

# An Ethic of Compassionate Retreat

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*The more the island of knowledge expands in the sea of ignorance, the larger its boundary to the unknown.*  
—L.S. Rodberg and V.F. Weisskopf<sup>1</sup>

*What makes . . . the Gaia Hypothesis so inspiring? . . . the awareness of our being anchored in the earth and the universe, the awareness that we are not here alone nor for ourselves alone, but that we are an integral part of higher, mysterious entities against whom it is not advisable to blaspheme. This forgotten awareness is encoded in all religions.*  
—Vaclav Havel<sup>2</sup>

**W**e need a fundamental shift in perspective within water management. To attain such a goal, we must reconsider how efforts in modern water management have, in general, focused on scientific and technological advances and assigned a declining importance to cosmology, religion, and ethics, areas formerly used to provide a context for the ends of human knowledge and action. A good place to start is to critically evaluate ideas in the broader Western narrative that have tended to privilege human welfare, scientific knowledge, and technological know-how. The alternate view we suggest, that of *compassionate retreat*, positions water use decisions in a different, although not wholly new narrative. In this narrative, the rightful role of humans is more modest and is mindful of two factors. The first addresses scientific uncertainties about water's role in earth systems and the potential-

ly detrimental effects of acting on inherently limited knowledge.<sup>3</sup> The second enumerates humanity's duties of respect and reciprocity as an increasingly influential and potentially responsible member of Earth's living communities.

A central problem with the ethical narrative underlying much of modern water management is that policy decisions are conceived of primarily as epistemological (i.e., scientific or technological) questions whose primary focus is on how to achieve a certain view of human welfare. This underlying narrative fails to consider how beliefs about human welfare legitimate actions that impact the hydrological cycle. It also fails to consider the non-epistemological aspects of moral experience that influence our acceptance of different water use practices; some of these include issues of aesthetics, compassion, fairness, temperance, habit, and custom. As such, the criteria for right and wrong and their applications are not adequately situated in relation to either the empirical realities of the hydrological cycle or facts about moral experience and human obligations.

In questioning the basic tenets of the narrative of modern water management, we should not seek to consolidate water use decisions under a single model of decision-making, such as those management paradigms that emphasize epistemic claims over moral concerns. Rather, we should recognize that all knowledge is partial and limited, and all management actions affecting water have moral dimensions. And, as the epigraphs to this essay imply, we would suggest that effective, ethical water management systems must take

into account three things: (1) The uncertainties still rife in modern management, which reflect a very incomplete understanding of complex social and ecological systems. In fact, given our limited understanding, in some cases it might be prudent to confess ignorance. (2) A revised—though by no means new—view of the relationship between humans and the rest of life and the world. In framing this part of the argument, we are drawing on Aristotle’s distinctions between scientific knowledge (*epistêmê*), technological know-how (*technê*), and practical wisdom (*phronêsis*). (3) How a revised perspective may help water managers to begin thinking about ethical behavior in times of crisis, and ultimately how to turn from a management perspective focused primarily on scientific and technological knowledge towards what we call “compassionate retreat.” From the perspective of compassionate retreat, water management would begin by recognizing that modern societies, as the dominant ecological force in the Anthropocene, must operate in view of their potential to degrade, whether temporarily or permanently, the productive capacity of different ecosystems.<sup>4</sup> Within this framework, human managers would seek a relationship wherein knowledge and actions are situated within the systems they seek to manage and operate in a manner that will increase their practical wisdom as they encounter uncertainties and complexity. This approach would also require a deep respect, growing out of the recognition that human beings are part of the universe and its expression in the exuberance of life on Earth.

#### SOME ETHICAL ASSUMPTIONS OF THE MODERN MANAGEMENT NARRATIVE

The past century has witnessed fierce debates over the role of philosophical and ethical values in science. In particular, there has been a fundamental questioning of the so-called deductive-nomological method, wherein particular truths are rationally inferred (often experimentally) from universal laws about the way the world works. More recently, similar debates have aris-

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points of view; they are often stories of peoples that provide a way of understanding where they have come from and where they may be going, rather than objective theories regarding what they ought to do. These narratives share traits with myths and stories, such as having a beginning, a middle, and an end, the latter sometimes being foretold, such as in the apocalypse in the biblical Book of Revelation or the predictions of the Book of the Hopi. Although we seldom recognize it, from a narrative perspective, modern water management is conditioned by its own cultural story. This story grounds and defines the values that it derives for

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making water use decisions and provides the context for the ends toward which its policies aim.

Modern water management arose within the context of the mainstream Western narrative, which begins with humanity as the main focus of moral concern, separate from and generally understood to be

en in ethics, particularly in the model of applied ethics, wherein correct action in a particular case is, in theory, rationally deduced from general moral principles.<sup>5</sup> Without entering in on the details of these arguments, one development evolving from this discussion has been the reinterpretation of modern science and ethics in narrative terms. Such narratives reflect particular

superior to the rest of the world. From this beginning, nature has been viewed (in the main) as something to be transformed in the service of humanity, in recent centuries by using scientific knowledge and industrial technology.<sup>6</sup> What is especially noteworthy about these initial normative premises is that they are pre-scientific—they took on many of their main features centuries before the scientific revolutions of the last several centuries and have undergone little substantial revision in light of these monumental discoveries, such as those that have shaped our understandings of evolutionary biology. Within this old Western narrative, water's value is often tied to the type and quality of human life promoted within a culture. For instance, the essays commenting on Christianity in Peter G. Brown and Jeremy J. Schmidt, eds., *Water Ethics: Foundational Readings for Students and Professionals* emphasize that attitudes toward water are important due to the role of water in meeting obligations to fellow humans and their commitments of belief.<sup>7</sup> The essays that comment on Islamic and Hindu beliefs regarding water situate these beliefs within the larger cultural narratives of which these religions are a part and which influence the legitimacy of different legal or social claims to water.<sup>8</sup>

