Journal of Agricultural and Environmental Ethics
https://doi.org/10.1007/s10806-019-09804-0

REVIEW PAPER

Entanglements of Water Management

Victoria Machado[1]

Accepted: 21 September 2019

Abstract

This review essay investigates Andrea Ballestero's *A Future History of Water* (Duke University Press, Durham, 2019), Jeremy Schmidt's *Water: Abundance, Scarcity, and Security in the Age of Humanity* (New York University Press, New York, 2017), and Wade Graham's Braided *Waters: Environment and Society in Molokai, Hawai'i* (University of California, Oakland, 2018) within the wider theme of water-human relationships. More specifically, these books provide insight into the human dimensions of water management as they explore the process of how water impacts and drives economic, social, and political change. By doing this, Ballestero, Schmidt, and Graham highlight water's agency and the vital role it plays in a variety of locations and situations. Broadly speaking, works like these help move water beyond discussions limited to ecological science, giving this resource a starring role in crucial discussions ranging from policy and economics to community development and social equity. In this regard, environmental issues are holistic matters that must engage cultural, economic, political, and religious dimensions as well as ecological issues. Collectively these books show that water's fluctuating nature dictates the structure of our world, permeating every issue from the daily to the global while reinforcing the need to look critically at this life-giving resource.

Keywords Water management · Water rights · Abundance · Scarcity · Social equity

Water is a dynamic resource that appears in a variety of forms and is essential to life on earth. Taking a look at the water cycle shows that water travels a complex route with property shifts that accompany changes in location, thereby allowing it to provide life for flora and fauna. However, just as it has the ability to be woven into the bodies of living beings, water also carves out the scene in which these beings interact. Water has extensive experience creating canyons and valleys, as well as adding

✉ Victoria Machado
vickie7@ufl.edu

[1] Department of Religion, University of Florida, Anderson Hall, P.O. Box 117410, Gainesville, FL 32611-7410, USA

Published online: 05 October 2019

to shorelines among other natural features. Needless to say, water's influence is a bit more complicated than the elementary cycle taught to many in grade school.

Still, many overlook the fact that the complexity of water's role in the environment does not stop with the biological or physical. Rather, water also plays a complex role within every human society. In this sense, water is an active agent that impacts not only the physical life forms that rely on it and the landscape in which it plays out but also the very social structure of the world we inhabit—from how we think, plan, and organize social systems to where and how communities thrive. This resource is a driver in crucial discussions ranging from policy and economics to community development and social equity. In this regard, environmental issues are holistic matters that must engage cultural, economic, political, and religious dimensions as well as ecological issues. Collectively the books in this review essay use the human dimensions of water management to show that water's fluctuating nature dictates the structure of our world, permeating every issue from the daily to the global. Using water to look at economic, social, and political change reinforces the need to look critically at this life-giving resource.

This review essay looks at three books that examine water's complex relationship to the social world around it. Focusing on water management, in addition to such issues as water allocation and rights, these books explore larger societal impacts of water-human relationships. This subject is as big as an ocean and while these authors share large common themes, they each do so in very distinct ways. Andrea Ballestero's *A Future History of Water* (2019) draws from materialist ethnographic fieldwork as well as a feminist science and cultural anthropological lens to investigate what everyday, mundane objects tell us about water management in Costa Rica and Brazil. Geographer, Jeremy Schmidt's *Water: Abundance, Scarcity, and Security in the Age of Humanity* (2017) looks at the philosophical ideas behind water management's history in the U.S. and how this system of thinking about and managing water ventured beyond national boarders to set global standards. Finally, Graham Wade's *Braided Waters: Environment and Society in Molokai, Hawai'i* (2018) focuses on the environmental history of a marginal island as he explores how water management acts as the primary driver of social change on Molokai.

Together, these books provide insight into the management of water and, more specifically, they engage topics of distribution and rights of water by uncovering how water's abundance and scarcity determines economic, political, and social change. In doing this, water, along with it's complex properties, proves to be a crucial player in large scale and global decisions concerning economics, social stratification, policy implementation, and management as well as concrete local issues like social equity. This is achieved by looking at the location of communities, allocation of resources, and community development through access to resources.

Perhaps the most extensive connections between large and small scale water management can be seen in Andrea Ballestero's *A Future History of Water* (2019). Ballestero seeks to uncover the complexities of water through ethnographic research that focuses on everyday bureaucratic and often mundane processes that shape how water is perceived in Costa Rica and Brazil. She asks the larger question 'Is water a right or a commodity?' While her conversations and research support an argument for water as a human right, this position is multifaceted as she uncovers the

"braiding of long histories of economic, legal, and political systems" that accompany this resource (Ballestero 9). While water may be a human right, with it comes local issues of service costs, legal definitions, and pragmatic tactics in order to ensure a certain degree of preservation and public distribution.

