Citizen Science: Public Participation in Environmental Research

Author: Marzluff, John M.

Source: BioScience, 63(2) : 139-140

Published By: American Institute of Biological Sciences

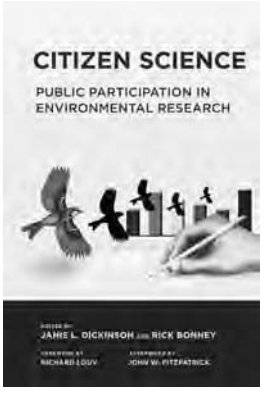
URL: https://doi.org/10.1525/bio.2013.63.2.10

In the Footsteps of Jefferson

Citizen Science: Public Participation in Environmental Research. Janis L. Dickinson and Rick Bonney, eds. Cornell University Press, 2012. 304 pp., illus. $49.95 (ISBN 9780801449116 cloth).

The scale of environmental problems frequently transcends the scale of professional scientific research. Although environmental processes operate at broad geographic scales, most scientists work alone or with small teams of professionals. This traditional approach limits our ability to monitor, understand, and solve many pressing environmental problems. Fortunately, *Citizen Science: Public Participation in Environmental Research* introduces readers to a new research paradigm that promises to simultaneously remove these limits and improve society's scientific literacy. Done well, this new approach will reveal causal understanding and will produce a citizenry willing to turn understandings into action. The approach is termed *citizen science*, which this book simply defines as "public participation in organized research efforts." The 44 authors of this edited book's 16 chapters are experienced practitioners and scholars. Editors and contributors Janis L. Dickinson and Rick Bonney are at the forefront of citizen science efforts and wear scientific and educational hats as director (Dickinson) and cofounder (Bonney) of the citizen science program at the Cornell Lab of Ornithology.

Citizen Science describes the perspectives and tools necessary to involve large numbers of ordinary people scattered across the globe in organized research efforts. The logistical challenges of incorporating young students, teachers, and interested amateurs in research are substantial and involve areas that many environmental scholars are ill equipped to tackle, including matters of volunteer recruitment and motivation, creation and maintenance of appealing and reliable Web portals, development of multijurisdictional conservation actions and policies, and assessment of research impact. This book introduces each of these issues and illustrates how selected projects have solved them. For example, readers learn how citizens have expanded the scope of many bird studies and increased ecologists' abilities to track butterfly migration and bud burst.



Framed within these case studies, several chapters describe how bioinformatics, outcome evaluation, and social networking are important to citizen science projects. Other chapters investigate the educational aspects of projects, the factors that contribute to learning by participants, and the possibility of using a citizen science network to monitor and contribute to disaster responses. Most projects describe simple tabulations of the presence and abundance of species by citizens, but more detailed studies are also possible, and this possibility is wonderfully developed in a chapter that illustrates how amateurs in Britain contribute survey and demographic data to national monitoring schemes that are integrated into predictive models relating bird populations to environmental and climatic variables at a national scale. These models inform conservation policy. The interface among large-scale data collection, citizen education and engagement, and conservation is a major theme of *Citizen Science.*

> *This book inspires the professional to see the scientist in everyone and to broaden our research programs, which will stoke the fire of scientific curiosity that burns within each of us.*

As I read, I quickly grasped what adding a citizen science component to my own research could allow me to accomplish. But as each chapter broadened my appreciation for the value of citizen science, it also illustrated the requirements necessary to succeed in this new research arena. This book is not (nor does it claim to be) a how-to manual. Rather, it is an enticement to learn more, including how to facilitate training and data collection by a large and diverse team; how to gather, mine, and analyze messy data sets; and how to develop curricular materials for students and teachers below the university level that enable and encourage them to make their own discoveries.

Introducing readers to potential collaborators of ongoing projects may be the greatest contribution of the book, because successful citizen science programs are, in fact, enormous. Over half of the authors, including both editors, are from a single institution that invests millions of dollars each year in its citizen science programs. Funded by the institution, scientists, educators,

doi:10.1525/bio.2013.63.2.10

information technicians, and administrators work together to deliver some of the world's most impressive citizen science programs. The investment in and sustained commitment to these programs is impressive but not directly relevant to many smaller groups.

