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## EDITORIAL

John R. Ehrenfeld  
International Society for Industrial Ecology

### Sustainability needs to be attained, not managed

In preparing for this editorial, I read through several recent issues of *Sustainability: Science, Practice, & Policy* to get a sense of the way in which this concept appears. I was not surprised that sustainability showed up in many shapes and flavors, reflecting the diverse ways this term appears in conversations today. Early in the history of any new normative concept, one can find similar, but perhaps not so widely varying, views on the subject at hand.

Sustainability and its derivatives fall into the same class as a few of the key concepts underlying liberal democracies everywhere—like equality, freedom, and liberty—that are explicitly written into the founding documents of the United States. Such terms have been called “essentially contested concepts” (ECCs), signifying that there is an ongoing, never-ending dispute about both the meaning and the degree to which one can attain whatever is named by the concept (Gallie, 1956). I recall a recent allusion to some 300 or more definitions regarding sustainability. Sustainability is confused or conflated with “green” in many places. It is used more-or-less interchangeably in this publication and others focused on the notion of “sustainable development.”

The title of a recent article in this journal, “Sustainable development: how to manage something that is subjective and never can be achieved?” exemplifies the point (Kemp & Martens, 2007). I will try to answer the question that the authors raise. But first, it is critical to explore the idea of ECC. I have not done a careful analysis or literature search on ECC, but I do find something that all of the instances of this phenomena I have encountered have in common. All ECCs are emergent properties of complex systems, and are subjective in the sense that they arise through an assessment by some observer looking on the whole system. ECCs are unquantifiable, but can be described via qualities coming from the observer’s assessment.

One famous such assessment is the way a United States Supreme Court Justice defined “obscenity.” In a case deciding whether a movie was obscene, or more precisely contained “hard-core pornography,” Justice Potter Stewart wrote, “I shall not today at-

tempt further to define the kinds of material I understand to be embraced within that shorthand description; and perhaps I could never succeed in intelligibly doing so. *But I know it when I see it*, and the motion picture involved in this case is not that” (emphasis added).

The second point about ECCs is that they cannot be managed in the deterministic sense that “management” implies: that a manager operates according to some set of rules describing the behavior of the system being managed, and further that the outcome can be measured according to some quantifiable metric. So goes one of the most famous of management mantras, “You can’t manage what you don’t measure.” If I push a little here, the system will move to the place I want it to be. This apparent limitation is just that, apparent. The biggest challenge to those who construct or oversee human-made complex systems or oversee natural systems is to make sure that they are producing the desirable properties that make them special.

And I disagree with Kemp & Martens that whatever is being sought, like freedom or beauty, cannot be achieved. There is general agreement that da Vinci’s Mona Lisa is beautiful. Not everyone agrees, however, because the assessment is subjective, as Kemp & Martens’ title says. “Subjective” in this case is the opposite of “objective,” which refers to phenomena that have been scientifically measured and described via some sort of theory, law, or rule. But behind all such objective findings lurk subjective hypotheses, values, and so on. But even more important to my argument, the dichotomy between objective and subjective presumes a Cartesian world that separates the observer from the observed.

Sustainability is a much more general concept than is implied in its adjectival use in sustainable development. It is better defined as the possibility that some system that is now producing, or soon will produce, one of these desirable emergent properties will continue to produce it indefinitely. The Mona Lisa exhibits sustainability regarding its beauty, which it will bring into the views of those who gaze upon it as long as it hangs in the Louvre. The folly of attempt-

ing to quantify and mechanize beauty is quite clear if one looks at an animated video, touting Microsoft's MS Paint program, a very fancy paint-by-numbers kit, showing how one can paint the Mona Lisa in just a few minutes.<sup>1</sup>

But sustainability, as contrasted with "sustainable development" or any phrase using the adjective sustainable, is very different. Sustainable development is, indeed, all about managing the technocratic process of economic development so that the Earth will continue to support future generations in the same way it has for us. Development is certainly not the objective. But what is? Even the conventional triad—environment, economy, and equity—that accompanies the standard Brundtland definition does not help much. Further, since sustainable development is categorically a continuing process, it cannot, by definition, ever be achieved. Words can, and do, really get in the way of actions.

To avoid this, again, apparent dilemma, I begin with a very different way to define and construe sustainability. In a recent book, I define sustainability as "the possibility that human and other life will flourish on the Earth forever" (Ehrenfeld, 2008). Here "flourishing" is the emergent property and the system producing flourishing is the Earth. I chose flourishing as the quality that encompasses all three legs of sustainable development because it conjures up a vision of a desirable future state and, thus, can be assessed as being present or not. It is certainly not going to be easy to get there, but it is not something "that never can be achieved."

Flourishing is a metaphor for many things, but always connotes aliveness, joy, health and many other qualities related to being. The challenges we face today, as portrayed in the volumes of this journal, are different from those related to managing sustainable development. Our goal should be to attain sustainability because it exists now only in tiny bits and patches, if at all. Even if we continue to disagree on the meaning of sustainability, we are largely in agreement that the present state of the Earth is unsustainable. We can come to terms here because we do define unsustainability in quantitative measures and rules.

Further, virtually everything that has been done in the name of sustainability is rather an attempt to reduce unsustainability. This may sound like a tautology, but it is not. Sustainability is a mere possibility; flourishing is the normative vision. Unsustainability is palpable and can be measured and reduced to the result of calculations. The dominant sustainable development framework, employed by virtually all

countries, is some form of technology to improve efficiency.

Ecoefficiency is the rubric applied to new consumer products and commodities: more value for less environmental impact. Energy efficiency aims at providing ever-increasing demands for energy via technology that reduces carbon emissions and preserves the finite supply of fossil fuels.

Few of these references to efficiency account for the rebound effect (also known as the Jevons Paradox) (Alcott, 2005) that states that growth in demand will negate the gains of efficiency improvement. This last sentence is not a criticism of efficiency or any other efforts to stem the tide of unsustainability; it simply points to its limitations. Anything done today that will slow down the potential collapse of the planetary and socioeconomic systems that nourish us is important.

However, we cannot confuse these efforts with creating sustainability. Nor can we allow the complacency that is created by continuing to attack the symptoms with technology, rather than attacking the underlying causes. Systems dynamics calls such defocusing on the real problems, instead of addressing the underlying causes, "shifting the burden."

Unsustainability is an unintended consequence of modernity. It has arisen in the normal course of societal activities. The underlying structure of modern cultures fuels the pump of consumption. Unsustainability will not disappear and make room for sustainability to emerge until the beliefs and norms that drive industrialized economies are exchanged for new ones aligned with sustainability. Cartesianism and the idea of an objective reality, accessing that reality through reductionist science, the standard model of the human as a machine driven to fulfill an insatiable set of needs, plus a presumption that technology will solve virtually all of our problems, are a few key beliefs that are implicated.

The Cartesian way of grasping (objective) reality leads to the notion of absolute truth and thence to domination. Humberto Maturana (1988), a Chilean biologist, says that in the system of objective reality, "a claim of knowledge is a demand for obedience." Reductionist science places humans outside of nature via the metaphorical microscope with a human eye at one end and the world at the other. Early modernist beliefs about the liberating power of this newly found knowledge and its technological applications saw nature as harsh and alien and sought to establish dominion over it for the perfection of humanity.

The standard rational model of cognition and action leads to a model of humans as possessing a mysterious set of insatiable needs that individuals continually strive to satisfy by basing actions on a maximizing calculus programmed into a computer in

<sup>1</sup> Available at [http://www.youtube.com/watch?v=uk2sPI\\_Z7ZU](http://www.youtube.com/watch?v=uk2sPI_Z7ZU).

our minds. Couple this to a neoclassical, capitalist political economy that must grow or die, and you have a formula for trouble. Finally, the shifting-the-burden propensity to use technology to solve every problem leads us to see the whole world as little more than raw materials for more and newer tools. Humans are transformed from something special to mere potential components for a tightly bound-up system of production and consumption. In the unending quest for tools to satisfy us, we have turned from our flourishing, or being, mode to one of having (Fromm, 1976).

If we are to see the possibility of flourishing realized, we must transform the cultural system at its roots. We can start by exchanging our model of determinate objective reality for one of complexity, accepting that the world and its subsystems cannot be reduced to a set of mathematical or analytic rules. The financial system, a good example of complexity, has been modeled by economists and bankers as a money machine, but what we really strive for is not money, but security and the means to enable us to care for the world, others, and ourselves. The recent collapse of the system did make a lot of money disappear, but what was really lost was confidence, trust, and security.

Complexity brings us a different set of beliefs that should line up better with sustainability: interdependent and communitarian instead of independent and individualist; and organic and holistic instead of mechanistic and atomistic. Seeing us as caring rather than needing creatures brings us other directedness instead of narcissism and concern for fairness instead of drive for efficiency. Beauty is not something that can be bought in a bottle, even though advertisements incessantly bombard us with exactly that message. Philosophers such as Martin Heidegger and psychologists like Erich Fromm recall our origins as being creatures. Being is a holistic concept that emerges when the whole body is working in harmony with all the interconnected links with the Earth and with other people. The sense of responsibility necessary to maintain taking care of the Earth, which has been lost, returns to one's consciousness.

We slowly become our stories and our actions play out the plot they weave. Vice versa, we create our stories from our actions. We can build these new kinds of models for the world and human life into the tools we use every day and into the social processes we use to make collective decisions. Tools that talk and guide our actions are one way to move. Simple artifacts, for example speed bumps, two-button toilets, or seat-belt alarms, speak to us with messages like: be careful, someone might be crossing; use only as much water as is necessary; or do not gamble with your life. Governance frameworks such as the Pre-

cautionary Principle reflect the indeterminacy of the complex worlds on which we depend for flourishing. Accepting that we cannot know how to predict their future states, especially when we suspect the possibility of collapse, of shift to an unfriendly regime, leads to prudence.

This editorial has been written to pique your curiosity and to start up the motor of critical and systems thinking. There is a lot more to say, but for that you will have to read my book.

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## ARTICLE

# The limits of integrated water resources management: a case study of Brazil's Paraíba do Sul River Basin

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The transition to water sustainability involves challenging questions about problem assessment, stakeholder involvement, and response coordination. To overcome these difficulties, new approaches have been developed to inform regulatory changes and to help to improve the level of water sustainability. One of the preferred methods is integrated water resources management (IWRM) that combines different aspects and a plurality of goals associated with water use and conservation. However, important obstacles remain in the way of IWRM and, ultimately, water sustainability. A case study in the Paraíba do Sul River Basin in the southeastern region of Brazil illustrates the multiple barriers to appropriate integration of socioeconomic considerations into the sustainable management of water systems. The opportunity to improve environmental conditions and to engage local stakeholders has been frustrated by the contradictory directions of regulatory reforms. On one hand, IWRM-informed policies have introduced flexible instruments of water regulation and pushed for the reorganization of the river-basin committee. On the other hand, the focus has been restricted to technical and managerial solutions that tend to ignore the influence of social inequalities and political asymmetries and, as a consequence, undermine water sustainability.

**KEYWORDS:** river basin management, socioeconomic factors, water use regulations, water conservation, water management

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## Introduction

Since the major conferences and publications on environmental sustainability in the 1970s and 1980s, such as the Mar del Plata Conference (1977), the Brundtland Report (1987), the United Nations Conference on Environment and Development (UNCED) and Agenda 21 (1992), and the Johannesburg Conference (2002), questions pertaining to water management have received considerable attention. Both the assessment of water problems and the formulation of solutions have benefited from better comprehension of the social and ecological complexity of water use and conservation. The meaning of sustainable water management has itself changed, from simply meeting quantitative water demands to concerns about water quality and, more recently, to the integration of spatial and temporal scales of multidimensional water issues (Hermanowicz, 2008). However, the translation of sustainability principles into action has often been contentious. Reforming water management under the goals of environmental sustainability is a far from complete project, particularly because of difficulties in breaking the link between economic growth and water demand and reluctance to incorporate issues of fairness and community involvement into the decision-making process (Gleick, 2002; Syme & Nancarrow, 2006). This article discusses the extent to

which new attempts to manage water resources in Brazil have responded to pressing demands for environmental sustainability.

In many parts of the world, the introduction of a new structure of water regulation has reflected the influence of international concepts and methodologies. One of the leading principles is integrated water resources management (IWRM), defined as “a process which promotes the coordinated development and management of water, land and related resources in order to maximize the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems” (Global Water Partnership, 2003). It is important to recognize the close association between sustainable development and the goals of integrated water management. As Simonovic (1996) observes, the sustainability agenda has reinvigorated attempts to better manage the water environment through appropriate policy making and integrated planning strategies. Some accounts describe the positive outcomes of IWRM-inspired experiences, such as those planned for the Fraser River in British Columbia, the Don River in Toronto, and the Thames River in England (Mitchell, 2005). Other assessments, particularly in developing countries, are more skeptical about IWRM's impact on the long legacy of social and economic demands

and lasting environmental degradation (e.g., Swatuk, 2005).

This international debate has important repercussions for the Brazilian experience where “the institutionalization of water norms has most strongly reflected the IWRM framework” (Conca, 2006). Policy tools informed by IWRM, such as catchment plans, water licenses, and bulk water charges, have been incorporated into national water regulation and form the basis of the 1997 Water Act (Law 9433/1997). The same act also established a national water management system that extends from the federal government to state authorities and river-basin committees (Abers, 2007). Although some authors have extolled the institutional reforms as a genuine new paradigm for dealing with water issues in Brazil (Formiga-Johnsson et al. 2007), insufficient attention has been given to operational problems and political disputes on the ground. A case study of the Paraíba do Sul River Basin shows that, despite repeated claims of success by the government and local water managers, the new regulatory approaches underestimate social inequalities and power asymmetries. Most of the public debate and stakeholder involvement in the area have been tied up with a single issue—the introduction of bulk water charges—that has paradoxically magnified the already contested basis of water use. Before moving to the case study, the article first considers several problems that are firmly entrenched in the IWRM model.

### **The Context and the Internal Contradictions of IWRM**

The progressive industrialization of the economy and society’s associated urbanization increased the rates of water use and land-use change in the last two centuries. The consequence was that problems such as water scarcity, urban flooding, and river pollution began to impact larger areas and affect a greater proportion of the population in many parts of the world. One of the first attempts to improve water management, and at the same time promote regional development, was the experience of the Tennessee Valley Authority in the 1930s that aimed to bring together social engineering and land and water management while benefiting from an unusual degree of political control (Selznick, 1949; Wescoat, 1984). In the subsequent decades, the idea that water could facilitate economic development influenced the construction of dams and the expansion of water infrastructure in the United States and other countries. Before too long, it became evident that focusing solely on the economic dimension of water projects was leading to operational inefficiencies and widespread impacts. At the end of the 1970s scientists and policy makers started

to revisit concepts and techniques following an international call from water users and civil society organizations for a more comprehensive understanding of the social and environmental dimensions of water systems. A new comprehension of water problems has, particularly since the 1990s, exerted formidable influence on legal, technological, and administrative reforms around the world (Tvedt & Cooper, 2006), with gradual movement away from conventional interventions and toward a combination of regulatory, economic, and multistakeholder participation measures (Ballabh, 2008).

This reform of water-management policies has been closely related to the construction of a broader sustainable development agenda. The search for water sustainability requires flexible management of the water cycle and innovative forms of stakeholder contribution (Cui et al. 2007). Nonetheless, the association between sustainable development and water management is far from straightforward. While some authors still define water sustainability as basically the search for efficient use of water (Wilderer, 2007), growing attention is being given to the multiplicity of perceptions of the role of water management (Hermanowicz, 2008), the need to deal with environmental conservation together with social and economic demands (Ioris et al. 2008), and the fact that water sustainability entails a scientific mindset that recognizes the relevance of place and integration (Schmandt, 2006). Accordingly, a key concept of the contemporary water-sustainability agenda is the aforementioned IWRM, a body of knowledge that has informed the development of new legislation, the involvement of stakeholders, and the redesign of management approaches (Conca, 2006). IWRM’s basic rationale is to foster an integration of socioeconomic development with physical planning and environmental protection (Savenije & Van der Zaag, 2008).

Ongoing efforts to integrate public policies undoubtedly represent an evolution in relation to previously fragmented and technocratic approaches. However, the translation of IWRM objectives into concrete management strategies has not been without its dilemmas. As will be discussed for the Paraíba do Sul, the reorganization of water regulation inspired by the IWRM doctrine has faced unexpected difficulties and delays in recent years. To a large extent, these obstacles can be related to a number of intrinsic limitations of the IWRM proposition. To begin with, despite various efforts to conceptualize integrated management, its epistemological grounds remain unclear. Most IWRM scholars persistently insist on the need to integrate plans and procedures (e.g., Bongartz, 2003; Faby et al. 2005; Hendry, 2006), but it is not easy to grasp what exactly should be priori-

tized and how responses should be integrated (Biswas, 2008). Water management is essentially about choosing between equally important demands, but elusive claims for wide-ranging integration, as in the case of IWRM, are unable to offer much help when dealing with specific water-management questions.

The practical experience in many countries (as in Colombia, according to Blanco, 2008) demonstrates the difficulty producing innovative answers to extremely complex water problems with only a vague set of ideas. In spite of calls for integration, some IWRM initiatives have suffered from the same old problems of administrative division (Fischhendler, 2008). On these operational weaknesses of IWRM, Rahaman & Varis (2005) point out that implementation in the field remains very challenging because, among other things, “the water sector is sparse in integrating its integrated plans.”

