

## Editorial

# Looking Forward, Looking Back

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## INTRODUCTION

In the world of managing systems that include both people and nature, the recognition of ecological regimes and the processes that mediate the shift among regimes requires new ways of thinking about management and governance. Last fall, colleagues working at the ARC Center of Excellence for Coral Reef Studies in Australia published a fascinating paper that demonstrates the forward and backward pathways of regime shifts. Bellwood et al. (2006) experimentally forced a regime shift from coral to algal dominance by removing herbivores from the system. They then observed the shift back to the coral state. Their surprising finding was that a fish that was not known as a herbivore was the primary driver in the restoration of the coral state. This demonstration of hysteresis, in which the pathway back is not the same as the one forward, was labeled “sleeping” functional diversity.

Additionally, recognition of alternative regimes requires that managers confront issues of thresholds, desirability, and reversibility in addition to hysteretic behavior. Thresholds are dynamic and difficult to ascertain, because they change as a function of local and global variables. Questions of desirability are contested in many institutional settings and cross scientific, social, economic, and political domains. Undesirable states may be extremely resilient, becoming traps that constrain future options.

Why are these properties so important to managers? Many of the problematic issues of resource management involve regime management. Ecological restoration involves active management that seeks to shift from an undesired regime to a desired one. For example, the large-scale restoration of the Everglades is attempting to move from a suite of undesired regimes, including low breeding populations of wading birds, homogenous vegetation patterns, and lower estuarine productivity,

among others, to those more desired. Similar issues appear in the Grand Canyon, where managers are trying to restore endangered populations of fish, sediment, and temperature regimes. A growing set of experiences indicates that many large-scale restoration projects can proceed only through an adaptive management process because of the inherent uncertainty of system responses. In an adaptive management framework, policies are acknowledged as guesses about system response, and actions are designed to help better understand how the system responds. Generally, ecosystem-scale experimentation is needed to understand how to shift regimes for restoration purposes.

## *Ecology and Society*

As in observed regime shifts in social-ecological systems, we can think about such transitions for this journal. Looking backward, *Ecology and Society* has undergone at least one regime shift in the last decade. Four years ago, the executive board of our publisher, the Resilience Alliance, decided to change the journal's name and shift the focus of its scholarship. This transformation has not been easy or simple. Although our point of view might be considered somewhat paternalistic and biased, we believe that the journal *Ecology and Society* has become an internationally respected, rigorous medium for reporting and understanding the theory and practice of complex social-ecological systems. We are still struggling with ways to evaluate the impact of the journal. Although some rely heavily on ISI's impact factor, many other metrics are finding their way into use, such as Google Scholar and Harzing's “publish or perish” statistics. We used the last two sources to generate statistics for *Ecology and Society* for the period 2004–2007. We have published 216 articles, with 246 citations per year and 4.6 citations per article. Multiple authorship is the norm, with 2.9 authors per paper. The numbers for citation indices for *Ecology and*

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*Society* appear comparable to those of journals like *Ecosystems* and *Ecological Applications*. As of now, the ISI has updated all previously published *Ecology and Society* papers and their aggregate citations, and we are thus fully back in the citations loop.

Furthermore, there has been a recent update of the bibliometric analysis of the knowledge domains “resilience,” “vulnerability,” and “adaptation” within the research activities on human dimensions of global environmental change. The update will appear in our journal in the fall (Janssen 2007) and concerns about 3400 publications produced between 1967 and 2007. It is very inspiring to see that *Ecology and Society* is ranked high on the list (Table 1).

In the early days of open-access Internet journals, part of their appeal was the potential decrease in time to publication. Since the inception of this journal in 1997, the average time from submission to publication has been about 10 months or 300 days. Although it could be improved, this delay is well within industry standards. We are also pleased that we have attracted several new and very qualified scholars to our editorial board.

## THIS ISSUE

*Ecology and Society* has taken a very active role in publishing special features. Indeed, half or so of the articles we publish are part of a thematic grouping focused on a specific topic of interest. As such, new features are opening, and other closing. With this issue, four special features are closing. Two of them, [Scenarios of Global Ecosystem Services](#) and [Strengthening People's Adaptive Capacity for Ecosystem Management and Human Well-Being](#) are products of the Millennium Ecosystem Assessment. In addition, the last contributions to [Restoring Riverine Landscapes](#) and [Scale and Cross-Scale Dynamics: Governance and Information in a Multilevel World](#) are now published. The special features that are currently open, [Crossing Scales and Disciplines to Achieve Forest Sustainability: a Framework for Effective Integrated Modeling](#), [New Methods for Adaptive Water Management](#), [Social Learning in Water Resources Management](#), [Assessing Risks to Wildlife Populations from Multiple Stressors](#), and [Navigating Trade-Offs: Working for Conservation and Development Outcome](#) all have new contributions published in this issue.

