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Flood Pulses, International Watercourse Law, and Common Pool Resources

A Case Study of the Mekong Lowlands

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Abstract

In river basins around the world, formal agreements based on international watercourse law are seen as important mechanisms for promoting sustainability and cooperation. While such agreements have been effective in avoiding conflict between states in the short-term, success at the international scale can, paradoxically, undermine the foundations of ecological and social sustainability at the local scale, thereby threatening long-term stability. To investigate reasons for this problematic, cross-scale institutional interplay, the paper draws on a case study from the Mekong lowlands, a common pool resource upon which millions of people depend for their livelihoods.

Keywords: Mekong River Basin, common pool resource, international watercourse law, flood pulse

JEL classification: Q17, Q56

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1 Introduction

During the dry season in Laos, when the river is low, the banks of the Mekong and its tributaries are blanketed with vegetable gardens. Farmers practice flood recession agriculture by planting crops along the exposed riverbanks, which are built up by the deposition of sediment during rainy season high flows. In the lowlands of Cambodia, fishermen cast nets and set traps to take advantage of one of the world's most productive inland fisheries, created when floodwaters recede from the inundated forests and floodplain of the Tonle Sap ecosystem. Further downstream, in the Mekong delta, 50 per cent of Vietnam's rice crop is grown in a landscape of complex land-water interactions. High flows deliver sediment to the delta, flush out acidic soils, keep saltwater intrusion at bay, and create fish, shrimp, and crab-spawning habitat, while varieties of wild floating rice keep pace with gently rising waters amid the flooded *Melaleuca leucadendra* forests in the Plain of Reeds.[1] As the Mekong empties into the South China Sea, it delivers a pulse of nutrients, creating an abundant coastal fishery.[2]

In the Mekong River Basin as a whole, and in the lowlands in particular, the 'lived spatial practices' (Natter 2000: 358) described above reveal the relationships that have evolved between people, species, and the ecological processes created and sustained by an annually flooding river. These spatial practices dominate the landscape at the intersection of land and water in the basin for two key reasons: the river is largely free-flowing, with only two completed dams on the mainstream and 5 per cent of its flow regulated (White 2002);[3] and the basin is predominantly rural, with the majority of its 60 million inhabitants depending, to varying degrees, on the river basin ecosystem for their food and livelihoods (Mekong River Commission [MRC] 1999). Focusing attention on the lived spatial practices at the intersection of land and water also sheds light on the ways in which the river ecosystem functions as a common pool resource.[4]

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1 Floating rice has been largely replaced by high-yield varieties, but it is still cultivated in the high floodplain (where it also grows wild), primarily in areas of strong acidic sulfate soils, where high-yield varieties do not grow well (Chiem 1994). While high-yield varieties have increased production, they depend on large quantities of fertilizers and pesticides. Overuse of these inputs has created a host of ecological problems (Berg 2002).

2 The 1,400 km-long Mekong is the eighth largest river in the world and the longest river in Southeast Asia. The river originates on the Plateau of Tibet, flows through Yunnan Province in China, forms the border between Laos and Burma, flows eastward into Laos, and becomes the Lao-Thai border for 662 km. The river then reaches Cambodia and becomes part of the Tonle Sap (Great Lake) ecosystem, flows through the Mekong Delta in Vietnam, and finally empties into the South China Sea.

3 The 1,500 megawatt Manwan dam (the first mainstream dam, completed in 1993) and the 1,350 megawatt Dachaoshan dam in Yunnan Province, China are the only two dams on the mainstream. Two are under construction. One of these, the 4,200 megawatt Xiaowan dam, will be the largest dam in mainland Southeast Asia, rising 300 meters above the river with a reservoir 150 km long. The current plan for the Chinese stretch of the river includes eight dams (Goodman 2004).

4 A common pool resource is characterized by non-excludability and rivalness (Buck 1998; Feeny *et al.* 1990; Ostrom 1990; Ostrom 2002 *et al.*). Non-excludability means that, in the case of a river, it would be virtually impossible (or would be very costly) to exclude people from using the river's flow, its fish, floodplain, or banks. Rivalness refers to the fact that one person's (or state's) use of the resource can limit the quality and quantity of another's use. While the Mekong functions in important ways as a common pool resource, rarely is a resource a 'pure' common pool resource or a 'pure' public good (Mitchell 1999; Keohane and Ostrom 1995). This is true for the Mekong, which cannot be categorized as a common pool resource as neatly as, say, an ocean fishery. Critically, the river basin ecosystem itself is the common pool

As a common pool resource, it is difficult to exclude people from the many benefits of a free-flowing river, such as the wild fisheries that thrive on a certain quantity and quality of water, or the various micro-habitats created by the flood pulse. Unlike more developed rivers around the world, these benefits are not yet significantly controlled by governments; nor have they been brought under private control. Limited private and government control mean that traditional property rights regimes – best described as some combination of collective action and open access – still shape natural resource management practices. Critically, for the millions of people who live in the lowlands, it is not the water alone that is the natural resource of greatest concern. Rather, it is the variability and complexity of an intact ecosystem – driven by an annual flood pulse – that is the resource of immediate, and arguably highest, value.