It is crucial to recognize that the conceptual and operational limits of IWRM are deeply related to the political naiveté that characterizes most of the ongoing institutional water reforms. Many authors, for instance, still fail to acknowledge that power differences between social groups or spatial areas have a striking influence on water allocation and on the distribution of negative environmental impacts. It has been observed elsewhere that a critical limitation of IWRM is the entrenched attitude of water managers and hydrologists who treat socioeconomic and political demands as a deviation from the “purist” goals of water management (McCulloch & Ioris, 2007). These professionals tend to attribute the problems of implementing IWRM to circumstantial nuisances to be overcome or avoided, but certainly not to more fundamental political disputes (Blomquist & Schlager, 2005). As a result, IWRM advocates fall short of addressing the important political nexus between economic growth, environmental degradation, and social demands. These advocates need to remember that social and economic inequalities are integral features of environmental management, even more in countries like Brazil where conflicts over resources are linked to systems of political and economic control established already in colonial times (Bryant, 1998). Furthermore, if the politicized bases of water management are ignored, new attempts are likely to legitimize existing inequalities and social privileges (Zhouiri & Oliveira, 2005).

The case study described below demonstrates that the internal limitations of IWRM (namely its conceptual impression, limited operationalization, and tendency to deny the essential politics of water) have significantly prevented satisfactory responses to the environmental and social problems related to water management in that river basin.

## The Case Study in the Paraíba do Sul River Basin

### *Fieldwork Methodology and Interpretation Approach*

The case study involved data collection in the Paraíba do Sul River Basin (PSRB) between March and May of 2007, following a preliminary visit to the area the previous year. The bulk of the research comprised 18 confidential interviews and subsequent e-mail discussions with water stakeholders (including industrialists, sanitation companies, nongovernmental organizations [NGOs], and professional bodies) and government officials (from municipal, state, and federal agencies). Interviews were recorded and transcribed and the most relevant parts were translated (by the author) into English.

The case study also included content analysis of documents, meeting minutes, and plans and observation at meetings of the river-basin committee. In addition, environmental monitoring and hydrological data were analyzed using statistical computer software to identify changes in long-term trends.

Examination of the collected data followed Sayer's (1992) recommendation that the world is not merely differentiated, but also stratified. Consequently, interpretation of the data concentrated on the dynamic relations among events, structures, and mechanisms. Following a critical analysis of a complex reality, explanations can emerge from the dialectical movement between the abstract (the isolation of particular attributes and relationships from the whole) and the concrete (the multiplicity of structures and events that comprise the world). Explanation was also tied to understanding the meanings, perceptions, and motives of local stakeholders, as well as to the antecedents of actions and the significance of current actions for those involved (Cloke et al. 2004).

### *The River Basin*

The PSRB is located in southeastern Brazil and is one of the country's most dynamic economic areas.<sup>1</sup> Water availability and the river network have been historically important for regional development and urban growth. Because of its strategic location (between the states of São Paulo, Minas Gerais, and Rio de Janeiro), the river basin currently accounts for

<sup>1</sup>The PSRB encompasses 55,500 square kilometers between latitudes 20° 26' and 23° 00'. The average flow at the river mouth is 1,118.40 cubic meters per second (m<sup>3</sup>/s) with low flow (Q<sub>95</sub>) of 353.77 m<sup>3</sup>/s. The river extension is approximately 1,100 kilometers, draining an area that includes 180 municipalities. More than 5.4 million people live in PSRB. The Paraíba do Sul is also used as the main source of water for the Rio de Janeiro Metropolitan Area and is the primary water supply for more than 12 million people (COPPETEC, 2006).



approximately 11% of national gross domestic product (GDP), but it has been a key economic region for more than 300 years. Already in the eighteenth century, the Paraíba do Sul was the main communication route between the coast (Rio de Janeiro) and inland gold mines. With the introduction of coffee production in 1770, vast areas of land were cleared and the natural vegetation removed to open space for plantation farms. By the end of the nineteenth century, because of significant rates of soil erosion and land degradation, coffee producers started to migrate to other parts of Brazil. Nonetheless, a new and stronger economic phase commenced around 1900 with the introduction of textile and food industries (Müller, 1969). The most significant milestone was the founding of the National Steel Company (CSN) in 1941, the first major steel plant in the country. The river basin now has a diversified industrial sector that includes more than 8,000 manufacturing units (CEIVAP, 2001). In conjunction with this process of rapid industrialization, more than 120 hydropower stations were installed in the river basin, with some new projects currently under construction.

Unfortunately, urbanization and industrialization have led to significant pollution problems due to sewage effluent (1 million cubic meters per day) and toxic industrial waste (7 tons per day).<sup>2</sup> According to the official environmental monitoring database (*Sistema de Informações de Recursos Hídricos da Bacia do Rio Paraíba do Sul*), the river's more polluted stretches have rates of coliform bacteria between 50 and 160 times the legal threshold. Water pollution is aggravated by the fact that only 17.6% of the sewage receives any form of treatment. The main public health consequence of the lack of sewage treatment is the high rate of hospitalization related to infectious and parasitic diseases and these disorders mostly affect the low-income population of the region. Treacherous biological conditions are particularly evident in the middle section of the main river where most industrial facilities and hydroelectric plants are located (Araújo et al. 2003). There is clear evidence of riverbed and reservoir contamination by heavy metals such as chromium that are released by industrial operations (Gruben et al. 2002). The total rate of water demand amounts to 263 m<sup>3</sup>/s and this volume of abstraction imposes significant pressure on limited water resources (more than 74% of the water available during periods of low flow). Another important source of impact is the extraction of sand (for civil engineering) from the river floodplains that creates

artificial lakes (1,726 hectares of lakes were identified in 2003) where the loss of water due to evaporation corresponds to the water demand of 326,000 inhabitants (Dos Reis et al. 2006). Additional water-management problems are related to persistent urban flooding, soil erosion, lack of adequate waste treatment, and construction of new hydroelectric dams. It is critical to realize that this precarious environmental situation has not improved in recent years.

### ***The Limits of IWRM: When Theory Clashes With Practice***

During most of the twentieth century, water management in PSRB meant basically the expansion of water supply and hydropower generation. The decision on where and how to invest was highly technocratic and centralized in the hands of the national government. While water supply and hydropower infrastructure were both targets for substantial public funds, there was minimal investment in effluent treatment and environmental restoration. In just a few decades, the quality of the environment in the main river and many of its tributaries was seriously compromised. The formal response to mounting water problems started in 1968, when the military dictatorship established the Paraíba do Sul Valley Commission (COVAP). The commission was ineffectual and was replaced in 1979 by a multiministerial committee called *Comitê Executivo de Estudos Integrados da Bacia Hidrográfica do Rio Paraíba do Sul* (CEEIVAP), also with negligible results. The membership in both organizations was restricted to public agencies and civil servants, without any mandate from water users and other stakeholders. The PSRB during these years became increasingly notorious for serious water quality and quantity problems. It was only in the 1990s, when the level of pollution started to attract growing international criticism, that the outlines of a more responsive structure were established. The new river-basin committee, *Comitê para a Integração da Bacia Hidrográfica do Rio Paraíba do Sul* (CEIVAP), was organized in 1996 under IWRM principles of catchment integration and stakeholder involvement. The PSRB was quickly turned into a showcase for the national government that financially supported CEIVAP to organize the agency's bureaucracy and to prepare studies and plans (Braga et al. 2005).

Despite the laudatory comments about CEIVAP in the media and academic circles,<sup>3</sup> after more than

<sup>2</sup>It is beyond the objectives the paper to list the full range of environmental problems in the Paraíba do Sul. The characterization that is provided here is from COPPETEC (2002; 2006). More information is available at <http://www.ceivap.gov.br>

<sup>3</sup>For example, CEIVAP was awarded the "Best Practices" prize by the United Nations Habitat Program in 2004 and the tenth anniversary of the committee in 2007 was extensively celebrated by its members and by the concerned public agencies. It is not possible to include here a full list of academic theses and dissertations (we have consulted more than forty) that repeatedly



ten years of activity, the new committee has largely failed to reduce environmental pressures and reverse water degradation. Several CEIVAP members contacted during this research expressed their concern, or even perplexity, with the negligible environmental results. Others complained about the restricted contribution of the new committee in terms of strategic thinking and long-term planning. Notwithstanding governmental support and an extensive bureaucratic structure, the fundamental problems of environmental degradation and fragmented management remain largely the same in Paraíba do Sul since the formation of CEIVAP. It is true that most committee members believe that the current troubles are transitory and, in the long run, the committee would be able to justify its existence. According to the majority of the committee members interviewed in our research, the river basin's geographical complexity was underestimated when CEIVAP was formed, in particular the difficulty integrating federal and (in the main river and in some major tributaries) state regulation (in most tributaries).<sup>4</sup> It is true that the dual domain—federal and state responsibilities for the same river basin—has been one of the major integration challenges for the management of larger catchments in Brazil. There exist today five sub-basin committees and eight municipal consortia in PSRB (the former have a legal mandate similar to the river-basin committee, while the latter have more targeted objectives such as waste and sanitation) that do not necessarily communicate with each other or with CEIVAP. The result is that instead of a more integrated structure the regulatory reforms have paradoxically exacerbated institutional fragmentation and—quite often—fratricidal competition for resources.

The positive expectations about the future of the new committee are certainly important and our research carefully considered that most committee members expressed optimism in relation to the circumstantial character of present difficulties. But at the same time, these opinions seemed overly influenced by IWRM's hegemonic ideology. Crucially, the stakeholders who expressed a more optimistic view are exactly those that, since the beginning of the reform process, endorsed IWRM principles. In other words, these stakeholders have a circular argument biased toward the new institutional framework, despite the persisting environmental degradation in most parts of the river basin. Certainly, as advocates of the current model point out, the internal fragmen-

tation of efforts that arises from the unique federal configuration of Brazilian river basins, has had a major impact on the success of water-management initiatives. Nevertheless, the failures of the institutional reforms indicate more fundamental inadequacies in the IWRM-inspired regulation.

In fact, experience in PSRB seems to encapsulate the conceptual, operational, and political limitations of IWRM mentioned above. The new regulatory approaches have been presented to the general public as a significant step forward, but without any clear indication of how long-lasting problems would be effectively resolved. In other words, the plans and strategies so far produced remain very generic and have had partial implementation. Likewise, the public has had only limited opportunities to participate in decision making. Despite a discourse of democratic governance, the new river-basin committee has, for the most part, replicated the centralized, top-down mechanisms of water management (e.g., civil servants and academics have played a crucial role in the organization of the new river-basin committee [cf. Formiga-Johnsson et al. 2007]). Abers & Keck (2006) point out that the regulatory reforms require a multidirectional power transfer among a variety of policy arenas and actors, but that remains a fundamental challenge for the river-basin committee. It should be mentioned here that the shortcomings of its internal democracy led the committee to a period without regular meetings in the year 2007 and this interregnum only ended due to renewed calls from senior committee members and, more importantly, to pressures from government agencies. The consequence is that, despite all the effort, the committee has been largely powerless and often inactive in the face of old and new water problems.

### ***The Main Distortion: The Narrow Agenda of Water Pricing***

To understand the mismatch between IWRM's theory and practice, it is important to reflect upon how the river-basin committee has functioned in recent years. It is clear that CEIVAP has had a busy agenda of meetings and ceremonies, often involving ministers and senior authorities. Nonetheless, most of these activities have been focused on a single issue: the implementation of water-use charges (i.e., bulk water charges or water pricing) that constitute a fundamental tenet of IWRM-inspired regulation (to the extent that it serves to express the economic value of water). The case for water charges became stronger around the year 2000 when many committee members started to argue about the necessity of reducing financial dependence on central government grants. Between 2000 and 2002, opinions against and in favor of charges polarized the committee. The federal

praise the success of the new committee, in particular the instrument of bulk water charges (see below).

<sup>4</sup>According to the Brazilian Constitution, water has dual ownership: federal, for those rivers that cross more than one state or are shared with other countries, and state, for those confined to one state territory.

government, academics, and some NGOs supported bulk water charges. Opposing the charges were the representatives of agriculture, electricity generation, sanitation companies, and, especially, the industrial sector.

During this period, according to our interviewees, CEIVAP meetings were turned into a “battleground” where representatives of the critical sectors systematically questioned the rationale of the proposed charges. The fierce debate about the adoption of charges, instead of improving the quality of stakeholder engagement, emasculated initial enthusiasm for the new committee. In 2002, the controversy took a curious turn when the industrialists surprisingly changed their position and agreed to the proposed charges; the river-basin committee eventually approved the charging scheme and implementation started in 2003.<sup>5</sup> The reason that the industrialists altered their opinion was that, since the charges were effectively inevitable (due to the requirements of the 1997 legislation), the sector preferred to take pre-emptive action to secure reduced fees and, more importantly, to prevent the adoption of more stringent regulation. The general public was led to believe that the industrial sector was cooperating with the new water-management approaches, whereas it was in fact tacitly accepting the charges. The irony during those crucial committee meetings was the unexpected support that the industry received from environmental NGOs that declined to impose higher charges and alleged instead that it was better to agree upon the charging scheme at once.

Charging for bulk water has been a central policy of the new IWRM-inspired regulation in PSRB. Advocates claimed that the charges, as an economic instrument applied to environmental management, would mitigate ecological damage, induce rational water use, and reallocate water according to economic efficiency (Garrido, 2004). In practice, however, the income from the charges achieved little more than spurring modest investments by the river-basin committee in isolated sewage works and river-bank regeneration projects. Since the beginning, the controversy about charges has prevented the committee from considering the broader context of environmental problems and social issues related to water (at the time of our fieldwork in 2007 the debate in the

river basin was concentrated on the revision of the charging scheme). In effect, between 2003 and 2006, the charging scheme was responsible for collecting a total of R\$25.4 million, an amount that is considerably less than the estimated sum needed to restore the river basin: R\$360 million per year in capital investments or R\$4.6 billion by 2025 (COPPETEC, 2006). In 2006, a total sum of R\$7.1 million was spent in fourteen municipalities (out of 180 in the river basin), but the money went to short-lived projects with only marginal environmental consequences.

Because the grants from the river-basin committee come in the form of donations, competition for resources has been fierce among the various municipalities and even NGOs. There is plenty of lobbying during the selection of proposals (for instance, it is common to notice mayors that attend CEIVAP meetings together with engineers of construction companies that have a vested interest in accessing committee funds), which only helps to poison the dialogue between CEIVAP members. Moura (2006) describes how the committee has unevenly invested the income from the water charges in the river basin, a situation that constantly feeds spatial conflicts and disputes among municipalities. A related problem is that the acceptability of the charging scheme has not improved (data provided by CEIVAP show that the income remained fairly constant between 2003 and 2007 at around R\$550,000 per month) and, after more than five years, water users retain considerable suspicion and misinformation.

Notwithstanding the above problems, the main failure of the PSRB charging mechanism is probably that water charges have neither influenced the reallocation of water in the river basin nor curbed the expansion of water use. To some extent, the new regulatory framework has induced some industries to anticipate investments in effluent treatment, but this outcome only occurred in the companies that were already planning to acquire new equipment or technology. In a survey of 488 industrial facilities, Féres et al. (2005) found that most companies invested in pollution reduction mainly because of the risk of bad publicity vis-à-vis their corporate responsibilities. This point is consistent with other international studies that have observed that active engagement of stakeholders, instead of charges, is the most important factor for achieving water efficiency and sustainable water use.

Finally, the new regulatory framework has been paradoxically used to legitimize the degrading activities of industrial and agribusiness companies, as long as the charges provide a political excuse for not questioning their location, scale, and operation. In our interviews, as well as during the CEIVAP meetings, industrial sector representatives explicitly

<sup>5</sup> All water uses above a certain threshold (i.e., consumptive use above 1 liter/second and hydropower larger than 1 megawatt) must pay a monthly charge, calculated in accordance with the extraction rate, the percentage of use, and the quality of the effluent. The standard charge (R\$0.02/m<sup>3</sup>) is applied to industries, water suppliers, and mining companies, with discounts for agriculture and aquaculture. There is a charge of 0.75% on hydroelectric revenues, but the river-basin committee has limited authority in how this specific levy is spent. Note: at the time of this research, US\$1.00 corresponded to approximately R\$1.80.

claimed that they have completed their contribution to restoring the river, especially in the form of water charges. In practice, the regulatory framework means using the river-basin committee's activities and formal compliance with the new policy instruments as an excuse to avoid further financial contribution to river restoration and, more importantly, to evade the history of river degradation. This situation can be attributed to the fact that the new regulation treats all water users according to their payment capacity and this policy erodes the differences among stakeholder groups and, consequently, hides relative obligations for environmental degradation of the river basin. For all these reasons, the claim that water pricing is a success in PSRB on grounds of inclusiveness and technical efficiency (cf. Formiga-Johnsson et al. 2007) seems largely overstated. On the contrary, the opportunity to effectively improve water management has been squandered due to ideological pressures for the adoption of water charges and related IWRM-based policies.

## Conclusion

This analysis is a relatively cursory account of a complex web of interaction and conflicts in PSRB, but it arguably illustrates the difficulties of translating IWRM goals into practice and, ultimately, achieving water sustainability. Environmental degradation and political asymmetries existed before the current institutional reforms, but the intrinsic limitations of IWRM—namely its conceptual, operational, and political shortcomings—have led to the persistence of water-management problems. Current attempts to improve water regulation in PSRB, representing just the most recent chapter in a long history of water management, have been largely unable to improve the river basin's environmental condition. Notwithstanding rhetorical changes, the new regulatory approaches—in particular the new river-basin committee organized under the influence of IWRM—have reproduced past contradictions and limitations. The consequence is that, after more than 300 years of intense agricultural, urban, and industrial activity, the river basin remains without any clear indication of how or when environmental conditions will be effectively improved.

The new regulatory framework that should be creating synergies between state and society has paradoxically widened the gap between public agencies and society at large, given that the river-basin committee has been dominated and manipulated by stronger political players, namely the federal government and business sectors, that have developed a sort of “veto power.” The river-basin committee remains a semigovernmental entity (as warned about by

Gruben et al. 2002), rather than a genuinely democratic decision-making arena where all stakeholders have equal opportunity. Instead of integrating ecological and social goals, as IWRM theory proposes, efforts in PSRB are as fragmented as ever and more than a dozen river-basin organizations are in daily competition with CEIVAP for financial resources and political space. The fundamental cause of these problems is that most of the regulatory effort has been concentrated on the introduction of water charges, an observation that confirms Brannstrom's (2004) point that water pricing is the central objective of regulatory reform in Brazil.