The scientific and technological developments of the last three centuries have used these underlying Western beliefs about the primacy of human needs and our inherent superiority over other creatures on Earth. They have advocated what have been presented as universal truths regarding the nature of our knowledge about the world and how to govern its systems. Although firmly based within a cultural narrative, a main feature of the modern approach to natural systems management has been this assumption of its universal claim to truth. For example, in the case of scientific positivism, a belief system that emerged in the late nineteenth and early twentieth centuries, narratives of any kind were proclaimed to be non-scientific, metaphysical beliefs that should be eradicated from serious management thinking. Yet the attempt to categorize them as such is itself based on the Western cultural narrative current at the time. It is important to note as well that the conceptual roots that explain the hydrological cycle in supposedly scientific terms are embedded within the eighteenth and early nineteenth century quest of “natural theology” to give a rational account of the amount and behavior of water on Earth—a window into the “mind of God.”<sup>9</sup>

In this context, the term *natural theology* refers to an era of inquiry that sought to reconcile the emerging fields of scientific knowledge (after the Renaissance) with the Christian belief that the world was created by God. From this perspective, advances in such things as Newtonian mathematics and their ability to give a rational account of natural phenomenon were thought to confirm the general belief that the world functioned according to the dictates of a provident creator who had established the natural laws that govern the earth. Hence, to understand natural law was to understand the “mind of God.” And to explain natural processes through the techniques of modern science and philosophy provided a firm foundation for knowledge and justification to have faith in reason.

From the perspective of natural theology, the main epistemological problem regarding water was the seeming excess amount of it on Earth, a point we will return to later. In fact, up until the nineteenth century the central question puzzling natural theologians was why a perfect God would have put so much water on the earth.<sup>10</sup> The vastness of the seas and oceans, whose saltiness rendered them less useful, combined with the fact that freshwater in rivers appeared to flow wastefully into the ocean were problematical. How were they reconcilable with the wisdom of a God for whom all things had a purpose in the divine economy of the world in the service of humanity?<sup>11</sup> Answering this question drove the investigations that led to the scientific account of water's behavior now referred to as the hydrological cycle. However, as the concept of the hydrological cycle matured into an accepted account of water's behavior, its origins in this specific theological and cultural narrative slowly faded from view in favor of a rational point of view grounded in empirical observation.

Despite this shift to empirical science, the values inherent in the larger theological narrative were uncritically carried over in the project of making water a “resource” that could serve the Western ideal of human welfare. For instance, a common sentiment in late nineteenth century North America was the pressing need to capture surface waters from rivers and lakes into human systems before they flowed “wastefully” out to the sea. In 1888, Major John Wesley Powell, an influential figure in North American water policy and former head of the U.S. Geological Survey, proclaimed that human diversions of water were key to the progress of Western civilization. Powell's arguments are

emblematic of how water management shifted from its beginnings in natural theology to an Enlightenment ideal of human superiority. This view assumed that human reason, judgment, and science could make wonderful and endlessly productive improvements upon water's natural dispensation.<sup>12</sup>

Simple models of hydrological cycles are inadequate for understanding the actual behavior of water in complex ecosystems. For example, they almost universally failed to predict the often catastrophic changes to biophysical systems that are caused by human interference in natural cycles via large dams, intensive irrigation, or changes in land cover. In 1909, with incomplete knowledge of the complex interrelationships between water and the environment, W. J. McGee declared water a natural resource that could (and should) be controlled by humans through technology, quantified through better science, and put to use for the greatest good of society.<sup>13</sup> Once head of the American Association for the Advancement of Science and a Secretary for the Inland Commission on U.S. Waterways, McGee's arguments found favorable hearing within the Progressive Era movement in American environmental politics.

The Progressive Era movement of the early twentieth century was, in terms of environmental issues, concerned with the degradation and exploitation of natural resources. In particular, there was concern that without strong government leadership and management, the proclivity of selfish entrepreneurs to maximize profits would leave few resources for the future. In response, progressives argued for a larger role for government in natural resource policy both from the conservationist perspective and on the basis of the "wise use" of all resources, as in the philosophy of utilitarians such as McGee.<sup>14</sup> The impact of declaring water a resource meant that it could be used in concert with other natural resources, such as forests, in service of the Progressive Era ideal of human progress<sup>15</sup>—progress, at least, as measured in the utilitarian ethic of the day. As such, water became one factor in service to political liberalism's idea of human-centered values, in which the Earth's natural systems can be integrated and managed to achieve this goal for all.

David Feldman has described in careful detail how the political economy of U.S. water resource policy throughout the twentieth century has been based on utilitarian claims.<sup>16</sup> Stephen Kraft has argued that these utilitarian notions are embedded in a larger nar-

rative of utilitarian ethics received in Western legal traditions.<sup>17</sup> Such an ethic fit its times perfectly, in its promotion of liberal ideas that legitimated living wherever one wants, having as many children as desired, and achieving an affluent lifestyle. After World War II, these ideas were promoted on an even larger scale, under the guise of national and international "development." As part of a subsequent, broader narrative, the achievement of material wealth and increased industrial production then became part of an international, global project to alleviate poverty through increased living standards for all. The prophetic gospel of this management movement was "resource efficiency," and its goal was the harnessing of global resources entirely in the service of human production and consumption.<sup>18</sup> In the neoliberal version of this narrative, goods and services could be supplied at the lowest possible prices to consumers by using sufficiently liberalized or "free" markets. These markets could access free-flowing capital and operate without the tariffs and quotas that were previously seen as necessary for the protection of national interests. In partial support of this narrative, more than 45,000 large dams have been constructed to harness water for human development, changing the operation of the water cycle on a global scale.<sup>19</sup>

