

# Sustainability: Virtuous or Vulgar?

JOHN A. VUCETICH AND MICHAEL P. NELSON

*Progress in understanding and achieving sustainability requires addressing it as both a scientific and an ethical issue. If sustainability is defined as “meeting human needs in a socially just manner without depriving ecosystems of their health,” most of the words in its definition are normative or value laden. Depending on how critical normative terms such as “human needs” and “ecosystem health” are defined, sustainability could mean anything from “exploit as much as desired without infringing on the future ability to exploit as much as desired” to “exploit as little as necessary to maintain a meaningful life.” We suggest that there are five key areas of sustainability. By examining how recent university cluster hires in sustainability compare with these five areas, we show not only how hiring has been radically lopsided but also how ethics has been entirely ignored. Lack of attention to the ethical dimension of sustainability is stifling progress toward sustainability.*

*Keywords: anthropocentrism, ecosystem health, environmental ethics, sustainable harvest, virtue ethics*

**A**chieving sustainability has become a central issue of our time. Aside from the challenges of how we can become sustainable, contention continues to simmer over basic issues such as what it even means to be sustainable, and what new knowledge is required to become sustainable. One manifestation of this contention is the exclusive manner in which various academic quarters sometimes portray the nature of sustainability: Too many environmental scientists think sustainability is primarily about documenting and protecting ecosystem health, whereas too many engineers think sustainability is primarily about more efficiently meeting human needs.

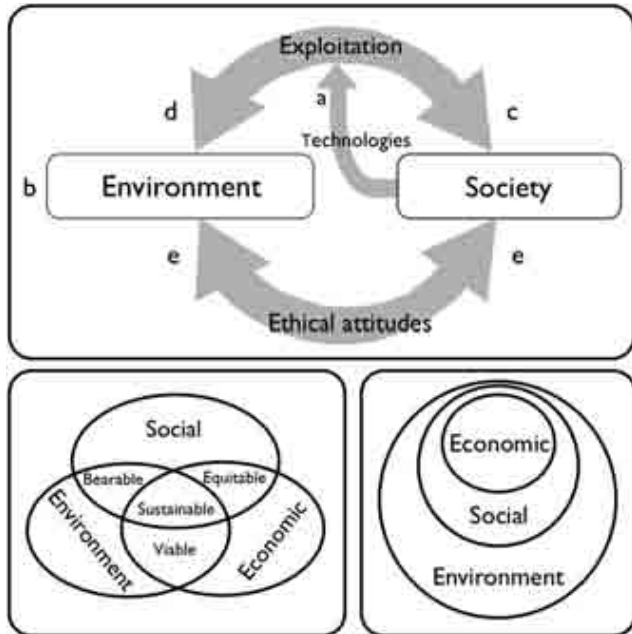
Sustainability scholars continue to debate whether sustainability is more about economics, ecology, or social science (e.g., Ott 2003, Adams 2006). This debate, however, has almost entirely neglected a fundamental dimension of sustainability: the ethical dimension. Exclusive perspectives and a lack of concern for ethical issues can be ameliorated by considering sustainability as a framework that would begin by defining sustainability as “meeting human needs in a socially just manner without depriving ecosystems of their health.” This framework builds upon existing notions of sustainability inasmuch as this definition is closely related to other widely appreciated definitions of sustainability (e.g., WCED 1987, Callicott and Mumford 1997, NRC 1999). The framework arising from this definition is composed of five critical dimensions (see figure 1):

a. Development of efficient technologies and markets for meeting human needs, which is generally the purview of engineering, physical science, biotechnology, economics, and business;

- b. Understanding the state and nature of ecosystems, which is generally the purview of ecology and environmental science;
- c. Understanding how exploitation affects ecosystems, which is generally the purview of applied ecology and environmental science;
- d. Understanding how exploitation affects human cultures, which is generally the purview of sociology, political science, policy, law, anthropology, and the arts and humanities;
- e. Understanding the meaning of normative concepts such as human needs, socially just, depriving, and ecosystem health, which is generally the purview of ethics and philosophy.

Dimensions (b) and (c) in practice are closely related, and many researchers would self-identify with both dimensions. Also, a more detailed framework might further specify dimension (b) by, for example, prioritizing the subdisciplines, taxa, and geographic regions most important for understanding sustainability. One could also argue that another significant dimension of sustainability includes the fields of basic human medicine and psychology. These fields of inquiry are necessary to understand human needs, much the same way that dimension (b) is necessary for understanding ecosystem health.