As a common pool resource, the river ecosystem is especially susceptible to overuse and abuse, which can turn a common pool resource issue into a common pool resource dilemma (Dietz *et al.* 2002; Gardner *et al.* 1990).[5] While the possibility of such degradation is problematic for any ecosystem, it is particularly worrisome in an international river basin, in part because 'all international environmental issues that generate international political conflict, show some characteristics of common pool resources' (Barkin and Shambaugh 1999: 6). This does not mean that conflict is an inevitable outcome of an international common pool resource dilemma. Yet, the observed relationship between common pool resources and international environment-related conflict provides a compelling reason to prevent serious ecological degradation in an international river basin. Indeed, the design of international institutions to prevent common pool resource dilemmas has been, increasingly, the focus of scholarly research (see Barkin and Shambaugh 1999; Buck 1998; Hall 1998; Keohane and Ostrom 1995; Mitchell 1999). This scholarship is evidence of important efforts to integrate insights from work in international relations and common pool resources (see Yetim 2002). However, among those doing research on international common pool resources, there have been few efforts to seriously integrate research from the ecological sciences.

A key objective of this paper is to demonstrate why disregarding ecological reality in the design of international institutions to govern common pool resources is so problematic. The Mekong case study provides a compelling example of how the failure to incorporate ecological knowledge into the design of international river basin institutions leads to a narrow focus on avoiding conflict over one dimension of the resource at the expense of others. In short, institutional arrangements become blind to the full spectrum of ecosystem values and benefits. Consequently, success at the international scale – the scale of formal institutional arrangements – may be defined in terms of equitably sharing water and maintaining minimum flows in the mainstream (since conflict over water is seen as a threat to regional stability), while at the local scale – where informal institutional arrangements prevail – the flood pulse (and the peoples

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resource, whereas the property rights regimes range from communal and open access to state and privately owned (Mitchell 1999; Edwards and Steins 1999).

5 Hardin (1968) coined the phrase 'tragedy of the commons' to describe the inevitable ruin and degradation of common pool resources. He suggested that the only way to avert the tragedy of the commons was to privatize the commons or subject users to centralized government control. It is widely recognized that Hardin failed to distinguish between open access and common property, thereby overlooking the many examples whereby local rules and regulations (i.e., collective action) sustain successful management of common pool resources (Ostrom *et al.* 2002).

and ecosystems it sustains) is not protected. More seriously, formal institutions may, by virtue of their success, actively undermine the informal arrangements and institutions that people have developed, over many generations, to prevent conflict.

Although the states and residents of the Mekong River Basin are not yet experiencing a common pool resource dilemma, life at the intersection of land and water in the basin is changing in ways that could precipitate a dilemma. Changes are linked to economic development – to construction of dams for power generation, diversion of water for irrigation schemes, blasting of rapids, and dredging of the channel to improve navigation. River-related development has accelerated in the past decade as the countries of the basin – emerging from years of conflict and isolation – pursue market-based economic development strategies that stress economic modernization and regional integration (Hirsh 2001).[6] The river itself figures prominently in the vision of a regional marketplace (Asian Development Bank 1998; MRC 1998; Yu 2003).

In a world of sovereign states facing unprecedented environmental challenges, institutions (i.e., norms, practices, and rules) have emerged to encourage sustainable management and, ideally, peaceful relations. One such institution is international watercourse law (Wolf 1999). In the Mekong Basin, the Agreement on the Cooperation for the Sustainable Development of the Mekong River Basin, signed in 1995 by Cambodia, Laos, Thailand and Vietnam, draws on international watercourse law in order to codify the legal principle of reasonable and equitable utilization.[7] The incorporation of this principle is a key reason that the agreement is widely lauded. It is often cited as a model for how states might structure cooperation for sustainable development.[8] Yet, throughout the basin, communities are experiencing significant changes to the ecosystems upon which they depend for their livelihoods. As a result, local (often traditional) management techniques and strategies are rendered ineffective.

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6 The former Thai Prime Minister Chatichai Choonhaven famously described the new era as one that would be marked by the conversion of 'battlefields to marketplaces' (Ryder and Rothert 1994: 5).

7 The recently adopted Procedures for Notification, Prior Consultation and Agreement (2003) reaffirm the Mekong River Commission's commitment to reasonable and equitable utilization. The Mekong River Commission is the most recent manifestation of an organization that began with the Mekong Committee in 1957, existed as the Interim Mekong Committee beginning in 1978, and was renamed the Mekong River Commission (MRC) in 1995. The current Commission comprises the member states of Lao PDR, Thailand, Vietnam, and Cambodia. The Committee's 1957 statute mandates that it 'promote, coordinate, supervise, and control water resource development projects in the lower Mekong basin' (MRC 1995: 5). The MRC is composed of the Council, Joint Committee, and Secretariat. The Council and Joint Committee are the decision makers, with members drawn from the four riparian states. The Secretariat implements the decisions of the Council and Joint Committee, providing technical, administrative, and scientific support and expertise.

8 Sustainable development comes up frequently in discussions of Mekong development. The current framework for cooperation is often described as a potential model of 'sustainable watershed development' (Matsumoto 1997-98; MRC 1995; Trolldalen 1991). One researcher predicts that 'it may well turn out to be one of the few examples in the Third World where the changing geopolitical and regional circumstances, and local and international efforts, may yet lead to the integrated and sustainable development of an international basin for the benefit of all the riparian states sharing it' (Elhance 1999: 192). Other commentators are similarly hopeful, calling the Mekong cooperative framework 'the world's most important effort in international river basin planning' (Jacobs 1992: iii). Another researcher writes that the 'Mekong Commission provides a model of the type of structure and organization that is required for a large river' (Dudgeon 1992: 185). These pronouncements stem from a sense of possibility, from the hope that mistakes made elsewhere can be avoided in the management of this great river.