The unfettered promotion of water resource development was critically confronted at the Conference on Water in Mar Del Plata, Argentina, in 1977, a conference that marks the dawn of global water policy discourse. There, the momentum of the development project and its implicit assumptions were criticized for prioritizing normative views, those remnants of natural theology that assumed water resources were abundant.<sup>20</sup> In place of abundance, it was put forward that water should be conceived of as universally scarce due to its inequitable distribution in time and space. Subsequently, water scarcity provided the grounding proposition for a new global era of policy and planning.<sup>21</sup> Yet the axiom of scarcity was no more value-neutral than the narrative of abundance, for it assumed that water resources were inequitably distributed based on existing human populations and patterns of resource use. Hence, even though the political contests that beset modern water policy discourse are well documented, there has been common consent that some combination of science, rational planning, and technology provide the necessary keys to remedy scarcity,<sup>22</sup> rather than to question the location, size, or social values of

human communities or their attendant demands for water.

Since the 1970s, many authors have documented the failures of excessively rational, “command-and-control” approaches to water governance and their inability to adequately regulate or adapt to the complexity of human behavior. In this regard, the late twentieth and early twenty-first century witnessed a major shift in the water narrative towards a kind of demand management based on “full-cost pricing,” or generally increasing the economic cost of water to encourage conservation—making water into a tradable commodity that is a discrete, private, and marketable good.<sup>23</sup> Where increases

in human happiness were formerly seen as a “good” on the supply-side of water, demand-side management through pricing was promoted by authors such as Anderson and Leal as a means for making sure that water went to those who placed a high value on it, largely as a way to reduce demand through increased water use efficiency.<sup>24</sup>

Pricing water is not a straightforward exercise in supply and demand. Rather, it is intrinsically tied to the regulations that govern such things as acceptable water uses and legitimate water rights. And these regulations cannot be divorced from the politics of their creation and enforcement.<sup>25</sup> A pricing system without constraints opens management efforts to the danger that water—a key to the functioning and basic existence of all life on Earth—will go only to those able to pay for it. For instance, in early 2009 the government of Madagascar announced a deal with private investors from South Korea, who sought to lease half of Madagascar’s arable land (1.3 million acres) for an agreed-upon sum to grow water-intensive crops that South Korea lacks the capacity to produce. This scheme clearly put too low a value on the country’s land and water and brought about the fall of Madagascar’s government. The deal was quashed, but it illustrates how poor systems of water pricing have the capacity to destabilize entire regions.<sup>26</sup> This little story also graphically illustrates that the idea of effi-

cient prices ultimately rests on the empirically unsubstantiated conceit that the world was made for the use of humanity—even to the point of permitting certain individuals or groups to use it all. We feel it is necessary to deeply reconsider the basic assumption that, even in the distant future, scientific knowledge and technological know-how will be able to allow, or even *ought to allow*, complete human management of the hydrological cycle.

#### THE PROBLEM OF ETHICAL PRINCIPLES IN COMPLEX SYSTEMS

There is little doubt that, for better but more often for worse, the scale of human activity on Earth is

affecting the entire hydrological cycle, from global land-cover changes to carbon emissions that alter ocean acidity and changes in rainfall patterns. Such awareness presents us with a fundamental crisis of values; that is to say, it presents us with a stark choice in the human narrative, a choice that will to some extent govern the sequence of events determining life’s future on this planet. Within the current

narrative, water is seen as crucial in supporting human populations, which are typically growing in both size and wealth, regardless of the most pressing needs of the natural landscapes around them. The latter are viewed as valuable only in terms of the services they provide in support the former.

In reality, complex natural systems present a direct challenge to an ethical viewpoint that rests on a single and/or inflexible principle. Devising and then acting on *any* single principle or standard (such as price) will inevitably alter the hydrological system of which the good is a part, as it legitimates some and constrains other water uses. Where such an ethic is based on deducing actions from overarching principles, such as the preeminent rights of humans or laws of supply and demand, it typically offers very little ability to respond to its own effects. This is the case because recognizing deleterious effects and responding to them would appear irrational in the context of the assumed and inflexible narrative. For example, if the good of achieving

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material wealth for humans requires increased water supplies, the problems that arise as a consequence of increased water use rarely cause managers to question the overarching goal of increasing human wealth.

From humanity's perspective, so long as the actions guided by ethical systems were small in relation to the vast and complex systems of the planet, the disconnect between natural complexity and what were taken to be the universal and necessary means of rationally discharging ethical obligations may not have made much difference, or at least we were blissfully unaware of such effects. But the distance has closed between the impacts of our normative actions and the world's complex biophysical systems. This closure has revealed a suspect inference in the assumptions of the basic narrative of modern water management: that material and moral progress are of a piece.<sup>27</sup>

Organizing water management around a single theory of value standards will constrain future avenues for social and biological evolution and adaptation, including avenues that the managers may not have considered or may not yet know about. This is an extremely unethical and unscientific basis for any action. According to evolutionary science, it is adaptation and flexibility that have provided biological survival for all life forms. Constraining adaptation and evolution of natural systems as radically as we are already doing today will close off future survival for many complex forms of life. If we are to avoid such a path by recognizing our limited knowledge of the ecosystems and cycles on which we depend, we should consider the role of multivariate decision systems that, other things being equal, are likely to work longer because they provide more options from which to respond to the feedback of complex systems. We would do this in the complete understanding, however, that no system of human principles can be as complex as the system(s) in which they operate. So, from a decision-making perspective, purely rational and technocratic management cannot go far enough in helping us through the current water crisis. What we also need is a new narrative that positions scientific knowledge and technological know-how as part of the broader systems people seek to manage, and which include the cultural, religious, and ethical values by which the managers and users are informed.