Ballestero steps outside of the traditional way of viewing this natural resource, which often links water with a particular place through regional watersheds or specific sources such as tying the discussion to a lake, river, or other larger aquascapes. Instead, her examination looks at "the vast worlds that are left unexamined when we assume that the politics of water are more 'intimate' near H2O rivers, pipes, or reservoirs" (191). Rather, this investigation is organized around four 'devices,' items she defines as "instrument[s] that [are] highly effective in organizing and channeling technopolitical work," all of which are "inscribed in larger processes" associated with water (193, 8). These devices include: formulas that determine the public price of water (chapter 1), indexes that recognize household income and consumption patterns as economic indicators of water's price (chapter 2), lists that legally define rights to water (chapter 3), and pacts that establish community promises to care for water (chapter 4).

The first three chapters investigate devices associated with mathematical equations and legal definitions within Costa Rica's water systems in order to show how water permeates even the most mundane areas of life. Focusing on formulas in chapter one, she jumps into "the sweaty act of monitoring water consumption" negotiating the fine line of market intersections that determine profit versus surplus to find out how the price of water is shaped (39–40). Again price plays a large role in chapter two as she examines affordability over time by looking at recorded household objects in relation to inflation rates, wondering "can human rights be commodities all the way down?" (105). While math regulations shape the first two chapters, legalities are the focus of chapter three as lists from congressional interactions and constitutional reforms show the ambiguity of water (135) and the often nonsensical, farcical nature that accompanies these processes (136).

In chapter four, perhaps the most personal of the book, Ballestero focuses on pacts made in Brazil. Pacts are described as promise making rituals and public meetings with the aim to change society's values to care for water. The formation of these pacts allows readers to easily make the connection between morality and water. Unlike the other devices, water is presented as a "social substance" as pacts are *both* used by and made up of individuals (183). Ballestero shows that while water is social, it is also ambiguous and any means of controlling it must factor into its fluid and uncertain nature. Thus, her chapter ends with just as much ambiguity as the others, as her interlocutor Rodrigo explains, "the magic of the pact was precisely that you would never be able to assess it's efforts because it was so all encompassing and diverse, it was everywhere and nowhere at the same time" (184). While this ambiguity is most clear here, throughout the book Ballestero shows that place-specific water management cannot fit into conventional categories.

In this sense, Ballestero ventures beyond the question of whether water is a human right. She explores *how* water is a human right and subsequently what this means for society at large as she asks, "how do people create distinctions in the world they inhabit"; how do they navigate seemingly contradictory categories"; "how are those

distinctions and categories connected to the aspirations for the future" (188–189); and finally, "how the work of living with proliferating fusions and bifurcations relates to the future" (190). Ballestero's investigation of the social, political, and economic aspects of water management leaves readers with these inquires, coming full circle in her 'wonder' filled quest into the everyday devices that play a role in dictating water in the lives of people in Costa Rica and Brazil.

Indeed, wrestling with these devices allows Ballestero to uncover the 'wonder' of water in the world of water management. She uncovers 'bifurcations' seeking out differences within formulas, indexes, lists, and pacts to show the growing complexity of water politics and the blurring of seemingly organized dimensions. Similarly, 'quasi-events' arise in each chapter as she uncovers situations that never happen but were carefully planned, realizing the rumor of a planned event that never happens can still be impactful. This is seen when the shift from accounting to economics, or from a flexible R to a fixed R, falls through. Even though the arranged shift never happened, anxieties and hopes still persisted (Ballestero 70). It is these struggles with planning and the process of such events that she is interested in. In fact, it is this process that helps Ballestero to craft a larger and meaningful discussion of water rooted in materiality. She certainly succeeds in her "attempt to restore the deskwork and cubicle based decision making," causing readers to take a second look at how decisions are created, maintained, and implemented through everyday items (Ballestero 186).

It is hard to think of mathematical equations, legal proceedings, and lists in terms of ethnographic fieldwork, let alone subjects that arise as central agents within the study of humanities' fields, but Ballestero works hard to show the significance of these materials. In doing this, she dives into "how ideological change take[s] technical form" (72) or how global problems play out on a local stage. Ultimately, she shows how national management changes in boardrooms must be considered on the local household level.