Many of the regular articles report on applications and explorations of the concept of resilience. [Marshall and Marshall \(2007\)](#) assess the conceptualization and operationalization of social resilience within fisheries in northern Australia. [Brand and Jax \(2007\)](#) examine the multiple meanings of resilience. [Deco nchat and colleagues \(2007\)](#) discuss the results obtained by using a social-ecological framework to assess rural landscape development. [Gotts \(2007\)](#) discusses the concepts of “resilience” and “panarchy” in global systems analysis. [Loring \(2007\)](#) examines the circus as a model of organizational resilience. [Stow et al. \(2007\)](#) present new methods for quantitative assessment of discontinuities as measures of resilience.

Other articles in this issue report on methods and concepts of ecosystem management. [Chalmers and Fabricius \(2007\)](#) discuss how different ways of knowing can contribute to understanding land-cover change on South Africa's Wild Coast. [Pyke \(2007\)](#) discusses the implications of global priorities for biodiversity and ecosystem services associated with protected areas. [Sanginga et al. \(2007\)](#) discuss the role of social capital and conflict resolution in the management of multiple resource regimes in Uganda. [Kok and colleagues \(2007\)](#) present insights from the development of multiscale participatory scenarios developed for southern Africa and Europe.

Two articles in this issue contribute to our understanding of interdisciplinary training and scholarship. [MacMynowski \(2007\)](#) muses on the nexus of power and knowledge between the social and biophysical sciences, and [Beratan \(2007\)](#) examines a cognition-based view of making in complex systems.

Finally, three articles discuss the emergence of the ecological and societal interactions of human development. [Aguayo and colleagues \(2007\)](#) examine spatial patterns of urban growth in Los Angeles, Chile. [Roedenbeck et al. \(2007\)](#) develop a new approach to understanding the social and ecological impacts of roads within a framework called the “The Rauschholzhausen Agenda.” [Jaeger and colleagues \(2007\)](#) describe how transportation and urban development contribute to landscape changes over time.

In conclusion, we look both backwards and forwards. Looking back, our understanding of the

**Table 1.** The top 10 journals with the largest number of papers (left) and the highest number of citations (right) in the knowledge domains “resilience,” “adaptation,” and “vulnerability” in the database for the period 1977–2007 (from Janssen 2007).

Papers published 1977–2007		Papers cited 1977–2007		
Journal	No. articles	Journal	No. citations (No. articles)	
1	<i>Climatic Change</i>	152	<i>Global Environmental Change</i>	669 (118)
2	<i>Global Environmental Change</i>	118	<i>Climatic Change</i>	639 (152)
3	<i>Ecology and Society</i>	109	<i>Annual Review of Ecology, Evolution and Systematics</i>	531 (8)
4	<i>Ecological Economics</i>	74	<i>Nature</i>	530 (21)
5	<i>Environmental Management</i>	74	<i>Ecosystems</i>	450 (42)
6	<i>Ambio</i>	67	<i>Science</i>	384 (27)
7	<i>Climate Research</i>	65	<i>Ecology and Society</i>	316 (109)
8	<i>Human Ecology</i>	44	<i>Ecological Applications</i>	253 (42)
9	<i>Ecological Applications</i>	42	<i>Ambio</i>	219 (67)
10	<i>Ecosystems</i>	42	<i>Journal of Range Management</i>	196 (11)

concepts and applications of nonlinear changes such as resilience has dramatically increased over the past decade. More is known and documented in this issue about the dynamic complexity of coupled social-ecological systems. We think that *Ecology and Society* has made an impact on scholars and practitioners at the international level in terms of contributing to the science and practice of sustainability. We ask your help in contributing to the scholarship of sustainability, which underlies the hope of our future—for the journal and our planet.

Responses to this article can be read online at:  
<http://www.ecologyandsociety.org/vol12/iss1/art32/responses/>

## LITERATURE CITED

**Aguayo, M. I., T. Wiegand, G. D. Azócar, K. Wiegand, and C. E. Vega.** 2007. Revealing the driving forces of mid-cities urban growth patterns using spatial modeling: a case study of Los Angeles, Chile. *Ecology and Society* 12(1): 13. [online] URL: <http://www.ecologyandsociety.org/vol12/iss1/art13/>.

