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ECOSYSTEM HEALTH

Ecosystem health is an instance of the extension of the concept of health beyond its core reference to the optimal state of living organisms. In addition to healthy ecosystems people often speak of healthy economies or a healthy body politic. Health sometimes is called a "thick descriptor" because it integrates a scientifically measurable state or condition with a positive value judgment. In the case of human health a body temperature of 98.6 degrees Fahrenheit and a pulse rate between 60 and 70 beats per minute are healthy, and to be healthy is good. Similarly, the concept of ecosystem health enables conservationists to evaluate, at once scientifically and ethically, the states or conditions of ecosystems.

ORIGINS OF THE CONCEPT

The attempt to articulate the concept of a "healthy" nature was popularized by Aldo Leopold with his notion of land health. Leopold argued on behalf of the preservation of wilderness for the last thirty years of his life, but his arguments changed over the course of those years. In the 1920s his arguments for designated wilderness areas were based on their value as recreational assets. However, in 1941, in his essay "Wilderness as Land Laboratory," Leopold argued that wilderness should be preserved as a measure or "base-datum for . . . land-health" (Nelson/Callicott 2008, p. 93). Evoking the Ancient Greek word *autopoeisis* (literally self-making, more loosely self-renewing), Leopold defined land health as the ability of the land to maintain the capacity for "self-renewal." Some have suggested that Leopold's famous summary moral maxim—"A thing is right when it tends to preserve the integrity, stability, and beauty of the biotic community. It is wrong when it tends otherwise" (Leopold 1949, p. 224–225)—should be read as a call to preserve the health of ecosystems. A close analysis of Leopold's use of the term *beauty* elsewhere in his writings indicates that he used the word to refer to land health. Healthy ecosystems are beautiful ecosystems.

The precedent for this type of argument for wilderness preservation goes back to the early 1930s or even the late 1910s. In a 1916 essay titled "Animal Life as an Asset of National Parks," the ecologists Joseph Grinnell and Tracy Storer went beyond the typical recreation arguments for the preservation of so-called protected areas. Although they seem to be interested mainly in preservation as a means to provide important areas of "scientific research," they at least hint at the object of that research: They refer to untoward human impact as a kind of "disfigurement" (Nelson/Callicott 2008, p. 24) of nature and suggest that in these places there still exists a "finely adjusted balance" (Nelson/Callicott 2008, p. 8) that scientists might study and come to understand. Although Grinnell and Storer never explicitly suggested that protected areas provide a standard of land or ecosystem health, their colleagues in the 1930s did. George Wright saw those areas as a source for healthy wildlife populations.

Ecologists such as Victor Shelford argued for the preservation of certain areas that would "serve among other things to show what natural fluctuations in abundance are like" (Nelson/Callicott 2008, p. 92). Those early twentieth-century ecologists used the terms *natural* and *normal* to mean both a descriptive state of affairs and a positively valuable condition without expressly employing the term *health* and apparently were arguing in favor of the preservation of certain land types (Nelson and Callicott 2008). Early twentieth-century ecology was dominated by the superorganismic paradigm propounded by Frederic E. Clements, who conceived of what later came to be called ecosystems as third-order organisms: Just as multicelled organisms evolved from closely associated single-celled organisms, superorganisms evolved from closely associated multicelled organisms. Because ecosystems were conceived

literally as organisms of the third kind, to think of them in terms of health was not far-fetched.

The superorganismic paradigm no longer dominates ecology. Hence, one must ask whether ecosystems sensibly can be said to be autopoeitic or healthy (or even natural or normal). If they can, what does this imply for human obligations toward ecosystems and for conservation?

Contemporary philosophical issues surrounding the concept of ecosystem health are of two varieties: metaphysical and ethical. First, the two main, and intertwined, metaphysical questions concern the form of the existence of ecosystems. In what way do ecosystems exist: as merely socially constructed and therefore metaphorical entities or as mind-independent and therefore genuine or real entities? In what way is it possible to press the notion of health onto an ecosystem? Are ecosystems healthy in the same way an economy can be said to be healthy (i.e., metaphorically) or in the same way an individual human organism can be said to be healthy (i.e., literally)?