#### THE AGE OF CRISES AND A NEW NARRATIVE

Our previous ethical systems have contributed to

the current water crisis. Yet if we are to offer a new direction for management, we must rethink the beginning, middle, and end of our water narrative. As we noted in the introduction to this essay, Aristotle offers sound advice. In his *Nichomachean Ethics*, he distinguishes three types of knowledge.<sup>28</sup> The first is pure knowledge, or *epistêmê*, which is the root word for "epistemology" and the types of knowledge claimed by modern science. For Aristotle, this knowledge proceeded from necessary and universal truths about unchangeable objects (i.e., mathematical axioms or water's chemical makeup as H<sub>2</sub>O). The second is applied knowledge, or *technê*, which is the root for "technology" and the types of knowledge employed in our productive capacity, or know-how, in reasoning out how to produce such things as a house, a hydroelectric dam, or a modern sewage treatment system. The third is practical wisdom, or *phronêsis*, which has no modern equivalent<sup>29</sup> but may be interpreted as a prudential type of reasoning characterized by those who are able to reason not only about what is good for them, but are also able to deliberate about what is conducive to the good life in general.<sup>30</sup>

For the purpose of critically engaging the ethic and narrative of modern water management,<sup>31</sup> it is helpful to show how its emphasis on scientific epistemology (*epistêmê*) and technological reasoning (*technê*) has excluded the virtues of practical wisdom (*phronêsis*) that offer a route to an improved, ethically conscious form of water management. First, where *epistêmê* emphasizes that scientific knowledge is often built from necessary and unchanging truths, such as the ocean's role in absorbing heat trapped by greenhouse gases and helping to moderate temperature differences on the earth, *phronêsis* offers the opportunity to deliberate on water's many changing relationships with other chemicals and biological organisms in complex, adaptive systems. Or again, where *technê* is concerned with productive knowledge—for example, improved irrigation methods or conveyance infrastructure—*phronêsis* is concerned with practices based on experiential wisdom. Excellent examples of this come from Paul Trawick's study of the evolution of successful principles for communal water management that have evolved in many regions of the world.<sup>32</sup> Another caveat about our current system is that *technê* takes advantage of luck, as in Canada, where relatively large stores of freshwater are dammed for large-scale electricity production based on a "myth of abundance."<sup>33</sup> By con-

trast, *phronêsis* does not depend on the serendipity of finding (or being rich enough to create) the right type of external environment conditions for achieving the good life. We can conclude that *phronêsis* is a type of knowledge distinguished from both scientific theory and technological production by its emphasis on the necessary flexibility required to act virtuously that, in the case of water management, means recognizing the limits imposed by being part of a complex, adaptive system.

With these distinctions in mind, it can be argued that acting ethically is not just a matter of acquiring enough knowledge to adequately solve a problem. Instead, ethical experiences are qualitative and require that we fully recognize our limited knowledge. Managing water cycles and supplies must be based on practical wisdom, which could potentially include ideas of ‘full-cost accounting’ or increased water efficiency, but only if these efforts were deemed prudent through reasoned debate that included much more than just economic deliberations. The notion of compassionate retreat first suggests that our actions ought to be guided by, but can never be reduced to, scientific or technological knowledge. It then implies that our attitude toward water ought to appreciate humanity’s position as just one part within a very complex and interwoven set of systems. It also includes a clear acknowledgment of our relative ignorance concerning how that system evolved, how its different component parts (i.e., different species) emerged, and the full effects and implications of our interactions with it.

A safer, more equitable, and long-lasting version of water management would require using scientific knowledge to construct a different narrative regarding how the world came to be and what place humanity holds within it relative to other forms of life. Here are some of the elements of such a narrative, presented in reference to the old one it seeks to amend:<sup>34</sup> First, the universe should not be viewed as having been brought into being by a Creator. Rather, the universe is itself Creative, or self-organizing in the Gaia hypothesis sense, and, by a long series of emergent steps, has given rise to extremely complex processes, such as

Earth’s living ecosystems and the organisms that live within them.<sup>35</sup>

We now know that life forms are creative influences that help construct both natural ecosystems and the Earth’s vast biophysical systems, such as the atmosphere and the water cycle. Human beings would

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therefore not be viewed as having a qualitatively distinct status due to their creation in God’s image. Rather, humans would be seen as members of natural communities that are the result of long-term emergent processes.<sup>36</sup> Whereas water once held primarily a human-focused, instrumental value, the new narrative

would value water as essential to the flourishing of all forms of life, not just our own. Such a perspective was and remains part of many religious beliefs, especially among indigenous and traditional peoples.<sup>37</sup> But even within the world’s dominant modern religions, water is usually held as sacred; behaving in accordance with this theological belief has been lost from modern forms of management.<sup>38</sup>

Under compassionate retreat, natural systems would not be considered simple mechanisms, where the consequences of intervention would always be believed to be reversible or amenable to “remediation,” as they are now. Instead, natural systems such as wetlands, taiga, or coral reefs would be appreciated both for their complexity and their necessity. Science has made it abundantly clear that each system has innumerable feedback loops prone to change in which small perturbations may result in significantly different states of affairs. As Madeleine Cantin Cumyn argues that ascertaining water’s value to human communities might begin by understanding that there are no real surpluses of water.<sup>39</sup>

Although the narrative just outlined is tentative, there are numerous authors who have been working to fill out what types of values ought to inform management decisions and to excise from them these very old cultural assumptions about human superiority or the priority of liberal, individual values. Joseph Sax, for instance, emphasizes the roots of several legal traditions in a communal right to natural resources.