This framework highlights how every academic discipline is necessary for realizing sustainability. The nature of the first four dimensions of sustainability are (we hope) self-evident, but the last dimension—the ethical dimension—requires some explanation. Although fields such as sociology and political science provide descriptive (i.e., scientific) accounts of how values relate to sustainability, they do not evaluate,



**Figure 1.** Sustainability is essentially the relationship between the environment and society. That relationship involves a physical aspect (exploitation) and an ethical attitude (upper panel). The relationship is affected by (a) our technologies, (b) understanding of the environment, (c) understanding how exploitation affects society, (d) understanding how exploitation affects the environment, and (e) how we understand our ethical attitudes about ourselves and nature. History provides plenty of evidence that dimensions (a)–(d) are inadequate for achieving sustainability. Ethical attitudes are a critical aspect of any relationship involving humans (e), and are the neglected dimension of sustainability. This model emphasizes that technology is conceptually secondary to exploitation, determining only our capability and efficiency of exploitation. Ethics determines how we use technologies. Previous conceptual models of sustainability (lower panels; Ott 2003, Adams 2006) are silent about the role of technology, which has become a central focus, and ethics, which ought to become a central focus.

for example, the logic, consistency, and robustness of the normative concepts upon which sustainability rests. Among academics, such evaluation is the purview of ethics.

Without developing the ethical dimension of sustainability, we will never even know what sustainability means, and will therefore be ignorant about how to achieve it. For example, consider the concepts of human needs and ecosystem health. Depending on how societies understand these concepts, sustainability could mean anything from “exploit as much as desired without infringing on future ability to exploit as much as desired” to “exploit as little as necessary to maintain a meaningful life.” These two attitudes seem to represent wildly different worlds—one might be called vulgar sustainability and the other virtuous—yet either could be considered

“sustainable,” depending on the meaning of the normative concepts that define sustainability. Ultimately, 7 of the 11 words (excluding articles) in our definition of sustainability are tied to fundamentally normative concepts.

Indeed, society will never come to an eternal consensus about the meanings of normative terms that comprise sustainability. This circumstance recalls contention about the concept of justice. Our understandings of justice are varied, indefinite, and evolving. However, by continuing to tend its meaning at all levels of society (i.e., academics, professionals, politicians, and the general public), we have developed viable legal systems that evolve with societies’ conceptions of justice. Achieving sustainability requires tending its ethical dimension across all levels of society, even though we cannot ever expect to arrive at a final determination of its meaning.

With these principles in mind, consider a specific (and narrow) illustration: the sustainable harvest of ungulate populations in North America. In this case, the human need (or perhaps merely desire) may be to maximize the harvestable surplus for an indefinite period of time. Moreover, the most common notion of a healthy ungulate population is one with a skewed sex ratio and young age structure, which lives on a landscape that produces enough vegetation to yield the largest possible harvestable surplus of ungulates. That is, population health is defined in terms of human needs or desires. However, other reasonable notions for population health of an ungulate population entail “more natural” conditions, such as balanced sex ratios, age structures, and abundances that are temporally dynamic and include older individuals; vegetative communities that support fewer ungulates; and wolves, whose viability requires us to share some of the “harvestable surplus.”

These principles also apply to our most general concerns about sustainability. For example, in recent years, humans have produced and used something close to 12 terawatts (TW) of energy annually. Are Earth’s ecosystems healthy if they continue to produce 12 TW of electricity, or if they possess an undiminished variety of flourishing habitats and species, but perhaps cannot produce 12 TW of energy? Does human need define ecosystem health, or does ecosystem health define the limits of human need?

Although many scientists and engineers consider these issues intractable and distracting, they represent critical obstacles to achieving sustainability. Moreover, these are issues that ethicists are trained to handle and to which others from the humanities would have much to contribute.

Essentially, we do not understand the extent to which sustainability represents an anthropocentric or non-anthropocentric attitude. Do we care about ecosystem health because ecosystems are intrinsically valuable, or do we care about ecosystem health only because it serves human interests? Many scientists and engineers are certain that sustainability is an anthropocentric concern. That certitude may be misplaced, as many of our colleagues in the humanities have offered rigorous, well-reasoned explanations for what nonanthropocentrism is and why it is essential for conservation (Plumwood 1993). For a gentle introduction to these