Second, environmental philosophers and ethicists, as well as conservationists, are interested in the notion of ecosystem health for a number of reasons. The concept apparently combines scientific/descriptive elements and evaluative/normative elements. That is, as was noted above, health is both an objective state of a specific entity and a condition that is positively valuable and implies an obligation to act in ways that maintain that state or condition. Hence, interest in ecosystem health is premised on the assumption that if humans can determine what an ecosystem is and determine that an ecosystem can be healthy or unhealthy, along with what its state of health is, they have established a set of obligations to maintain healthy ecosystems.

CRITICISMS

Critics of ecosystem health attack it on both metaphysical and ethical grounds. Some believe that the category ecosystem has no independent reality beyond that created for it by humans and that the notion of ecosystem health therefore is an ontological, ethical, and conservation nonstarter. If ecosystems are a scientific artifact, a useful fiction of ecology constructed by ecologists to isolate parts of nature artificially for scientific study, the notion of health can apply to them in only a metaphorical way. Some of these constructivists believe that health still can serve as an object of environmental management strategies, whereas others do not. Finally, some believe that ecosystems exist in a robust, mind-independent fashion, that they have a good of their own, and that humans can make sense of the notion of ecosystem health in the same way they can make sense of human health.

In their 1993 book *Method in Ecology: Strategies for Conservation,* Kristin Shrader-Frechette and Earl McCoy summarize this dilemma:

> Some researchers have argued that one can measure biotic health by means of factors such as the ability of ecosystems to recover their equilibria after a disturbance; their not losing sensitive species; or their resistance to disease.... Using such factors as indicators of health, however, presupposes accounts of equilibrium or stability that are question-begging and unconfirmed. Ecology has no clear, unambiguous norms for when a community is normal or healthy and, as a consequence, positing a goal for ecological practice is quite difficult. (Shrader-Frechette and McCoy 1993, p. 102)

ECOSYSTEM HEALTH AS A GOAL FOR CONSERVATION

Despite the fact that it is a controversial notion, ecosystem health might be viewed as a worthy goal for conservation. First, many environmental thinkers who comment on the application of health to ecological entities such as ecosystems note that in addition to health describing a purported objective state of affairs, health also comes with a positive value connotation. Thus, there is the assumption that healthy ecosystems are worthy of preservation and unhealthy ones are worthy of restoration. Second, an ecosystem (or watershed, or species, or Leopold's land) is perhaps a more tangible conservation unit than is something such as nature or the biosphere. Therefore, conservation might be more precisely focused than it would be if the preservation of nature were its goal. Third, since it might be possible to describe both a wilderness ecosystem and an agricultural ecosystem as healthy or unhealthy, ecosystem health might provide a way to account for the good of a variety of environments—from the natural to the seminatural. This would allow conservation to avoid charges of elitism and misanthropy. Finally, conservation efforts focused on ecosystem health might facilitate the confluence of anthropocentric environmental efforts such as sustainability and nonanthropocentric or ecocentric efforts such as wilderness preservation. The current natural resource management scheme of ecosystem management may be seen as a direct reaction to the assumption that ecosystems exist in a tangible fashion and that they count morally, although proponents of ecosystem management do not always articulate it in this way.

Apart from the advantages the concept of ecosystem health may offer conservation, it remains to be seen whether that concept can withstand philosophical scrutiny. Philosophers vary widely on whether ecosystems have the necessary qualities such as "a good of their own" that would make sense of the idea of ecosystem health. In her 2004

essay "Ecosystem Health" the philosopher Katie McShane concluded that "ecosystems *are* the kind of thing that can be healthy or unhealthy in a fully literal sense" (p. 245), and in his 1995 essay "The Value of Ecosystem Health," the philosopher J. Baird Callicott argued that "ecosystems may not be so well integrated that they can be thought to form mature, persistent superorganisms . . . the concept of ecosystem health is at best a metaphor, since 'health' may be predicated literally only of organisms" (Holland 1995, p. 347).

The International Society for Ecosystem Health (ISEH) was formed in 1994 to "engage scholars from a variety of fields to transcend the natural, social, and health sciences . . . [and] to encourage the understanding of the critical linkages between human activity, ecological change and health." The society published the journal *Ecosystem Health* from 1998 to 2001 and hosted a number of major international conferences. David J. Rapport, a leading figure in the field, served as both president of the ISEH and editor-in-chief of the journal *Ecosystem Health.*

SEE ALSO *Callicott, J. Baird; Ecology: III. Ecosystems; Economics, Ecological; Land Ethic; Leopold, Aldo; Preservation; Wilderness.*

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