Similar to the entanglements Ballestero sets up, Jeremy Schmidt's *Water: Abundance, Scarcity, and Security in the Age of Humanity* (2017) also tackles the complexities of water by digging into large social processes while also blurring seemingly organized dimensions through the broad investigation of "how a common way of thinking about water gained consensus" (4). Rather than focusing on the mundane, mirco-level materials that shape water, Schmidt looks at the thoughts, values, and, most of all, the philosophy behind water management. For Schmidt, laws, institutions, practice, and customary habits are tied to a way of thinking as the larger ideas of geology and early American anthropology come together to form 'global water governance' (4, 8). With this framework, he asks "how do contradictions over water, such as those over the right to water, gain civil status?"; in other words, "why do we have these water management challenges and not others?" (6). These questions lead Schmidt to investigate how U.S. water management was developed and exported to shape the global water management issues.

Drawing from the philosophy that shaped the concept of 'normal water' in a complex world, Schmidt finds the key problem to reside "not in [the] society/nature divide but, rather, a failed attempt to reject that dualism" (10). In this regard, 'normal water' is "the program of bringing water's social and evolutionary possibilities

into the service of liberal forms of life" (6). Like Ballestero, he uncovers the unseen social forces behind water management. Rather than formulas, indexes, lists, and pacts, it is the underlying philosophy that drives how society thinks about water. Similarly, both authors view unequal power relations as woven into the fabric of water-human relationships. Still, Schmidt's approach to this complexity differs in that it lies in the thought processes that created this belief. He looks at the philosophical ideas and theories governing how we think about water.

Focusing on three philosophical concerns through subjects, social relations, and symbolic goods, Schmidt uncovers what water management means for the anthropocene (14). More specifically, within this stream, he structures his book addressing three broad understandings: water abundance, water scarcity, and water security. Using this framework, he first uncovers the efforts of John Wesley Powell and William John (WJ) McGee in their creation of a post-colonial water concept that, through high modernism, transfers nature into 'natural resources' (29). Peppered with helped from Kant, Dewey, Mill, and Hegel, this process uncovers how geology and anthropology bind together to create an American exceptionalism that moves beyond colonialism. McGee and later the Tennessee Valley Authority (TVA) furthers this water management for "the People" of the United States and eventually exports this system to the world as water takes its role as a global "social object" (78) and a "geopolitical register" (95).

With the move to capture the abundance of water, water ventures into the realm of scarcity. Schmidt shows that resources build up in some areas only because they are taken from other regions. Schmidt explains this quite eloquently as he states, "as abundance was buried behind large dams, the shift to scarcity appeared to happen in short order" (116). This artificially created scarcity became the main concern of groups like the United Nations, which declared water as scarce in 1977, with various iterations of this declaration continuing to this day. Water's abundance and scarcity lead to the third section, security. Here, the notion "the Earth is one, but the world is not" takes center stage as economic values and cost–benefit analysis arise with the backdrop of liberalism. Through this section, Schmidt shows the awakening of a new organizing concept, the water-energy-food nexus that marks a new decade as water ventures into the anthropocene (166).

By the conclusion, Schmidt returns to philosophy, looking to Aldo Leopold's push to "disrupt American conservation and watershed management" (211) as an ethic that paves the way for our continual quest to manage water. As he notes, the complexity is heavy and "since we can't escape an entanglement with water resources, we must find new practice for thinking about the world that they helped to create" (191). This notion leads to his final suggestion: that water as a resource is not a neutral category but rather an unproductive myth that must be thought about differently. Ultimately, Schmidt asks readers to rethink water's role as a "neutral category" and realize this resource is used to reinforce broader ways of thinking and being in the world.

The ways people understand, use, and rely on water is central to Graham Wade's *Braided Waters: Environment and Society in Molokai, Hawai'i* (2018) as his book uncovers an environmental history of the Hawaiian Island of Molokai by looking at the "the nexus between environment and society" (4). For Graham, a water history

of Hawai'i *is* the history of Hawai'i as water acts as the main facilitator of interactions between people and the environment. As he notes, "Because water is so unevenly distributed, access to water resources is key to life: irrigated agriculture was at the base of Polynesian Hawai'i's economy, religion, and competitive social order" (194). In this respect, water sets the foundation for everything in Molokai.

Water management dictates the entirety of Hawaiian life on both large and small scales. In this sense, Graham's explanations remind readers of Ballestero's look at the mundane, as even something as common as language reflects water's importance. He writes that

> wai (freshwater) is associated with life; as kanawai, it is law; doubled, waiwai, it is wealth; malo'o (dryness) is associated with death. Control of water is more important than control of land because land is always shaped by water—islands are limited by the sea, terrains are shaped by the abundance or scarcity of rain—and has no value independent of it. Water's extent, forms, seasons, and geographies are constitutive of the Hawaiian landscape and culture (194).