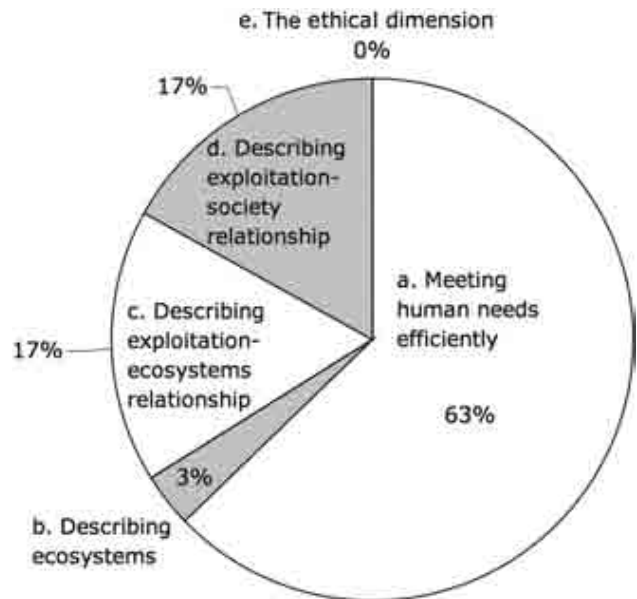
topics, see Callicott (2006) and Goralnik and Nelson (2010). Embarrassingly, most scientists and engineers are almost entirely unaware of these explanations.

We do not suggest that sustainability should be primarily an anthropocentric or nonanthropocentric concern. Our point is that discussion of the issue among all academics is critical to achieving sustainability. It is as important for scientists and engineers to know these arguments as it is for environmental ethicists and philosophers to know the basic principles underlying climate change, habitat destruction, and species extinctions.

Using these five critical dimensions of sustainability, we assessed hiring patterns of universities conducting cluster hires focused on sustainability. We used Google and the keywords “cluster hire,” “sustainability,” and “university” to identify universities that were currently or had recently conducted cluster hires. When university sites did not report the names and areas of expertise of new hires, we contacted the universities directly to request this information. We also asked these contacts and our colleagues about their knowledge of other cluster hires. Additionally, we contacted the Association for the Advancement of Sustainability in Higher Education and the Association for Environmental Studies and Sciences about their knowledge of cluster hires. We did not learn of any cluster hires from these sources that we had not already found through Internet searches. For this reason, we do not think we missed any cluster hires focused on sustainability between 2008 and 2010, and we have not learned of any cluster hires occurring before 2008. The results of our search suggest that university cluster hires focused on sustainability have not evenly represented the dimensions of sustainability and have particularly neglected sustainability’s ethical dimension (see figure 2).

Academia’s general neglect of sustainability’s ethical dimension is also reflected in the National Science Foundation’s Environmental Sustainability program, an interdisciplinary funding program. That program’s 570-word synopsis, found on its Web site, makes no reference to the ethical dimension of sustainability, but concludes: “All proposed research should be driven by engineering principles, and be presented explicitly in an environmental sustainability context.” Moreover, the word “ethic-” appears in the title, keywords, or abstract of just 1 of the 119 projects funded since this program’s inception.

University contributions to sustainability need to include deeply interdisciplinary collaborations. Deep interdisciplinarity involves collaboration among, not merely within, the five dimensions of sustainability. According to this view, deep interdisciplinarity is not represented by, for example, an engineer and an economist working to develop more efficient means of meeting human needs. However, an ecologist researching the ecological effects of biofuel production in coordination with the sociological dimensions of biofuels may be an example of deeply interdisciplinary collaboration, or it may be an example of disciplinary research coordinated to focus on the same problem—a problem defined by



**Figure 2. Recent university cluster hires in sustainability.** The percentage of faculty associated with each dimension (a–e, which correspond to the letters in the upper panel of figure 1) of sustainability hired by several universities in recent initiatives to hire clusters of sustainability faculty. These data represent 59 positions from nine universities. The universities are Cornell University; Iowa State University; Michigan Technological University; Ohio State University; Portland State University; Rochester Institute of Technology; the State University of New York College of Environmental Science and Forestry; University of California, San Diego; and University of New Hampshire.

dimension (a). An example of deep interdisciplinarity would be an ecologist and an ethicist collaborating to better understand the nature of ecosystem health. Another example of deep interdisciplinarity is the collaboration between evolutionary ecologist E. O. Wilson and social scientist Stephen Kellert, which gave rise to the biophilia hypothesis. Such collaboration would be facilitated if university cluster hires were better balanced in terms of the dimensions of sustainability they represent.

