UC SANTA BARBARA

THE Current

March 26, 2014
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Expanding the Domain of Natural History

In developed countries, there appears to be a steep decline for the support of natural history, the study of the fundamental nature of organisms and how and where they live and interact with their environment. Yet natural history provides essential knowledge for fields as varied as human health, food security, conservation, land management and recreation.

Stephanie Hampton, former deputy director of UC Santa Barbara's National Center for Ecological Analysis and Synthesis (NCEAS), was one of 17 authors convened by Joshua J. Tewksbury of the University of Washington (UW) and the international office of the World Wide Fund for Nature to research examples germane to the future of natural history. The group's findings appear in the April issue of BioScience.

"We document the decline in some aspects of natural history and suggest ways in which the practice of natural history can be revitalized," said Hampton, a professor at Washington State University and director of its Center for Environmental Research, Education and Outreach. "These views came from a series of workshops that involved a wide range of participants and were polished by the keen comments of a number of reviewers. Yet they still represent only a small fraction of what needs to be said, particularly about the path forward. It is one thing to lay out the broad outlines of a 21st-century vision for natural history, quite another to make it happen."

In the paper, scientists detail examples supporting their conviction that a revitalization of the practice of natural history will provide important benefits for science and society. For instance, 75 percent of emerging infectious diseases of humans, including avian influenza, Lyme disease, cholera and rabies, are linked to other animals at some point in their lifecycle. The researchers concluded that control strategies rely on knowledge of these hosts' natural history.

Cholera (Vibrio cholerae) provides a compelling example of how knowledge of natural history is key to disease control. The finding that the bacteria is carried by copepods and other zooplankton explains why scientists and public health experts are able to use satellite sensors to monitor phytoplankton chlorophyll as an early-warning system for cholera outbreaks.

The paper offers an abundance of other concrete examples of natural history's importance. Effective fisheries management disasters such as the collapse of the Bering Sea walleye pollock fishery might have been avoided had the natural history surveys needed to assess the pressure and structure of the population been in place. Rigorous forest fire suppression in the western United States during much of the 20^{th} century might have ended sooner if natural history knowledge — such as the critical importance of fire well known to Native Americans — had been used earlier. And recreational hunting and fishing have often benefited when interest groups applied knowledge of natural history and suffered when it was ignored.

Despite this, most American schools no longer have natural history requirements for a biology degree, a trend that has coincided with the rise of molecular, experimental and other forms of biology, which may be less expensive or can attract large grants and public recognition. According to the findings, the stagnation could also reflect more general public disengagement with nature in developed countries.

Although biological modeling has become more sophisticated, Tewksbury and his coauthors note that models must be built on field observations to usefully represent the real world. According to the research team, the important influence of microbes on human health and plants is a key new frontier in natural history research. They see hope for the discipline with the rise of Internet- and smartphone-based technologies that allow the growth of broad partnerships, including citizen-science initiatives.

“Such linkages are starting to develop but require established professionals to self-identify as natural historians to provide the leadership needed for natural history to reclaim its necessary role,” Hampton said. “Our hope is that our paper becomes a starting point for the next set of collaborations, initiatives and actions, and that ideas can spread to inform, energize and integrate different audiences passionate about the future of natural history.”

The work was supported by grants from the National Science Foundation; Thomas L. Fleischner, environmental studies professor at Prescott College in Arizona and director of its Natural History Institute; and UW’s College of the Environment. Additional support came from Prescott College; UW’s Doug and Maggie Walker Chair in Natural History; and UCSB’s National Center for Ecological Analysis and Synthesis.

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