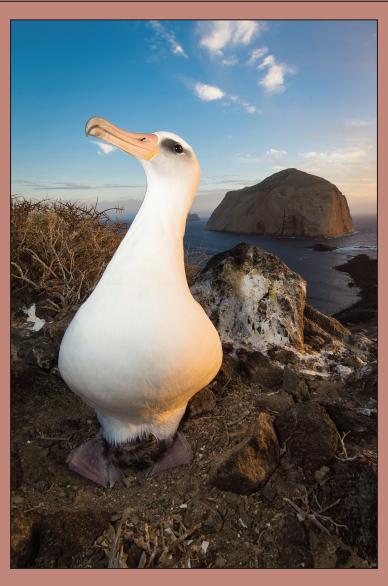
Western North American Naturalist

Volume 78 No. 3 November 2018 Brigham Young University

9th California Islands Symposium



3–7 October 2016, Ventura, California Part 1 of 2

WESTERN NORTH AMERICAN NATURALIST

Published at Provo, Utah, by Monte L. Bean Life Science Museum

> 1110 MLBM Brigham Young University Provo, UT 84602

SUBMISSIONS editorialmanager.com/wnan ARCHIVE scholarsarchive.byu.edu/wnan E-MAIL wnan@byu.edu PHONE 801-422-6688 FAX 801-422-0093

MARK C. BELK, EDITOR
JANENE AUGER, MANAGING EDITOR

Associate Editors

E. Arthur Bettis III Dept. of Earth and Environmental Sciences, University of Iowa, Iowa City

Michael Glassow Dept. of Anthropology, University of California, Santa Barbara

David Holway Division of Biological Sciences, University of San Diego, San Diego, CA

William K. Lauenroth School of Forestry and Environmental Studies, Yale University, New Haven, CT

Daniel R. Muhs
United States Geological Survey, Denver, CO
C. Rilev Nelson
Dept. of Biology, Brigham Young University, Prov

C. Riley Nelson

Dept. of Biology, Brigham Young University, Provo, UT

John M. Randall

The Nature Conservancy, San Francisco, CA

T. Scott Sillett Migratory Bird Center, Smithsonian Conservation Biology Institute, National

Zoological Park, Washington, DC

Editorial Board. Russell B. Rader, Chair, Biology; Leigh A. Johnson, Biology; Randy T. Larsen, Plant and Wildlife Sciences; and Brock R. McMillan, Plant and Wildlife Sciences. All are at Brigham Young University. *Ex officio* editorial board members include Duke S. Rogers, Monte L. Bean Life Science Museum; Mark C. Belk, Biology; and Janene Auger, Monte L. Bean Life Science Museum.

Publication and Scope. The Western North American Naturalist, originally founded in 1939 as the Great Basin Naturalist, is published quarterly by Brigham Young University. Unpublished manuscripts that further our biological understanding of western North America, including western Canada and all of Mexico, are accepted for publication.

Subscriptions. Annual subscriptions to the Western North American Naturalist for 2018 are \$30 for individual online-only subscriptions, \$35 for individual print + online (\$40 outside the United States), \$55 for institutional online only, and \$65 for institutional print + online. Back issues are available in print and online (http://scholarsarchive.byu.edu/wnan). All matters pertaining to subscriptions, back issues, or other business should be directed to wnan@byu.edu or Western North American Naturalist, 1110 MLBM, Brigham Young University, Provo, UT 84602.

Scholarly Exchanges. Libraries or other organizations interested in obtaining the Western North American Naturalist through a continuing exchange of scholarly publications should contact the Serials Exchange Coordinator, 2204 HBLL, Brigham Young University, Provo, UT 84602.

Manuscript Submission. See Information for Authors on the inside back cover or at https://scholarsarchive.byu.edu/wnan/styleguide.html

Editorial Production. Sarah Dickson Manuscript Supervision. Morgan Baker

Copyediting Assistance. Sarah Dickson and Bekah S. Wolz

Abstract Translation. CommBridge Language Services and Nadia Libertad Neri Vera

Copyright © 2018 by Brigham Young University Online issue closure date: 8 November 2018 Print publication mail date: 10 December 2018 ISSN 1527-0904

Cover photo: Laysan Albatross and chick on Guadelupe Island, Mexico. GECI Archive/J.A. Soriano. Used with permission.

9th California Islands Symposium: Connecting Communities

The 9th California Islands Symposium was sponsored by a diverse group of agencies, nonprofit organizations, and academic institutions. The following individuals served on the organizing committee: Julie Bursek, Christie Boser (Co-chair), Ann Bull, Amy Catalano, Cause Hanna, Laura Kirn, Denise Knapp (Co-chair), John Knapp, Kate Faulkner, Annie Little (Co-chair), Paula Power, T. Scott Sillett, Peter Sharpe, and John Ugoretz. The Bureau of Ocean Energy Management provided generous financial support of the Proceedings of the 9th California Islands Symposium. A special thanks to the editors who dedicated many hours to the production of these proceedings (E. Arthur Bettis III, Michael A. Glassow, David A. Holway, William K. Laurenroth, Daniel R. Muhs, C. Riley Nelson, John M. Randall, and T. Scott Sillett) and to Mark C. Belk, Janene Auger, and Morgan Baker of the Western North American Naturalist.

This symposium was made possible by the generous support of the following sponsors:











































Webpage:www.californiaislands.net

IN MEMORIAM

DR. CAUSE HANNA (1980–2017)

Dr. Cause Hanna brought incredible enthusiasm, knowledge, and joy to the California islands community. As the first director of the California State University Channel Islands Field Station, Cause employed his fantastic humor and intellect to inspire students and researchers to reach their highest potential, to love the islands, and to appreciate their ability to teach us about ourselves and this planet. He and his family, Tracy, Solstice, and Be, created a community that will influence generations of scientists and ensure that the heart and resilience of these California Islands live on.