#### Where are we, and how did we get here?

The ethical dimension is better understood by considering how literature on the meaning of sustainability has developed over the past three decades. Key developments are summarized in a set of easily accessible papers (e.g., Jamieson 1998, Thompson 2007, Kajikawa 2008). An early development, marked by the phrase “sustainable development,” was the appreciation that sustainability involved concern for both ecosystem health and economic development. From this, a distinction developed between what has come to be known as weak sustainability and strong sustainability (Beckerman 1994, Daly et al. 1995). Weak sustainability is generally concerned with sustaining human welfare, and is

thought to be more commensurable with economic principles. Strong sustainability is generally concerned with sustaining natural capital, and is thought to be more aligned with traditional conservation values. Much of the discourse on the distinction between strong and weak sustainability has sought to assess the logical rigor of each vision and has attempted to anticipate the outcome of adopting one vision or the other (Jamieson 1998, Neumayer 2003, Ayres 2007). This distinction also serves as a vehicle for better understanding how ecosystem health and economic development should relate to one another: Which value is more important? Under what conditions should concern for one value override the other?

Today, sustainability is broadly thought to require valuing not only ecosystem health and economic development but also social justice (e.g., Douglass 1984, Allen and Sachs 1992, Dobson 1999, Kastenhofer and Rammel 2005, Zimmerman 2005, Hay and Mimura 2006, Koehler and Hecht 2006, Rapport 2007). Although the connection between sustainability and social justice is widely appreciated, and although social justice is certainly a worthy ambition, the logical necessity for connecting sustainability and social justice may be yet unspecified (Thompson 2007). Moreover, the meaning of social justice has been defined about as precisely as the meaning of ecosystem health (i.e., not very well). Nevertheless, the essential idea is that a sustainable society cares about social well-being. That is, a sustainable society has concern for poverty, racism, political marginalization, the opportunity to make a livelihood, and how social interactions should be fair and equitable.

As these philosophic aspects of sustainability have developed, they have been eclipsed by an explosion of attention now given to sustainability science (see Kajikawa 2008 for a review). With the domination of sustainability science, philosophers have been evaluating new ideas about the deep nature of sustainability.

One idea is that the most basic framework for understanding sustainability does not rely on understanding the interrelationship between its principal values (ecosystem health, social justice, and human needs); rather, the most basic framework for understanding sustainability may be the interrelationship between its technical and philosophical dimensions. These dimensions were dubbed by Thompson (2007) as the substantive and nonsubstantive aspects of sustainability, respectively. By this assessment, the technical dimension seems valuable for its ability to define problems precisely and to be usefully applied to many specific cases that differ greatly in circumstance (e.g., achieving a sustainable harvest of some particular population, or achieving sustainable water use in some local community). This value is clearly demonstrated by the framework that supports sustainability science (see Kajikawa 2007).

The assessment goes on to conclude that the philosophical dimension, by contrast, seems too general and vague to be usefully applied to any specific problem. In this sense, some philosophers of sustainability seem to explain how

the philosophic aspects of sustainability are not all that important (Thompson 2007, see also Jamieson 1998). This thought is problematic, however, because although it certainly represents a description of how we have been treating sustainability, it does not explain how or why thinking about sustainability in this way is wise (Davison 2001).

Perhaps the appropriate primary distinction is between the “end goals of sustainability” and the “means by which to achieve sustainability” (see also Kothari 1994). Neither aspect can be pursued independently of the other because the two are inextricably entwined. Moreover, this distinction is applicable to the most general and vague discussions about sustainability, and also applicable to the most specific cases of sustainability (e.g., What does it mean to sustainably harvest a particular population? or, What does it mean to sustainably use water in a particular local community?). At every scale, the ethical dimension of sustainability is inescapable (though underappreciated).

Another criticism of the ethical dimension of sustainability is that though it may be useful for characterizing and identifying various philosophic attitudes about sustainability, it is largely unable to effectively motivate sustainable actions or change attitudes about sustainability (Jamieson 1998, Thompson 2007). This belief is also misguided. Once a group or person has determined what the appropriate end goals of sustainability should be, those end goals are, in an important way, the motivations underlying sustainable behavior. The challenge remains as it always has: to assess the appropriateness of various motivations and end goals of sustainability.

Some think that the philosophic dimension of sustainability may be, despite its purpose, of limited value in more deeply understanding the ethical or philosophical aspects of sustainability (Jamieson 1998, Thompson 2007). This criticism rests on the observation that “being sustainable” has become more-or-less synonymous with “being good.” The question, “What does it mean to be good?” has been the central issue of Western ethics for more than two millennia. The concern is that inserting this ancient and enduring question into sustainability discourse offers little assistance in achieving answers (Thompson 2007).