Importantly, this right is not simply the aggregate of individual claims because it is not possible to trade these claims without communal effects.<sup>40</sup> In place of the independent, controlling shares of water awarded to individual humans, corporations, or governments in the past, Sandra Postel, Greta Gaard, and Carolyn Merchant all highlight the interdependence of human and natural systems. They argue that respect for one is intrinsically tied to respect for the other.<sup>41</sup> Alternative views of property and the plurality of claims to water are provided by Peter G. Brown, Rajendra Prahadhan, and Ruth Meinzen-Dick, who argue that both natural and human systems *already* have legitimate claims on water as parts of complex natural, cultural, and legal systems. And therefore, anyone making changes to the governance and management of watersheds, however well intentioned, is well advised to consider that predictive techniques such as economic forecasts are not well suited for policy-making in complex, nonlinear systems. Hence, they risk jeopardizing the survival of local systems that, at least in some cases, are working well.

While we should be careful not to read the views expressed by the other authors as automatically supporting our own—for in many cases significant differences remain—it is important to consider how a new and clearer water ethics discourse is emerging within the context of environmental ethics, environmental law, and natural resource policy. In all these disciplines, common criticisms have been made of the policies that have dominated the ethics of twentieth and early twenty-first century development. Seeing these criticisms as part of an emerging literature is, therefore, not only an observation of familial resemblance, it is a statement that the water ethics literature is assembling rungs on a ladder that should help us all to think more ethically and responsibly in the current and clearly exacerbating water crisis. From the perspective of these frameworks, there is an ethical imperative to reduce the scale and intensity of human intervention in the hydrologic cycle and to thoughtfully reverse many of the interventions that have already been made. These changes must be accompanied by fundamentally rethinking the ends toward which water management is aimed.

#### COLLAPSE AND THE ETHICS OF COMPASSIONATE RETREAT

According to the World Economic Forum, the world water crisis is closely interlinked with other cri-

ses facing humanity as the new millennium gets underway, including climate uncertainty, intermittent but often severe shortages of staple grains, rampant and increasing consumption of goods, political destabilization in developing countries, foreign oil dependence and energy security in Europe and North America, crises in urban water supply and sanitation, and global human health and population increases and shifts.<sup>42</sup> These are all examples of systems under increasing stress. We think it is important to see these interconnected phenomena as signals that fundamental rethinking of our circumstances is required—a fundamental shift in perspective and in the scale of our demands on Earth's life-support systems.

At this time in history our ethical systems face immediate and critical tests. As Falkenmark and Folke make clear, systems that are greatly disturbed may collapse or “flip” from one set of behaviors to another.<sup>43</sup> In the water sector, the potential for many such collapses is imminent due to the effects of climate perturbation on droughts, floods, sea level rise, aquifer depletion and contamination, ice melt, ocean acidification, and saltwater intrusion. A new ethic needs to help us prepare for the likelihood of ecological, economic, and social collapse. However, from the perspective of constructing a vitally needed new narrative, we must think critically about what such collapses portend, and about reconstruction thereafter.

Jared Diamond defines social and ecosystem collapse as a “drastic decrease in human population size and/or political/economic/social complexity over a considerable area, for an extended time.”<sup>44</sup> The nascent literature on social responses to collapse postulates five pathways that normally occur after social or environmental collapse.<sup>45</sup> (1) One is where complex human and natural systems are not able to re-emerge as they once were. Remnants of previous civilizations, such as those Mayan groups whose water use rituals contributed to ecological and social collapse, exemplify a road to be avoided if possible.<sup>46</sup> (2) Another may be referred to as template regeneration. When the crisis is past, there is a reassertion of old ideologies and worldviews, and little is learned from the experience of collapse. A contemporary example was produced in the film *Crapshoot: The Gamble with Our Wastes*, which links contemporary sanitation problems with a failure to rethink the basic Roman assumption of mixing water with waste: namely, that once mixed, nature's processes or our technological prowess will

allow us to safely separate them later. The conclusion of this and legal work in the same vein is clear. We have repeated the Roman pattern of poor reasoning in modern sanitation and now are faced with wastewater problems at a much more vast scale.<sup>47</sup> (3) The opposite of regeneration is a new system that contrasts strongly with the pre-existing template or narrative—sometimes with a foreign source. An example of this is the replacement, in the United States, of the Iroquois self-understanding with the Judeo-Christian understanding of the European settlers. (4) In the fourth pathway, social or natural complexity does not re-emerge at all. After collapse the capacity of the system is too weak to support human and natural diversity, such as when floods erode topsoil and permanently curtail productivity, or fossil aquifers collapse from over-pumping and can no longer store groundwater. (5) A final option is called orthopraxy. In these cases, marginalized groups practice the orthodoxy of the dominant group but do not internalize it. For instance, Australian aboriginal groups have persisted using their own values but also argue for rights to both water and land within the system imposed by their colonizers.<sup>48</sup>

To the degree that we can influence the timing and nature of collapses and their aftermath, this typology provides some guidance on what to do—tempered by strong humility that our control over events is likely to be limited in many cases and nonexistent in others. For example, it is apparent that as climate changes are amplified by positive feedback loops, future generations will have no timely prospect of reversing the process. It is also obvious that they must avoid template regeneration if at all possible, since, as we have already argued, that narrative has been a major cause of our current multiple crises. Avoiding past mistakes, however, will not be enough; a water ethic must be seen as constitutive of, and complementary to, much broader social and moral obligations. In this sense, it requires carefully re-adjusting our water use patterns in a manner that honors our obligations of respect and reciprocity toward how the rest of life flourishes.

