

Profiles

Championing Ecosystem Sustainability and Health: Profile and Tribute to the Life and Work of James Kay (1954–2004)

David Waltner-Toews,^{1,6} Martin J. Bunch,^{2,6} Cynthia Neudoerffer,^{3,6} Margot Parkes,^{4,6} and Henry David Venema^{5,6}

¹Department of Population Medicine, University of Guelph, Guelph, Ontario N1G 2W1, Canada

²Faculty of Environmental Studies, York University, Toronto, Ontario, Canada

³School of Environmental Design and Rural Development, University of Guelph, Guelph, Ontario, Canada

⁴Division of Ecology and Health, John A. Burns School of Medicine, University of Hawaii, Honolulu, HI

⁵International Institute for Sustainable Development, Winnipeg, Manitoba, Canada

⁶Network for Ecosystem Sustainability and Health, <http://www.nesh.ca>

Abstract: The past decade has seen considerable developments in the integrated study of ecosystem sustainability and health. Important developments in theory, methods, and application of this area have emerged from the work of key individuals and informal, multidisciplinary networks of peers working across continents and countries and based in governments, universities, and private organizations. This profile focuses in particular on the critical influence of James Kay as a key advocate and intellectual champion for incorporating complexity and uncertainty into the “Ecosystem approach.” The intent is to provide an overview of an important era in the application of this approach to address health and sustainability concerns and to highlight the frameworks, methods, and networks that have emerged as collective acknowledgments to the life and work of James Kay (1954–2004).

Key words: ecosystem approaches, complexity, health, networks, Dirk Gently

BACKGROUND

The early- to mid-1990s were heady days for environmental researchers in Canada. The country’s three major granting councils—The Natural Sciences and Engineering (NSERC), Social Sciences and Humanities (SSHRC), and Medical Research (MRC) Councils—were given a mandate to jointly administer a new Eco-Research Program. Proposals were to be large, inter- and trans-disciplinary, and simultaneously address the concerns of all three councils. At

about the same time, Canada’s International Development Research Centre (IDRC) was re-inventing itself as the premier international research agency devoted solely to issues of sustainable development in the developing countries of the south. These unprecedented experiments in new modes of research were to have profound impacts on individual scholars, as well as the research community as a whole, in Canada and globally.

Responding to the collaborative challenge, many investigators were pulled far outside the comfort zone of their traditional training and theoretical frameworks. As a case in point, David Waltner-Toews, trained as a quantitative epidemiologist and veterinarian, became a principle

investigator of the Tri-Council-funded agroecosystem health project in Canada, and collaborator on IDRC-funded ecosystems and health projects in Nepal, Kenya, and Peru. A recurring challenge was the need for a clearer theoretical basis to inform and refine the early attempts at integrative research and practice (Smit et al., 1998; Walter-Toews and Wall, 1997). James Kay, a professor at the University of Waterloo and world leader in research into the thermodynamics of ecosystems, was among the scholars exploring the link between theory and practice. An exquisite physicist and theoretician on complexity and thermodynamics, his early work with Eric Schneider on the thermodynamics of ecosystems was featured as a cover story in the *New Scientist*, and was followed by work that some have judged to be of Nobel Prize quality (see Kay, 1991; Kay and Schneider, 1994; Kay, 2000). It was his passion for exploring the practical implications of complexity theory, and for facilitating relationships among scholars who might never otherwise cross paths, however, that led many of us to his door.

Among the more important outcomes of the Tri-Council and IDRC programs was a dissatisfaction among scholars and practitioners in public health, environmental sciences, and sustainable development with the conventional institutional structures for research; they did not seem commensurate to the task of fostering the kind of integrative research and practice required. Both within Canada and internationally, there began to emerge networks of scholars and practitioners, comprising a kind of globalized, publicly engaged parallel university system. James Kay served as an important catalyst and recruiter for one such network that provided an important forum for future developments in ecosystem approaches to health and sustainability.