The value of equating “goodness” with “sustainability” is that the meaning of goodness has varied tremendously over time (MacIntyre 1981). In the Homeric period, being good meant being a good warrior, and that involved a set of virtues including bravery and cunningness. For ancient Athenians, being good meant being a good citizen, which Aristotle thought included a set of virtues including temperance and magnanimity. In the Dark Ages, being good meant being subservient to God’s will, and involved virtues like hope, humility, and faith. Today, sustainability defines what it means to be good. Each epoch in our ethical history is associated with different sets of virtues that provided strong, but flexible, guidance as to what it meant to be “good.”

More specifically, sustainability may well be the primary schema for describing and evaluating what it means to be a good person or good society in today’s world. That schema

involves understanding how to balance sustainability's three primary virtues: concern for human needs, ecosystem health, and social justice. The flexibility, universality, and guiding force of sustainability's philosophic dimension lend this approach strength (see also O'Neill et al. 2008). What counts as sustainable or good, even for the most specific management scenario (e.g., harvesting or water use), requires knowing whether proposed management actions satisfy the guiding virtues of sustainability. Being able to make the connection between management and values requires collaboration between science and ethics.

Another recent thought related to sustainability, rising in the wake of science's domination of sustainability, is the mootness of debate over whether sustainability should be derived from anthropocentric or nonanthropocentric values (Norton 1991, 2005). The basis for such thinking is the belief that both sets of values will lead to the same outcome. Moreover, because the moral relevance of humans is not controversial and the moral relevance of the nonhuman world is controversial, we should simply proceed as though we were all anthropocentrists. These perspectives certainly seem to limit the perceived value of assessing the ethical dimension of sustainability in general.

However, many scholars have offered rigorous explanations for why anthropocentrism and nonanthropocentrism represent an important distinction (Callicott 1999, McShane 2007, Nelson 2010). These authors have argued both *why* the goodness of an action rises primarily from the motivation and values that motivate an action, and *how* anthropocentric and nonanthropocentric motivations will lead to profoundly different outcomes. For example, recall that sustainability could mean anything from "exploit as much as desired without infringing on future ability to exploit as much as desired" to "exploit as little as necessary to maintain a meaningful life." These plainly represent different motivations, and they would clearly result in different worlds.

## Conclusion

Perhaps a research priority for sustainability should be providing the knowledge necessary to determine whether we will, or ought to, follow the virtuous or vulgar path of sustainability, or some path in between. Similarly, the academy should commit itself to deeply interdisciplinary research to assess the consequences of deciding whether sustainability should be considered anthropocentric or nonanthropocentric. This goal is no more audacious than trying to achieve sustainability with science and technology alone.

More generally, the sustainability framework we describe (figure 1) is also valuable for placing ethics alongside science and technology in efforts to develop sustainability; highlighting the importance of resolving the extent to which sustainability represents an anthropocentric or nonanthropocentric attitude; helping universities develop strategic plans related to sustainability research initiatives; framing syllabi for general education courses on sustainability and providing a general and practical venue for teaching students how ethics relates

to the real world, which is also an independently appreciated need; and being simple enough to motivate a more enlightened discourse among the general public.

If we attain sustainability, it will not only require critical changes in technology, but also the most profound shift in ethical thought witnessed in the last four centuries. While we devote tremendous resources to develop "sustainable" technologies, ethics remain almost entirely neglected.

## Acknowledgments

We thank Margaret Gale for providing a venue for discussion that fostered some of the ideas in this article, David Shonnard for helpful discussion, Aimee Wilson and Anurag Agrawal for comments on a draft of this article, and the National Science Foundation (DEB-0918247) for financial support. The views expressed here do not necessarily reflect the views of the National Science Foundation.