On the one hand, modern water management has not fully appreciated its roots in the broader Western narrative and has not come to terms with the ways

this narrative has proven to be problematical. On the other, simple models of the hydrological cycle and attendant assumptions of either universal abundance or scarcity fail in their ability to capture natural complexity. So as a first step, water management must expand to include an ethic of virtue—where the quest is not only for improved decision-making frameworks, but is also for persons who act out of recognition that scientific and technological knowledge must be situated in relation to deliberations on ethics, fairness, temperance, and justice and which include great humility regarding the types and ends of human knowledge. *In this sense, a water ethic must be seen as moderating, rather than managing, the human–environment relationship.* We want to point out that we are arguing that any notion of including a virtue ethic for water must be situated within humanity’s position as one part of many complex socio-ecological systems. With considerable foresight and drawing on one form of phronêtic wisdom, Aldo Leopold argued that as members of a complex ecological community, humans must acknowledge that ethics bear on those actions involving “deferred reactions” that have consequences not

discernible to the average person.<sup>49</sup> This is because, within complex systems, it is not likely that we will always be able to connect or single out direct causal relationships. Like C. S. Holling and others who view the world as a complex

adaptive system, we are arguing that people need to “manage” water by minimal intervention.<sup>50</sup> The virtue of a water ethic would therefore lie in the fact that managers and users needn’t understand the complexities of water in all of its manifold processes in order to behave in a manner respectful of it. This would answer any objections that what we are suggesting would complicate water management by adding more criteria to its goals. Indeed, trying to manage in such multitudinous ways would present intractable, probably impossible levels of calculation. We are rather arguing that humanity’s primary relationship with life and the world should be one of respect and reciprocity, wherein we use our existing knowledge toward ends that are conducive to a good life for the entire community of life that is dependent on water. To start with, we should not assume that natural water is in any way

“...humanity’s primary relationship with life and the world should be one of respect and reciprocity, wherein we use our existing knowledge toward ends that are conducive to a good life for the entire community of life that is dependent on water.

inequitably distributed over time and space. Rather, the incongruence between supply and demand should cause us to reflect on the size and characteristics of human communities and patterns of resource use, not only on water supply.

The quadrupling of the human population and the economic expansion of several hundred percent in the twentieth century have placed a crucial choice before us: live with a denuded, simplified, dangerous, and quite possibly dying world, or embrace what we're here calling *compassionate retreat*. At this turning point, humankind is facing some of the most difficult choices of our history. There are large and often rapidly growing human populations living in areas like sub-Saharan Africa, where chronic droughts are very likely to be increased in magnitude and intensity by climate change. The same holds true for the U.S. southwest and large parts of Australia. It is growing increasingly unlikely that it will be feasible to continue to support these areas' current populations in situ. Nor is it possible to legitimately support the high-consumption societies of which the two latter places named are a part.

*Compassionate retreat* starts with the recognition that the size of the human population and the massive consumption already underway (and nearly universally aspired to) are not consistent with an ethic of respect and reciprocity, and especially do not accord with the human ability to understand or to manage complex systems. Rather than maintain the conceit that we can somehow get out of the problems we have created through management based only on science and technology, this new narrative proposes a form of strategic retreat similar to those used in a battle that cannot be won. It offers the option of significant reductions in the scale and escalation of our problems, which will allow us more time to assess and respond. There is, moreover, a concomitant and urgent need to think through and move toward steady-state economies, such as advocated by Peter Brown, Herman Daly, and Peter Victor.<sup>51</sup> Ultimately, *compassionate retreat* aims for an overall impact that approximates what Daly calls "the biocentric optimum"—that level of activity consistent with abundant human and non-human life and needs. Technological advances can play a major role in reducing the overall scale of the human impact, but technical advance alone is not sufficient to deal with the excessive scale of the human enterprise at this stage in history.

There are several dimensions to the *compassion-*

*ate* side of this strategic retreat. The first is to recognize that modern water management has failed to appreciate and understand the influence of its roots in Western values, worldviews, and religion.<sup>52</sup> It should start by sharply and systematically questioning that narrative and then should take an open stance toward alternative ideas and beliefs that will have positive effects on how decisions affecting water are made. Modern science's account of the evolution of the universe offers one possible narrative, using its own version of human origins and of our collective relationship to Earth, which is fundamentally different from the older, pre-scientific Western narrative in which current water management approaches are embedded. But we can enrich our understanding of *compassionate retreat* from existing cultural sources as well. For instance, Chinese philosophy has a strong history of using water's behavior as the natural model—displaying humility, leadership, and perseverance—for principles from which ethical and even political obligations are derived.<sup>53</sup>

A second approach is to recognize that our current water use patterns, though in many cases both unsustainable and ethically indefensible, have committed us to certain obligations to human and non-human communities that now depend upon them. Solutions to longstanding problems should seek low-technology alternatives, such as solar water disinfection (SODIS), which uses the sun's ultraviolet rays to purify water, already in use purifying water for over two million people. Such non-invasive technologies represent proven ways to increase community involvement in human health and sanitation in the latitudes most affected by water-related illnesses without large changes to complex systems and in the areas of the world where drinking-water needs are the most severe.<sup>54</sup> Under *compassionate retreat*, any new water developments must be premised on the fact that the hydrological cycle is already fully in use by the world's interdependent communities, both human and non-human. And finally, there is a need to redistribute material wealth away from the excessively rich to the desperately poor, at the same time that we redesign the economies of the wealthy countries away from high consumption, gradually, so as to cushion damaging jobs while evolving good ones. This change will require new global institutions respectful of community rights to water, which have the power to severely curb and redirect the current emphasis on individual and business liberalism.<sup>55</sup>

What we are able to offer here is a preliminary vision of a future that is most urgently in need of construction. It is also clear that in finding a new ethic for water, we can draw on elements of humanity's shared moral and scientific heritage and reposition them within a narrative that puts science and ethics together in living within complex systems. In this sense, although we have argued here that humanity's underlying water narrative needs reconstruction, the process of creating the new one may involve reusing stones from the building that is being torn down. We are all inheritors of rich moral teachings that can be deployed as elements in a narrative and ethic that envisions and helps to bring into being a flourishing Earth.

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This article is reprinted from their new book: Peter G. Brown and Jeremy J. Schmidt, eds., *Water Ethics: Foundational Readings for Students and Professionals* (Washington, DC: Island Press, 2010). Reprinted by permission.