From the Pak Mun and Nam Theun dam sites in Thailand and Laos, to the Great Lake of Cambodia and the delta of Vietnam, ecological degradation and social conflicts are accelerating despite regional agreements intended to promote sustainable development environmental protection.

What accounts for this problematic interplay between the formal and informal, between the international and the local?[9] To answer this question, the analysis begins with an explication of the relationship between peoples and ecosystems in the Mekong lowlands, focusing on how people have adapted to the ecological complexity and variability of the natural flow regime. The examples reveal that this variability and complexity function in important ways as a common pool resource, one that tends to be managed through some combination of common property and open access. The analysis continues with an inquiry into the formal institutional framework governing resources, highlighting the way that international law represents the river as a 'watercourse', a simplified, one-dimensional structure composed primarily of water in a main channel. As a watercourse, the river can be reduced to its parts, divided between states, and rationally managed through the application of universal legal principles. While this makes the river legible to state-centric reasoning, transforming a flood-pulse driven river into a watercourse requires the discursive erasure of ecological reality. In a watercourse, water itself is the key resource, and the greatest concern is placed on maintaining minimum flows during the dry season. Little attention is paid to maintaining the flood pulse, to sustaining the variability and ecological complexity upon which millions of people depend for their livelihoods.

2 The flood pulse and livelihoods – 'shaking hands with the flood'

The ecological integrity of the Mekong, like all rivers, depends on its natural dynamic character (Poff *et al.* 1997: 769). As a tropical river, the seasonal variability of the Mekong's flow is of particular importance (Dudgeon 1992: 167).[10] The variable flow generates a series of complex land-water interactions that take place along vertical, temporal, lateral, and longitudinal dimensions within the basin (Junk *et al.* 1989; Kite 2000; Stanford *et al.* 1996; White 2002). This means that, rather than being catastrophic, floods are predictable annual events that facilitate the exchange of water, sediment, nutrients, and organisms between the channel and the floodplains. In such an ecosystem, the absence of a flood constitutes a disturbance (Sparks 1992: 145). In the Mekong basin, the annual flood (with peak flows in September-October) raises river levels to nearly thirty times dry season flows (Phanrajsavong 1996: 26). The flood pulse connects terrestrial and aquatic ecosystems, resulting in an aquatic/terrestrial transition zone (ATTZ) that is ecologically valuable because of its high primary production (Junk *et al.* 1989: 110). The significance of the land-water interface is reflected by recent

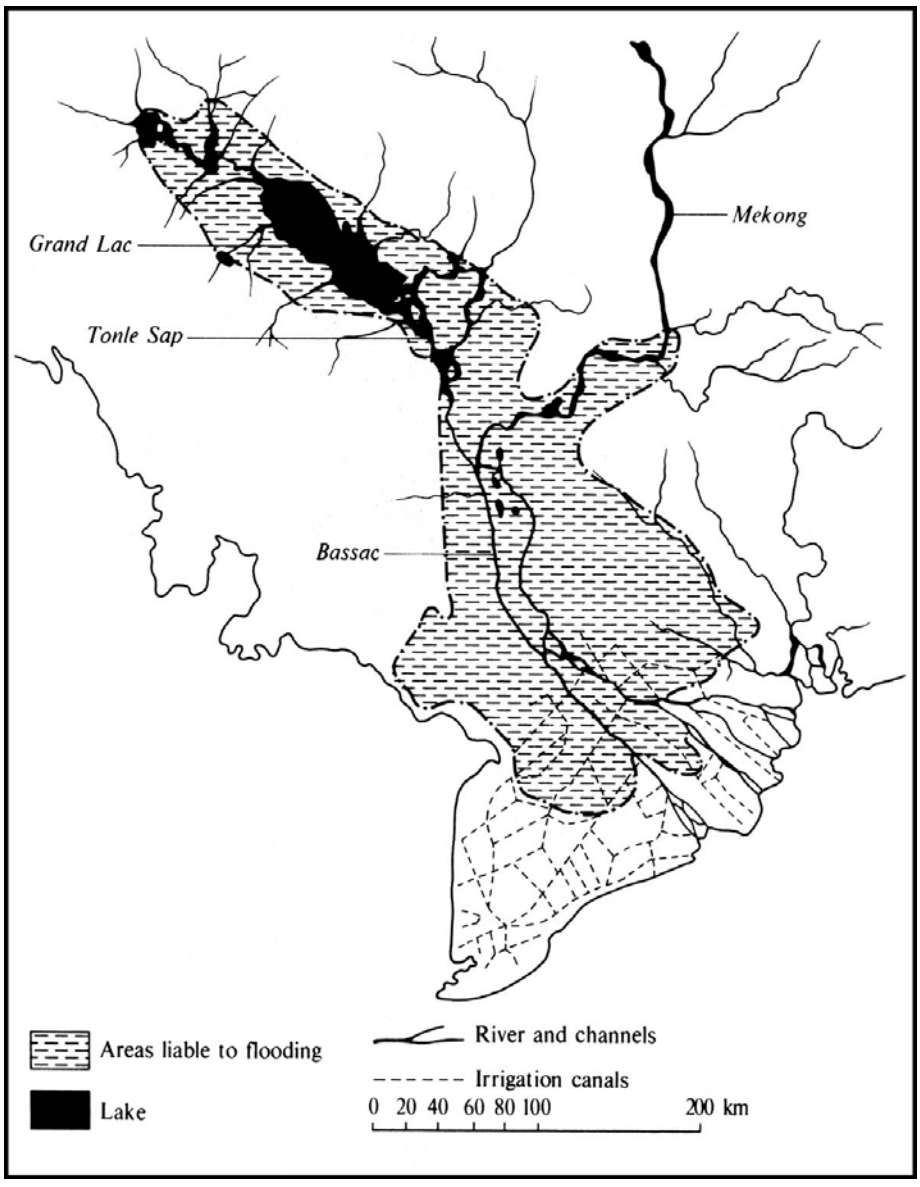
9 What Young (2002: 264) would term the 'malign' consequences of vertical institutional linkages and interactions.

