

# Awards

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## EMINENT ECOLOGIST AWARD



**Crawford S. Holling**

The Eminent Ecologist Award is given in recognition of an outstanding body of ecological work or of sustained contributions of extraordinary merit. The winner of the 1999 Eminent Ecologist Award is Professor Crawford S. (Buzz) Holling of the University of Florida. Buzz Holling is among a handful of living ecologists whose careers are both extraordinary and exemplary. His career is extraordinary because it combines seminal research contributions, innovative applications of ecology and evolution, and visionary leadership. It is exemplary because he has demonstrated the highest standards of creativity and accomplishment in both research and

administration. Throughout his career he has continued to contribute provocative, synthetic ideas that challenge and inspire colleagues of all ages. The wealth and sustainability of his contributions to ecology and its applications to society are perhaps best exemplified by the observation that Buzz is one of those very rare individuals to win both the Mercer Award given to a young scientist in recognition of an outstanding paper in ecology (in 1966) and the Eminent Ecologist Award for a senior scientist to honor a lifetime of achievement in ecology (in 1999).

Buzz began his career as a forest entomologist with the Canadian Department of Forestry in Sault Ste. Marie, Ontario. His early work on predation led to a series of papers, including his 1959 Citation Classic in the *Canadian Entomologist*, developing the notion of functional response, which continues to be a linchpin of modern predator-prey theory. Buzz showed that the simple forms assumed in the theories of Lotka, Volterra, Gause, and Nicholson and Bailey were inadequate to represent the inherent complexity underlying population dynamics, and that a careful analysis of the components of predation led to more appropriate models.

Holling's early work with the Morris Project on the spruce budworm also had a profound effect on his thinking about larger scale issues in ecology. It was clear that no static concept or

model could capture the dynamics of this system. Instead, wide temporal variations seemed to dominate the system, and indeed the system seemed to have adapted to variation. Buzz went further and saw that the system didn't merely cope with variation; it was maintained by variation. This led to his 1973 concept of "resilience" as a product of a long history of wide variation. Resilience is a difficult concept, and it has no proper theory yet. The concept appears to involve at least three time scales: the ecological scale on which ordinary population processes act, the longer scale on which abrupt changes or catastrophes or other wide variations appear, and the still longer evolutionary scale on which many of these large changes appear. Since this early work, Buzz has continued to contribute ideas that illuminate the role of evolution in ecosystem ecology. For example, he was among the first to point out that loss of biodiversity has serious implications for the origins of novelty in ecosystems, and therefore could impact the capacity of ecosystems to respond to new environmental stresses; he has worked to inject this important idea into economics and policy. Most recently, he has introduced the hypothesis that body size distributions of animals are clumped, and that the clump structure is related to a hierarchy of controlling processes, including those that regulate biodiversity. It is too

early to say whether this hypothesis will prove correct, but it is certainly provoking debate and thoughtful empirical research. One can ask no more of an idea early in its ontogeny.

Throughout his career, Buzz has also worked to transpose abstract science to the real temporal and spatial scales of resource management, and this has led to his continuing involvement with social science. During the 1970s he and his colleagues introduced the idea of adaptive environmental management. He recognized that stabilization of yield, the conventional goal of ecosystem management, was doomed to failure because it did not account for changes in the system due to evolution, ecological dynamics, management itself, and the changing social expectations that managers try to satisfy. To be sustainable, management would have to involve experiment, learning, and adaptation. Holling's group pioneered the initial applications of this approach, which has grown to include diverse practitioners in a substantial international literature. Holling's vision of the

interactions between ecological and social systems has broadened into the Resilience Network. This cross-disciplinary group is already having an impact on economists and others concerned with ecosystem management. Perhaps his best-known contribution in this area is the Adaptive Cycle, which is an analogy between the ontogeny of a management project and secondary succession.

In addition to his stellar research accomplishments, Buzz has made remarkable contributions as a leader in service and administration. Most notable are his service as Director of the Institute of Animal Resource Ecology at the University of British Columbia, and as Director of the International Institute for Applied Systems Analysis. For the latter, he received the Austrian Cross of Honor in 1985. Most recently, Buzz has developed and continues to serve as Editor-in-Chief of one of the newest journals in the field, *Conservation Ecology*. Under his leadership, this journal is exploring the novel possibilities that arise with electronic publication. Innovations that

emerge from our experience with *Conservation Ecology* are likely to shape the Ecological Society's approaches to publication for decades to come.

Finally, Buzz has been a passionate champion of innovation, of intellectual tolerance and a fair test for new ideas. This perspective was vividly presented in his address at the Albuquerque meeting in 1997. It is evident in his inaugural editorial for *Conservation Ecology* and in the electronic forums for young scientists associated with that journal. Buzz Holling has been and continues to be a leader in fostering opportunities for creating, sifting, and winnowing new ideas. This may be the best of many good reasons that he has been granted the Eminent Ecologist Award.

### **Eminent Ecologist Subcommittee**

Deborah E. Goldberg (Chair), C. Richard Tracy, Steve Carpenter, Pam Matson, Judy Meyer, Bruce Menge, Steven Pacala

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