

Acceptance speech

16 June of 2022

Simon Asher Levin, awardee in the Ecology and Conservation Biology category (14th Edition)

It is a tremendous honor not only to have been awarded the Frontiers of Knowledge Award, but also to share it with my distinguished colleagues, Lenore Fahrig and Steward Pickett, both of whom I have known for more than three decades, and both of whom have made major contributions to the subject of theoretical ecology and its application to conservation biology. These BBVA Foundation Awards are among the most prestigious in ecology; and the great fortune to join the list of past laureates, many of whom I know well, provides a special gratification that I know that Profs. Fahrig and Pickett share with me. We accept the award not only for ourselves, but also for all our families, colleagues and students who have made our advances possible, and are thrilled for the recognition it brings to the problems we have devoted such large portions of our careers to.

Ecology grew as a subject from its base in natural history, shaped by the evolutionary perspectives pioneered by Darwin and Wallace. The mathematical foundations are a century old, but are playing an increasingly important role both in the conceptual growth of the subject, and also in the implementation of the basic principles in addressing problems such as biodiversity loss, climate change, the control of epidemics and pandemics, and a wealth of other issues fundamental to achieving a sustainable future for humanity. The variety of habitats and biomes in the world, the spread of invasive species and infectious diseases, the design of nature reserves, and the mobility of species including our own all make clear the need for the development of approaches that fully take into account the spatial dimensions of population dynamics, species interactions and nutrient fluxes. The approaches my colleagues and I have taken to these dimensions are what we are being recognized for today.

Lenore Fahrig, Chancellor's Professor of Biology at Carleton University in Canada, is one of the world's leading landscape ecologists. She has made major contributions to providing focus on the impacts of habitat fragmentation on biodiversity, one of the most destructive of human

assaults on our planet. She has pushed the frontiers of the subject as an academic discipline, but has also had a tremendous influence on wildlife conservation across many continents, as practitioners have adopted her advances to reshape conservation practice. She has built upon and expanded theoretical approaches, and connected them with data, to produce principles to reduce the effects of habitat loss, in particular those due to road networks and other insults to natural systems. Her work is certain to contribute even more in the decades to come in the essential challenge of reducing biodiversity loss.

My other co-recipient, Steward Pickett, was at Rutgers University when I first met him but has long been one of the principal researchers at the Cary Institute of Ecosystem Studies (United States), and indeed played a crucial role in elevating that institute to its current level of preeminence. I knew his work originally for his theoretical contributions to the theory of patch dynamics, also an essential part of my research program; but, like Lenore Fahrig, he brilliantly integrated theoretical work with direct application to problems facing humanity, specifically the importance of urban spaces in preserving biodiversity. This is a particularly timely area of research, since now more than half of the world's population lives in urban areas, and Prof. Pickett was one of the pioneers, through his leadership role in the Baltimore urban ecosystem project, in addressing these matters. The sustainability of cities, especially in the face of climate change, is a challenge of obvious overriding import; Steward Pickett recognized that long before it became central to our common agenda, and his work provides essential structure for thinking about these issues.

Though the three of us have never worked together, my own work is very much complemented by that of my colleagues. My first paper on the importance of spatial considerations in the theory of ecology appeared nearly 50 years ago, as I endeavored to understand the essential factors underlying the generation and maintenance of biodiversity, as well as the distribution of plants and animals across the globe. My work in this area continued in collaboration with my late and dear colleague, Robert T. Paine, in elucidating the importance of patch dynamics in the intertidal regions of the west coast of the United States, but expanded quickly to forests, oceans and other biomes. It led naturally to other collaborations involving the optimal design of nature reserves, complementing the work of Prof. Fahrig, and ultimately to the recognition of the importance of pattern and scale, and the development of methods to relate phenomena across scales. In recent years, I have turned especially to exploring the interface between ecology and the social sciences, especially economics, where the ideas of my late colleague Elinor Ostrom made clear the importance of the spatial context on governance of natural and social systems. The spatial

dimensions of these challenges are crucial in maintaining public goods and common-pool resources, without which there is no sustainable future for humanity.

I am honored to accept this wonderful award from the BBVA Foundation. I offer my sincere thanks and appreciation.