10 The significance of temperature as a biological limiting factor declines with decreasing latitude and the role of discharge (determined largely by the northeast and southwest monsoons) increases (Dudgeon 1992: 169). From a fisheries perspective, perennial rivers can be divided into two major classes, reservoir and flood rivers. Reservoir rivers have stable flow throughout the year, while flood rivers such as the Mekong are characterized by a large seasonal variation in rainfall, with lateral plains that are submerged during the rainy season (Welcomme 1979).

research that focuses on the interactions between river systems, floodplains, and wetlands (Gregory *et al.* 1991; Tockner *et al.* 2000). Of particular relevance is research on ecohydrology, which seeks to close the gap between ecology and hydrology by examining the interactions between biota dynamics, climate, geomorphology, plant cover, and human activities (Gurnell *et al.* 2000; Janaeur 2000; Zalewski 2000).

Nowhere is the flood pulse more socially and ecologically critical than in the Mekong delta and the Tonle Sap ecosystem (i.e., the lowlands), where people have long since learned to 'shake hands with the flood' in order to benefit from its annual arrival (Miller 2000). It is here that one can see most clearly why the provision aspect of the river as common pool resource is so important for local livelihoods (Figure 1).

Figure 1
Mekong lowlands: zone of deep flooding'



Source: Welcomme (1979: 11)

Provision refers to the 'creation, maintenance, or improvement of the environment within which the good is located, and which is required for the good to retain its value' (Barkin and Shambaugh 1999: 7). This can be differentiated from appropriation, which describes the use of the resource itself. In the case of the Mekong, use of the river's water is best understood as an appropriation issue, while the overall health and functioning of the basin ecosystem – the ecological complexity and variability that define the system – is the provision issue. Although it is difficult to disaggregate these two dimensions of the river ecosystem, a key point about the relationship between them is worth noting. That is, while the flood pulse clearly cannot exist independent of water, water can continue to flow through the system long after the flood pulse has been diminished or even eliminated. It is critical that this dynamic be understood and reflected in international agreements. As Barkin and Shambaugh (1999:2) note, 'if international environmental issues are considered in a misleading way or modeled inappropriately, the negotiations and institutions are not likely to lead to effective solutions'. In short, it is essential not only to be clear about which aspects of a resource one is trying to protect through a given institutional arrangement, but also to understand the ecological dynamics of the ecosystem in question. Simple resource typologies will be of limited use in this regard. The danger is that, as is happening already in the Mekong, local communities will experience common pool resource dilemmas around provision issues long before states experience conflict over appropriation of water. The formal institutional framework does not reflect the ecological reality of the river ecosystem.

2.1 The Tonle Sap fisheries

Fisheries provide one of the most vivid examples of how a free-flowing river supports livelihoods and functions as a common pool resource in the Mekong lowlands. The health of wild-capture fisheries are inextricably linked to an intact ecosystem, to the provision aspect of the river as a common pool resource. The basin produces an estimated 2 million tons of fish per annum, and in parts of Cambodia (one of the world's poorest countries), up to 80 per cent of peoples' annual protein intake comes from fish. There are at least 1200 species of fish and perhaps as many of 1,700 in the basin (MRC 2003). These fisheries depend almost completely on the flood pulse, as flooding is the dominant process driving fisheries production. Fish rely on the annual floods to signal migratory and reproductive behaviour and to open up floodplain habitats for reproduction and crucial food sources (White 2002; Sverdrup-Jensen 2002). Floods deposit millions of tons of dissolved and suspended solids into the delta environment, leading to an 'explosive annual reproductive outburst' (Pantulu 1986: 724).[11] Most fish also synchronize breeding and feeding with the flood season, migrating laterally into inundated floodplains (Dudgeon 1992: 171). Fish are so highly adapted to the delta ecosystem that some species move from pool to pool as floodwaters recede, often travelling overland using accessory respiratory structures (Pantulu 1986: 727). The duration of high flows is equally important. If the floodwaters recede too quickly, eggs will be stranded in the floodplain and will not hatch. Or, if an area remains flooded too long, the dissolved oxygen concentration and pH will drop to lethal

11 Mekong silt is, by itself, nutrient deficient. Production is sustained by organic matter from terrestrial and aquatic plant material inundated by the flood, and fish are supported mostly by detritus food chains (Pantulu 1986).

levels (Pantulu 1986). Low water levels are also critical for many species that rely on very slow flows, allowing their fry to remain in sheltered and relatively productive water, where they can find the food essential for their survival (Halcrow 1998: 4.24).