Many scientists will be challenged by the new and rapidly evolving paradigm of citizen science. The ongoing needs of massive field teams, huge data sets, and distance education curricula require trade-offs—none more fundamental than the likely sacrifice of traditional scholarly productivity in exchange for the ability to achieve broad conservation goals. I suspect that some agencies and nonprofit organizations will view the benefits of conservation as outweighing the costs of lowered scholarship, but will academic institutions maintain scholarship at a cost to both a broader understanding of environmental problems and the effective implementation of conservation policy?

Citizen Science succeeds in showcasing a path of knowledge that is unfamiliar to—and, at first glance, unwanted by—many professional scientists. Its well-written, wide-ranging, and accessible chapters make a compelling argument that engaging the public in scientific research is important in order to increase our environmental knowledge and build a citizenry that values and uses what science produces. This book inspires the professional to see the scientist in everyone and to broaden our research programs, which will stoke the fire of scientific curiosity that burns within each of us.

Surrounding an informative text are the motivational foreword by Richard Louv and afterword by John W. Fitzpatrick suggesting that the movement to involve ordinary citizens in the craft of science is nothing new. We are reminded that Thomas Jefferson, an amateur scientist himself, tutored Meriwether Lewis before sending him westward to catalog the flora and fauna of our country. By extending his reach, Jefferson increased our scientific knowledge immensely. Today's citizen science projects are infinitely more complex, but the rewards are equally great. Any scientist anxious to improve their scope of inference by following Jefferson's lead will find much to learn from the pages of *Citizen Science*.

JOHN M. MARZLUFF

John M. Marzluff (corvid@uw.edu) is a professor of wildlife science in the School of Environmental and Forest Sciences at the University of Washington, in Seattle.

LEARNING FROM DEFORMED FROGS

Peril in the Ponds: Deformed Frogs, Politics, and a Biologist's Quest. Judy Helgen. University of Massachusetts Press, 2012. 272 pp. $24.95 (ISBN 9781558499461 paper).

Most people have heard of deformed frogs, but few know the backstory. Their discovery in Minnesota wetlands in 1995 was covered by local news media and then catapulted onto the front pages of newspapers around the world—a harbinger of a new kind of environmental health crisis. Deformed frogs became an issue of national concern in a matter of weeks after they were found. The ensuing public demand for answers challenged the somewhat stately pace of science, a subject covered in detail by William Souder (2000), whose book appeared in the midst of the response, describing what was then a seemingly impenetrable mystery.

More than a decade later, it is high time to check back in on the frogs.

Peril in the Ponds: Deformed Frogs, Politics, and a Biologist's Quest does just that, and Judy Helgen could not be better positioned to tell the story. As a biologist with the Minnesota Pollution Control Agency (MPCA), Helgen was the point person at the onset of the investigations and remained engaged throughout subsequent efforts to explain the cause of the crisis. Her account of the initial responses to these unprecedented occurrences and the subsequent actions of scientists, bureaucrats, politicians, and members of the public has a *you-are-there* feel to it. Unfortunately, the author's chronological recounting of events—meeting by meeting and phone call by phone call—can become tedious. Although her writing style highlights the complicated nature of the situations that she faced, the major themes that Helgen wishes to communicate would survive a less detail-oriented treatment.

Most readers want to know, first and foremost, what led to the outbreaks. Unfortunately, they will be disappointed on this front. Seventeen years after the initial discovery, we still do not know what caused the deformities in Minnesota. This book is no victory lap. As an ecologist who has long worked on amphibians, I already knew the broad outlines of the story. I had assumed that Helgen would use the deformed frog crisis as a platform for understanding how we can mount more effective responses to environmental crises, but we do not learn much on that score, either. Helgen focuses on individual incidents that are emblematic of larger forces at work in society, but the individual trees never give way to a view of the forest.

Instead, *Peril in the Ponds* is about three things: making the case for amphibian deformities as an ongoing cause for societal concern, describing the beauty and worth of frogs and their wetland homes, and providing a window into Helgen's personal life as she deals with the slings and arrows that inevitably arrive as she works to do science while under a spotlight. In the writing of these overlapping themes, Helgen also offers readers a view of how one scientist reconciles her beliefs and her responsibilities as a seeker of scientific understanding. This topic deserves more attention, since much of what is currently being written about scientists and their motivations is often critical but not necessarily informed by scientists' own perspectives (e.g., Sussman 2010).