM (Åberg, 2010). This reinforces the sense of an 'eco-aesthetic' of river landscaping.

Technical disciplining of nature-oriented river engineers

The attempt to re-write Japan's river landscapes, drawing engineers away from their previous automatic recourse to concrete, has not been straightforward. In recent years, two reports have been compiled highlighting some of the shortcomings of the movement. One was undertaken by a review committee in 2006, to mark 15 years since the passage of the first ministry circular on the subject. The other was a report issued by MLIT (the Ministry of Land Infrastructure Transport and Tourism, successor organisation to the Ministry of Construction) in 2008 to mark ten years since the passage of the revisions to the River Law. The Nature-Oriented River Works Review Committee found in its 2006 report a number of problematic areas, including perception, technology, institutional framework and training (2006, page 4). There was a lack of assessment and evaluation, a lack of appropriate technology, a failure to transmit knowledge and inadequate involvement of the public. The review committee found that nearly 70 percent of all river works were not following the policy recommendations to use new technology for constructing varying channel widths and 'soft' bank revetments; 42 percent of the projects studies were lacking any kind of pre-project monitoring; and 87 percent of the projects were without post-project monitoring. The findings from the review led to a reformulation of Nature-Oriented River Works (*tashizen-gata kawa-zukuri*) into the term currently used, officially translated as Nature-Oriented River Management (*tashizen kawa-zukuri*). The rewording aimed to stress the importance of managing the whole river system and not just construct site-specific remedies, a move away from models (*gata*) towards recognising the individual characteristics of each river (2006, page 8). Fundamentally, it would appear that directives from the centre to incorporate eco-friendly, green engineering techniques were being treated mechanistically by local officials who neither completely

understood them nor sympathised. The old constraints on water were, in many cases, simply being re-applied in a slightly revised guise.

The report published by MLIT in 2008 is a substantial and wide-ranging review and critique of the planning and upkeep of river environments building on the earlier findings. The report flags up a number of problems with NORM projects (for example, failures in understanding, lack of evaluation, lack of training facilities) and suggests some ways forwards, including sending consultants on site, establishing a framework for evaluation, and encouraging participation by local residents again through setting up appropriate structures (MLIT, 2008, page 30). In its conclusion, the report stresses the need for a more integrated approach to river planning, integrated within river basins, with related water issues, with local and regional residents and cultures (page 127).

Two new manuals of technical standards for NORM have been published to guide river managers and clarify concepts. The first of these starts with a re-definition of the aims of nature-oriented river management, as follows: firstly, to preserve and repair complicated topography while making use of fluvial dynamics; secondly, to obtain the space that permits rivers to work; thirdly, to preserve and repairs rivers' connectivity; and fourthly, to create rich river landscapes (NORM Study Group, 2007, page 4). Indeed this and the ensuing manual, published in 2008, direct much attention to giving rivers the space they need to flow freely. This is precisely what is difficult in the Japanese context of densely populated flood plains. Nevertheless, river planners are urged to try not to interfere where banks and bed are good, to give rivers space in which to work, not to increase the speed of water flow, and always to build in inspection and maintenance and so, on this last point, to work with local residents (NORM Study Group, 2008, page 7). These promptings are brought together in an official government guideline announced in 2008 entitled, 'Concerning technical standards for river planning on small and medium rivers' (River Bureau, 2008).

NORM is part of a wider programme of concern for the environment that includes a Law for the Promotion of Nature Restoration (2003) involving a number of large-scale nature conservation projects. The Japanese government has developed a national strategy on biodiversity part of which is based on the conservation of previously neglected rice-field and woodland landscapes (known respectively as *satochi* and *satoyama*). This programme to conserve and celebrate rural landscapes, called the Satoyama Initiative, is now part of an international campaign to promote an aesthetic of landscape that has long been under severe threat in Japan (www.satoyama-initiative.org). The idiom of harmony between people and nature and the images of cultivated rice terraces picks up on a very similar cultural-aesthetic imaginary as river landscaping and transmits it over a wider territory, straddling the ground between the cultural referents of the hometown river projects and the eco-friendly discourse of nature-oriented river landscaping.

Nature-oriented river landscaping and the construction state

Throughout recent decades of changes to river landscape and water management policies, the state has been in control. The state, of course, is not monolithic, and contains divergent tendencies. Unresolved and perhaps inevitable tensions exist, as Kaika (2006) has shown for Greece in the 1990s, even if they have not developed into diametrically opposed paths of movement. For many years, officials of the Ministry of Construction (not, it should be noted, the Environment Agency, precursor of the Ministry of the Environment), would brook no opposition in their management of landscape and policy. They refused to compromise, and this led to some of the longest and most bitter disputes in Japanese history, including those concerning the five-decade old struggle over the Isahaya barrage in Kyushu and the briefer but even more bitter conflict over the Nagara weir near Nagoya (Vosse, 2000). They stood at the apex of the Japanese 'construction state', which was built around a large and diverse

construction industry and the close ties that exist between the industry and politicians (Honma 1996; Woodall 1996; Igarashi and Ogawa, 1997; McCormack 2002).