THE DIRK GENTLY GANG: THE SCHOLARLY SETTING

The Dirk Gently Gang is an ad hoc international group of scholars studying uncertainty, complexity, and managing for sustainability, particularly in relation to environmental and public health policy. As a scholarly network, this group of colleagues has met in Costa Rica, Canada, Colombia, Italy, Sweden, and the United States—indeed whenever and wherever an occasion could be found. The members of the “Gang” encompass a wide range of theoretical experience and practical expertise, including public health and epide-

miology, complexity and energy, risk assessment, economics, public policy, research design, and environmental management. With working homes in universities and small nongovernment agencies, as well as international organizations like the United Nations and the European Commission, the network addresses a range of substantive issues related to sustainability in agriculture, public health, natural resource management, and relationships between science, public policy, and public engagement. Theoretical issues and questions tabled at Dirk Gently Gang meetings and addressed by the network at large include:

- integration across scales;
- synthesis of different types of analysis and epistemological perspectives into narratives;
- characterization and identification of system attractors, especially description of feedback loops and how these give rise to emergent behavior;
- promotion of desirable self-organizing and resilient systems, and
- escape from situations of perverse resilience.

An earlier moniker for the group, the Cali Cartel, named after the working place for one of the members, created some traveling problems at international borders. A defining event for this group of colleagues and its future name was a memorable meeting at La Faloria Convent in Cortina, in the Italian Alps. People flew in from around the world with no clear agenda and no committed funds; the only sponsor was an Italian wine-maker who agreed to provide wine. Just as Dirk Gently, the fictional detective created by Douglas Adams, the Gang intended to “solve the whole crime, to find the whole person, to find the whole solution” to our global problems. The group was served pasta and heavenly Italian wine by the nuns, read poetry, argued complex systems theories, and explored the reasons for epidemics and the nature of agricultural development—in what was widely hailed as one of the greatest scientific experiences of their lives. When it was suggested that they might call themselves the Dirk Gently Group, James Kay, with typical impishness, insisted on referring to them as the Dirk Gently Gang.

While the work of the Gang continues as a self-organizing network, several specific institutional structures have emerged to deal with slightly different issues. NUSAP (acronym for Numeral Unit Spread Assessment Pedigree. Notational system developed by Silvio Funtowicz and Jerry Ravetz to better manage and communicate uncertainty in

science for policy [<http://www.nusap.net>] was organized to bring together and disseminate information on Post-Normal (publicly engaged) Science and a “robust science for sustainability.” Liphe4 (acronym for Learning; Individualities; Producing; Holarchic; E⁴—Essences, Experiences, Expected behaviors, Established mechanical systems [<http://www.liphe4.org>]) is a nonprofit scientific association dealing with “the development and application of innovative approaches and analytical tools.” It aims at a participatory quality control of the selection and discussion of relevant scenarios and strategies for sustainable development. The Network for Ecosystem Sustainability and Health (<http://www.nesh.ca>) has focused on developing the theory and practice of community-based ecosystem approaches to managing for sustainable health, environment, agriculture, and development.

NESH: NETWORK FOR ECOSYSTEM SUSTAINABILITY AND HEALTH

In the mid-1990s, James Kay, David Waltner-Toews, and David Cressman, an agronomist and president of the consulting firm Ecologistics, sat down to design a response to the problem of organizational mismatch between the challenges posed by sustainability and the kinds of intellectual and practical work needed to address them. Discussions were held with IDRC about linking the projects in a newly emerging Ecosystem Approaches to Health program, as well as with other researchers and practitioners. A new network of knowledge and practice was envisioned that would bring together cutting-edge theoretical research into complex eco-social systems, with the most immediate and urgent management and development issues in health, agriculture, and environment. The founders decided that it had to be a network, where knowledge was shared across physical, intellectual, and organizational boundaries, rather than an institute, with its implications of a center from which knowledge would flow. In particular, the network was seen as a way to link and promote a community of research and practice in ecosystem approaches to sustainable development. In this way, it was imagined that the people involved in projects in Kenya, Nepal, Peru, Canada, and elsewhere could share their knowledge, pose questions, disseminate results, and develop new projects.