In Cambodia, this variability plays out in a dramatic fashion when the Tonle Sap River annually reverses its flow, acting as the natural flood regulator of the Mekong and expanding the lake from three to five times its dry season size (Tarr 2003). As the forests surrounding Tonle Sap flood, fish enter and feed heavily on leaves and fruits, earthworms, insects and other terrestrial invertebrates, aquatic invertebrates including shrimp, crabs, and mollusks, and other fish (Hubbel 1999: 29). The annual flooding creates a remarkable inland fishery that may produce as much as 500,000 tons a year for a very poor country (Tarr 2003). When the flood subsides and the Tonle Sap flows back towards the sea, people put out nets and traps to catch fish swimming back to the mainstream.

Since before French colonization, Cambodia has managed its fisheries by means of a common resource management system (Bonheur and Lane 2002: 35). The system is based on concessions or fishing lots that are awarded to both communities and private parties, with open access fishing permitted for middle scale and family fishing (Bonheur and Lane 2002). While the system is far from perfect and is occasionally marked by conflict, it is characterized by a high degree of ecological and institutional resiliency, supporting large numbers of people. In the lower Mekong as a whole, the majority of the fish catch is by small-scale operators, and especially by families, with between 64 and 93 per cent of rural households involved in fisheries for both consumption and sale (MRC 2003: 14). People tend to live close to where they fish (even on the water itself, in floating houses), with entire communities dependent on fish. Fishing is characterized by flexibility and diversity, carried out with possibly the most diverse array of fishing gear anywhere in the world, with 160 types of gear identified in Cambodia alone (MRC 2003: 14). Use of the gear is seasonal and adapted to specific habitats. The Tonle Sap ecosystem itself is suited to this sort of small-scale exploitation, since ‘you simply cannot purse-seine a flooded forest’ (Coates 1996: 2). In general, inland wild capture fisheries are so highly resilient and able to ‘sustain mystifying levels of fishing pressure’ (Coates 1996: 2), because species are adapted to higher mortality rates than those in more seasonally stable environments (Coates 1996: 3; MRC 2003).

One can see evidence of institutional and ecological resiliency in the fact that overexploitation is not yet a major threat to these fisheries (MRC 2003). Rather, it is environmental degradation and environmental change that are the key threats. While degradation might result from pollution or deforestation, the most serious large-scale environmental change is likely to be a consequence of upstream development – dams and diversions that capture and store the flood pulse. It is worth mentioning that Cambodia has experienced almost unimaginable disruptions to its society, economy, and environment over the past half century. De-colonization, bombing, genocide, land mines, and deforestation have all taken a toll on the landscape and people. Given these events, the resiliency of the Tonle Sap ecosystem and the institutions that govern fisheries is quite remarkable. It is more than a little ironic that development, guided by the Mekong Agreement, might have more harmful, and potentially irreversible, impacts on local fisheries and practices than so many other social and political disruptions.

2.2 Mangroves and *Melaleucas*

The delta ecosystem is, arguably, even more linked to and dependent on the flood pulse than the Tonle Sap ecosystem. The delta would simply not exist were it not for 6000 years of sediment deposition carried by the floodwaters and flood pulse of the Mekong River (Nguyen *et al.* 2000). While there are many constraints to living in a landscape of indistinct boundaries between land and water – an 'amphibious ecology' (Brocheux 1995) – the ecosystem offers many possibilities for agriculture and fisheries. As is the case around Tonle Sap, people have long adjusted 'their cropping schedules and land use patterns to the predictable variation in water supply conditions' (Koppel 1990: 5). Fishing, shrimp farming, rice growing and other activities have all evolved around this variability. Examples include flood recession agriculture, which takes advantage of receding floodwaters (Fox and Ledgerwood 1999), and fish-rice systems that allow farmers to benefit from the natural productivity of the flooded rice field ecosystem (Berg 2002). The integrated and adaptive approach of farmers to the delta ecosystem often stands 'in sharp contrast to the institutional approach' promoted by governments, which tend to emphasize large scale infrastructure development and focus on single issues (White 2002).

In the delta, the variable flow brings not only water, but also sediment and nutrients. The river delivers 79 million tons of nutrient-enriched alluvial deposits to the Cuu Long estuary annually, and deposition extends the Ca Mau peninsula 150 meters every year (Khoa and Roth-Nelson 1994). At the interface between salt and fresh water, the floods create a 'nutrient, sediment and freshwater pulse [that] maintains the brackish and estuarine zones in a vibrant state' (Pantulu 1986: 724). Variable flows maintain an annual balance between marine and river silt deposition, with the primary sediments deposited in the intermediate zone of the estuary being from marine sources in the dry season, but coming from upstream in the wet season (Halcrow 1998: 4.28).

