

Observation and Ecology

**Broadening the Scope of Science
to Understand a complex World**

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 **ISLANDPRESS**

Washington | covelo | London

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Library of Congress Cataloging-in-Publication Data

Sagarin, Rafe.

Observation and ecology : broadening the scope of science to understand a complex world / Rafe Sagarin and Anibal Pauchard.

p. cm.

Includes bibliographical references and index.

ISBN 978-1-59726-825-7 (cloth : acid-free paper) — ISBN 1-59726-825-9 (cloth : acid-free paper) — ISBN 978-1-59726-826-4 (paper : acid-free paper) — ISBN 1-59726-826-7 (paper : acid-free paper)

1. Ecology—Methodology. 2. Ecology—Research. 3. Ecology—Study and teaching. 4. Observation (Scientific method). 5. Nature observation. 6. Biocomplexity. I. Pauchard, Anibal. II. Title.

QH541.28.S23 2012

577.072—dc23

2012001570

Printed on recycled, acid-free paper 

Manufactured in the United States of America

10 9 8 7 6 5 4 3 2 1

Keywords: Island Press, observational approaches to ecology, natural history, conservation biology, ecological science, citizen science, traditional ecological knowledge, local ecological knowledge, climate change, complex systems, social ecological science, education and policy in ecology.

BOX 9.1**Observing Invasive Species and Novel Ecosystems in Urban Areas****BRENDON LARSON**

I grew up in the countryside and my life as a naturalist derived from long hours spent rambling along a local creek, looking for new plant species, learning bird calls, and trying to catch that one big dragonfly that was always just out of reach of my net.

Unfortunately, such childhood experiences are increasingly uncommon. The majority of the world's people now live in urban areas—and the percentage is increasing. The future of earth's biodiversity will depend on the relationship—or lack thereof—that these people develop with nature. While some of them will visit “wilderness” areas, which themselves face greater and greater threats due to the global scale of our impacts, most of them won't. Thus, their relationship with nature will mostly come about through observations of nature around them—in their backyards, local parks, and schoolyards, perhaps supplemented by a few transformative experiences outside of their urban homes.

Accordingly, ecologists need to reflect upon their own tendency to emphasize the importance of rare and endemic species found in protected wilderness areas that are too often distant from urban areas.

It is particularly useful to reflect on invasive species in this context. Urban environments are largely disturbed, which contributes to a preponderance of introduced and often invasive species.

will help them to have a broader understanding of the world they live in and the consequences of their actions for the biosphere (Kaplan and Kaplan 2002). Nonetheless, teenagers usually feel alienated from nature, and short-term experiences in nature do not seem to change this notion. For example, Haluza-Delay (2001) reports that after a 12-day field trip teenagers felt that nature only exists in more pristine environments and that there is little they can do to conserve it. One way to break through this perceived barrier is to involve adolescents in a working project with direct consequences for their environment. For example, when teenagers help to survey and plan a protected area they can see the direct effects of

It concerns me that so many environmental education programs now emphasize the “horrors” of invasive species, when these are the species that comprise the natural environment of so many children growing up in urban areas. Often, they are taught such lessons at what I consider too young an age, when the emphasis should instead be on becoming comfortable, exploring, and playing in this environment.

While there are ecological lessons and distinctions here, I feel quite certain that the risks of educating students with the idea that these landscapes are tainted and unworthy is untenable. The students might not want to go back. Instead, show them plants and teach them their stories, maybe even highlighting how these biological communities are now as cosmopolitan as contemporary cities. Consider the ecological functions that these communities might serve.

This might even be a first lesson in scientific “objectivity,” in teaching them to observe the world around them before making judgments about its quality—perhaps even learning how difficult it is to justify distinctions between “good” and “poor” quality. The jump to higher-level concepts related to biogeography, dispersal, and biodiversity can come later.

Such lessons might help to nurture these urban children’s urge to explore, much as I did, so that they grow closer to the nature that exists around them and perhaps even try to catch that one special living being that is just out of their reach.

their actions (Thomashow 2002). Here we see a clear convergence between educational, psycho-social, and scientific outcomes, because this kind of “project-based” or “problem-based” learning is exactly what education advocates are pushing for within and beyond the sciences (Darling-Hammond 2008).

Unfortunately, the educational system for elementary and high school students is extremely classroom oriented, and the opportunities for outdoor educational activities compete with other educational needs. Our traditional educational systems are based on closed environments with occasional outside “breaks” that are not considered part of the curricula.