The ambiguities of the PSRB experience demonstrate that IWRM-inspired policy does not necessarily lead to adequate social and environmental solutions to highly complex and politicized water problems. On the contrary, the new policies introduced an economic rationality—the “user-pays principle”—that is blind to the uneven balance of power and to the historical context of environmental degradation. In the case of PSRB, the ongoing IWRM-inspired reforms have been unable to properly reconcile responsibilities for water problems and have failed to indicate a genuinely new direction for dealing with social demands and environmental conservation. That is the reason why Merrey et al. (2005) recommend that, instead of the currently ineffective approaches, water policies in developing countries should emphasize empowering poor people, reducing poverty, improving livelihoods, and promoting fair economic growth. In the same way, Swatuk (2005) suggests that it is important to reflect on the political nature of the IWRM proposition and be prepared to revise, or even discard, the basic assumptions and ideologies driving the reform process. Overall, the search for water sustainability requires, first and foremost, taking into account the full range of social and political pressures that shape the use and conservation of water systems.

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ARTICLE

## Ecotourism and nature-reserve sustainability in environmentally fragile poor areas: the case of the Ordos Relict Gull Reserve in China

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This article explores the applicability of the conventional wisdom that economic growth is paramount to environmental sustainability by examining ecotourism and nature-reserve sustainability in environmentally fragile poor regions. The discussion focuses on the Ordos Relict Gull Reserve in the Inner Mongolia region of China. The study evaluated reserve records of water and soil conditions and interpreted satellite images to identify lake-level and land-cover changes at the reserve. The Ordos Relict Gulls seem to have abandoned the reserve following ecotourism development and established new colonies in northern Shaanxi. We argue that ecotourism—especially ersatz ecotourism—in certain nature reserves is an unsustainable practice rooted in the conventional wisdom that economic development spurs environmental protection as suggested by the environmental Kuznets curve (EKC). The article concludes that environmental protection rather than economic growth is of vital importance in nature-society interactions in environmentally fragile poor areas. We call for prohibitions on tourism in such nature reserves to enhance sustainability.

KEYWORDS: ecotourism, environmental protection, nature reserves, resource development, human-environment relationships

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China has made significant efforts to pursue sustainability, in terms of seeking to reconcile environmental protection and social improvement with economic growth (Liu, 2008; 2009). However, these efforts have not been successful in areas characterized by ecological fragility and poverty (Jiang, 2006; Peng et al. 2006; Yue et al. 2006), conditions that cover 40% of the country's territory and are home to mainly ethnic minorities (Zhang & Ma, 2006). Challenging climates, rough terrain, and depleted soils reduce the resilience of these ecosystems and create situations that are particularly sensitive to human activity and exacerbate desertification, soil erosion, and land degradation (Zhang & Ma, 2006). Widespread poverty in these areas encourages the government to push for rapid economic growth.

Central and provincial governments in China endorse the belief that unbridled expansion and environmental improvement are achievable at the same time. Commitment to this notion encourages local governments to give priority to economic growth rather than to sustainability and this prioritization has led to unsustainability (Peng et al. 2006; Yue et al. 2006). A well-known example of this phenomenon is the dramatic environmental collapse in Maduo County (Qinghai Province) and its portion of the Three-River Headwaters (*Sanjiangyuan*) Nature Re-

serve, at the confluence of the Yellow, Changjiang, and Qiantangjiang Rivers. Prior to 1970, environmental conditions in this Tibetan county were regarded as excellent, with over 4,000 lakes and rich grasslands. Following the "grow first" path during the early 1980s, Maduo accrued wealth quickly and achieved the highest per capita income among all of China's animal-husbandry counties (Ren & Wang, 2004). By 2004, however, 90% of its lakes had dried up due to overgrazing, and the resulting economic decline caused Maduo to become one of China's ten poorest counties despite the fact that the county became part of the Three-River Headwaters (*Sanjiangyuan*) Nature Reserve in 2001 (Wang, 2006). By 2007, most of the population had migrated out of the region as the area became increasingly unsuitable for human habitation due to ecological collapse (Qu Lai Ma Cultural Village, 2007). Conventional wisdom claims that economic growth is the key to environmental sustainability (Esty et al. 2008; The Economist, 2008). Consequently, the Chinese government commonly uses nature reserves as resources for development and ecotourism as the solution to nature-reserve sustainability (Mu et al. 2007). Using the Ordos Relict Gull Reserve (ORGR) in the Inner Mongolia region of China as a case study, this article explores the applicability of this conventional wis-

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dom and examines how ecotourism development may be unsustainable in some nature reserves in environmentally fragile poor regions. We aim to stimulate debate over ecotourism development and its relationship to the sustainability of nature reserves by arguing that reliance on the environmental Kuznets curve (EKC) is at the root of contemporary unsustainable practices.

The EKC is a widely applied theory developed by Grossman & Krueger (1993; 1995) and Roberts & Grimes (1997), based on the work of Nobel Laureate Simon Kuznets (1955). This concept contends that the initial stages of economic growth are accompanied by increasing environmental degradation, but once per capita income exceeds a given threshold, further increments of growth lead to environmental improvement (Beckerman, 1992; Shafik, 1994). Some authors have put forward the EKC as the optimal growth path and this view has contributed to a belief that relatively high income is a precondition for environmental recovery (see, e.g., Chimeli & Braden, 2002). Such ideas have attracted a great deal of attention in various fields situated at the intersection of development and environmental policy (Beckerman, 1992; World Bank, 1992; Ezzati et al. 2001). Some policy makers and researchers have even asserted that the EKC model should serve to steer developing countries' efforts to "grow first and clean up later" (Dasgupta et al. 2006), because wealth is a major determinant of environmental success (The Economist, 2008; Esty et al. 2008).

In contrast, Raymond (2004) and Fonkych & Lempert (2005) argue that the EKC is an inadequate guide for environmental policy makers. These authors find strong evidence that the EKC-development path may not be available to today's developing countries (Nahman & Antrobus, 2005). More specifically, Chen & Liu (2004), Cao et al. (2006), and Qu (2006) warn that the EKC may not be applicable to China as, in terms of health and ecological impacts, the country cannot afford the "grow first and clean up later" approach. Ecologically fragile poor areas are particularly vulnerable to environmental degradation and this damage can easily become irreversible so that an EKC may never occur (Prieur, 2007; Liu, 2008; 2009).

The remainder of this article first provides an overview of nature-reserve and ecotourism development in China, with a focus on recent expansion and associated environmental problems. It further examines these issues using the case of the Ordos Relict Gull Reserve in terms of the sharp decline of the gull population and the possible causes of reserve devastation, with evidence of environmental degradation following ecotourism development.

What drove the gulls away from the reserve? Only a couple of articles in the literature include any discussion of the possible causes. The predominant explanation offered by He and his colleagues blames global and local climate change for the decline in water levels in the lake and resultant reserve degradation (He et al. 2004; He et al. 2005; He et al. 2007). This article does not disagree with that literature. It simply examines if the development of ecotourism in the reserve may have played an additional role in reserve decline. The last sections discuss policy implications of the case study and research conclusions.

## **Nature-Reserve and Ecotourism Development in China**

The first nature reserve in China was established in 1956 and 40 years later the country had 1,276 areas that carried this status. Since 1999, there has been a veritable boom in nature reserves as the government has increased efforts to conserve the environment. By the end of 2006, China had 2,395 protected parcels covering over 15% of the country's land area (MEP, 2007). The Chinese Ministry of Environmental Protection (MEP) currently plans to incrementally expand this figure to 16% by 2010 and to 17% by 2015 (MEP, 2006). In a further encouraging sign, the Organization for Economic Cooperation and Development (OECD) (2007) reports that China has established a comprehensive legal framework for managing nature and biodiversity (through the establishment of both terrestrial and maritime protected areas). Though the number of nature reserves and their geographic extent are impressive, they are not well protected, according to reports by Jim & Xu (2003; 2004), the official Chinese media (Li, 2006), and field observations by the second author. Li (2006) points out that lack of funding causes a dilemma for nature reserves in China and nearby poor areas. For example, the Hunchun Nature Reserve that borders Russia and North Korea suffers serious environmental degradation due to insufficient money (Li, 2006). The second author of this article found the same problem during his 2006 visit to the Hunchun Nature Reserve. The four white dolphin reserves established along the Yangtze River failed to protect the Chinese white dolphin, reported by the Chinese official media to have just gone extinct (China Daily, 2007), the first cetacean species to be extirpated by human activity (Laurance, 2007).

A major problem for China's nature reserves is a scarcity of funding. While protected areas in many countries around the world are underfunded, the situation seems to be even worse in China. Developed countries spend an average of US\$2,058 for each square kilometer (km<sup>2</sup>) of protected area, developing

countries spend an average of US\$157, and China spends only US\$52.70 (Li, 2006). This funding disparity may support the claim that wealth is a major determinant of environmental success and raise questions about the capability of poor countries to effectively conserve nature using legal mandates. With such a meager amount of money, China's nature reserves are under pressure to generate resources to fund themselves (Li & Han, 2001; Jim & Xu, 2003), practices that frequently have the paradoxical effect of intensifying environmental degradation.

How can underfunded nature reserves generate money on their own? Conventional wisdom prescribes that ecotourism is the answer. Ecotourism gradually took shape between the late 1970s and early 1980s and, by the early 1990s, the concept had coalesced into a popular new genre of environmentally and socially responsible travel (Honey, 2008). Ecotourism has arguably experienced the fastest growth of all subsectors in the tourism industry (Randall, 1987; Honey, 2008). Many factors seem to have contributed to this popularity, including a change in tourist perceptions, increased environmental awareness, and a desire to explore natural environments (Randall, 1987). The trend has also benefited from tourist-industry promotion (Honey, 2008) and efforts of institutions such as the United Nations Environment Program (UNEP) and World Tourism Organization (WTO) that have heralded it as an exemplary form of sustainable development (Butcher, 2006). Ecotourism has many definitions and the concept continues to evolve. The International Ecotourism Society (TIES) provides a substantial, contemporary definition of ecotourism. To TIES, real ecotourism involves travel to natural destinations, minimizes impact, builds environmental awareness, provides direct financial benefits to conservation, creates financial benefits and empowerment for local people, respects local culture, and supports human rights and democratic movements (Honey, 2008). However, we do not believe ecotourism in China has these characteristics. According to Wight (1994):

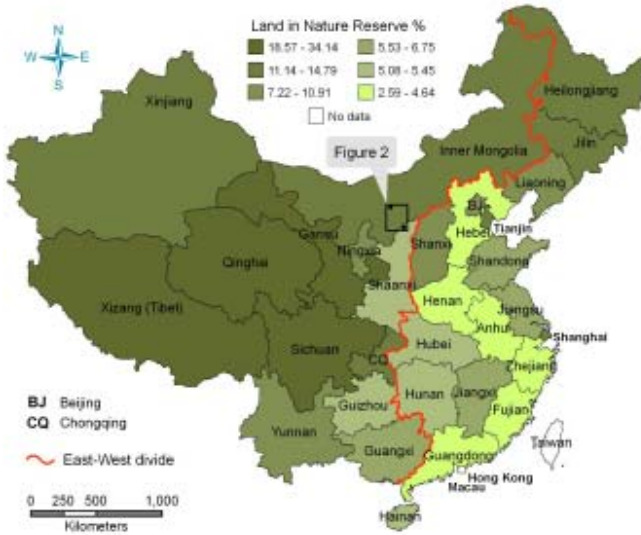
There seem to be two prevailing views of ecotourism: one envisages that public interest in the environment may be used to market a product; the other sees that this same interest may be used to conserve the resources upon which this product is based. These views need not be mutually exclusive.

Ecotourism in China seems to subscribe to the first view and is predicated upon a strong economic motive. Tourism, and ecotourism in particular, is often viewed as an ecological approach to development and poverty reduction (Donaldson, 2007; Muhanna,

2007), to conservation of endangered species and habitats in developing countries (Bookbinder et al. 1998), and to managing protected areas (Cengiz, 2007). The United Nations International Year of Ecotourism of 2002 marked the rise of ecotourism from its prior position as a novel niche market opportunity to its current status—at least in the eyes of its proponents—as an exemplary form of sustainable development in the rural developing world (Butcher, 2006). The basis of this advocacy is that sponsors of ecotourism can “provide a leadership role” to the rest of the industry (UNEP & WTO, 2002). However, ecotourism does not always provide a nature conservation solution and its environmental impact has long been a major concern (Bookbinder et al. 1998). Wall & Wright (1977) were among the first to systematically examine the impact of tourism on vegetation and soil conditions. Edington & Edington (1986) pointed out that the negative impact of tourism must be effectively controlled by ecosystem protection. Tourism has been blamed for damaging local environments in Russia (Lunkashina et al. 1996), Belize (McMinn, 1998), Tunisia (Poirier, 1995), and Honduras (Stonich, 1998). In opposition to government plans that encouraged state-operated nature reserves to engage in commercial operations, Russian scientists criticized ecotourism as commercial exploitation of, and a threat to, the protected areas (Levitin, 1994). Svoronou & Holden (2005) cautioned that ecotourism as a tool for nature conservation requires careful monitoring to keep visitation in line with carrying capacity.

The process of designating nature reserves in China puts too much emphasis on nonconservation gains (Jim & Xu, 2004), as conservation is not always the top priority (Zhou & Chen, 2006). Nature-reserve tourism in the country is developing more rapidly than other types of tourism, prompting increases in the number of nature reserves and encouraging nearly all protected areas in China to become actively engaged in tourism (Mu et al. 2007). A significant number of the new nature reserves are in environmentally fragile poor areas in western China. The twelve western provinces contain over 83% of China's land area in nature reserves (Figure 1). Tibet, Qinghai, Gansu, and Sichuan have the highest percentage of land in nature reserves, ranging from 34.1% to 18.6% of their total territory. The six provinces with the lowest percentage in nature reserves, ranging from 2.6% to 4.6%, are all in eastern China. To promote economic growth, the central government launched the Western China Development Program in 2000. Tourism—especially ecotourism—has been one of the program's major components and the growth of visitation in western China is above the country's average (Gan, 2005).





**Figure 1** Percentage of land in nature reserves by province, China, 2007 (MEP, 2007).

Several negative impacts from tourism in China's environmentally fragile areas have been reported, including land degradation, water and air pollution, and destruction of breeding environment and food sources for wild animals (Yang & Ding, 2003). Due to the lack of national funding for nature reserves, managers are often left to depend on local budgets. However, local authorities tend to use their nature reserves to generate money. Many government officials insist that nature-reserve degradation will be controlled when the reserves are wealthy and that ecotourism is the only way to fund nature-reserve management. However, Chinese researchers have found that tourism development is responsible for serious environmental pollution and degradation in many facilities throughout the country. Examples include environmental degradation in Zhangjiajie National Forest Park (Wang & Hao, 1988), parks in Suzhou (Wang, 1986), and E-mei Mountain tourist sites (Jiang et al. 1996). Landscape degradation, water pollution, waste accumulation, and species loss in nature reserves are widely reported (Li & Han, 2001).

### The Case of the Ordos Relict Gull Reserve

Established as a sanctuary for the rare Ordos Relict Gulls (*Larus relictus*) in 1998 and upgraded to a national reserve in 2001, the Ordos Relict Gull Reserve (ORGR) is one of 21 internationally recognized wetland reserves in China. It is also the only protected area in the world for this endangered bird. The Ordos Relict Gull is a medium-sized gull that breeds in the Ordos in China and is believed to make up over 60% of the worldwide relict gull population (Xu et al.

2006). Since 2000, the International Union for the Conservation of Nature (IUCN) Red List of Threatened Species (2008) has classified this species as "vulnerable" because it had a small population that has been undergoing continuing decline due to human development of coastal wetlands and disturbance of its breeding grounds. Incursion has increased the mortality of eggs and chicks. Only 10,000 birds are thought to exist today and this number continues to decline (IUCN Red List of Threatened Species, 2008). The gulls breed in colonies located on islands in saltwater lakes where they are typically out of reach of humans and other animals. These island sites are fragile and nesting does not occur when lakes dry up, water levels are too high, or islands become so large that they join the shore.

The ORGR is located in the Taolimiao-Alashan Lake (Nur) area at the heart of the Ordos Plateau in the upper reaches of the Yellow River (Figures 1 and 2). The terrain is higher in the western plateau and lower in the eastern hills. The north is an alluvial plain and the central land is the Muus Desert and the Khoqi Desert. The Ordos area has a typical temperate continental climate and rainfall concentrates between July and September with sand and dust storms in the spring. The ORGR is about 45 km west of the Ordos City urban district, Dongsheng (2007 population 35,500 people) and occupies 45 km<sup>2</sup>, an area that includes a lake that is 10.2 km<sup>2</sup> in size. About 80



**Figure 2** Ordos Relict Gull migration (A) from Taolimiao-Alashan Lake (B) at Ordos Relict Gull Reserve, Inner Mongolia, and Hongjian (Hongjiannao) Lake (C) in northern Shaanxi. Source: <http://earth.google.com> (2008).

other bird species also reside in ORGR, including Whooper swans (*Cygnus Cygnus*), Mandarin ducks (*Aix galericulata*), and Greylag geese (*Anser anser*), as well as rare birds such as Oriental magpies (*Ciconia boyciana*), black-billed magpies (*Pica pica*), and white-tailed sea eagles (*Haliaeetus albicilla*) (Shizhen Garden, 2008; Travel China Guide, 2008).

