EcoHealth 4, 117–118, 2007
DOI: 10.1007/s10393-007-0106-4

ECOHEALTH

Editorial

Aquatic Ecosystems, Indicators, and Adaptive Management

Pierre Horwitz, Co-Editor

Consortium for Health and Ecology, Edith Cowan University, School of Natural Sciences, Joondalup, Western Australia 6027, Australia

One of the characteristic features of the early issues of the journal *Ecosystem Health*, a predecessor of this one, was the attentiveness given to indicators of ecosystem condition. Much of the focus was on biophysical measures, repeatable and reliable, ones that behaved in a predictable way against a known array of disturbance types. Classes of indicators were erected, most notably *vigor, resilience*, and *organization*, that despite their rather abstracted nature, at least together captured a sense of holism in the management of a target ecosystem. In a more grounded way, vast databases are starting to be assembled, around the globe, and with them a capacity to deal with huge amounts of data, to model ecosystems behavior *real time*.

Elsewhere, and turning up from time to time in articles in *EcoHealth*, have been efforts to demonstrate the centrality of *resilience*, *connectivity*, and *potential* in social ecological systems, and how shifts in them allowed for predictions of systemic response. With them comes a management principle of not eroding the capacity of a system to respond to change. Adaptive management systems, said by some to be built on an understanding of ecosystems as being both uncertain and pluralistic, envision resource development as an experimental process engaged in a constant cycle of hypothesizing, observing, learning, and refining our management approaches. Here again, key parameters (as indicators) likely to be part of cause and effect pathways, are central. Carefully selected and measured, these parameters indicate the degree to which system response is desirable and/or acceptable following the target intervention.

Aquatic systems are a case in point, and relevant here because this issue presents a series of six articles that, together, the convenors claim to be *the next generation* of indicators for wetland condition. For many readers of *EcoHealth*, the convenors may also pose, implicitly, important questions—how well do the articles deal with social ecological systems?

Our calls for integration when dealing with water have grown louder in the last 20 years: across aquatic ecosystems (from headwater drainages and watersheds, to groundwater systems, river flows, estuaries and near coastal environments, and urban water), under one management scheme that recognizes spatial, organizational, and cultural heterogeneity, with a participatory democracy that aims to address poverty and equity. Despite the laudable rhetoric, the world has questionably few examples where integration has not been problematic on one or all of these fronts. Do the articles in this issue adequately represent measures that integrate across areas of biophysical attributes of wetlands, cultural aspects of wetlands and other societal influences, and human health and well-being? How well will they translate once outside North America? We will ask you to be the judge.

Clearly our capacity to measure and understand biophysical and social ecological systems has undergone significant incitement over this period, and arguably we *are* getting better at it. Much less, however, has been our organizational capacity to respond to the messages and warnings that we interpret from indicators.

Published online: May 5, 2007

Correspondence to: Pierre Horwitz, Co-Editor, e-mail: p.horwitz@ecu.edu.au

Better indicators feed the decision-making process in at least two ways. The most common outcome is when indicators provide the organizational impetus to adjust practices to address the symptoms, to mitigate undesirable (and usually biophysical) impacts. Perhaps, at best, the articles in this issue of *EcoHealth* will allow for these types of adjustments, but it is hard to see how they will shift the status quo in terms of resource management issues, beyond business as usual. The second way is for indicator measures to be built into a flexible and adaptive organizational framework, so that their clear messages can ensure a political will to act to address undesirable change through more wholesale redirection of development options. Numerous examples exist of the application of outstanding wetland indicator suites and measurement, with little or no directional change except around the edges. However, cases of indicator systems adequately detecting and reporting on systemic change, and then organizational and political systems responding by translating those into action that addresses systemic causes, are precious few in at least the western/northern world.

Research about our organizational and political capacity to respond appropriately to indicator messages, next generation or not, is lacking. Healthy organizations and healthy political systems of the future will encourage as much research on these aspects as they will on the measurement of indicator parameter suites themselves. And we will be delighted to publish their findings.