To this end, with the organizational help of Michelle Boyle, currently at the University of British Columbia, the nonprofit organization, the Network for Ecosystem Sus-

tainability and Health was established. (The current board of NESH is comprised of David Waltner-Toews and Cynthia Neudoerffer [University of Guelph], Martin Bunch [York University], Henry David Venema [International Institute for Sustainable Development], and Margot Parkes [University of Hawaii]. Our members are from all over the world.) The vision that sustains NESH is, “to foster a global vision of sustainable, equitable and enjoyable development while maintaining the health and integrity of ecosystems at the local level.” NESH does this by promoting collaborations, providing educational opportunities, providing peer review, and disseminating the relevant findings of network members both electronically and through traditional publications, meetings, and short courses. Building on his groundbreaking work on thermodynamics, complexity, and ecology, James Kay saw NESH as an unprecedented opportunity to stimulate the development of complex systems theory and, more urgently, its applications to the challenges of fostering local and global sustainable development. The website, which became NESH’s first action item, has large “hidden areas” accessible only to NESH project participants. These hidden areas facilitate collaborative work by automatically tracking revisions to documents and notifying participants of updates as they occur. Within the past few years, NESH has developed partnerships and collaborations with several other networks and organizations, including the International Support Group (<http://www.isglink.org>), Conservation International, the Ecosystems, Climate Change and Health Omnibus Project (<http://www.ECCHO.ca>), and more recently the EcoHealth Network (<http://www.ecohealth.net>). NESH has mounted short courses in different countries, and a new book, based on NESH project and theoretical work, has been published by Cambridge University Press with the NESH imprint (Waltner-Toews, 2004a).

LINKING THEORY, RESEARCH, AND PRACTICE: THE DIAMOND DIAGRAM AND AMESH

During the 1990s, the University of Waterloo’s Faculty of Environmental Studies was one of the most active nodes in the international network for developing sound ecosystem approaches to managing for sustainability. This was in no small measure due to the pioneering work of James Kay and a coterie of graduate students. Coming from a cluster of three geographically-close universities (Guelph, Waterloo, and Wilfrid Laurier), a group of faculty and graduate

students led by James Kay met regularly, creating a “PNS” (Post-Normal Science) colloquium with (usually) no academic points attached to it, and which has continued actively since his death. This informal and uncredited colloquium, a highlight in the graduate career of the students, was an unusually productive forum for debate, learning, and creativity for all participants. In July 2004, at a NESH-sponsored symposium in Montreal celebrating James Kay’s life and work (as part of a conference of the International Society for Ecological Economics), many of these students and ex-students presented work that has grown from the seeds planted in those PNS discussion groups.

When NESH was founded in the 1990s, there was no accepted methodology for tackling the sorts of complex questions being asked of scientists studying sustainability. Hence, much work retreated into engineering, ecological, and epidemiological models that were designed for very different tasks and were incommensurate to the problems being tackled. One of the important products of the PNS colloquia was a heuristic diagram and related set of activities that came to be known as the “diamond diagram” (see Kay et al., 1999, for the theoretical foundation, and see Bunch, 2003; Bunch and Dudyca, 2004; and Venema, 2004, for applications). The diagram (Fig. 1) encapsulates the importance of linking socio-cultural and ecological understanding to arrive at socially agreed-upon scenarios, which can then be used as a basis for public policy and action. As was clear at the International Forum of Ecosystem Approaches to Human Health (Montreal, May 2003, see *Eco-Health*, Volume 1, Supplement 2) this has served as an important guide for both research and environmental management initiatives. Using the diamond diagram as a base, and integrating insights from the IDRC-funded Eco-health projects in Kenya, Nepal, and Peru, NESH members have now developed and tested an Adaptive Methodology for Ecosystem Sustainability and Health (AMESH) (Fig. 2; Waltner-Toews et al., 2004). Unlike many scholarly methods, which rely on using set techniques in a specific order, AMESH focuses on developing a set of guiding principles, guiding questions, associated activities, and measures of quality, for the application of complex systems thinking to community and regional sustainable development programs. This is now being tried out in a variety of sustainable development projects in several parts of the world, including (that we know of) in Canada, Africa, and South Asia.