## NOTES

<sup>1</sup> L. Rodberg and V. Weisskopf, "Fall of Parity," *Science* 125 (1957): 627–33, at 632.

<sup>2</sup> V. Havel, "The Need for Transcendence in the Post-Modern World," speech delivered at Independence Hall, Philadelphia, July 4, 1994.

<sup>3</sup> B. Vitek and W. Jackson, eds., *The Virtues of Ignorance: Complexity, Sustainability and the Limits of Knowledge* (Lexington: University of Kentucky Press, 2008).

<sup>4</sup> P.M. Vitousek, H.A. Mooney, J. Lubchenco, and J.M. Melillo, "Human Domination of Earth's Ecosystems," *Science* 277 (1997): 494–99.

<sup>5</sup> B. Hoffmaster and C. Hooker, "How Experience Confronts Ethics," *Bioethics* 23 (2009): 214–25.

<sup>6</sup> C. Merchant, *Reinventing Eden: The Fate of Nature in Western Culture*. (New York: Routledge, 2004).ob

<sup>7</sup> P. Bartholomew, "Byzantine Heritage," in Peter G. Brown and Jeremy J. Schmidt, eds., *Water Ethics: Foundational Readings for Students and Professionals* (Washington, DC: Island Press, 2010).

<sup>8</sup> F. Al-Awar, M.J. Abdulrazzak, and R. Al-Weshah, "Water Ethics Perspectives in the Arab Region," and R. Pradhan and R. Meinzen-Dick, "Which Rights Are Right? Water Rights, Culture, and Underlying Values," in Peter G. Brown and Jeremy J. Schmidt, eds., *Water Ethics: Foundational Readings for Students and Professionals* (Washington, DC: Island Press, 2010).

<sup>9</sup> Y.-F. Tuan, *The Hydrological Cycle and the Wisdom of God: A Theme in Geoteology* (Toronto, ON, Canada: University of Toronto Press, 1968).

<sup>10</sup> *Ibid.*

<sup>11</sup> *Ibid.*

<sup>12</sup> J.W. Powell, "The Course of Human Progress," *Science* 11 (1888): 220–22.

<sup>13</sup> W.J. McGee, "Water as a Resource," *American Academy of Political and Social Science* 33, no. 3 (1909): 37–50. Reprinted in Peter G. Brown and Jeremy J. Schmidt, eds., *Water Ethics: Foundational Readings for Students and Professionals* (Washington, DC: Island Press, 2010).

<sup>14</sup> For an interesting overview and primary documents see E. Stradling, ed., *Conservation in the Progressive Era: Classic Texts* (Seattle: University of Washington Press, 2004).

<sup>15</sup> See for background J. Westcoat, "Watersheds in Regional Planning," in *The American Planning Tradition: Culture and Policy*, ed. R. Fishman (Washington, DC: Wilson Centre, Smithsonian Institutions, 2000), 147–72.

<sup>16</sup> D. Feldman, *Water Resources Management: In Search of an Environmental Ethic* (Baltimore, MD: Johns Hopkins University Press, 1995); D. Feldman, *Water Policy for Sustainable Development* (Baltimore, MD: Johns Hopkins University Press, 2007).

<sup>17</sup> S. Kraft, "Surface Water and Groundwater Regulation and Use: An Ethical Perspective," in Peter G. Brown and Jeremy J. Schmidt, eds., *Water Ethics: Foundational Readings for Students and Professionals* (Washington, DC: Island Press, 2010)

<sup>18</sup> W. Sachs, *Planet Dialectics: Explorations in Environment and Development* (London: Zed Books, 1999).

<sup>19</sup> Large dams are classified as those over fifteen meters high or, if between five and fifteen meters, impounding more than three million cubic meters of water. *World Commission on Dams, Dams and Development: A New Framework for Decision-Making* (2000). Retrieved March 9, 2009, from [http://www.dams.org/docs/overview/wcd\\_overview.pdf](http://www.dams.org/docs/overview/wcd_overview.pdf).

<sup>20</sup> A. Biswas, ed., *United Nations Water Conference* (Oxford, U.K.: Pergamon Press, 1978).

<sup>21</sup> *Ibid.*

<sup>22</sup> K. Conca, *Governing Water: Contentious Transnational Politics and Global Institution Building* (Boston, MA: MIT Press, 2006).

<sup>23</sup> E. Freyfogle, "Water Rights and the Common Wealth," *Environmental Law* 26 (1996): 27–51.

<sup>24</sup> T. Anderson and D. Leal, "Priming the Invisible Pump," in Peter G. Brown and Jeremy J. Schmidt, eds., *Water Ethics: Foundational Readings for Students and Professionals* (Washington, DC: Island Press, 2010).

<sup>25</sup> B. Haddad, *Rivers of Gold, Designing Markets to Allocate Water in California* (Washington, DC: Island Press, 1999); M. Robertson, "Discovering Price in All the Wrong Places: The Work of Commodity Definition and Price under Neoliberal Environmental

Policy," *Antipode* 39 (2007): 500–526.

<sup>26</sup> National and international protests have slowed development. See S. Haughn, "Outsourcing Irrigation, Farming Discontent," *Circle of Blue/Water News*, February 23, 2009, <http://www.circleofblue.org/waternews/world/africa/outsourcingirrigation-farming-discontent/>.

<sup>27</sup> As Mahatma Gandhi remarked on such equations, "They say that before we can think or talk of their [those in India living on one meal per day] moral welfare, we must satisfy their daily wants. With these, they say, material progress spells moral progress. And then is taken a sudden jump: what is true of thirty millions is true of the universe. . . . I need hardly say how ludicrously absurd this deduction would be." M. Gandhi, "Economic and Moral Progress," in *Mahatma Gandhi: The New Economic Agenda*, ed. P.C. Joshi (New Delhi, India: Har-Anand Publications, 1996), 236–37.