### Devastation of the Ordos Relict Gull Reserve

This case study is based on field research carried out in ORGR in 2004. A sharp decline in the population of Ordos Relict Gulls, from 3,594 nests in 1998 to zero nests in 2004 and to 6 nests in 2005, was reported (He et al. 2004; He & Ren, 2006) (Table 1). No Ordos Relict Gulls have been reported at the reserve since 2005 (He & Ren, 2006; He et al. 2007). Meanwhile, a sharp increase in the Ordos Relict Gull population, from 200 birds since they were first observed in 2000 to 11,000 birds (Xu et al. 2006), or 2,460 nests, in 2005 (Xiao et al. 2006) was reported in Hongjian (Hongjiannao) Lake in Shenmu County, northern Shaanxi (Figure 2). Huo et al. (2007) noted an increase from 87 nests in 2000 to 5,038 nests in 2007 and He et al. (2007) similarly found 5,036 nests during the same year. The rapid increases in Ordos Relict Gulls in northern Shaanxi have been attributed to conservation success at Hongjian Lake (Wang & Cao, 2005; Huo et al. 2007), though this population growth is not likely through reproduction. We argue that the increase is mainly due to migration from ORGR where ecological failure has driven the gulls away. It appears that the Ordos Relict Gulls have abandoned the reserve and established new colonies about 100 km southward (Figure 2).

**Table 1** Nests of Ordos Relict Gulls Found in Ordos Relict Gull Reserve, 1998-2005.

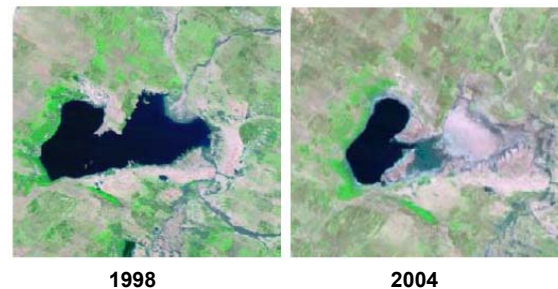
Year	1998	1999	2000	2001	2002	2003	2004	2005
Nests	3594	709	3587	2887	2269	326	0	6

Note: Data for 1998-2003 are from He et al. (2004) and data for 2004-2005 are from He & Ren (2006).

To encourage the return of the gulls, the Ordos City government has started a three-year project to repair the reserve with a grant of 18 million yuan (~US\$2.5 million) with most of the money coming from the central government (Inner Mongolia Government, 2007). Ding (2007) reports that local officials were debating why the Ordos Relict Gulls left the reserve and if they will return. The case holds important lessons that could benefit nature-reserve and ecotourism management in China. Environmental degradation in the reserve is assumed to be the most important reason for the exodus as the gull is very sensitive to interference with its breeding envi-

ronment (He et al. 2004; 2007; IUCN Red List of Threatened Species, 2008).

As discussed earlier, it is reasonable to attribute degradation of the reserve to climate change. This case study attempts to further examine how exactly the environment changed and whether ecotourism development contributed to reserve devastation. Comparison of satellite images of the reserve area from July 1998 and July 2004 highlights a dramatic decline in lake levels (Figure 3). The 1998 image shows islands where the gulls nested that were about 1.15 km<sup>2</sup> in size (at the center of the 10.25 km<sup>2</sup> lake). The islands provided a good environment for the gulls and protection during their nesting season from April until July. The 2004 image demonstrates that the original main nesting islands joined the shore and were exposed to declining water levels in the lake. This nesting environment became severely degraded as the lake shrank in size to 2.7 km<sup>2</sup>, less than a quarter of its 1998 extent.



**Figure 3** TM images of Ordos Relict Gull Reserve Taolimiao-Alashan Lake area, July 1998 and 2004 (Images purchased from Earth View China Image Beijing, Inc. <http://www.ev-image.com/newslists.aspx?id=97>).

### Could Ecotourism be a Possible Cause of Reserve Devastation?

In 2000, the Dongsheng Corporation in Ordos City founded the Inner Mongolian Shizhen (World Rare) Garden Ecotourism Resort on and around ORGR. The company installed a network of Mongolian yurts, or portable huts, on the reserve to accommodate hotels, restaurants, and souvenir shops to support the tourism business. The primary tourist attraction was the Ordos Relict Gulls during their nesting season from April until July. From 2000 to 2003, tourism increased sharply. The reserve management recorded approximately 260,000 visits in June 2003, the peak month of the tourist season. The tourists engaged in gull watching, speedboat riding, boat racing, and fishing. It is reasonable to assume that the noise from tourists, particularly the speedboats, disturbed the nesting birds. Other tourist activities included games, horseracing, archery, sand

skiing, and sand-motor biking on the lakeshore. Most tourists made day trips from Dongsheng while others stayed at the reserve for one or two days. The presence of such a large number of tourists and their activities presumably made the birds feel insecure about their nesting environment. Compared to 3,587 nests in 2000, there were only 236 nests in 2003 to accommodate the 260,000 visits in June, averaging over 1,000 visits for one nest in a month. Is it reasonable to expect that under these circumstances the birds were disturbed, scared, and ultimately driven away? The arrival of the tourists seems to have prompted the gulls to move out (Ding, 2007) and it should be no surprise that no nesting gulls were found in 2004.

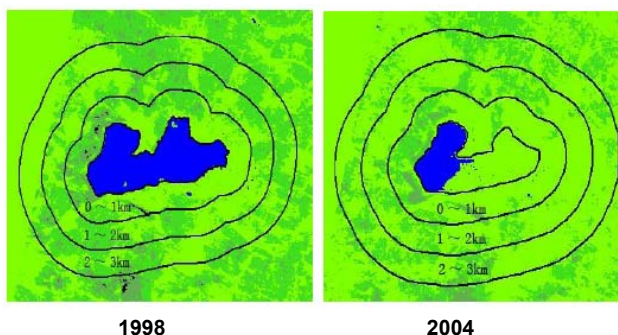
Ornithologists have blamed human disturbances for the abandonment of bird-nesting colonies in many parts of the world, as the following reports show. Research suggests that human interference caused the disappearance of the largest nesting ground for endangered little terns (*Sterna albifrons*) in Britain during the breeding season (BBC, 2003). Little terns are up to 34 times more likely to succeed in breeding without human intrusion (Medeiros et al. 2007). Similar disturbance is also considered a major reason for the disappearance of colonies of the endangered Aplomado Falcon (*Falco femoralis*) in Texas (TPWD, 2008). Unregulated tourism and human interference have been identified as significant threats to the breeding success of Malaysian plovers (*Charadrius peronii*) (Yasue & Dearden, 2006), Yellow-eyed penguins (*Megadyptes antipodes*) (Ellenberg et al. 2007), and hooded plovers (*Thinornis rubricollis*) (Weston & Elgar, 2007).

Based on a comparison using Google Earth images (Figure 2), the Ordos Relict Gulls' new home at Hongjian Lake does not appear to have better breeding conditions than the site the birds abandoned. In particular, the new location does not have many islands out of human and animal reach. The islands are very small and close to the southeastern and southwestern shores. The main difference is that the Hongjian Lake area has not been developed yet, thus

human disturbance is minimal. Compared to ORGR, the advantages of Hongjian Lake include a larger water area and isolation from population centers. The new location probably also provides a better food supply for the gulls due to less human interference. Indeed, it is likely that the gulls would have stayed at ORGR if not for the disturbance they encountered. In addition to adding to the nesting gulls' apprehension, we contend that tourists have made the nesting environment intolerable by causing land and water degradation and reducing the food supply. However, there have to date been no reports of such damage at ORGR and this case study infers whether field evidence supports such a possibility.

### Evidence of Environmental Degradation

Based on the 1998 and 2004 Thematic Mapper (TM) images, we used the Earth Resource Data Analysis System (ERDAS) to develop a Normalized Difference Vegetation Index (NDVI) for the Taolimiao-Alashan Lake area and its 3 km buffer zone (Figure 4), following the NDVI classification formulated by Ding & Tiyp (2002) (Table 2). The NDVI is a simple numerical indicator that can be used to analyze remote sensing measurements and to assess whether the target being observed contains live green vegetation. The results show that the area around the lake was dominated by bare land,  $\text{NDVI} \leq 0$ , while vegetation density  $0 < \text{NDVI} \leq 0.21$  increases with distance from the lake (Table 3). The higher percentage of scattered vegetation cover,  $0.21 < \text{NDVI} \leq 0.50$ , in the less than 1 km zone is the result of a higher density of planted trees around the lake. NDVI changes indicate severe land-cover degradation from 1998 to 2004. The area of bare land increased from between 50% and 59% in 1998 to between 75% and 79% in 2004. At the same time, sparse and scattered vegetation covers decreased in intensity. The decline was almost 50% for this zonal classification. Land-cover degradation was most severe in the 1-2 km zone, possibly due to motorized and horseracing activities. Tree cover around the lake suffered extensive damage as reflected by a sharp decline in vegetation cover from 10% to 4% in the 0-1 km zone.



**Figure 4** NDVI distribution on TM Images of Ordos Relict Gull Reserve Taolimiao-Alashan Lake area, 1998 and 2004.

**Table 2** NDVI intervals and description (Translated from Ding & Tiyp, 2002).

Intervals	Vegetation Cover
$\text{NDVI} \leq 0$	Bare land, no vegetation
$0 < \text{NDVI} \leq 0.21$	Sparse vegetation
$0.21 < \text{NDVI} \leq 0.50$	Scattered vegetation



**Table 3** NDVI derived from Ordos Relict Gull Reserve Lake area, 1998 and 2004.

Distance from lake	1998			2004		
	NDVI≤0	0<NDVI≤0.21	0.21<NDVI≤0.50	NDVI≤0	0<NDVI≤0.21	0.21<NDVI≤0.50
0~1 km	11.42(57%)	6.60(33%)	1.99(10%)	15.75(79%)	3.46(17%)	0.80(4%)
1~2 km	12.64(50%)	11.51(46%)	0.85(4%)	19.80(79%)	5.18(20%)	0.11(1%)
2~3 km	15.70(51%)	14.01(45%)	1.33(4%)	23.22(75%)	7.45(24%)	0.37(1%)

The first author took randomly selected water samples from the northern and southern ends of the lake to test the level of water pollution. The northern shore was developed for tourism activities, while the southern shore has remained undeveloped. This comparison was designed to detect the impact of tourism on water quality. A Hanna Instrument for water and soil testing was used to test the samples. All seven indices tested pointed to poorer water quality at the northern end of the lake than at its southern end (Table 4). Tourist activity provides the only explanation for the difference in pollution levels as there were no other known human or animal activities around the perimeter of the lake. We also tested randomly selected soil samples from the northern and southern shores of the lake using the Hanna Instrument. The test results indicate that soil at the northern shore had significantly higher pH values and lower levels of such soil nutrients as nitrogen, phosphate, and potash, which means that soil quality was higher at the southern shore than at the northern shore. We contend that tourist activities at the northern shore contributed to soil-quality degradation because there were no other known human or animal activities around the lake. This claim is consistent with other reports by Wall & Wright (1977) and Yang & Ding, (2003) that tourism activities cause soil degradation.

### Policy Implications of the Case Study

Borg (2008) reports that Chinese officials in Sichuan Province acknowledge that mass tourism at some nature reserves has harmed the quality of landscape and scenery. As a result, other reserves have begun to discourage mass tourism and are receptive to the notion of (real) ecotourism. An ecotourism project launched in Wanglang Nature Reserve in

2001 has become a prototype of this trend. Officials admit that developing (real) ecotourism in China is difficult, because of the pressure on individual nature reserves to raise money. China's current conception of ecotourism suffers from problems similar to those experienced in more developed countries. As Honey (2008) describes:

Much of what is marketed as ecotourism is simply conventional mass tourism wrapped in a thin veneer of green. Ecotourism lite is propelled by travel agents, tour operators, airlines and cruise lines, large hotels and resort chains, and international tourism organizations, which promote quick, superficially "green" visits within conventional packages.

Current ecotourism in China is overwhelmingly "ecotourism lite" which this article simply refers to as "ersatz ecotourism." It is possible that ersatz ecotourism is one of China's growing pains and that the situation will improve in the future, as it did in the United States and Costa Rica where the ecotourism industry has become more developed and sustainable (Honey, 2008). The problem is that nature reserves in China may suffer irreversible damage due to ersatz ecotourism, as has been the case at ORGR. It may be too late to recover if the situation does not improve soon. Han & Ren (2001) point out that, along with opportunity, ecotourism presents challenges as China's nature reserves may suffer irreversible losses in environmental quality and biodiversity in the name of a false sense of ecotourism. As there are so many nature reserves in a large country with varied environmental, economic, and social conditions, it is understandable that stories of many successful nature

**Table 4** Water quality (mg/L) near the northern and southern shores of Ordos Relict Gull Reserve Lake, 2004.

	Alkalinity	Solidness	Sodium sulfite	Iron content	Chloride content	Dissolved oxygen	pH
North	840	600	10.0	1.2	7600	6.0	8.8
South	630	570	6.0	1.0	5000	7.0	8.6

reserves have been widely publicized. For instance, China's State Forestry Administration (SFA) accredited 51 Chinese National Forestry Model Nature Reserves in 2006 (SFA, 2008). Among the most successful nature reserves in China, many of these have effectively incorporated ecotourism, such as the Songshan Nature Reserve near Beijing, Xishuangbanna Nature Reserve in Yunnan Province, and Jigongshan Nature Reserve in Henan Province (Luo & Zheng, 2008; The Nature Conservancy, 2008). This article focuses on one case and draws attention to others reported in the literature. We believe the Ordos Relict Gull case is emblematic of many nature reserves in environmentally fragile poor areas in China. However, it would be useful to analyze all of China's 2,395 nature reserves: their comparative status, the importance of the biodiversity they are protecting, the different land-use types/biomes they are managing, and the different levels of sustainability inherent in their activities. We would encourage further examination of how and why other well-known Chinese nature reserves have failed to achieve their objectives. For example, it is curious there has been no known investigation on the extinction of the white dolphin in their four nature reserves.

It is China's national policy to promote ecotourism as a sustainable approach to nature conservation. By using natural beauty to attract affluent foreign visitors to poor areas of China, ecotourism is frequently regarded as a bright spot in China's often chaotic and unpleasant tourism business (Blanchard, 2008). It is common for Chinese literature to recognize both the merits and challenges of ecotourism in national nature reserves (Han & Ren, 2001; Wu et al. 2007; Blanchard, 2008; Luo & Zheng, 2008). However, the IUCN categories suggest that Category I (Strict Nature Reserve and Wilderness Areas) are protected lands managed mainly for scientific research and/or environmental monitoring (IUCN, 1994). Though there are no IUCN category designations for ORGR or many other similar facilities, Luo & Zheng (2008) assert that nature reserves in China fall into the ambit of Category I where tourism—including ecotourism—should be excluded. China's State Nature Reserves Regulations (published in 1994 and still in effect in 2009 as no new regulations have been developed) strictly prohibit any tourism in designated tracts that have no zoning, or in the core or buffer zones in those parcels that do have zoning (MEP, 1994). As with most nature reserves in China, ORGR does not have zoning, but should follow the regulations. China has no dearth of regulations or definitions, but there is a notable shortage of implementation and enforcement. We call for the imposition of bans on ecotourism (especially ersatz ecotourism) in nature reserves similar to ORGR. Fur-

thermore, China should adopt IUCN categories and associated management recommendations for all its nature reserves. Current literature (especially Chinese material) tends to blame the lack of clear definitions, regulations, funding, and enforcement for failures in nature reserves and ecotourism management (see, e.g., Han & Ren, 2001; Luo & Zheng, 2008). It is true that China has no official definition of ecotourism. In addition, ecotourism in nature reserves has been managed by a variety of governmental agencies that control nature reserves, including MEP, SFA, the Ministry of Water Resources, and the Ministry of Land and Resources, along with their provincial and municipal counterparts. This complex division of responsibility causes confusion regarding the use of a single definition of ecotourism or common set of nature-reserve regulations. However, Chinese academic publications often use the TIES definition of ecotourism (e.g., Wu et al. 2007). In practice, ecotourism is used as a marketing tool to promote any form of nature-related tourism in China (Wu et al. 2007).

## Conclusion

This article argues that ecotourism development does not always facilitate sustainable nature-reserve management and focuses on a case study of efforts to protect the Ordos Relict Gull. This finding supports the contentions put forward in many other publications on the negative impacts of tourism on nature reserves. Environmental protection, rather than economic growth, may be the key in the relations between environment and development in environmentally fragile poor areas. If nature reserves are not well protected, the country loses them and their direct and indirect contributions to economic growth. Due to their fragile environments, nature reserves are vulnerable to irreversible destruction. Wildlife like the Ordos Relict Gull are extremely sensitive to interference and do not do well when forced into close contact with tourists. In particular, human disturbance devastates the breeding environments favored by these birds and funding for reserve management is vitally important for the success of nature reserves. However, developing ecotourism to generate money may not be practical in all locations. Since these are national reserves, the state should be responsible for providing adequate funds for reserve success. Funds from wealthier areas in China and international sources should also be sought. China is no longer a poor country and the government should revise its policy to take full responsibility for nature reserves in environmentally fragile poor areas.

Lake shrinkage caused by climate change is an apparent cause of reserve degradation. We contend that tourism is also a likely cause of degradation in

land cover, water quality, and soil quality in ORGR. Definitive identification of what drove the gulls from the reserve requires further research so that other protected areas can learn from this experience. This point is particularly important for the gull's new home in northern Shaanxi. We urge immediate establishment of a new reserve for the Ordos Relict Gull at Hongjian Lake, and the mobilization of efforts to secure the gulls' nesting environment from human disturbances so that this vulnerable species will not become extinct. The central government should fully fund this new reserve as ecotourism is growing, with an estimated 150,000 tourists arriving in 2007 to this environmentally fragile and economically impoverished area (Huo et al. 2007). The outcome in Inner Mongolia will likely be replicated in northern Shaanxi if ecotourism is not strictly limited and managed to protect the gulls' nesting environment from disturbance.