This pulse of sediments and freshwater is particularly important for the survival of the delta's mangroves (Blasco *et al.* 2001). Mangrove forests have suffered greatly from war and deforestation, but they continue to have high ecological and social value. They stabilize banks, promote accretion of shorelines, protect against erosion, sustain the productivity of marine fisheries, and serve as nursery grounds for crab, shrimp, prawn and various fish species. They provide edible fruits, medicines from bark, leaves and fruit, high quality wood, leaves for roofing, and bark for the production of tannin, among many other uses (Khoa and Roth-Nelson 1994). Farmers have adopted more sustainable practices in this ecosystem by cultivating shrimp-mangrove forestry farms, which depend on both freshwater and tidal influences. They diversify by growing bananas, Indian taro, pineapples and cherry trees on levees around the farm, all of which thrive during the wet season (Johnston *et al.* 2000). In areas where farmers practice rice-shrimp farming, they depend on wet season river flows to flush the fields of residual salinity (Brennan *et al.* 2002).

In the flooded *Melaleuca* forests in the Plain of Reeds, this same adaptability to variability can be seen. *Melaleuca* trees themselves require variable water levels, since they are unable to survive year-round inundation (NEDECO 1992). The seasonally inundated forests play a number of important roles, serving as important bird habitat and building soil humus to reduce soil acidity. In the *Melaleuca* forests, people practice a traditional technique to harvest honey and beeswax from the giant native honeybee (Tan and Ha 2002). Aquatic and terrestrial wild vegetables are also gathered, with wild plants

contributing up to 81 per cent of the daily intake of vegetables during the flood period and rainy season. They are a particularly important part of the diet of the rural poor (Ogle *et al.* 2001). In general, the acid sulphate soils of these areas are not well suited to agriculture. People have adapted by cultivating immediately after the flood recedes, using the high flows to flush out acidic soils (Husson *et al.* 2000). Other adaptations include cultivating floating rice, which keeps pace with rising floodwaters (Chiem 1994).

As with the Tonle Sap ecosystem in Cambodia, it is important to point out that the delta is far from pristine. It was massively transformed by the French, was heavily damaged by bombing during the US-Vietnam war, and has been further impacted by recent agricultural expansion. Despite these changes, people continue to adapt and often prosper. As of yet, no development has significantly altered the annual flood, the lifeblood of the ecosystem.

To summarize, throughout the lowlands, people had adapted to the flood pulse, controlling it and using it in ways that do not affect the overall integrity of the ecosystem. At the local scale, people do not have the capacity to interrupt the flood pulse. For the most part, the property rights regime that characterizes the provision aspect of the resource can be described as some combination of open access and common property. Local practices and techniques have been surprisingly resilient in the face of population pressure and a variety of land-use changes. These simultaneously harsh and abundant environments support millions of people.

The next section demonstrates why current institutional arrangements are likely to allow, and even facilitate, a common pool resource dilemma around the provision aspect of the river ecosystem (i.e., the ecosystems and livelihoods described above) long before mechanisms to prevent conflict between states are activated. The analysis focuses on the principle of equitable utilization, which is codified in the Mekong Agreement. A key point is that equitable utilization relies on the discursive simplification of a complex ecosystem, and that this, in turn, lends support to a particular vision not only of the river ecosystem, but also of regional economic development, one that is likely to alter dramatically life at the intersection of land and water.

3 Equitable utilization – prioritizing appropriation through ecological simplification

States have ‘long sought to manage the environment based on the assumption that the ‘environment’ can be divided into discrete entities for management purposes’ (Bryant and Wilson 1998: 323). The perception is that an ecosystem can be divided and managed for some optimal yield or maximum return. Because it is difficult to manage river basins that are characterized by complex land-water interactions, uncertainties, and disequilibria across a range of processes, an important component of this process is discursive simplification. In the Mekong, this simplification is reflected in the 1995 Mekong Agreement’s overarching concern with watercourses, to the neglect of other aspects of the basin. Because reasonable and equitable utilization is the principle upon which the treaty is based, allocating water in the channel between states, and advancing a way for states to cooperate over the allocation – the appropriation aspect of the river

as common pool resource – is its primary concern. The principle of equitable utilization guides the procedures for water utilization and inter-basin diversions, and, as covered in article 5 of the treaty, is focused on determining how to 'utilize the waters of the Mekong River system' (MRC 1995). As Mekong development plans reveal, 'utilizing' the water tends to mean hydropower development and water diversions for irrigated agriculture. There is little recognition of the millions of people who already utilize the ecosystem in a variety of ways unrelated to energy production or large-scale irrigation (Hirsch 1998; Ryder amd Rothert 1994).

The principle of equitable utilization, and its application in the Mekong context, is particularly illustrative of how international watercourse law simplifies basin processes and excludes alternative ways of envisioning the river basin. The principle is a substantive rule of international law governing international watercourses (Wouters 1996),[12] and it has historically guided and continues to guide regional legal agreements in the Mekong basin (MRC 1995; Legal Study Team 1993; Radosevich 1996; Wouters 1996). The principle establishes that 'each riparian state is entitled to a reasonable and equitable share in the beneficial uses of the waters of the drainage basin' (Legal Study Team 1993: 4). While the 1995 Mekong Agreement does discuss broad cooperation and includes reference to making 'every effort to avoid, minimize and mitigate harmful effects that might occur to the environment, especially the water quantity and quality, the aquatic (eco-system) conditions, and ecological balance of the river system, from the development and use of the Mekong River Basin water resources or discharge of wastes and return flows' (MRC 1995: 6), the impulse to cooperate on the basis of ecological sustainability is tempered by article 4, which reaffirms the principle of state sovereignty. It notes that states will 'cooperate on the basis of sovereign equality and territorial integrity in the utilization and protection of the water resource of the Mekong River Basin' (MRC 1995: 4). Article 9, which addresses state responsibility for damages, refers the states to the principles of international law in order to resolve disputes. While the professed goal of the basin states may be sustainability, the actual document envisions the Mekong as a purveyor of water for the developmental goals of sovereign states.