<sup>28</sup> Aristotle, *The Nicomachean Ethics* (New York: Oxford University Press, 1998).

<sup>29</sup> B. Flyvberg, *Making Social Science Matter: Why Social Inquiry Fails and How It Can Succeed Again* (Cambridge, U.K.: Cambridge University Press, 2001).

<sup>30</sup> Aristotle, *Nicomachean Ethics* (Indianapolis, IN: Hackett Publishing, 1985), at VI; H. Gadamer, *Truth and Method*, 2nd ed., trans. J. Weinsheimer and D. Marshall. (New York: Continuum, 2000).

<sup>31</sup> We gratefully acknowledge the input of May Sim in this paragraph.

<sup>32</sup> P. Trawick, "Encounters with the Moral Economy of Water: General Principles for Successfully Managing the Commons," in Peter G. Brown and Jeremy J. Schmidt, eds., *Water Ethics: Foundational Readings for Students and Professionals* (Washington, DC: Island Press, 2010).

<sup>33</sup> K. Bakker, ed., *Eau Canada: The Future of Canada's Water*. (Vancouver, BC, Canada: UBC Press, 2007).

<sup>34</sup> See also T. Berry, *The Great Work: Our Way into the Future* (New York: Bell Tower, 1999).

<sup>35</sup> E. Schneider and D. Sagan, *Into the Cool: Energy Flow, Thermodynamics and Life* (Chicago, IL: University of Chicago Press, 2005).

<sup>36</sup> *Ibid.*

<sup>37</sup> G. Chamberlain, *Troubled Waters: Religion, Ethics, and the World's Water Crisis* (New York: Rowman & Littlefield Publishers, Inc., 2007).

<sup>38</sup> Since we have critiqued the nonempirical basis of religion above, we do not advocate that religion offers grounds for the new narrative. Rather, religious systems are one part of it. For recent work on religion and water see S. Shaw and A. Francis, eds., *Deep Blue: Critical Reflections on Nature, Religion and Water* (London: Equinox, 2008).

<sup>39</sup> M.C. Cumin, "The Legal Status of Water in Quebec," in Peter G. Brown and Jeremy J. Schmidt, eds., *Water Ethics: Foundational Readings for Students and Professionals* (Washington, DC: Island Press, 2010).

<sup>40</sup> J. Sax, "Understanding Transfers: Community Rights and the Privatization of Water," in Peter G. Brown and Jeremy J. Schmidt, eds., *Water Ethics: Foundational Readings*

for Students and Professionals (Washington, DC: Island Press, 2010).

<sup>41</sup> See S. Postel, "The Missing Piece: A Water Ethic"; G. Gaard, "Women, Water, Energy: An Ecofeminist Approach"; C. Merchant, "Fish First! The Changing Ethics of Ecosystem Management." all in Peter G. Brown and Jeremy J. Schmidt, eds., *Water Ethics: Foundational Readings for Students and Professionals* (Washington, DC: Island Press, 2010).

<sup>42</sup> World Economic Forum, "The Bubble Is Close to Bursting: A Forecast of the Main Economic and Geopolitical Water Issues Likely to Arise in the World during the Next Two Decades," Draft for Discussion at the World Economic Forum Annual Meeting 2009 (Geneva, Switzerland: World Economic Forum, January 2009), <http://www.weforum.org/pdf/water/WaterInitiativeFutureWaterNeeds.pdf>.

<sup>43</sup> M. Falkenmark and C. Folke, "Ecohydrosolidarity: A New Ethics for Stewardship of Value-Adding Rainfall," in Peter G. Brown and Jeremy J. Schmidt, eds., *Water Ethics: Foundational Readings for Students and Professionals* (Washington, DC: Island Press, 2010).

<sup>44</sup> J. Diamond, *Collapse: How Societies Choose to Fail or Succeed* (London: Penguin Books, 2005), 6.

<sup>45</sup> The last four categories draw on G. Schwartz and J. Nichols, *After Collapse: The Regeneration of Complex Societies* (Tucson: University of Arizona Press, 2006).

<sup>46</sup> L. Lucero, *Water and Ritual: The Rise and Fall of Classic Maya Rulers* (Austin: University of Texas Press, 2006).

<sup>47</sup> J. Benidickson, *The Culture of Flushing: A Social and Legal History of Sewage* (Vancouver, BC, Canada: UBC Press, 2007).

<sup>48</sup> V. Strang, "Blue, Green and Red: Combining Energies in Defense of Water," in *Deep Blue: Critical Reflections on Nature, Religion and Water*, ed. S. Shaw and A. Francis (London: Equinox, 2008), 253–74.

<sup>49</sup> A. Leopold, *A Sand County Almanac: With Essays on Conservation from Round River* (New York: Oxford University Press, 1966), 239.

<sup>50</sup> C.S. Holling and G. Meffe, "Command and Control and the Pathology of Natural Resource Management," *Conservation Biology* 10 (1996): 328–37.

<sup>51</sup> P. Victor, *Managing Without Growth: Slower by Design, Not Disaster*. (Northampton, MA: Edward Elgar Publishing, 2008), P. Brown and G. Garver, *Right Relationship: Building a Whole Earth Economy* (San Francisco, CA: Barrett-Kohler Publishers, 2009).

<sup>52</sup> Chamberlain, *Troubled Waters*.

<sup>53</sup> S. Allan, *The Way of Water and Sprouts of Virtue* (Albany: State University of New York Press, 1997).

<sup>54</sup> R. Meierhofer, "Solar Water Disinfection Helps Reduce the Global Diarrhea Burden," *IWRA Update: Newsletter of the International Water Resources Association* 22 (April 2009): 5–9.

<sup>55</sup> R. Petrella, *The Water Manifesto: Arguments for a World Water Contract* (New York: Palgrave, 2001).