James Kay died, at 11 PM on May 30, 2004, just a few weeks short of his 50th birthday. He died with his eyes

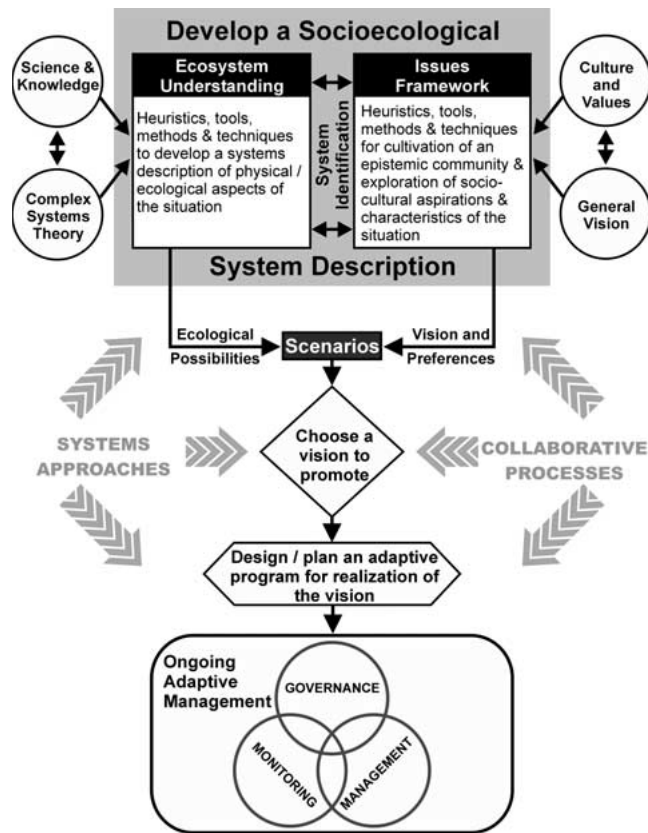


Figure 1. An ecosystem approach framework (Adapted from Kay et al., 1999 in consultation with James Kay. Reprinted by permission. © Geography Publication Series, University of Waterloo, Waterloo, Canada).

open, both literally and figuratively. The achievements and progress outlined here offer a collective tribute to the myriad ways James has fueled, and inspired, our understanding of ecosystem sustainability and health. Yet, in the spirit of James’ appreciation of complexity, a more personal note is warranted within this brief profile of his influence. During the final months of his life, James Kay lamented the fact that there is a lot of work still to be done, and his health problems were preventing him from doing all he would have liked to do. Waltner-Toews (2004b) in his tribute presented at the International Society for Ecological Economics (ISEE) on July 11, 2004, said: “At the beginning of May 2004, I visited him in the hospice shortly after he had moved in. It was an unsettled spring day, with temperatures around 20°C, bits of rain, bits of sunshine. The hospice is in a small gulley, with a wetland nearby, and James had some bird feeders outside his floor-to-ceiling windowed doors. He immediately started talking about energetics, feed availability, and species competition. We watched the young red-winged blackbirds, chipmunks, a