The chaotic situation of ecotourism in Chinese nature reserves is due less to a lack of definitions or regulations than to deliberate neglect of these provisions. Moving beyond conventional perception, this article links the failure in nature-reserve protection to the development policies and practices based on the "grow first and clean up later" belief. The problems in nature-reserve sustainability and ecotourism development in China will not be solved until sustainability concepts and approaches are adopted in policy and practice.

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## COMMUNITY ESSAY

### What do we mean by *sustainable landscape*?

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#### Author's Personal Statement:

As an academic working in the field of landscape design and planning, I continually encounter references to the idea of a "sustainable landscape." It is a concept of growing significance. For example, the European Landscape Convention, which has now been widely adopted by governments in Europe, refers twice to the role of landscape in sustainable development and also to the sustainable protection, management, and/or planning of landscapes. The term is routinely used by educators, private practitioners, researchers, consultants, and government officials who tend to assume a common understanding of its meaning. Yet the idea of a "sustainable landscape" often remains undefined, or is defined in relation to specific applications and geographical contexts. Conceptions differ significantly between "old world" and "new world" landscapes. Professionals working in landscape architecture, planning, and engineering prioritize different aspects of sustainability as do researchers and academics depending on whether their emphasis is on landscape science, design, management, planning, or history. I feel passionately about landscape and believe that intelligent decisions about its future are pivotal to sustainable development. This essay does not pretend to be a definitive statement on the nature of "sustainable landscape," but I hope that it will provoke further thought about what the concept might mean both in theory and practice.

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#### Introduction

Landscape has become a major issue in spatial policy both as a sector in its own right, important to outdoor amenity and the leisure economy, and, increasingly, as a basis for framing and managing wider socioenvironmental systems. This trend reflects two broad "schools" in sustainable landscape development—one focused on the design and protection of scenic assets and the other emphasizing dynamic multifunctional links between ecosystem services and human well being. Given sustainability's centrality to public policy and corporate social responsibility, it is not surprising that analysts are asking critical questions about the nature of "sustainable landscape" (Roe, 2007).

The definition of sustainable landscape is not straightforward, not least because of the differing contexts in which it is framed. In relation to large-scale exurban landscapes, an exaggerated, but not groundless, caricature is to contrast a "New World" view of something relatively pristine that sometimes needs ecosystem management with an "Old World" view of a palimpsest that requires the maintenance of traditional land-management practices to sustain subtle character distinctions. In relation to landscape architecture and planning, there is a professional subculture that interprets sustainability in terms of low-impact, but physically and socially pertinent, design (Dunnett & Clayden, 2007) and a scenic planning

subculture that designates and safeguards rural areas on the basis of "natural" aesthetic value (Brown et al. 2005). The discourses of these traditions are often quite distinct and lead to varied interpretations of sustainability. They also differ in the degree to which landscape sustainability is anthropocentrically defined (as a resource underpinning human well being) or ecocentrically defined (as a self-regenerative dynamic system). This essay analyzes what sustainable landscape might mean in practice, proposing some principles potentially relevant to a spectrum of traditions and geographical contexts. The author is grounded in the European context and acknowledges this bias; however, as Phillips (2002) has noted in relation to the International Union for the Conservation of Nature's (IUCN) Protected Landscape Category V, such cultural landscapes/seascapes are by no means exclusive to Europe or, indeed, the "Old World."

#### Dimensions of sustainable landscapes: environment, economics, society, governance, aesthetics

Sustainable development is generally considered to be at the intersection of environment, economy, and society, although these terms are now often expanded into phrases reflecting ecosystem services and limits, fair and durable prosperity, and health and social justice. Many authors also draw attention to a

fourth dimension of “political sustainability,” referring to governance mechanisms that continuously deliver sustainable development through the use of responsible science and economics. In the case of landscape, it is also uniquely important to consider what might be described as “aesthetic sustainability.” Much of the justification for landscape’s importance has been its visual appeal, coupled with intuitive (and perhaps demonstrable) associations between visual harmony, ecological integrity, human well being, and place identity. The remainder of this essay reflects on how these five dimensions might relate to sustainable landscape.

First, the *environmental sustainability* of landscapes has been strongly influenced by landscape ecology which is concerned with spatial patterns and processes (e.g., Farina, 2006). In the ecological perspective, a sustainable landscape would be one in which the green infrastructure—i.e., biodiverse network of habitat patches and corridors—is of sufficient size, quality, and connectedness to facilitate species’ life cycles, maintaining healthy and viable populations. The concept of sustainable landscape has developed largely in response to habitat fragmentation through land intensification; in places, it also reflects a reaction against wholesale land destruction through mining and industry where large seminatural areas are alleged to act as “stabilizers” (Hawkins & Selman, 2002). The relative importance of patch (habitat) size, the permeability of the fragmented landscape matrix, and the extent to which connected linear features improve connectivity for species movement have been much debated. In addition to the biotic realm, landscape sustainability has also been related to other natural environmental factors, notably the conservation of soil moisture and nutrient status, the integrity of water quality and quantity in surface and subsurface hydrological systems, and the influence of vegetation on the equability of microclimate and atmospheric carbon levels.

Evidence for the environmental sustainability of landscapes is often related to their multifunctionality, services, and/or resilience. In the first of these factors, functions (e.g., biodiversity, soil filters) draw upon underlying structures (e.g., habitat mosaic) and in turn yield values to society (e.g., scenic-aesthetic). A landscape may thus afford regulation (e.g., energy balance), carrier (e.g., human settlement), production (e.g., raw materials), and information (e.g., educational) functions. Often, several functions can be found together, but their simultaneity and interactivity, rather than mere colocation, is the hallmark of multifunctionality, and this criterion has found particular application within Europe’s multilayered cultural landscapes (Antrop, 2004; Ling et al. 2007). The Millennium Ecosystem Assessment (2005) has po-

pularized the notion of ecosystem services underpinning human well being, notably:

- Provisioning services such as food, water, timber, and fiber;
- Regulating services that affect climate, floods, disease, wastes, and water quality;
- Promoting cultural services that deliver recreational, aesthetic, and spiritual values; and
- Supporting services such as soil formation, photosynthesis, and nutrient cycling.

Landscape sustainability has been closely linked to these factors and to the associated accumulation of natural capital (Haines-Young et al. 2006). The perspective of ecosystem resilience has found particular popularity in North America, although its adherents are now widely spread (e.g., Walker et al. 2004; Matthews & Selman, 2006). This theory views a sustainable landscape as one able to achieve a state of relative stability through self-regulating feedback, albeit periodically destabilized when drawn to a different “attractor.” If the agent of instability is predominantly natural, a new self-regulating state may well be achieved. However, if the system is destabilized by high-impact human activity, feedback may prompt ever more frantic attempts to remediate to avoid transition to an undesirable state.

The *economic sustainability* of landscapes has often been expressed as the maintenance of attractive scenery to support tourism and recreation. However, this superficial view, though not without immediate practical merit, fails to query the desirability or possibility of retaining nostalgic spaces. Our finest cultural landscapes often exist where mainstream economic practices have serendipitously created iconic scenery and ecology as an inadvertent side effect, as with the Enclosure Acts across the English countryside during the eighteenth century. Also, the economic practices that produced them (perhaps during the eighteenth and nineteenth centuries) are increasingly obsolescent and their archaic farming methods can now only be shored up with taxpayer subsidy. Europe has gone down this route through an elaborate scheme of agroenvironmental payments that, despite many successes, is still in tension with World Trade Organization (WTO) agreements and may be no more than a fiscally unsustainable expedient, temporarily slowing the rate of attrition. At the heart of economic landscape sustainability lies the notion of a “virtuous circle” in which mainstream endogenous, spontaneous production spins out landscape benefits that in turn make the local area attractive for producers to maintain and embed supportive environmental practices (Powell et al. 2002; Vollet et al. 2008). This synergy has been most fully articulated in relation to

specialist food and timber products that achieve a premium based on distinctive local identity and in relation to the impact of urban greenspace on property values. However, many unexplored opportunities, both urban and rural, relate to drivers of landscape change such as housing, energy, and infrastructure.

Although it is simplest to think of economic landscape sustainability relying on market-based “change drivers” it is also necessary, in complex modern economies, to acknowledge the nonmarket mechanisms of public and voluntary patronage. The role of the wealthy patron has been prominent in garden and estate design over many centuries and there is little fundamental difference in the contemporary maintenance of landscape distinctiveness and ecological status through state intervention and the direct action of “conservation, amenity, and recreation trusts” (CARTs). Additionally, land use planning mechanisms can enforce landscape amelioration as part of the development process, and this further distorts the open market (or perhaps rectifies market failure). However, such interventions will inevitably be spatially uneven and, in a policy context where almost all landscapes are valuable to at least some “insider” groups, the character of ordinary/quotidian landscapes will generally rely on spin offs from mainstream market mechanisms or voluntary action.

*Social sustainability* in landscapes is often addressed in terms of participation and inclusivity in decision making and access (Moore-Colyer & Scott, 2005). While these practices are necessary, however, they are not sufficient. The phenomenological tradition affirms that landscapes have meanings to a spectrum of insiders and outsiders and may be integral to the construction of place and its *genius loci* (e.g., Scazzosi, 2004). The legibility of a landscape’s narrative is critical to its perceived value, while an understanding of its rules—both codified and tacit—is pivotal to its navigability and use (Olwig, 2005). Places may be landscapes of security or fear to a range of residents or sojourners.

Several aspects are of current practical interest to the design of socially sustainable landscapes. First is the inclusion of public preferences through relatively well-developed methods of participatory design and landscape appraisal. Often, however, this remains at a relatively superficial level and lacks a clearly articulated model of client-centered design where users may be from diverse cultural and social (and even nonhuman) groups—the challenge of socially just landscape design is still poorly understood (Brown & Jennings, 2003). Second, landscapes provide a powerful setting for “social” (e.g., Collins et al. 2007) and “sustainability” (Tàbara & Pahl-Wostl, 2007) learning. Especially in situations where people have be-

come disconnected from daily contact with land and rivers, enjoyable rediscovery of the environment through the medium of landscape may facilitate re-engagement and an appreciation of aesthetic values that incorporate nature. Third, it is striking that people in community settings tend to describe landscape not in physical terms, but in associative terms related to friendship, kinship, and employment. Quotidian performances of walking and talking the landscape engender mental images of “peopled landscapes” so that both purposeful and aimless, solitary and accompanied, traverses of a place become integral to its recall. Such intimate perceptions are pivotal to social sustainability and yet have scarcely been explored. Finally, acknowledgement is rapidly expanding of landscape’s relationship to health, fitness, and well being. Several studies have attempted to relate vegetated space to mental and physical recovery and wellness, but even in this limited context the subtlety and complexity of linkages render research design intractable (e.g. Skärbäck, 2007). Yet the Millennium Ecosystem Assessment (2005) discusses far more elaborate connections between landscape and well being, ranging from national security to food supply, and most of these linkages remain matters of conjecture.

The *political sustainability* of landscape requires effective governance structures, including “commons,” for both the private and public domains. While some cultural landscapes have evolved endogenously from artisan practices, many have the imprint of privileged power and have thus always been “political.” In contemporary cultural landscapes, the roles of the state and the corporation are so intimately intertwined that it is difficult to imagine the production and reproduction of distinctive landscapes without government intervention. While one might question the state’s role in truly self-sustaining landscapes, it is no more of an artifice than the conscious creation of landscape (often with beneficial unanticipated ecological-visual consequences) by erstwhile gentry and potentates. A recurrent problem of landscape governance has been a widespread reliance on “projectism,” providing short-term funding for successive countryside management initiatives. While a few of these schemes have proved durable, future sustainability will rely on mechanisms to mainstream landscape considerations in designs, plans, policies, and programs related to key “drivers of change.”

A number of mechanisms signal the way toward sustained inclusion of landscape within public and private decisions. Europe is now witnessing the widespread implementation of the European Landscape Convention (Council of Europe, 2000) that is embedding the planning, protection, and management of landscapes by “strengthening institutional frame-

works” and “creating an inclusive, people-centered approach.” Similarly, local spatial planning increasingly embraces Landscape Character Assessment for systematic and consistent policy application (Swanwick, 2004). Spatial plans are also moving toward the retrofitting or phased incorporation of potentially lavish green infrastructure and sustainable urban drainage systems, thereby capitalizing on sustainable housing as a driver of future multifunctional landscapes and using statutory devices such as “developer contributions.” Such mainstreaming of landscape sustainability is, if actually practiced, a step change from the piecemeal and generally superficial development-plan policies that have existed to date (Punter & Carmona, 1997). Within the cultural landscapes of Europe, landscape measures have been widely incorporated into agricultural support mechanisms, not least as WTO agreements have forced governments to remove overt subsidies and instead pay farmers for their environmental services. The targeting of farm payments is now widely made on the basis of landscape-scale analysis, enabling strategies to reconnect habitat networks (Catchpole, 2007). The EU Water Framework Directive is also establishing catchment-scale governance, increasingly reflected in statutory documents such as River Basin Management Plans and more voluntary approaches such as river contracts. Significantly, in the United Kingdom these measures connect with a cross-departmental statutory Public Service Agreement to “secure a healthy natural environment for today and the future.” There is increasing evidence of the incorporation of landscape benefits into policy and practice in ways that assure sustained and central, rather than intermittent and precarious, consideration. While stopping short of the more fundamentalist interpretations of “bioregionalism,” numerous instances of governance are now being based on landscape units such as river catchments, thereby promoting environmental integrity and intactness (e.g., Hamilton & Selman, 2005).

As noted previously, the criterion of *aesthetic sustainability* is uniquely important to landscape, not only because visual amenity has been a longstanding mainstay of policy, but also because it is often assumed to indicate healthy functioning of underlying systems. There is a long tradition of valuing landscapes for their “natural beauty” (Brady, 2003). As a very sweeping generalization this tends to relate to intimate and harmonious scenery in the “Old World” and sublime and transcendent scenery in the “New World.” The arguments linking outstanding beauty to sustainability have often been emotive and essentialist, but recent interpretations suggest that these determinations are based on more than mere intuition. For example, some arguments link visual complexity

and fractal dimension to ecological functionality, while numerous studies relate green and natural environments to wellness and recuperation. However, equating “natural beauty” with landscape sustainability is too limited, as it refers only to a “high culture” ontology. Many ordinary and even damaged landscapes give pleasure and security to some users, although their ambivalent qualities may mean they are contested (Jorgensen & Tylecote, 2007). Sustaining their visual qualities is a more complex issue than simply protecting them against change.

An intriguing aspect of aesthetic sustainability is that aesthetic tastes are socially dynamic and, while some perceptions of beauty may be cross cultural (Strang, 2005), often they vary according to time and place. The idea of an “acquired aesthetic” suggests that we may gradually develop an appreciation of objects that initially seem discordant or heretic—even mountains and wetlands have been the subject of a progressive revision of tastes since the eighteenth century. Landscapes possess varying degrees of legibility that betray underlying narratives, and the extent to which we appreciate or denigrate a landscape is closely related to the way we are conditioned to “read” it. It is quite plausible that, as we learn more of a landscape’s underlying story, the degree to which we endorse that story will influence the extent to which we favor the view. We could, for example, hypothesize that reactions to wind turbines—which are variously described as magnificent or monstrous—are influenced by the viewer’s belief in the importance of wind energy to sustainable development or self sufficiency. (Consider, for example, how the residents of the beautiful island of Gigha in Scotland have termed their community-owned turbines the “three dancing ladies.”) A low-impact development policy based on explicit sustainability criteria has recently embraced some “heretic” Welsh permaculture communities in the Pembrokeshire Coast National Park that had been subjected to a longstanding bureaucratic battle to demolish the buildings (Willis, 2008). The resultant structures may soon come be viewed appreciatively by tourists and planners. Such a possibility is of great significance, for the serious pursuit of sustainable development will have landscape implications that will inevitably attract protest. The extent to which society endorses a landscape’s narrative and acquires an aesthetic for its changed appearance may prove to be critical to the acceptance of “strong” sustainability practices.

## Conclusion

The manifold dimensions of sustainable landscapes raise challenging questions over the nature of how to design, plan, and manage them. The matter is

further complicated by a variety of traditions and subcultures and by the different scales and concerns of urban and rural practitioners. However, some common themes emerge around the canons of sustainability. For example, there is a blurring of traditional urban-rural divides, characterized by strategic networks of multifunctional greenspaces, environmental service provisioning, and connective urban fringes. This confluence reflects a growing emphasis on blue-green infrastructure, not merely based on spurious leftover spaces, but systematically promoting settlements that “touch lightly on the earth” and integrate with wider landscape systems. In this MacHargian tradition, people and places reconnect with “nature” through imaginative thrift in the use of ecological-hydrological resources entailing strategic approaches to sustainable drainage, green roofs, multifunctional networks, and recuperative green-space (see MacHarg, 1998). Further, there is a growing acknowledgement of the importance of all landscape, not only that deemed “outstanding” in terms of natural beauty. Thus, sustainable landscape planning may entail creation, reinforcement, and restoration just as much as protection; it also requires the embedding of political and economic mechanisms that possess the continuous potential to reproduce valued places. On occasion, it may involve recreation and rewilding to promote a “future nature” (Adams, 2003) across extensive areas and habitat networks, resulting in landscape systems sufficiently large and intact to be autopoietic, self-sustaining, and adaptable to climate change. Finally, there is an acknowledgement of the need to “people” landscapes, not only through participatory processes, but more generally through wider re-engagement between communities and place, and a deeper professional appreciation of the ways that local landscapes are walked and talked. Overall, addressing the sustainable landscape means moving away from “set pieces” towards systemic integrity based on wisdom and intelligent care (Iverson Nassauer, 1997) that draw upon both an anthropocentric and an ecocentric discourse. It is quite likely that such functionally sustainable landscapes will also, serendipitously, come to be seen as beautiful.

