

warranted. Also, new concepts and terminologies constantly emerge, especially in a dynamic discipline like invasion biology. There are some changes that the editors can implement to improve the current version. For example, it would have been convenient for the readers to have page numbers included in the "Content by Subject Area." For some well-known invasive species, distribution maps would have been informative. The general public also would have benefitted from information about the successful control of specific invasive species and about why these cases were successful.

Overall, *Encyclopedia of Biological Invasions* is an excellent, much needed, and easy-to-read addition to the current literature on biological invasions. This collective effort testifies to this discipline's strong links to other disciplines, its progression, and further challenges lying ahead. I am confident that both ecologists and land managers will find this a very useful tool and quick reference in their future work.—*Qinfeng Guo, U.S. Department of Agriculture, Forest Service, Eastern Forest Environmental Threat Assessment Center, 200 WT Weaver Blvd., Asheville, North Carolina 28804, USA.*

Sandhill and Whooping Cranes: Ancient Voices over America's Wetlands. Paul A. Johnsgard. 2010. University of Nebraska Press, Lincoln, Nebraska, USA. 155 pages. \$12.95 (paper). ISBN: 978-0-8032-3496-3.

Paul Johnsgard has long been captivated by wild cranes and their unique vocalizations, courtship dances, and wide-ranging migrations. As a scientist and an admirer, Johnsgard has watched their migrations and behaviors for decades as hundreds of thousands of cranes staged each spring by the central Platte River, not far from his home in Lincoln, Nebraska. As an artist, he has skilfully captured their courtship dances and other behaviours in his exceptional line drawings. And, as an author, he has written extensively on their ecology in three earlier books: *Cranes of the World* (1983), *Those of the Gray Wind: the Sandhill Crane* (1986), and *Crane Music: a Natural History of Cranes* (1991). Much has happened relative to North American cranes in the 20 years since Johnsgard published *Crane Music*, including increased crane abundance in many areas and the completion of multiple studies on crane ecology and conservation. This new crane book serves as an update to *Crane Music* and provides the reader with many useful resources for observing and learning about cranes.

Johnsgard opens the book with a description of taking his granddaughter to the Platte River to view sandhill cranes departing from their roosts at sunrise and returning at sunset. He writes in lyrical language of the "unadulterated

magic" of the scene and describes the important role that the Platte River plays in the migration of North American cranes. The text then shifts to more standard prose as he describes the distribution and migration of North American cranes and summarizes new information about North American crane populations, recent conservation efforts, and recent and future conservation challenges. Line drawings of cranes and maps are found throughout the text.

The book consists of four chapters of text, followed by extensive reference information. The first three chapters describe the distributions, migration paths, and status of North American cranes, including lesser and greater sandhill cranes (both migratory and non-migratory populations) and whooping cranes (both wild Aransas-Wood Buffalo population and experimental flocks). Within each of these chapters, Johnsgard draws on recent surveys and research to bring readers up to date on the birds' status and other new findings. Citations of scientific articles are as recent as summer 2010 and cover a wide range of topics, ranging from surveys to genetics to reintroduction techniques. Some of the more notable activities since the 1991 book are the efforts to establish a non-migratory flock of whooping cranes in Florida and to establish a migratory flock that breeds in central Wisconsin and winters in Florida. This book provides one of the few published resources for the general public that describes those supplemental introduction efforts, including the many challenges faced by biologists and what was learned in the process. In his final chapter, Johnsgard reviews the current and future challenges facing sandhill and whooping cranes. For sandhill cranes, issues include changing food availability for migrating cranes that stage at the Platte River, river channel maintenance, administration of the Platte River Recovery Implementation Program, hunting, and a changing climate. His discussion of harvest clearly shows his disagreement with hunting cranes, and he "...wonder[s] about the humanity of people who think that killing cranes can possibly be sporting." For the whooping crane, he describes the growth of the Aransas-Wood Buffalo population and the devastating losses that coincided with drought conditions in the winter of 2008–2009. His ending paragraphs are a heartfelt call for conservation of cranes and their wetland habitats.

Covering nearly half of the book are appendices that provide extensive resources for the reader. The first appendix provides a thorough listing of crane viewing sites in the United States and Canada, with brief descriptions and contact information. Johnsgard also includes references, a suggested reading list, and online resources to guide interested readers to more information.