## References cited

- Adams WM. 2006. The Future of Sustainability: Re-thinking Environment and Development in the Twenty-first Century. Report of the IUCN Renowned Thinkers Meeting, 29–31 January 2006.
- Allen P, Sachs C. 1992. The poverty of sustainability: An analysis of current discourse. *Agriculture and Human Values* 9: 30–37.
- Ayres RU. 2007. On the practical limits to substitution. *Ecological Economics* 61: 115–128.
- Beckerman W. 1994. Sustainable development: Is it a useful concept? *Environmental Values* 3: 191–209.
- Callicott JB. 1999. Intrinsic value in nature: A metaphysical analysis. Pages 239–261 in Callicott JB, ed. *Beyond the Land Ethic*. SUNY Press.
- . 2006. Conservation values and ethics. Pages 111–135 in Groom MJ, Meffe GK, Carroll CR, eds. *Principles of Conservation Biology*. 3rd ed. Sinauer.
- Callicott JB, Mumford K. 1997. Ecological sustainability as a conservation concept. *Conservation Biology* 11: 32–40.
- Daly H, Jacobs M, Skolimowski H. 1995. Discussion of Beckerman's critique of sustainable development. *Environmental Values* 4: 49–70.
- Davison A. 2001. *Technology and the Contested Meanings of Sustainability*. SUNY Press.
- Dobson A. 1999. *Fairness and Futurity: Essays on Environmental Sustainability and Social Justice*. Oxford University Press.
- Douglass GK. 1984. The meanings of agricultural sustainability. Pages 3–29 in Douglass GK, ed. *Agricultural Sustainability in a Changing World Order*. Westview.
- Goralnik L, Nelson MP. 2010. Anthropocentrism. In Callahan D, Chadwick R, Singer P, eds. *Encyclopedia of Applied Ethics*. 2nd ed. Elsevier. Forthcoming.
- Hay J, Mimura N. 2006. Supporting climate change vulnerability and adaptation assessments in the Asia-Pacific region: An example of sustainability science. *Sustainability Science* 1: 23–35.
- Jamieson D. 1998. Sustainability and beyond. *Ecological Economics* 24: 183–192.
- Kajikawa Y. 2008. Research core and framework of sustainability science. *Sustainability Science* 3: 215–239.
- Kastenhofer K, Rammel C. 2005. Obstacles to and potentials of the societal implementation of sustainable development: A comparative analysis of two case studies. *Sustainability: Science, Practice, and Policy* 1: 5–13.
- Koehler DA, Hecht AD. 2006. Sustainability, well being, and environmental protection: Perspectives and recommendations from an Environmental Protection Agency forum. *Sustainability: Science, Practice, and Policy* 2: 22–28.

- Kothari R. 1994. Environment, Technology, and Ethics. Pages 228–237 in Gruen L, Jamieson D, eds. *Reflecting on Nature: Readings in Environmental Philosophy*. Oxford University Press.
- MacIntyre A. 1981. *After Virtue*. University of Notre Dame Press.
- McShane K. 2007. Anthropocentrism vs. nonanthropocentrism: Why should we care? *Environmental Values* 16: 169–185.
- [NRC] National Research Council. 1999. *Our Common Journey: A Transition Toward Sustainability*. National Academy Press.
- Nelson MP. 2010. Teaching holism in environmental ethics. *Environmental Ethics* 32 (Spring): 33–49.
- Neumayer E. 2003. *Weak Versus Strong Sustainability: Exploring the Limits of Two Opposing Paradigms*. 2nd ed. Edward Elgar.
- Norton BG. 1991. *Toward Unity among Environmentalists*. Oxford University Press.
- . 2005. *Sustainability: A Philosophy of Adaptive Ecosystem Management*. University of Chicago Press.
- O'Neill J, Holland A, Light A. 2008. *Environmental Values*. Routledge.
- Ott K. 2003. The case for strong sustainability. Pages 59–64 in Ott K, Thapa PP, eds. *Greifswald's Environmental Ethics*. Steinbecker.
- Plumwood V. 1993. *Feminism and the Mastery of Nature*. Routledge.
- Rapport DJ. 2007. Sustainability science: An ecohealth perspective. *Sustainability Science* 2: 77–84.
- Thompson PB. 2007. Agricultural sustainability: What it is and what it is not. *International Journal of Agricultural Sustainability* 5: 5–16.
- [WCED] World Commission on Environment and Development. 1987. *Our Common Future*. Oxford University Press.
- Zimmerman JB. 2005. EPA's P3—people, prosperity, and the planet—award. *Sustainability: Science, Practice, and Policy* 1: 32–33.

---

*John A. Vucetich (javuceti@mtu.edu) is an assistant professor of population ecology at the School of Forest Resources and Environmental Sciences at Michigan Technological University, in Houghton. He also leads the long-term research on Isle Royale's wolves and moose. Michael P. Nelson (mpnelson@msu.edu) holds a joint appointment as an associate professor of environmental ethics and philosophy at Michigan State University, in the Lyman Briggs College, and in the Departments of Fisheries and Wildlife and of Philosophy. He is also the Isle Royale wolf-moose project's philosopher and historian.*



"Quit complaining about erosion. It's made you look ten years younger."