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## COMMUNITY ESSAY

# Product stewardship in the United States: the changing policy landscape and the role of business

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### Author's Personal Statement:

Since I came to the United States almost twelve years ago, I have been astonished by the rate of consumption and the enormous amount of waste generated by people and organizations. Could Americans wake up one day without electricity, gasoline, or bread, as happened to many Eastern European countries in the early 1990s? It was a tough lesson that many people of my generation will never forget. It is clear to me that the current rate of consumption and environmental pollution is unsustainable. Every few years, people change cars, computers, televisions, other appliances, and even their homes! It is often said that if every person on this planet consumed like Americans, we would need several planets Earth. But why should people in other countries not have the right to own a car, travel to exotic destinations, and purchase prepackaged food, modern appliances, and toys for their children?

As an engineer and scientist trained in cleaner production, I have always believed in the unlimited potential of humankind to find solutions to seemingly unsolvable problems. But we need to have the right incentives. This does not mean people and organizations should not change their consumption patterns, but rather that we can build the economy from a systems perspective, considering the entire lifecycle of products and services and the social, economic, and environmental impacts of our actions today and in the decades to come. The current global recession makes it even clearer that a systems approach is critical going forward to ensure stable and sustainable development in an increasingly interconnected world. Business, government, and civil society organizations all need to work together to design the rules of the new economic system where products last longer, have no toxic chemicals, and are reused and recycled; society as a whole consumes less; and people spend more time with family and friends and less time working to maintain their "standard of living."

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Back in 2001, the Product Stewardship Institute (PSI) convened its first dialogue around electronic waste issues and began to explore the challenges of handling leftover paint. Seven years later, the Fourth PSI Forum was an exciting and overwhelming experience. Despite a lack of federal regulation, business in the United States is beginning to work with federal and state governments to address product stewardship and companies are taking increasingly active positions. In the current economic downturn, and with the new White House administration, product stewardship issues will be an even more important source of competitive advantage (Economist Intelligence Unit, 2008). This essay provides an overview of the changing policy landscape in the United States, reviews some emerging practices, and explores the role of business in product stewardship.

### What is Product Stewardship?

The PSI defines product stewardship as "a principle that directs all participants involved in the life cycle of a product to take shared responsibility for the

impacts on human health and the natural environment that result from the production, use, and end-of-life management of the product" (PSI, 2008). The main objective of product stewardship is to promote waste reduction by encouraging manufacturers to redesign products so they contain fewer toxics, last longer, can be reused and recycled, and/or contain recycled materials.

The PSI was created to alleviate the financial and logistical burden of managing waste on state and local governments. As of November, 2008, PSI membership included 45 states and 60 local governments (representing over 85% of the United States population) and had recently expanded to create an adjunct council comprising 30 businesses, environmental and academic organizations, and other stakeholders. Through conference calls, meetings, and information exchange, PSI has helped consensus building, policy development, and regulation adoption in many states.<sup>1</sup>

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<sup>1</sup> For information on past dialogues, potential new product initiatives, or details on membership in PSI's Adjunct Council see the

In most cases, the process begins with a regulation overseas, typically in the European Union (EU), which *The Economist* (2007) calls “the world’s chief regulator.” Rules such as the EU Waste Electrical and Electronic Equipment (WEEE) Directive, the Restrictions of Hazardous Substances (RoHS) Directive, the End-of-Life Vehicle (ELV) Directive, and the Packaging Directive have been quickly adopted by other countries, including Canada, China, Japan, Korea, and Australia. Typically, some American states such as California, Minnesota, and New York then begin introducing similar bills. For example, in the electronics waste area—the first issue tackled by PSI—as of November, 2008, 16 states and New York City had already passed laws on electronic waste and more than 15 other states were considering such bills (Electronics TakeBack Coalition, 2008).

### The Role of Business in Product Stewardship

Whether realizing it or not, companies play an important role in shaping the product stewardship policy landscape. PSI has shown that successful initiatives require the involvement of all key stakeholders, such as manufacturers, retailers, recyclers, governments, nongovernmental organizations (NGOs), and others. On the one hand, successful policies require building a consensus around responsibilities, performance goals, incentives, and implementation. If a state or local government drafts a bill, lack of agreement with key industry players may lead to aggressive lobbying and defeat. On the other hand, without business input, regulators might support a bill that is either unfeasible or can hurt local businesses.

While European companies have traditionally been more supportive of environmental regulations, American businesses have preferred voluntary initiatives (see the carpet take-back program described in Box 1). Historically, the United States federal government has also avoided environmental protection or health and safety issues, because “most government leaders believed that this responsibility should be chiefly shouldered by private industry, the states, and professional organizations” (Geiser, 2001). Moreover, many economists, policy makers, and businesses in the country believe that environmental regulation retards productivity despite numerous studies demonstrating the opposite (e.g., Jorgenson & Wilcoxon, 1990). This view is, to some extent, related to the burdensome and highly prescriptive and

#### Box 1 Addressing Carpet Disposal

- Product stewardship efforts: Driven largely by manufacturers such as Interface and C&A.
- Memorandum of Understanding (MOU) signed in January 2001: Agreed to develop “negotiated outcomes” for collecting and processing discarded carpet, establish reuse and recycling goals, and develop model procurement goals.
- Carpet dialogue: Determined recycling and reuse rates with participants including EPA, the states of Minnesota, Iowa, Massachusetts, North Carolina, California, Oregon and Maryland; industry and NGOs.
- New MOU signed in January 2002: Agreed by 2012 to achieve 40% landfill-diversion goal, roles and responsibilities, evaluation criteria, and schedule.
- 2007: Midcourse review conducted by Zero Waste Alliance found efforts significantly lag behind established targets. Identified new strategies including increased marketing of recycled products, developing forms of sustainable financing, and expanding collection and processing infrastructure.

complex regulations like Best Available Control Technology (BACT) that have been previously implemented in the United States. By comparison, regulations in Europe have generally been simpler and more flexible, based on setting goals and targets and letting businesses decide how to get there (Vig & Faure, 2004). One example is the standard for occupational exposure to cadmium; the provision is about 15 pages long in Sweden versus several hundred in the United States.

At the same time, individual American states continue to lead the way with environmental regulations and this approach poses a logistical difficulty for many American companies (Rabe, 2004). Having to meet numerous different standards in various jurisdictions can be an enormously complex task. At the Take It Back! annual conference in 2005, electronic industry manufacturers asked the Environmental Protection Agency (EPA) to pass a federal take-back regulation to provide a “common play field” (Veleva, 2005). Without such uniform standards, companies risk fines, litigation, and damaged reputation, as Microsoft experienced in 1999 when the Mateel Environmental Justice Foundation sued the company for noncompliance with California’s Proposition 65 that mandates labeling wire and cable products containing a high lead concentration (Veleva & Sethi, 2004).

More recently, American toy manufacturers have faced similar challenges. After numerous large recalls in 2007 and 2008, a Mattel spokeswoman stated, “Fifty different state standards will create a confusing patchwork of regulations, limit certain toys sold in some states, drive up costs for consumers and will not substantively increase toy safety” (Trottman & Williamson, 2008). Therefore, Mattel and many other

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Product Stewardship Institute website: <http://www.productstewardship.us>.

manufacturers support tougher federal standards that give the industry “clear and uniform rules.” Working with state and federal regulators, NGOs, industry peers, and other stakeholders is one way for businesses to advance uniform rules and policies.

Major companies in the United States have long realized the importance of being active players in dialogues around product stewardship. For instance, Dell came under significant pressure from environmental groups across the EU to assume responsibility for its old products and this experience sensitized company officials to the risks and opportunities of state and federal e-waste regulations and the need to take proactive steps (Cole & Vozick, 2002). The computer manufacturer drafted and successfully campaigned for the passage of the so-called “Dell Model Bill” in several American states, including Kansas, Texas, and Oklahoma. While states with poor capacity to enact such policies believe it is better to have the “Dell Bill” than no regulation at all, some federal regulators and the Electronics Take-Back Coalition consider it weak regulation and a cause for concern as it may prevent passage of a stricter bill nationwide.

Companies want to be involved in the discussion and the framing of product-stewardship policies, as government and NGOs expect them to pay for product end-of-life disposal. While in most cases firms are able to pass these costs on to the end consumer, global competition from companies overseas with no such regulations sometimes leads to manufacturers absorbing the cost of take back and disposal. For example, while some computer manufacturers charge a fee for taking back old computers, others, such as Dell, Lenovo, and Toshiba, have free take-back programs. In addition, with limited state and local government resources for waste treatment and disposal, there has been a movement globally toward shifting the responsibility to manufacturers. In California, for example, local governments responsible for hazardous waste collection met in 2001 and recognized that their costs had tripled due to the large stream of electronic waste. Since they did not want to increase tipping fees or taxes to pay for it, “industry needs to take responsibility and fund a program” (Fraser, 2009). As a result, the state passed Senate Bill 20, which imposes a recycling fee on all electronics that contain lead.

Known as Extended Producer Responsibility (EPR) in Europe and Product Stewardship (PS) in the United States, this approach to environmental management typically requires collecting and recycling or safely disposing of old or unused products at the end of their useful life (e.g., EU’s WEEE and ELV Directives). EPR, though, differs from PS in two important ways: 1) it shifts responsibility (physically

and/or financially) upstream to the producer and away from municipalities, and 2) it provides incentives to producers to take environmental considerations into the design of the product. PS, by comparison, considers all parties involved in producing, selling, or using a product (e.g., suppliers, designers, manufacturers, distributors, retailers, customers, recyclers, remanufacturers, and disposers) to be responsible for the full environmental and economic impacts of that product. Such “shared” accountability provides less clarity and weaker incentives for manufacturers to redesign their products to reduce end-of-life impacts.

In both cases, however, taking back old or unused products is expensive. Manufacturers typically do not do so, and taxpayer money is required to fund take-back programs at state and local government facilities to properly recycle such products so they do not end up in the landfill or get incinerated and thus contaminate air or groundwater. Many regulators and NGOs in the United States are calling on manufacturers to fund take-back programs and for retailers to collect waste products in their stores (the most convenient option for consumers). Group Health, for example, participated with its 25 pharmacies in a voluntary take-back pilot program for secure medicine returns in Washington State (see Box 2). In 2001, Benjamin Moore was involved in a voluntary take-back pilot program in Massachusetts, coordinated by PSI and the Massachusetts Department of Environmental Protection. This initiative later helped inform the PSI dialogue on this issue (see Box 3).

### Is Walmart Driving Product Stewardship?

Whether inspired after Hurricane Katrina (Scott, 2007; Creno, 2008), or as a result of stakeholder pressures and an attempt to improve its image and reputation, Walmart’s transformation to embrace sustainability is a phenomenon that has begun to attract considerable attention. The historic speech by Walmart Chief Executive Lee Scott in the fall of 2005 put the giant retailer on a fast track called “Sustainability 360.”

According to Scott, sustainability is the single biggest business opportunity today. In a subsequent lecture to the Prince of Wales’s Business and the Environment Programme in February, 2007, Scott declared that, “Hurricane Katrina changed Walmart forever. And it changed us for the better. We saw our full potential—with absolute clarity—to serve not just our customers, but our communities, our countries, and even the world. We saw our opportunity and our responsibility” (Scott, 2007).

**Box 2 Pharmaceutical Waste**

- **Problem:** Improperly disposed of drugs can be a source of childhood poisoning and teenage and adult abuse. They are also increasingly showing up in the environment and, according to the United States Geological Survey, are found in 80% of the country's streams and in the drinking water supply of many cities.
- **Global status:** Some jurisdictions such as British Columbia have enacted regulations and created agencies such as the Post-Consumer Pharmaceutical Stewardship Association (PCPSA) with active participation by pharmacies to safely collect and dispose of medications.
- **United States status:** No federal regulation and only guidelines on safe disposal by consumers exist. PSI convened a dialogue in three phases:
  - Phase I: Literature search that identified and interviewed stakeholders, summarized efforts, invited participation in a national dialogue, developed the Product Stewardship Action Plan for Unwanted/Waste Pharmaceuticals.
  - Phase II: Launched in June 2008 to convene four national dialogue meetings, to organize workgroup meetings, to develop priority agreements, and to disseminate project results.
  - Phase III: Will jointly implement priority projects and initiatives identified in dialogue process.
- **Funders:** Waste Management; EXP Pharmaceuticals; King Pharmaceuticals; Water Environment Federation; National Association of Clean Waters; States of Minnesota, California, and Idaho; King County (Washington State) and Los Angeles County (California); and Cities of Santa Monica and San Francisco.

To begin this process, the company held a meeting at its headquarters in Bentonville, Arkansas in March 2006, inviting many sustainability specialists to devote a day to analysis, discussion, and action planning (Googins et al. 2007). Representatives from the Boston College Center for Corporate Citizenship were among the invited participants.<sup>2</sup> The company's journey started with defining three main inspirational goals, two of which—Goal 2 and Goal 3 below—are related to PS:

- Goal 1: Use 100% renewable energy
- Goal 2: Generate zero waste
- Goal 3: Sell sustainable products

To progress, Walmart established three networks to focus on key opportunities under each goal. The networks start with a “captain,” or senior business leader, whose performance review includes sustainability criteria (Waddoups, 2008). To measure achievements toward the three goals, Walmart developed specific targets and initiatives, such as:

- Increasing fleet efficiency by 25% in three years (achieved).

<sup>2</sup> The Boston College Center for Corporate Citizenship is a membership-based research organization associated with the Carroll School of Management. It is committed to helping business leverage its social, economic, and human assets to ensure both its success and a more just and sustainable world. As a leading resource on corporate citizenship, the Center works with global corporations to help them define, plan, and operationalize their corporate citizenship. Through the power of research, education, and the insights of its 350 corporate members, the Center creates knowledge, value, and demand for corporate citizenship. The Center offers publications including a newsletter, research reports, and white papers; management and leadership programs, including three certificate programs; events that include an annual conference, roundtables, and regional meetings; peer-to-peer learning forums; and a corporate membership program.

- Selling 100 million compact fluorescent light (CFL) bulbs in 2007 (exceeded the target by selling 137 million).
- Partnering with suppliers like General Mills to reduce product packaging (prevented the generation of 890,000 pounds per year of waste; launched packaging scorecard for suppliers in 2006).
- Reducing supply-chain greenhouse gas emissions by sourcing locally (by partnering with Mississippi farmers Walmart reduced by two-thirds the miles traveled to source corn).
- Selling 100% sustainably harvested seafood (currently working with the Marine Stewardship Council (MSC) to develop guidelines and certification; selling 22 MSC-certified seafood products as of December, 2008).
- Introducing chemical-safety standards for suppliers

**Box 3 Leftover Paint Disposal**

- **Goal:** Develop nationally coordinated leftover paint management system
- 2003-2004: Four dialogue meetings held
- 2005: First MOU signed
- 2007: Second MOU signed by 45 parties thus far:
  - “Invisible” ecofee paid by consumers at retail locations
  - Industry-run system of collection
  - Industry pays for the collection and reuse/recycling of leftover paint and passes costs onto the consumer
  - Industry will enhance existing collection infrastructure
  - No mandatory retail take back
  - Consumer education on proper paint disposal
- 2008: Minnesota legislation passed by both Houses; supported by industry, manufacturers, retail, and government; vetoed by the governor, but will be reintroduced in the 2009 session.
- 2008-2010: Based on demonstration in Minnesota, system will roll out to Oregon, Vermont, Washington, California, Iowa, Florida, North Carolina, and Connecticut.

that are more stringent than current federal regulations in the United States (e.g., for lead, phthalates, mercury, antimony, arsenic, barium, cadmium, chromium and selenium; three priority chemicals have been identified in 2008 for phase out by suppliers: Propoxur, Permethrin and Nonyl Phenol Ethoxylates).

There is growing evidence that Walmart is walking the talk and its actions have begun to affect the market (Plambeck & Denend, 2008; Ethical Performance, 2009). Using its large purchasing power, Walmart is changing the way companies design and deliver products. Many of the member companies of the Boston College Center for Corporate Citizenship, such as Teradata, Tennant, and General Mills, admit they are making product changes or committing to corporate citizenship reporting because “Walmart asked us to do so” or because “our customers are demanding it.” With over 60,000 suppliers around the globe, Walmart is able to bring changes that no government can enact so fast (Birchall, 2008; CSR Wire, 2008). By introducing tougher requirements for suppliers, making longer-term commitments, and partnering with NGOs for product testing and certification (Plambeck & Denend, 2008), Walmart is becoming one of the driving forces for product innovation and stewardship, as are many other large companies such as Nike, Target, Dell, and Intel.<sup>3</sup>

At the same time, most business support for PS in the United States is around product design, manufacturing, and use, rather than end-of-life management. An example of this approach is Walmart’s commitment to influencing consumers to switch to more energy efficient CFLs. By actively promoting these bulbs, Walmart has probably helped reduce energy use, but at the same time the company’s actions have indirectly contributed to another problem: mercury emissions from discarded products. While CFLs are an environmentally preferable option from the standpoint of energy conservation, not all consumers know that the bulbs contain mercury and need to be properly disposed of at the end of their life.

Collecting old CFLs has proved difficult and costly, and currently Walmart does not want to get involved. The EPA considers discarded CFLs to be “hazardous waste” and the subject of special re-

quirements for collection, personnel training, and transportation due to the health risks that they pose (Appell, 2007). While studies show that the mercury used in CFLs is less than the mercury emitted from a coal-fired power plant that would otherwise power incandescent lightbulbs, the former is still a concern due to its “dispersed” nature. If a consumer throws an old CFL in the trash, there is no way to separate it from the other household waste that is typically incinerated or disposed of in a landfill. Moreover, recycling CFLs containing mercury can expose workers to this toxic chemical. In contrast, mercury from coal-fired power plants is “concentrated” at the source and new technologies exist to capture much of it before emission (Feeley et al. 2003).

Some environmental groups, such as the Natural Resource Defense Council (NRDC), are considering whether other innovations, such as light-emitting diodes (LEDs) that do not contain mercury or any other toxic chemicals, could be an alternative to CFLs (Roman, 2008). This approach, however, could be costly and require systems thinking, life-cycle assessment, and collaboration by various stakeholders, including government.