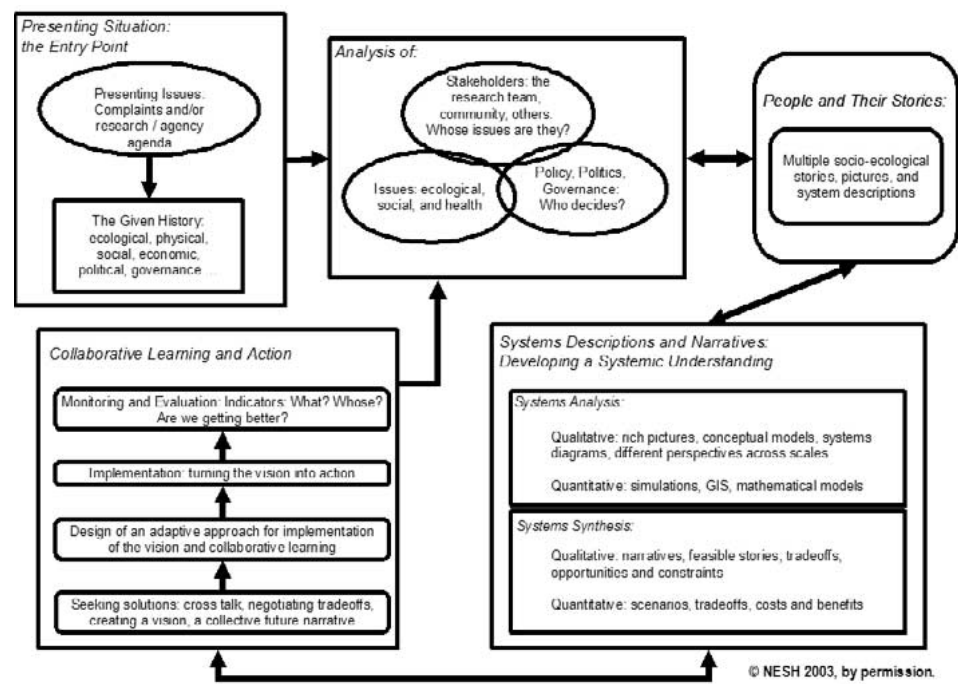


Figure 2. The Adaptive Methodology for Ecosystem Sustainability and Health (AMESH). Reprinted by permission. © NESH 2003.

flock of goldfinches. James was taking pictures with a new digital camera to document the ecology outside his window. The world never ceased to intrigue and amaze him. Until a couple of weeks before he died, he was still debating with geographer and eco-health practitioner Martin Bunch and me the fine details of diagrams of self-organizing system to be included in a book we had been working on, it seems to me, almost forever, entitled *The Ecosystem Approach: Complexity, Uncertainty, and Managing for Sustainability* (Waltner-Toews et al., 2005). The book emerged from a workshop by that name which NESH organized at the International Society for Systems Sciences conference in Toronto, in 2001.”

“Looking over the edge of eternity, James was worried that his work might not amount to what it should, that it would fall short of its potential. On May 19th, just a couple of weeks before he died, I dropped by his hospice on my way home from work, and talked with him over supper, and then we wheeled out to the little wetland and looked at water and listened to the red-winged blackbirds. It’s all going so fast,’ he said. I told him again about how he had connected so many diverse people from so many parts of the world, the marvelous influence he had both intellectually and practically. Only half joking, I think, he told me to keep saying that, as it made him feel better. That night, I went home and worked in the back yard until dark and I had a sore back. I guess I just wanted to feel my body,

knowing how easily it can slip away, how easily, if we let it, this world can slip away from us.”

In spite of his regret at not having finished his work here, James left a rich legacy to us, in terms of books, papers, videos, tapes, intuitions, enthusiasm, contacts, friendships, shared experiences, memories, ongoing projects, and personal example. His website (<http://www.jameskay.ca>), now replicated on the NESH website (<http://www.nesh.ca>), is a treasure of both clear and lateral thinking. James would want us to share it, to use it, to let it multiply in the minds of students and scholars everywhere. It is time for us now, to get out there and do the hard and wonderful work of sustainability and health, not to let it all slip away, this world full of misery and wonder, immense problems and immense resilience. With James’ passing, the world lost a champion of good science, good ecological economics, and good citizenship. But most of all, for many of us on this strange and wonderful journey of life, we lost a traveling companion and a good friend.

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