Johnsgard wrote this book to "...feed an unrelenting need to inform others of the special values and aesthetic appeal of wild cranes." His passion for these birds is clear throughout the book. *Sandhill Cranes and Whooping Cranes* provides a useful and largely nontechnical update on the current status of North America's two crane species and

a summary of research and conservation efforts over the last 20 years. It cannot serve as a complete compendium of crane ecology, but it complements the existing general literature. The book would be a good addition to the libraries of birders and others interested in the lives and conservation of cranes. Perhaps its most valuable contribution are the appendices, which provide readers with information on where they can observe cranes for themselves and resources to learn more about cranes. In that, Johnsgard has indeed been successful in his goal of informing others of these special birds.—*Jane E. Austin, 8711 37th Street SE, U.S. Geological Survey, Northern Prairie Wildlife Research Center, Jamestown, North Dakota 58401, USA.*

Teaching Children Science: Hands-on Nature Study in North America, 1890-1930. Sally Gregory Kohlstedt. 2010. University of Chicago Press, Chicago, Illinois, USA. 363 pages + xv. \$45.00 (hardcover). ISBN-13: 978-0-226-44990-6; ISBN-10: 0-226-44990-4.

Many scientists and educators agree that the goal of science education is to prepare students “to know, use and interpret scientific explanations of the natural world,” as cited in the National Research Council publication, *Taking Science to School: Learning and Teaching Science in Grades K-8* (Duschl et al. 2007). Yet, many science instructors of K-12 and post-secondary students often rely on teacher-telling modes of pedagogy and neglect to engage their students in natural inquiry and scientific study that model the research methods used by scientists. As a result, many young people are not aware of how scientists make discoveries about the natural world. Moreover, some critics argue that our children are so out of touch with the natural world that they prefer to be “plugged in” to electronic games rather than discovering the outdoors, a phenomenon coined as “nature deficit-disorder” by Louv (2006). In response to the realization that our students need more meaningful science instruction, scientists and educators actively proposed reforms and have been studying the effects of various instructional and assessment strategies. As I read about the nature study movement in the late 1800’s and early 1900’s, I realized that for the past 100 years, North American educators have been passionate about the same things—trying to find ways to improve science instruction by making it more relevant and interesting to students. We know that when people are passionate about topics, they are more motivated to learn, and this is exactly the sentiment that educators drew upon at the start of the nature study movement in the U.S. and Canada.

In her book, *Teaching Children Science*, Professor Kohlstedt provides a rich and detailed history of nature

study in the U.S. (with some description of Canadian perspectives but nothing south of the U.S.). The nature study movement initially grew from a philosophical approach about teaching people how to be environmental stewards. Soon afterwards, it developed into complex curricula grounded in geographical and biological lessons that could be presented to in-service and pre-service teachers in both rural and urban areas—most often it involved getting students outdoors to experience their natural environment and to engage in in-depth study through collecting, preserving, recording, gardening, and sharing of data.

Normal schools and laboratory schools (associated with university teacher education and educational research programs) played important roles in testing innovative instructional nature study curricula. Educators of science teachers had an important voice in influencing curriculum and instructional approaches of formal and informal teachers of children. Instructors and professors at Cornell University, SUNY campuses, University of Chicago, McGill University, along with others offered not only teacher education courses, but also professional development workshops to teachers on nature study and outdoor studies. In some cases, university faculty teamed up with non-formal science educators (such as those at museums or botanical gardens) in their effort to reach teachers. As a result, teachers started integrating school gardens, field trips, and nature study into their curricula. On occasion visiting scholars from abroad transported ideas from the U.S. to their peers back home.

Not all educators adopted the same curricular and instructional approach when it came to nature study. These varied according to teachers’ geographic location (north vs. south, urban vs. rural, etc.). For example, some educators felt that agricultural study was not to be confused with nature study, whereas others felt that rural interests needed to be incorporated in nature study. In the southern states and on Native American reservations, nature study was sometimes introduced as an extension of vocational education during which students learned about building character (such as self-reliance) through horticultural activities. Kohlstedt points out the stark contrast of this interpretation of nature study intended for African American and Native American students, compared to the experience that Euro-Americans students enjoyed in northeastern states which involved field work in natural, uncultivated areas.

Dissemination of nature study approaches occurred not only through workshops and classes, but also through publications. We learn, in great detail, how important pamphlets were, such as Anna Botsford Comstock’s *Home Nature-Study Course* series, which was later published as *The Handbook of Nature Study* in 1911. Wilbur Jackman (University of Chicago) collated his pamphlet series and published *Nature Study for Common Schools* in 1891, which combined both content information and child development theories. Pamphlets often were published by universities