To address both the presence of mercury in fluorescent lightbulbs and the lack of collection options, PSI is convening a national dialogue that seeks to develop a comprehensive solution for CFL product responsibility. The goal is to negotiate acceptable and accountable roles for key stakeholders involved in the product life cycle, including retailers, manufacturers, and government officials. The key objectives of the dialogue are to reduce the environmental impact of the manufacture of fluorescent lightbulbs, to increase the manufacture and procurement of environmentally preferable lighting, and to maximize the safe collection and recycling of spent lamps from households and businesses by developing a nationally coordinated system that is financially sustainable.

### What Should Companies Do To Prepare for the Product Stewardship “Wave”?

Momentum is growing both globally and in the United States for greater environmental responsibility and PS. With the new White House administration, it is widely expected that government involvement and oversight of business will increase. To prepare for this coming “wave” in PS policies and regulations, companies can do the following:

- **Educate yourself:** If you manufacture products, parts, or materials, educate yourself about what happens to your goods once they reach the end of their life and whether there are social, environmental, or health risks. The Boston College Center

<sup>3</sup> Nike, for example, is taking back and recycling old sneakers. Pressured by socially responsible investors and NGOs, Target agreed in 2008 to phase out from its stores all products containing polyvinyl chloride (PVC). Dell became the first computer maker in the United States to take back its old or unused computers. Intel was among the founding members of the Electronics Industry Code of Conduct—a voluntary initiative promoting better supply-chain management that includes guidelines for designing and manufacturing greener products.

for Corporate Citizenship has numerous offerings and works with companies to map and address key social and environmental impacts and to help their bottom line.

- **Know your supply chain:** Knowing and tracking all ingredients and suppliers of your products, parts, and materials is one of the most critical business challenges today for companies across industries. Visionary companies like HP and Intel have developed a sustainable supply chain and see their suppliers as key partners (Veleva, 2007).
- **Track the regulatory landscape:** Learn about any regulatory action, NGO campaigns, or other initiatives that target your industry's products, parts, or materials, not just in the United States, but also overseas. In a global marketplace, it is just a question of time before such actions affect domestic companies. Think of NGO campaigns, customer requirements, and regulatory restrictions on mercury, cadmium, lead, polybrominated diphenyl ethers (PBDEs), phthalates, PVC, bisphenol A (BPA), trans fats, and most recently nanomaterials.
- **Participate in a dialogue:** Find out if someone is already working on PS issues and join a group, such as the PSI dialogues, to participate in the development of new policies.
- **Be proactive:** New regulations will emerge whether you take action or not. To be better prepared, start with some pilot initiatives to explore the costs and benefits of various product redesigns and take-back schemes. Companies including Benjamin Moore, Staples, Dell, Nike, and Best Buy were among the first in their industries to explore take-back options.
- **Be transparent:** Customers, consumers, regulators, and NGOs want to know what your company is doing to address issues of concern. Communicating your initiatives builds trust and improves your reputation, both crucial resources for your business and bottom line.
- **Look at product stewardship as a process, not a destination:** Today we cannot possibly foresee all the changes in scientific knowledge, environmental issues, and consumer preferences. As nicely summarized by Tod Arbogast (2008), director of sustainable business at Dell, "You get a lens into the future if you engage with stakeholders." The best way to prepare for the coming PS "wave" in your industry is to join a network, engage with stakeholders, learn, talk, and act.

In times of product oversupply and increasing global competition, deepening economic crisis, and changing consumer preferences, PS provides unique opportunities for innovations that can increase market

share, profits, and shareholder value. Proactive companies can play a key role in shaping emerging PS policies and regulations in the United States.

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## BOOK REVIEW PERSPECTIVES

### Paul Hawken, *Blessed Unrest: How the Largest Movement in the World Came into Being and Why No One Saw It Coming*

Viking Press, 2007, 352pp, ISBN: 0670038520

#### Terence Jeyaretnam

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Paul Hawken is one of the best-known environmental authors of our time. With *The Ecology of Commerce*, he pointed out to business its impact on the environment, but most importantly, the opportunities available to manage these impacts from a life-cycle perspective. With *Blessed Unrest*, Hawken has again presented an optimistic view. From a social and environmental perspective, it is a book about what is going right in a resource-constrained, polluted, and corrupt world.

*Blessed Unrest* is a book about action rather than words. Civil society is renowned for action, which is no surprise. The surprise the book presents is the hive of activity and activism globally in environmental conservation, social justice, and indigenous cultures' resistance to globalization. Hawken had greatly underestimated the strength of ecological sustainability and social justice movements. Working on this book, "I soon realised that my initial estimate of 100,000 organizations was off by at least a factor of ten," he confesses. No doubt that figure will surprise many. The undercurrent of activity is heartening—to know that millions of people are acting for the voiceless, those suffering social injustice throughout the world and its poor cousin, the environment.

Focusing on change, the book is carved into easily digestible slices comprising different flavors in the history of the environmental social justice and indigenous rights movement, starting with the indigestible harm caused by world trade and business and ending with the sweetness of immunity and nirvana. A voluminous appendix of common terms and issues in the movement is a useful catalogue for readers who plan to use the information in their work, but will generate little interest for the layperson.

What captures the reader are the historical and present-day anecdotes that are ever present. As an example, Hawken lashes out at the United States by questioning the Iraq War: "[H]ow do you describe the American administration that will spend \$1 tril-

lion on winning a war for Iraq oil while refusing to allocate any funds to resolve the dependency on oil? For \$1 trillion, the United States could have catalyzed the replacement of its entire automobile fleet with plug-in hybrid electrics getting 500mpg." Hawken adds that, "for every dollar spent on UN peacekeeping, \$2,000 is expended for war making by member nations."

From time to time, Hawken drops frightening statistics, such as "we have consumed 90 percent of all the big fish in the oceans" and "[i]n 2005, the *Los Angeles Times* devoted one hundred times more coverage to a vandalistic spree by three unaffiliated students who damaged or destroyed 125 SUVs than it did to the landmark UN Millennium Ecosystem Assessment." Regarding business, Hawken notes that "the world's top two hundred companies have twice the assets of 80% of the world's people" and "Exxon Mobil once issued directives forbidding the use of the word sustainability in all internal and external communications." For those affiliated with large corporations, Hawken lists names of polluters and corrupt lobbyists "that legally or illegally impose their will on indigenous cultures."

The book is ripe with teachings from leaders and activists such as Rachel Carson, Mahatma Ghandi, Martin Luther King Jr., Ralph Waldo Emerson, Henry David Thoreau, and Rosa Parks. Revealing the theory behind the global movements for social and environmental justice—the *Blessed Unrest*—provides context and meaning to the why and how of the struggle for expression and freedom.

To me, the book was an eye-opener, offering a glimpse of hope to those despairing in the world's current state. I could read it again and again, yet my only criticism would be the complex and somewhat disorganized nature in which it is presented. The connections between anecdotes and coverage of the issues, as well as connections between chapters, are weak. Perhaps that's the way Hawken intended for it to be presented, with a lack of order that is synonymous with the movement and nature that he ever-so-interestingly captures.

A quote from poet Adrienne Rich seems to explain why Hawken sat down to write this book: "My

heart is moved by all I cannot save / So much has been destroyed / I have cast my lot with those / who, age after age, perversely / with no extraordinary power, / reconstitute the world.”

Thank you, Paul Hawken, for another enthralling and meaningful read.

### **About the Author**

Terence Jeyaretnam is a director of Net Balance Management Group based in Melbourne and holds a degree in environmental engineering, is a Chartered Professional Engineer, and a Fellow of the Institute of Engineers (Australia). He chairs the Sustainability Committee of Engineers Australia and in 2005 was named as one of the top ten most influential young engineers in Australia by Engineers Australia.



## BOOK REVIEW PERSPECTIVES

### James Gustave Speth, *The Bridge at the Edge of the World: Capitalism, the Environment, and Crossing from Crisis to Sustainability*

Yale University Press, 2008, 320pp, ISBN: 9780300136111

Philip J. Vergragt<sup>1</sup> & Halina S. Brown<sup>2</sup>

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Out-of-control capitalism is the root cause of the enormous environmental threats facing humanity; the great environmental movements of the twentieth century have been unable to reverse the inevitable slide toward the environmental abyss. This is the opening message in Gus Speth's new book, *Bridge at the End of the World: Capitalism, the Environment, and Crossing from Crisis to Sustainability*. A powerful message it is, coming from a leader of modern environmentalism in the United States whose arena has been very much tied to the existing economic system, power relations, and dominant institutions. It suggests that nothing short of a fundamental shift in economics, politics, lifestyles, technology, and culture is needed. It also promises to show the reader the trajectory for this shift. But it falls short on delivering.

Speth is at his best analyzing the nature and the complexity of the problem, and displaying the debates among various academic disciplines and in multiple circles: scholars, policy analysts, activists, opinion leaders, and policy makers. His prodigious knowledge of these debates and his ability to render them in a crisp, clear prose, densely sprinkled with great quotes from great minds, make the book a fine read and a valuable resource. It should be standard reading for students who care about sustainability, regardless of their area of study and future career plans.

Part 1, the best in the book, brilliantly explains what is wrong with the system. For one, the American form of capitalism, with its imperative of continuous growth, and driven by profits, competition, short-termism, externalization of costs, and discounting of the future, is the root cause of environmental unsustainability. Secondly, today's environ-

mentalism is profoundly ineffective in reversing this trend. The strategies that worked in its early decades—pragmatism, incremental policy reforms, enforcement actions (often through litigation), and narrow focus (often on a single environmental problem)—are no match for the magnitude and complexity of today's challenges. Furthermore, these strategies target the symptoms rather than the systemic root causes. Speth's conclusion for Part 1 is that "working only within the system will, in the end, not succeed when what is needed is transformative change in the system itself."

The discussion of the transformative changes—their nature, triggers, and agents—is meant to be the stuff of Part 2. This central section is a compilation of six stand-alone essays under the sweeping title "Great Transformation." The first two are the most familiar, as they simply re-enact well-travelled discussions on how to improve environmental policies by harnessing markets and the need to move to the post-economic-growth society. Here, we meet all the usual suspects: getting the values of pollution caps and resource harvests right, taxing undesirable activities, eliminating perverse subsidies, implementing the polluter pays principle and cap-and-trade systems, and changing how we calculate gross domestic product (GDP) to account for human welfare, good jobs, health services, education, and the like. This is the twentieth-century environmentalist speaking; the agenda is sensible, well researched, neatly fits into the existing capitalist system, and is definitely *not* transformative. Speth's answer to how to shift to a post-growth society is to take us to the next two essays, on human well-being and on harnessing consumption. These essays are aspirational, based on recent critiques of out-of-control consumerism and personal wealth accumulation in the United States and advocating for simpler, less cluttered, less hurried, more spiritual and leisurely lifestyles.

The last two essays of Part 2 return to the topic of capitalism, specifically the corporation and ways to advance beyond the current system. The corporation, the author proclaims in an opening sentence, is

the principal agent of capitalism, the executor of the bad deeds that collectively comprise the unsustainable system of production and consumption. The corporation is politically and economically extremely powerful and is intent on growing that power and on resisting systemic change. What is the remedy? The answers are tentative and at times internally contradictory. For example, Speth hopes for corporate voluntary “greening” (under the umbrella of corporate social responsibility), driven by pressure from civil society, consumers, and financial markets, while also acknowledging that voluntary initiatives do not produce transformative changes. He talks about limiting corporate political influence through various policy reforms, but does not address the fact that, precisely owing to that power, corporations have been able to shape, through policy processes, the capitalist system to what it is today. The author notes one interesting initiative to fundamentally reframe the function of a corporation and to rewrite the corporate charter, but provides no critical analysis of its viability. Examples of different models of company ownerships are interesting but underdeveloped.

The minimal attention devoted to other economic systems is striking here. Socialism is rightly dismissed, based on its dismal environmental record in Soviet-dominated Europe. But the European social-democratic forms of capitalism, which have much lower per-capita energy consumption and exercise more control over corporate power, are mentioned only in passing, never to be revisited again. One exits the “Great Transformation” section of the book with a better understanding of what is wrong with the system, why incremental reforms do not work, and what alternative models are being entertained out there in the realm of ideas. But the reader comes away without any clear sense of the shape, trajectory, or drivers of the great transformation.

Partly, Speth takes up this unfinished business in the third, and last, part of the book entitled “Seedbeds of Transformation.” He calls for a new consciousness, a new world view. Tellus Institute’s Great Transition Initiative and the Earth Charter are featured as examples of the expression of such new consciousness. New social movements, education, and a “new narrative” are seen as the seedbeds of change. We clearly also need new democratic politics. Speth rightly points out that the environmental movement should broaden, to include human rights, social justice, social well-being, and political reform. An international movement of citizens and scientists, coalescing from a wide array of existing organizations, is needed to advance a transition to sustainability. Examples of such nascent movements in America are noted. The book ends with the double metaphor of the bridge across the abyss, which can only be

reached after we take the right path at the crossroads that we are approaching fast. But here again, few conceptual or practical proposals are included on how to go from here.

If the root of the crisis is in American-style capitalism, kept afloat by greed, hyper-competitiveness, and the ultimately unsatisfying pursuit of individual interests, we should take a harder look at alternatives that deliver different results. We should bring together the social psychology of consumption and consumerism, new ecological economics, new business models, new theories of technological innovation, and new political theories in an attempt to further conceptualize deep change. The European SCORE! Project on sustainable production and consumption, funded by the European Union, is an example of one such forward-looking effort. Moreover, we should study and learn from small-scale experiments with alternative lifestyles, business models, and technologies: why and how they emerge, the anatomy of their success and failure, the role of leadership, and their potential for becoming agents of systemic change. It is not enough to call for broad citizens’ movements; we need to reflect on the kind of leadership that might mobilize such movements and to critically evaluate their potential to change mainstream social values and lifestyle choices, including the more or less affluent Americans, the working class, professionals and intellectuals, progressives, and conservatives.

We also have a lot to learn from traditions and recent experiments in Africa, India, and other parts of the developing world. Let’s face it, our Western rationalist modernization paradigm, which has been dominant for four hundred years, has brought us into this mess, and it is hard to see how the same paradigm can get us out of it. New voices need to be heard. Speth’s book is a step in the right direction, but when it comes to building the bridge at the edge of the world it only provides us with an unsorted heap of building materials.

### About the Authors

Philip J. Vergragt is a Senior Associate at the Tellus Institute and a Research Fellow at Clark University. Before moving to the United States, he was a professor of technology assessment at TU Delft in the Netherlands and a Deputy Director of the Dutch government’s Sustainable Technological Development Program. His main research concerns technological innovation for sustainability, technology assessment of emerging technologies, sustainable consumption, and sustainable system innovation. Together with colleagues at the Tellus Institute, he works on the “Great Transition Initiative” to bring about a social transition toward sustainability. Vergragt was a cofounder and

an Advisory Board member of the Greening of Industry Network. He has published more than 70 academic articles and co-authored two books. Vergragt obtained a PhD in chemistry from Leiden University in 1976.

Halina Szejnwald Brown is Professor of Environmental Science and Policy at Clark University and was previously a chief toxicologist for the Massachusetts Department of Environmental Protection. Her research focuses on environmental regulatory regimes in the United States and Europe, technological innovation in a transition to sustainability, science and information in public policy, and corporate social responsibility. Brown has authored more than 50 articles and two books and served on numerous state and federal advisory panels for the National Academy of Sciences, the United States Environmental Protection Agency, the Massachusetts Toxic Use Reduction Institute, the National Science Foundation, and the American Association for the Advancement of Science (AAAS). She is a Fellow of the Society for Risk Analysis and a Fellow of the AAAS. Brown received a PhD in chemistry from New York University.

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### Edward Sanders

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Gus Speth's *The Bridge at the Edge of the World* is an important contribution to the growing body of visionary literature dealing with the challenges of sustainability. In addition to his own thought-provoking observations, Speth's extensive references offer an excellent introduction to many other authors who address our daunting global environmental problems, capitalism's role in exacerbating them, and the core sufficiency principles that many observers believe will be required to deal with them. The book provides a smorgasbord for future readings by those who want to dig deeper into the issues of sustainability.

The book's basic theme is that today's mainstream environmentalism (incremental and problem solving) is no longer up to the task of dealing with current resource depletion and pollution problems. In essence, Speth asserts that capitalism as we know it is incapable of sustaining the environment and that aggregate consumption levels in the richer countries are beyond the point where we should have stopped. As a result, he argues that the modern capitalist system has to be radically transformed and that a post-growth society must forgo increased production and consumption.

Speth explicitly proposes "an assault on the citadel of consumption" and suggests a variety of measures (e.g., public participation in corporate rechartering, legal liability for shareholders) that would fundamentally alter the economy's "operating sys-

tem," thereby forcing corporations to devote resources to a variety of social objectives beyond profit maximization (albeit probably with a variety of likely unanticipated consequences, which he might or might not approve of). A book of this nature will, therefore, appeal primarily to readers already disposed to sweeping social change rather than to those more concerned with near-term policies to move a few steps closer to environmental sustainability (while recognizing the need to address a number of other social problems at the same time).

To highlight the basic options for moving ahead, Speth summarizes five worldviews suggested by Paul Raskin for responding to global environmental challenges: Fortress World, Market World, Policy Reform World, New Sustainability World, and Social Greens World. As both the narrative and the selection of quotes and citations from other authors make clear, Speth basically dismisses the Market World and Policy Reform World models as inadequate to force the underlying structural and social changes that he sees as necessary. Instead, he comes down firmly on the side of the New Sustainability model, with overtones of the Social Greens World.