Woven into words, water frames the livelihoods of Molokai acting as the foundational basis of how people understand both the natural world and human-created concepts. In this sense, words are similar to water formulas as they show that water is a powerful yet common driver of people's daily lives. Not only does water dictate how the surrounding world is understood but it also is viewed as more important than land, an idea that is contrary to what most environmental thinkers assume. Indeed, water is wealth, power, and life.

Even with a very place-specific approach, Graham's investigation offers greater insight into the central role of water as a driver of land use. He writes, "water, in abundance or scarcity, had from the beginning of settlement there fundamentally structured human social and economic possibilities and thus how people have restructured the natural environment to suit their aims" (5). Controlling water resulted in ultimate power as expressed through historical isomorphism, the notion that something similar happened to different people at different times in the same place (6). Starting with this baseline, Graham then draws from Donald Worster's focus on the role structures of class, expertise, and power have on the settlement of marginal landscapes. In this regard, irrigated landscapes and political domination go hand in hand (10). Water is the ultimate influencer. More specifically, water is the political influencer that lays the foundation for the structure of society.

Through a lengthy study that begins in 1000 AD, Graham follows water's role to the activists of today. The first half focuses on the Polynesian Period through the Māhele, the Hawaiian land redistribution process. Chapter one investigates early settlers, physical environment, farming settlement, land usages, biota, and aquaculture. Water arises in folklore and traditional stories through Kāne, the god of kalo, streams, and irrigation (38). Food surplus signifies wealth and with it comes the building blocks of an abundance of water. Chapter two progresses into the later 1700s and early 1800s through the creation of a new Pacific world. Here he looks at the world and regional history in order to situate Molokai. While water does not seem central, one must only look to the distribution of seeds and the spread of agriculture in order to see water's influence. This arises again in

chapter three through the sugar era of the mid to late 1800s as well as the introduction of larger animals like cattle.

The Māhele or "the revolution of land tenure that marked the coming of Western legal, economic, and political norms to the Sandwich Island kingdom" (44) paved the way for American water management to try its luck at taming the waters of Molokai. Rights and investments in irrigation accompany the sugar cane boom and with it come erosion and the quest for more water as expressed in chapter four. Chapter five sees the U.S. government take over with a "programmatic campaign to remake Hawai'i through scientific management of forest, range lands, and water resource that extend over hundreds of thousands of acres" (127). Wells are dug and salt water intrudes time and again as locals learn "without enough water, no amount of capital could save the day" (136). This is the water management expansion Schmidt discusses. Graham writes that just as "the triumphant march of arid lands irrigation in the western United States had captured the American imagination; it seemed natural to extend the vision to the new Hawaiian territory" (136–137). Chapter six discusses more irrigation efforts as well as more water intrusion, along with millions of dollars spent on pipelines and dams. Tourism and development are also called into question as Graham discusses today's modern day disputes of land usage and in turn water allocation, reminding readers that many local communities foresee the damage associated with present day overdevelopment.

Even when it seems like water can be reduced to terms like 'abundant' or 'scarce,' Graham's history details the entanglements and complexities that arise when water, land, and humans meet. Again, the seemingly discrete dimensions of water are blurred. In this sense, his book is a detailed summary of the issues that come with water's management, again returning to Ballestero's question about "how ideological change take[s] technical form" (72) or how global problems play out on a local stage.

The three books in this review challenge readers to ask such questions while also opening new pathways for policy makers and water managers, as well as everyday citizens to consider when thinking about water—whether it is water bills in Costa Rica, the philosophy behind the American water ethic, or the livelihoods of the people of Molokai. These accounts highlight water's role as both crucial and complex in today's world. In one sense, water is a passive pawn that is used to reinforce the ideologies of powerful political players through Western management and policies that reach far beyond their borders. At the same time, water is an active agent that carves a path for itself and shapes social, political, and economic interactions. Regardless of the direction, Ballestero, Schmidt, and Graham recognize these complexities through their web of entangled accounts regarding water management. On a broader scale, they show that water-human relationships must be considered when thinking about the environmental humanities. Indeed, these authors are expanding the holistic nature of this field as they use water to engage cultural, economic, political, and religious dimensions as well as ecological issues. Ultimately, this shows readers that water must be critically considered when addressing pressing social and environmental issues.

References

Ballestero, A. (2019). *A future history of water*. Durham: Duke University Press.
Graham, W. (2018). *Braided waters environment and society in Molokai, Hawai'i*. Oakland: University of California Press.
Schmidt, J. J. (2017). *Water: Abundance, scarcity, and security in the age of humanity*. New York: NYU Press.