By referencing international watercourse law and its emphasis on the principle of equitable utilization, the agreement discursively denies the river its connection with the terrestrial landscape, focusing instead on water in the channel. In other words, it re-imagines complex aquatic ecosystems as watercourses, where river basins are simply water. This erasure of land-water interactions from the conceptual landscape was deliberate. The UN Convention on the Law of the Non-navigational Uses of International Watercourses (1997), the most recent effort to create a constitutive foundation for legal regimes in international watercourses, rejects the terms 'watershed' or 'watershed ecosystem' because those terms so clearly acknowledge linkages between

12 The UN Convention on the Law of the Non-navigational Uses of International Watercourses (1997) codified two principles, 'equitable utilization' and 'significant harm'. Equitable utilization is more commonly invoked than 'significant harm' and it is the principle cited in the Mekong Agreement. The two are generally seen as conflicting, because 'while the former rule might permit significant harm as a result of an equitable use of the watercourse, the latter would not' (Wouters 1996: 419-420). The no harm rule is generally (but not always) favoured by downstream states, whereas equitable utilization is preferred by upstream states. Equitable utilization is more sensitive to the sovereign right of upstream states to develop their portion of the river.

land and water (Korhonen 1996: 488). The watercourse definition was preferred, because it:

> relies solely on the aquatic element without addressing the interdependencies that riverine ecosystems have with the terrestrial environment. Surrounding land areas are held as having minimal bearing on the protection and preservation of the watercourse itself. (Korhonen 1996: 487)

The concept of a drainage basin is considered too expansive and a deviation from the channel-based tradition of international law. Drainage basins pose a potential threat to state sovereignty because their processes literally transcend the territories of the states involved in their governance (Wescoat 1992: 304, 307). As a watercourse, the river is confined to its channel and disconnected from its geological, hydrological, chemical, and biological linkages with the adjacent land areas. The result is a disregard for interactions within the whole river basin between flowing freshwater, streamside vegetation, and upland environments (Korhonen 1996: 482-483). A watercourse is much simpler to deal with in a basin of territorially defined and demarcated states, because there is no need to address 'complex linkages between the spatial dimensions' of the river ecosystem (Stanford *et al.* 1996: 397). Complex, dynamic, and not-fully-understood linkages between land and water are conceptually erased from the landscape, replaced by a channel crossing state borders. Agreements crafted around watercourses will be therefore limited in their ability to deal with the biophysical actualities of river-riparian interactions.

To imagine a river consisting primarily of water in a channel allows resource managers to focus efforts on controlling and re-directing water, overlooking ecological processes that generate and transcend the channel. The damaging environmental legacy of decades of policies derived from this model of river science – based on 'reductionist, analytical science focused primarily on equilibrium concepts' (Graf 2001: 1) – can be read on the landscape in the form of fragmented and degraded rivers around the world.[13] In fact, both scientists and local people understand very well that 'rivers are not simply water' (Graf 2001: 24). But, whereas river science has refocused on the dynamic nature of river ecosystems, on the interface between hydrology and ecology, on shifting water sources and habitat heterogeneity, and on the multi-dimensional nature of river ecosystems, international watercourse law and associated policy prescriptions fail to incorporate this ecohydrological understanding. Water continues to be viewed as 'a physical substance to be allocated', and the 'traditional emphasis of international water law remains preoccupied with issues of physical quantity and pollution' (Wescoat 1992: 326). This focus on water solely as 'resource' makes it more amenable to natural resource management, legal reasoning, and a sovereignty-centric logic. Conceptually, there is little space for consideration of the ecological dynamics that define the Mekong lowlands – for the provision aspect of the river as common pool resource.

This failure to consider the 'lived-spatial practices' and the ecosystems upon which they depend is reflected in the actual rules for implementing equitable utilization. In short, the rules of prior notification and prior consultation (the key procedures for

13 A particularly dramatic example is the Los Angeles River, which has been transformed into little more than a concrete channel.

operationalizing the Agreement) focus on who has the right to appropriate the river's water, and how that water should be allocated. The rules are intended primarily to ensure maintenance of minimum flows in the mainstream. Because there is only the barest consideration of the value of the river's annual flood regime, serious degradation of the river through water resource development activities is likely to occur before any legal or institutional mechanisms might be activated to prevent or mitigate harmful alterations.[14]