Throughout the book, Speth highlights the deep-seated changes that will be needed to sustain natural and human communities—changes in public policy, in individual and social behavior, and in the very nature of contemporary capitalism. He recognizes that none of these changes will be easy and many would require radical alterations in consumer and voter behavior. In an illuminating passage, he acknowledges that

[t]hey are not next steps. The next steps involve urgent efforts to apply the approaches of today's environmentalism to address climate change and other challenges where serious action is long overdue.

Instead, the book's prescriptions deal with the "next, next steps." With this passage, he admits that the radical transformation in social consciousness, economic organization, and politics that are the focus of the book will not be achievable until some "next, next" time in the future.

From this reviewer's perspective, the willingness to skip past near-term steps required to deal with today's environmental concerns points to an essential weakness in the book. Specifically, if today's environmentalism can successfully overcome the phenomenally complex problem of climate change (aptly elsewhere characterized as "the mother of all market failures"), as well as the other challenges where serious action is long overdue, then today's environmental establishment will have demonstrated the

ability to deal with major environmental issues. If this is the case, it is not clear why the fundamental and (many would argue) utopian and risky changes that Speth advocates would be required.

The reality is that our democratic, market-oriented capitalistic system will continue to dominate domestic (and much of global) production for the foreseeable future. Further, it seems most unlikely that human nature will change sufficiently for significant portions of society to willingly embrace the concept (admittedly winsome) of voluntary simplicity and substantially reduce its consumption. Finally, Speth's legitimate charge that governments are obsessed with throughput growth rather than real development disregards the fact that many of the policies he advocates (adequate retirement income, good quality child care, shorter working hours, universal health care, support for the arts, companionship for the chronically ill, foreign aid) require considerable financial resources. A growing economy will help facilitate public support for funding these other needs. A shrinking economy, requiring a dramatic redistribution of wealth and curtailment of private consumption, would make reallocating funds to meet these other priorities vastly more difficult.

The unaddressed question is whether environmental and political leaders can persuade the voting public to accept tough enough policies to actually curb greenhouse-gas emissions, curtail toxic releases, and preserve ecosystems functions. This would require fundamental tax reform and other actions to raise the cost of polluting activities to fully reflect environmental, intergenerational, and other externalities. The jury is still out whether this can happen, but the book actually gives some reason for hope. For example, Speth cites European actions to tax energy and reward work, as well as noting the scope for reducing the US\$850 billion in counterproductive worldwide subsidies to environmentally and socially destructive activities. The fact that Germany is the world's leader in solar applications, even though it has meager solar resources, is a testament to the power of strong government policies and economic incentives.

Furthermore, the book notes that the modern capitalist system is evolving in ways that are giving greater voice to public interests and environmental considerations (e.g., employee-stock ownership programs and pension plans, public sector and socially responsible investment funds). More importantly, the excellent chapter on real growth highlights the fact that personal happiness on a national level is not highly correlated with income, although most studies find that, due to social positioning and habituation, richer people are happier than poorer people in individual countries. This weak relationship between in-

come and happiness gives some hope that the ideas of voluntary simplicity and environmental responsibility are falling on increasingly receptive ears (e.g., the not-so-big house, the slow food movement, relocation initiatives, green certification schemes).

Given these positive trends, it is disappointing that the book does not attempt a more balanced assessment of the likely success of incremental and policy-oriented solutions to today's pressing environmental problems. Of particular concern to this reviewer is the limited discussion of strong versus weak sustainability. Under strong sustainability, all forms of natural capital are statically preserved at current levels. Under weak sustainability, natural capital can be consumed in a dynamic system as long as it is at least replaced by substitutes, such as new technologies and human-made capital. As Speth notes, this distinction is fundamental.

Speth appears to adopt strong sustainability as the guiding policy objective, although he does not say so explicitly. As a result, the potential for policy and technological change to overcome environmental problems is not directly addressed. Yet, when high priority environmental problems have been identified and targeted, they have usually been ameliorated through appropriate technologies and policies (e.g., ozone depletion, sulfur-dioxide emissions, local air pollution). If the regulatory and market incentives are strong enough, corporations and consumers act accordingly. Thus, with the right policies, technologies and productivity increases could presumably allow both increased consumption and preservation of vital ecosystems, not just those that generate direct ecosystem benefits (raw materials, crop pollination, nutrient recycling, recreation venues, water purification, storage and flow control), but also those that are inherently important (e.g., existence values).

The underlying issue, therefore, is whether mainstream environmentalists can persuade the broader public to support the tough policy changes necessary to deal with the current environmental challenges, especially those whose solution entails real economic costs. On the latter, such as global climate change, it is too soon to tell. Yet, by the same token, it is not self-evident that the changes recommended in the book—restructured capitalism and voluntary consumer restraint—would necessarily result in a political decision to reallocate resources to reduce greenhouse gases rather than to meet competing priorities.

Although these comments focus on the book's shortcomings rather than its strengths, the reviewer certainly agrees that it is vitally important to address the more fundamental systemic changes that would be required if the Market and Policy Reform World approach fails to meet the next-step environmental challenges. If this incremental approach is not up to

the task, a more radical path such as that outlined by Speth in this farsighted and provocative book will more than likely be needed.

### About the Author

Edward Sanders is President of Ecotourism International, a consulting firm that provides planning and implementation services to governments, communities, and private entrepreneurs. He specializes in evaluating the economic feasibility of ecotourism and related sustainable development projects, developing business strategies and plans, and securing financing for them. A former Vice-Chairman of The International Ecotourism Society (TIES) and author of *The Economics and Financing of Ecotourism* (TIES, 2001) and *U.S. Ecotourism Market* (World Tourism Organization, 2002), Sanders is a founding partner, business planner, and investment recruiter for a 13,000-acre conservation and ecotourism project in Belize. He is a former Associate Director of the President's Office of Management and Budget and Staff Director of the U.S. Senate Foreign Relations Committee. Sanders has a PhD in economics from Yale University and attended the Advanced Management Program at the Harvard Business School.

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### John D. Peine

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James Speth's new book, *The Bridge at the Edge of the World: Capitalism, the Environment, and Crossing from Crisis to Sustainability*, was an epiphany for me. As a scientist with the United States Department of the Interior for over 35 years, serving seven administrations, I have been shocked and saddened by the rapid degradation of the environment since the first Earth Day observance. This book has helped me by sorting out the primary drivers of this decline and identifying the fundamental changes that are required to turn things around. It is an optimistic view of the future, which is an oddity in itself.

The core premise is that traditional capitalism, dominated by global corporations, is driving the rate of environmental change. The conundrum is figuring out what will replace traditional capitalism. The recommended concepts for change are fundamental and daunting. Transformative change is driven by evolving social values and institutional dynamics and explored in many dimensions. Speth considers environmental threats to be of universal social concern and cites several authors who suggest that the inability of capitalism as we know it to sustain the environment is one of the biggest threats to its future. He extensively discusses the platforms to coalesce this

change, with a focus on the exploding information age universally facilitated via the Internet. We are witnessing its impacts today in the United States, with increasing democratization of national politics and growing awareness of the inefficiency and imbalance of governance. The now cliché slogan "think globally, act locally" remains a central tenet to build momentum. The book cites numerous examples and calls for a revolution in personal consciousness evolving into a new worldview. The following quote encapsulates Speth's call for refocusing our social values.

The values shift of cultural turning leads us to redefine wealth—to measure it by the health of our families, communities, and natural environment. It leads us from policies that raise those at the top to policies that raise those at the bottom, from hoarding to sharing, from concentrated to distributed ownership, and from the rights of ownership to the responsibilities of stewardship (Korten, 2006).

The most important of Speth's messages is how to navigate moving forward. He notes forces of change by synthesizing literature that focuses more on a collection of theories rather than on specific case examples and I found this tendency to be a weakness throughout. He observes that these forces are complementary and contribute to a new worldview. In the section "Getting There from Here," Speth advocates moving environmental concerns into the broader context of social issues and demonstrating their connectivity. He advocates a new environmental political strategy that encompasses other issues. This worldview implies that somehow environmental conditions need to become a precondition of a global sustainable society. New signs of change are recognized, but no magic bullet is offered to drive a drastic shift in perspective. Corporate greening is a hopeful sign of a changing customer base as documented in the book. This trend of designing green helps the corporate image, serves a growing customer base, and appropriately is driven by enhancing the bottom line. This process is being emulated in the financial sector as well. The catch phrase "corporate social responsibility" is now widely accepted. Speth documents the skepticism that some commentators express regarding such commitments and the sense that motivation derives primarily from government action rather than new forms of corporate consciousness. Several suggestions are offered to transform corporations of the future, the most fundamental/radical of which is to transition away from the premise of focusing on self-interest and maximizing stakeholder wealth. This is



the heart of the radical change proposed, which presents the theory that environmental problems are the central driver of corporate change and that we are entering an era of systematic crisis. This is the jaw dropper in the book for me!

So are we approaching a tipping point in which our global society has concluded that the sacrifice needed to achieve environmental sustainability is worth it? Can Aldo Leopold, as quoted in the book, again be an icon for inspiration and change? Certainly there is a growing sensitivity to weather events and climatic trends leading to extensive environmental and infrastructure destruction. Contemporary climatic conditions and extreme weather events in the United States, for instance, have led to drought and thousands of related wildfires in the Western states and extensive flooding and numerous tornadoes in the Midwest. The North Pole may be ice free for the first time in recorded history. A just-announced US\$1.75 billion purchase of 187,000 acres of a sugar plantation north of the Everglades National Park is hailed as a triumph for the environment even though some climate-change models predict that sea-level rise will inundate it in the future. Until carbon-dioxide emissions are dramatically reduced globally, this Florida deal has not been closed. Did I mention a pending potable water shortage? That will make high gas prices look like child's play.

One of the book's most compelling features is that it serves as a guide to key literature; hundreds of citations are included for those of us inclined to explore further the issues raised. Some may find this book full of radical ideas, but I see it as a guide for moving toward cultural, social, and environmental equity that could in turn lead to balanced sustainability in the planet's future. Speth did the impossible; he made me an optimist! Thank you, sir!

Looking for a holistic perspective on global environmental conditions, insights into the factors driving drastic degradation, and samples of the key building blocks for achieving sustainability? Read this book! I am making sure all my graduate students read my copy. They represent a generation of optimists determined to correct my baby-boomer generation's numerous mistakes. They will be among those leading in the walk over Speth's "bridge at the edge of the world." That makes me feel a bit ashamed, but also warm and fuzzy inside.

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## About the Author

John Peine is a social scientist with the United States Geological Survey stationed at the University of Tennessee in Knoxville. From 1982–1992, he served as the Chief Scientist at Great Smoky Mountains National Park. He is the editor of and contributor to the 1999 book *Ecosystem Management for Sustainability: Principles and Practices Illustrated by a Regional Biosphere Reserve Cooperative*. More recently he contributed to the books *A Land Imperiled: The Declining Health of the Southern Appalachian Bioregion* (2005) and *Conservation of Rare and Little Known Species: Biological, Social, and Economic Considerations* (2007). A member of the IUCN World Commission on Protected Areas–Mountain Group, his current research focuses on leadership in ecosystem management, documenting best environmental sustainability practices, and environmental inventory and monitoring in the Appalachian highlands.

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## Rejoinder from the author James Gustave Speth

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I am deeply grateful for the three constructive and generally sympathetic reviews of *The Bridge at the Edge of the World*. They span a spectrum from "this porridge is too hot" (Sanders) to "this porridge is too cold" (Vergragt & Brown) and include one where the porridge is "just right" (Peine), or almost so.

Several months of discussing the book with various audiences have underscored that while despair in the face of our multiple challenges is certainly not pervasive, it is quite common. I was particularly gratified, therefore, that Peine was impressed by the book's underlying optimism. We can indeed build a better world, but it will require a level of effort, risk, and sacrifice to which we are not now aspiring. As I mention in the book, we will never do the things needed unless we appreciate the full extent of our current predicament.

Peine has a good point that my book does not dwell on describing real world examples of people actually making changes that point the way. Two excellent books have surveyed that landscape, William Greider's *The Soul of Capitalism* and Gar Alperovitz's *America Beyond Capitalism*, and I felt that I had little to add to them.

Sanders is also optimistic, but his optimism is more for the present than mine. He still has hope that today's environmentalism can deliver the changes needed. We have now run a 40-year experiment to test that hypothesis, and the results are in. The environmental community in and out of government has

grown larger and more sophisticated, but the environment has continued to go downhill, to the point that we now face environmental risks of unprecedented proportions. The burden of managing accumulating environmental threats, and of addressing the powerful forces of modern capitalism driving them, has fallen to the environmental community. But that burden is too great. The system of modern capitalism as it operates today will grow in size and complexity and will generate ever-larger environmental consequences, outstripping efforts to cope with them. That has been the pattern to date, and there is no reason to expect it to change.

Sanders' optimism stems from his view that "when high priority environmental problems have been identified and targeted, they have usually been ameliorated through appropriate technologies and policies." But a virtual armada of environmental threats has been identified and never targeted, and while there has surely been amelioration on numerous fronts, it is very incomplete and unsatisfactory, and this is true even where our laws are strongest, as with air and water pollution.

Sanders also adheres to the conventional wisdom that a growing economy will facilitate public support for social and environmental needs, whereas "a shrinking economy...would make reallocating funds to meet these and other priorities vastly more difficult." It is easy to forget that the greatest public support for social reform in America occurred not during a period of great prosperity but during the Great Depression, and that growth has been sought historically not to deal with social challenges but to avoid confronting them. We have often heard it said that growth is the alternative to having to face the distribution issue. And so we have had lots of growth, and we have not faced the distribution issue, with disastrous results.

As I discuss at some length in the book, the United States has experienced tremendous economic expansion in recent decades, for which we have paid a high environmental price, but today we have poverty rates near a thirty-year high, stagnant wages despite rising productivity, declining social mobility and opportunity, record levels of people without health insurance, failing schools, increased job insecurity, swelling jails, shrinking safety nets, and the longest work hours among the rich countries. I show in the book that America's growth dividend has not been spent to improve our performance on social or environmental issues, with the result that we rank far down the list of nations on both scores.

Here is what I would say to my fellow liberals who hold to the we-must-sustain-high-rates-of-growth persuasion: make a list of all the positive things you wish to do with the resources generated by

growth, and rather than waiting on the growth, let's just do them. In truth, the resources for these actions are already available, abundantly; they are simply being misallocated.

All we have to do to destroy the planet's climate and biota and leave a ruined world to our children and grandchildren is to persist in exactly what we are doing today, even with no growth in the human population or the world economy. Just continue to release greenhouse gases at current rates, just continue to impoverish ecosystems and release toxic chemicals, and the world in the latter part of this century won't be fit to live in.

But human activities are not holding at current levels: They are accelerating dramatically. It took all of history to build the US\$7 trillion world economy of 1950. Today, we add that much output every decade. The world economy is on a path to quadruple in size by midcentury. The escalating processes of climate disruption, toxification, and biotic impoverishment, which continue despite decades of warnings and earnest effort, constitute a severe indictment of today's capitalism.

Vergragt & Brown are complimentary on numerous matters, but fault the book for not saying more about the shape of things to come: "Speth's book is a step in the right direction, but when it comes to building the bridge at the edge of the world it only provides us with an unsorted heap of building materials." Ouch, that hurts. It hurts in part because it is not true. The building materials for the bridge we need are actually very carefully sorted. Market failure can be corrected by government, perverse subsidies can be eliminated, and environmentally honest prices can be forged. The laws, incentives, and governance structures under which corporations operate can be transformed to move from shareholder primacy to stakeholder primacy. The affluent countries can shift to a post-growth society where jobs and economic security, the natural environment, our communities, and the public sector are no longer sacrificed in order to sustain high growth rates—mere gross-domestic-product growth that is consuming natural and social capital, both now in short supply. An ethic of sufficiency can moderate consumption and both government policy and social marketing can help us recover from our affluenza. Each of these new directions are the focus of a chapter.

That said, it is true that the book does not bring these elements together into a holistic vision or detailed blueprint. I would be among the first to agree that much, much more needs to be done—more on analysis, on envisioning, and on strategy. My hope is that the book will help to legitimize a set of issues and ideas barely present in mainstream environmental policy and politics in the United States, to

point honestly to the changes needed, and to stimulate a sea change in today's mainstream environmentalism and its engagement with other communities. I shall be very happy if the book contributes meaningfully to these ends. But it is important to round the bases in the right order.

Vergragt & Brown reflect an academic bent to characterize "getting the values of pollution caps and resource harvests right, taxing undesirable activities, eliminating perverse subsidies, implementing the polluter pays principle and cap-and-trade systems, and changing how we calculate gross domestic product (GDP) to account for human welfare, good jobs, health services, education and the like," as well as the move to a post-growth society, as "twentieth-century" environmentalism and to conclude that such an agenda "neatly fits into the existing capitalist system." Only in academia is this path well travelled, and growth gets a free pass even in academia. Were this path *truly* well travelled as a practical matter in politics and policy, we would not have today's environmentally dishonest prices and wrongheaded measurements. Moreover, while market corrections can fit (though not always neatly) within the framework of neoclassical economics, that is very different from fitting within the system of political economy we know as American capitalism. There, one finds massive, and successful, resistance to eliminating negative externalities and perverse subsidies. There one also finds, of course, a powerful growth imperative.

Vergragt & Brown give insufficient credit, I believe, to the material on a new consciousness and a new politics in Part III of the book. The chapter on consciousness describes what it will likely take to bring about a large-scale change in dominant cultural values. The chapter on politics begins with the observation that it is unimaginable that American politics as we know it will deliver the transformative changes needed, and it goes on to lay out a program for far-reaching change in environmental politics.

One of the key points in the book is that today's environmental reality is linked powerfully with other realities, including growing social inequality and neglect and the erosion of democratic governance and popular control. So my conclusion is that we as citizens must now mobilize our spiritual and political resources for transformative change on all three fronts. Our best hope for real change is a fusion of those concerned about environmental sustainability, social justice, and political democracy into one powerful progressive force. The vital political task before us is to build this progressive fusion.