Throughout relevant areas of government and affiliated government organisations, officials were and still are likely to have been trained as engineers. Their vision of water as object to be trained brings with it the weight of convention, orthodoxy and science -- in one word, modernity -- and has all too easily occupies hegemonic terrain. The 'hard' techniques they advocate come out of the manual of modern engineering. Officials still complain that they dominate the construction offices of local government and the regional bureaus of the ministry. Many senior positions today, however, are occupied by 'green' engineers, who advocate an approach rooted in concerns for ecology and respect for the innate properties of water. Civil engineers dominate river divisions of MLIT, as they do the organisations affiliated to MLIT that have directed the NORM programme -- the Foundation for Riverfront Improvement and Education and the Public Works Research Institute. The head of the ministry's River Bureau at the time of clashes with opponents over the construction of the Nagara weir later became president of the Foundation for Riverfront Improvement and Education, the main government-affiliated body directing the NORM movement. Little could be more revealing of the shift in government approach to its sense of stewardship of the Japanese landscape.

Whether it is compromise or expediency on the part of the state is hard to tell, but the divergence of earlier years appears to have dissipated. The weight of international discourse on the environment, on biodiversity and on related issues into which Japan is locked and substantial reductions in the national budget for public works have shifted positions. The 'hard' engineers can no longer spend as freely as once they did, while the 'green' engineers have tempered some of their early messianic enthusiasm but have continued with their efforts to train their colleagues. Recent flooding caused by typhoon rains and exceptionally heavy downpours have had the effect both of emphasising the importance of expanded underground drainage systems but also of underlining the effectiveness of the nature-oriented approach (hard engineering underground, green over ground). Now, when a river bursts its banks causing flooding, an adviser is despatched to help implement nature-oriented techniques in re-designing river banks. River officials argue that where possible, they concentrate today on letting nature do its thing (*shizen ni makasu*) wherever possible. Banks are constructed only where necessary. The biggest expense is the purchase of land for river widening (and relocation of residents), but it can be shown that this not more expensive than construction of new banks.

Under its programme of Nature-Oriented River Management, the state has reached out to enlist partners and support from groups of experts and practitioners in what has become a largely successful process of cooptation. The involvement of local community groups to form a new stewardship of the environment suggests that the state has learnt from the experience of bitter clashes with opponents of its policies. The state, it could be argued, has realised that its former position of hegemonic control over water landscapes is no longer viable, and the continued instances of flooding serve as a reminder of the need to respect the properties of falling and flowing water and to reach out to (and coopt?) both expert and 'lay' constituencies.

Conclusion: engineering new space for flowing water

The multiple imbrications that are constituted around water -- what Swyngedouw (2007, page 24) has called the hydrosocial nexus -- are intensely experienced in Japan, characterised by particularly keen material and symbolic interactions with water (Keil, 2003). Japan's water landscapes involve an unusually dense inter-weaving of activities, a long history of riparian works, rivers diverted and storage ponds created, irrigation channels moved, removed,

covered in concrete, culverted, and converted into urban streams. Water, indeed, is central to the political ecology of the Japanese landscape, eradicating distinctions between urban and rural, rewriting strategies of containment and control, and fusing the practices of disparate actors. Water is central to the political ecology of Japan's landscape because of the centrality of irrigation to food production, because of the seasonal variations in rainfall and water flow and because of the intensity of the struggle between land and water that is a consequence of rapid urbanisation in fertile flood plains crisscrossed by water channels. The intrinsic qualities of water, as blessing and curse, are intensified as a consequence of these factors. The Japanese have worked with (and against) water in various ways over the centuries. But the process of urbanisation, that is to say, the rapid filling-out of the flood plains with houses, roads, schools and factories, has fractured the relationship with flowing water. The presence of water in the landscape was concealed and encased within concrete, behind barrages and within banks and culverts. Now it is being allowed, hesitantly and only partially, to regain space.

In this paper we have considered both discourse and practice as they reflect changing water landscapes and approaches to water management, showing how a state-led discursive apparatus has sought out new idiomatic territory. It started in the 1970s with a partial embrace of holistic concepts of catchment management designed to find more space for water. Almost contemporaneously, a move began to re-landscape rivers with design motifs that brought out historical or local characteristics or both. A sense of 'river culture' was built up through performances of water celebration. Memories of playing around in streams and of interaction with animals of symbolic import were used to generate a sense of affection for rivers and water. Only a few years later, a new discourse-and-practice was introduced, one of eco-friendly river landscaping, expressed in terms of nature-oriented river management. Work on river bank and beds incorporated features fashioned to aid animal life. This was an 'eco-aesthetic', designed to make rivers 'amenable' to fish. It was not so much culture-in-nature, as were the earlier projects, but nature-as-culture, in the sense that the appeal to ecology was conveyed in an inevitably cultural idiom.

Writing about the Los Angeles river, Matthew Gandy (2006, page 142) identified a discursive divide between "two 'expert' visions: an environmentalist pre-occupation with 'ecological restoration' and a technical concern with the modernization of the city's floodplains". We have argued in Japan, however, that the discourse and practice of hard engineering is finding common cause with that of green engineering, and once rigid boundaries between water and land are being perforated. Nevertheless, this is occurring within the context of a continued, if not increased, threat of flooding and within the discursive boundaries set by an aesthetically inflected appreciation of 'nature orientation'.

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