**Bellwood, D. R., T. P. Hughes, and A. S. Hoey.** 2006. Sleeping functional group drives coral-reef recovery. *Current Biology* 16: 2434–2439.

**Beratan, K. K.** 2007. A cognition-based view of decision processes in complex social-ecological systems. *Ecology and Society* 12(1): 27. [online] URL: <http://www.ecologyandsociety.org/vol12/iss1/art27/>.

**Brand, F. S., and K. Jax.** 2007. Focusing the meaning(s) of resilience: resilience as a descriptive concept and a boundary object. *Ecology and Society* 12(1): 23. [online] URL: <http://www.ecologyandsociety.org/vol12/iss1/art23/>.

**Chalmers, N., and C. Fabricius.** 2007. Expert and generalist local knowledge about land-cover change on South Africa's Wild Coast: Can local ecological knowledge add value to science? *Ecology and Society* 12(1): 10. [online] URL: <http://www.ecologyandsociety.org/vol12/iss1/art10/>.

**Deconchat, M., A. Gibon, A. Cabanettes, G. du Bus de Warnaffe, M. Hewison, E. Garine, A. Gavaland, J.-P. Lacombe, S. Ladet, C. Monteil, A. Ouin, J.-P. Sarthou, A. Sourdril, and G. Balent.** 2007. How to set up a research framework to analyze social-ecological interactive processes in a rural landscape. *Ecology and Society* 12(1): 15. [online] URL: <http://www.ecologyandsociety.org/vol12/iss1/art15/>.

**Gotts, N. M.** 2007. Resilience, panarchy, and world-systems analysis. *Ecology and Society* 12(1): 24. [online] URL: <http://www.ecologyandsociety.org/vol12/iss1/art24/>.

**Jaeger, J. A. G., H.-G. Schwarz-von Raumer, H. Esswein, M. Müller, and M. Schmidt-Lüttmann.** 2007. Time series of landscape fragmentation caused by transportation infrastructure and urban development: a case study from Baden-Württemberg, Germany. *Ecology and Society* 12(1): 22. [online] URL: <http://www.ecologyandsociety.org/vol12/iss1/art22/>.

**Janssen, M. A.** 2007. An update on the scholarly networks on resilience, vulnerability, and adaptation within the human dimensions of global environmental change. *Ecology and Society*, forthcoming.

**Kok, K., R. Biggs, and M. Zurek.** 2007. Methods for developing multiscale participatory scenarios: insights from southern Africa and Europe. *Ecology and Society* 13(1): 8. [online] URL: <http://www.ecologyandsociety.org/vol12/iss1/art8/>.

**Loring, P. A.** 2007. The most resilient show on earth: the circus as a model for viewing identity, change, and chaos. *Ecology and Society* 12(1): 9. [online] URL: <http://www.ecologyandsociety.org/vol12/iss1/art9/>.

**MacMynowski, D. P.** 2007. Pausing at the brink of interdisciplinarity: power and knowledge at the meeting of social and biophysical science. *Ecology and Society* 12(1): 20. [online] URL: <http://www.ecologyandsociety.org/vol12/iss1/art20/>.

**Marshall, N. A., and P. A. Marshall.** 2007. Conceptualizing and operationalizing social resilience within commercial fisheries in northern Australia. *Ecology and Society* 12(1): 1. [online] URL: <http://www.ecologyandsociety.org/vol12/iss1/art1/>.

**Pyke, C. R.** 2007. The implications of global priorities for biodiversity and ecosystem services associated with protected areas. *Ecology and Society* 12(1): 4. [online] URL: <http://www.ecologyandsociety.org/vol12/iss1/art4/>.

**Roedenbeck, I. A., L. Fahrig, C. S. Findlay, J. E. Houlahan, J. A. G. Jaeger, N. Klar, S. Kramer-Schadt, and E. A. Van der Grift.** 2007. The Rauschholzhausen agenda for road ecology. *Ecology and Society* 12(1): 11. [online] URL: <http://www.ecologyandsociety.org/vol12/iss1/art11/>.

**Sanginga, P. C., R. N. Kamugisha, and A. M. Martin.** 2007. The dynamics of social capital and conflict management in multiple resource regimes: a case of the southwestern highlands of Uganda. *Ecology and Society* 12(1): 6. [online] URL: <http://www.ecologyandsociety.org/vol12/iss1/art6/>.

**Stow, C., C. R. Allen, and A. S. Garmestani.** 2007. Evaluating discontinuities in complex systems: toward quantitative measures of resilience. *Ecology and Society* 12(1): 26. [online] URL: <http://www.ecologyandsociety.org/vol12/iss1/art26/>.