4 Conclusion

Among scholars of international watercourse law, it is generally understood that 'equitable and reasonable utilization of an international watercourse may still involve significant harm to another watercourse *state*' (Wouters 1996: 423, italics added). This admission reflects a more honest assessment of equitable utilization than one might find coming from sovereign (and especially upstream) states. But, it also reveals a failure to recognize the consequences of an un-ecological and a-geographical institutional framework for governing international rivers. Yes, it is likely that states will eventually suffer significant harm in the Mekong River basin if development proceeds as guided by the Mekong Agreement and the principle of equitable utilization. But, long before the Agreement's conflict resolution mechanisms are activated, peoples and ecosystems (and the informal institutions they have devised to manage resources) will suffer irreversible damage. This is because, while the states that are party to the Agreement clearly recognize the need for cooperation in the governance and management of an international common pool resource, they have prioritized only one dimension of that resource, the appropriation of water that flows through the river's mainstream. The states are cooperating around a watercourse. The Agreement, therefore, has no mechanisms to address, in a timely and effective manner, the degradation of livelihoods and ecosystems that will result from the attenuation of the river's annual flood pulse. The Agreement does not take seriously the provision aspect of the river as a common pool resource.

But, why are states that are party to these institutions and agreements so blind to this reality, particularly when it seems so obvious? There are two reasons that, taken together, offer at least a partial explanation. First, as with all forms of geopolitical representation, international watercourse law is not a neutral project. Law is power

14 Specifically, prior consultation is required for (1) intra-basin uses or inter-basin diversions during the dry season when flow levels are low, and (2) inter-basin diversions from the mainstream during the wet season when flows are greater. Prior consultation is the stricter of the two standards because it requires that an actual consultation among the riparian states must occur before a water project can proceed. Notification, or simply informing one's riparian neighbours of one's intentions regarding a water resource development project, is the less demanding standard and is required for intra-basin uses during the wet season. The result is a document that reserves its strictest standards for ensuring minimum mainstream flows during the dry season. (Many wet season intra-basin uses, such as dams, can significantly impact the flood pulse.) While maintaining minimum flows is a reasonable concern, if there is not a similar concern for maintaining high flows during the wet season (a point about which the 1995 Agreement and subsequent documents are silent), the flood season dynamics of the Mekong are once again given only marginal consideration. The Mekong Agreement does stipulate that the Tonle Sap should continue to reverse its flow, but this is rather meaningless, since a tremendous alteration to the flood peak would occur before the river stopped reversing its flow completely.

(Blomley 1994), and 'to the extent that modern understandings of what it is to be human are dependent on particular conceptions of nature, it is reasonable to suggest that legal discourse cannot be 'neutral' with respect to competing conceptions of nature' (Delaney 2001: 488-489). Equitable utilization is a privileged discourse, one that works in important ways to advance the interests of centers of power and authority. In the Mekong Basin, the centers of power and authority tend to be states, supported by a private sector that sees a tremendous amount of economic potential in the powerful flow of the Mekong. The fact that states do not prioritize the 'lived spatial practices' that sustain local places and peoples results in what might be called a 'hiatus between state and place' (Smith 2000: 370). One way to understand the creation of this hiatus is to use Scott's (1998) notion of 'seeing like a state'. Seeing like a state describes the processes and practices through which states create legibility – 'the central problem in statecraft' (Scott 1998: 2). The creation of legibility is an important dimension of statecraft, because:

> Certain forms of knowledge and control require a narrowing of vision. The great advantage of such tunnel vision is that it brings into sharp focus certain limited aspects of an otherwise far more complex and unwieldy reality. This very simplification, in turn, makes the phenomenon at the center of the field of vision more legible and hence more susceptible to careful measurement and calculation. Combined with similar observations, an overall, aggregate, synoptic view of a selective reality is achieved, making possible a high degree of schematic knowledge, control and manipulation. (Scott 1998: 11)

Turning the unwieldy reality of the Mekong River into a simplified watercourse is a clear example of seeing like a state. What states fail to see, and what regional institutions fail to consider, is that all across the lowlands people have developed institutions, techniques, and practices to sustain themselves and manage their environment. In the rush to cooperate around appropriation of water, states have overlooked the critical institutional frameworks that have arisen around the provision aspect of the river as a common pool resource. Success in dividing up and sharing water among states will come at the expense of those local practices and institutions. This is not sustainable, ecologically or politically, in the long-term.

In the Mekong, the greatest threat to the flood pulse comes from hydropower dams that will capture high flows to fill reservoirs during the wet season and release water to power turbines in the dry season. What results is a smoothing out of the flow – removing the variability at the heart of the ecosystem. As the Mekong River Commission notes, 'development activities in a river system almost always result in simplification, or even obliteration, of ecosystem diversity' (2003: 6). For a host of reasons, this sort of development remains very attractive to states in the region. Current institutional arrangements not only facilitate, but encourage this sort of development, since the preoccupation is with maintaining minimum flows rather than protecting variability. Mitigation measures cannot compensate for such fundamental alteration of the ecosystem, because while 'tropical rivers are a renewable natural resource, subject to sustainable exploitation, tropical rivers with hydropower dams are not renewable, natural, or sustainable resources' (Roberts 1996: 1). However, it is not only about economics and power. How we represent and understand ecosystems matters. Science has advanced in its understanding of river dynamics, and this knowledge must be incorporated into the formal institutional frameworks that govern river ecosystems. In the Mekong region, the livelihoods of millions of people depend on rethinking how we

structure institutions to manage river ecosystems. Those livelihoods depend on closing the gap between formal institutions and informal strategies for managing river basin resources.

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