

Cover

Source: The Condor, 119(1)

Published By: American Ornithological Society

URL: <https://doi.org/10.1650/cond.2017.119.1.cov>

The BioOne Digital Library (<https://bioone.org/>) provides worldwide distribution for more than 580 journals and eBooks from BioOne's community of over 150 nonprofit societies, research institutions, and university presses in the biological, ecological, and environmental sciences. The BioOne Digital Library encompasses the flagship aggregation BioOne Complete (<https://bioone.org/subscribe>), the BioOne Complete Archive (<https://bioone.org/archive>), and the BioOne eBooks program offerings ESA eBook Collection (<https://bioone.org/esa-ebooks>) and CSIRO Publishing BioSelect Collection (<https://bioone.org/csiro-ebooks>).

BioOne is an innovative nonprofit that sees sustainable scholarly publishing as an inherently collaborative enterprise connecting authors, nonprofit publishers, academic institutions, research libraries, and research funders in the common

Journal Mission and Scope

The Condor: Ornithological Applications is an international, peer-reviewed journal that publishes original research, syntheses, and assessments that address ornithological applications in two ways: the application of scientific theory and methods to the conservation, management, and ecology of birds; and the application of ornithological knowledge to conservation and management policy and other issues of importance to society. The journal aims to reach both research ornithologists and practitioners.

Topics addressed in the journal include:

- Population biology, including threats to bird populations
- Conservation genetics
- Community and landscape ecology
- Ecosystem-level influences of birds
- Effects of habitat alteration and fragmentation
- Avian responses to climate change
- Anthropogenic effects on genetics, behavior, or physiological processes
- Biology of avian diseases and disease transmission by birds
- Birds in urban or agricultural settings
- Sociological and economic studies related to birds or the discipline of ornithology
- Integrative and cross-disciplinary studies
- Theoretical and methodological advances in practice
- Evaluations of science relevant to issues in conservation and management
- Thematic reviews and opinion pieces

Journals of the American Ornithological Society

The American Ornithological Society publishes two peer-reviewed, international journals of ornithology. *The Condor: Ornithological Applications* focuses on applied ornithological study. *The Auk: Ornithological Advances* focuses on basic ornithological science. The refined, separate missions of the journals in 2014 has created an opportunity for them to work together to publish the best science in basic and applied ornithology and to build on their long histories as top journals in the field of avian biology.



THE CONDOR
Ornithological Applications

Volume 119 Number 1 February 2017



Editor-in-Chief: Philip C Stouffer

THE CONDOR: Ornithological Applications

Volume 119, Number 1, Pages 1–174

February 2017



THE CONDOR

Ornithological Applications

Published by the American Ornithological Society
www.AmericanOrnithologyPubs.org

AmericanOrnithology.org

EDITOR-IN-CHIEF Philip C Stouffer

School of Renewable Natural Resources, Louisiana State University, pstouffer@lsu.edu

EDITORS Paul F. Doherty, Jr., Colorado State University, paul.doherty@colostate.edu
Colleen M. Handel, USGS Alaska Science Center, cmhandel@usgs.gov

Journals Director: Kathleen E. Erickson, aoucospubs@gmail.com, (415) 435-1604
Managing Editor: Mark C. Penrose, aoucospubs@gmail.com
Copyeditors: Richard Earles, Janice Faaborg, Scott W. Gillihan, Thalia Sachtleben
Translators: Carlos Daniel Cadena Ordoñez, Lucio R. Malizia, Karl S. Mokross, Hélène Senechal

ASSOCIATE EDITORS

Jane E. Austin, USGS Northern Prairie Wildlife Research Center
Richard Buchholz, University of Mississippi
Jeffrey J. Buler, University of Delaware
Kristina L. Cockle, IBIGEO-CONICET
Norbert J. Cordeiro, Roosevelt University/The Field Museum
Jim Cox, Tall Timbers Research Station
Amy J. Davis, USDA APHIS
Jill L. Deppe, Eastern Illinois University
Kristen E. Dybala, Point Blue Conservation Science
R. J. Gutiérrez, University of Minnesota
Amanda M. Hale, Texas Christian University
Mark D. Jankowski, Minnesota Pollution Control Agency
Steven T. Knick, USGS Forest and Rangeland Ecosystem Science Center
Nicola Koper, Natural Resources Institute, University of Manitoba
Richard B. Lancot, USFWS Alaska Region
Frank A. La Sorte, Cornell Lab of Ornithology
Steven C. Latta, National Aviary
Matthias Leu, College of William and Mary
Martine Maron, The University of Queensland
Kathy Martin, The University of British Columbia
Daniel J. Mennill, University of Windsor
Joseph J. Nocera, Ontario Ministry of Natural Resources
Erica Nol, Trent University
Susan Smith Pagano, Rochester Institute of Technology
Monica Papeş, Oklahoma State University
A. Townsend Peterson, The University of Kansas
Christin L. Pruett, Florida Institute of Technology
Christine Ribic, USGS Wisconsin Cooperative Wildlife Research Unit, University of Wisconsin-Madison
Gregory J. Robertson, Environment Canada Wildlife Research Division
Erin A. Roche, Northern Prairie Wildlife Research Center
John R. Sauer, USGS Patuxent Wildlife Research Center
Joel A. Schmutz, USGS Alaska Science Center
T. Scott Sillett, Smithsonian Migratory Bird Center
Jennifer A. Smith, Virginia Polytechnic Institute & State University
Sarah A. Sonsthagen, USGS Alaska Science Center
Colleen Cassady St. Clair, University of Alberta
Colin E. Studds, University of Maryland Baltimore County
David Swanson, University of South Dakota
Diana F. Tomback, University of Colorado Denver
Susan Waugh, Museum of New Zealand Te Papa Tongarewa
Steven L. Van Wilgenburg, Environment Canada National Hydrology Research Centre
Gustavo A. Zurita, Universidad Nacional de Misiones-CONICET

Book Review Editor: Jay Mager, Ohio Northern University, j-mager@onu.edu
In Memoriam Editor: Ted Anderson, McKendree University, ted020@centurytel.net

On the Cover: Male Southwestern Willow Flycatcher (*Empidonax traillii extimus*), an endangered riparian obligate, feeds young in a declining southern California population. In this issue (pp. 17–25), Kus et al. link a female-biased adult population to skewed sex ratios among young and discuss an associated facultative shift from monogamy to polygyny that likely slowed the population decline. Photo credit: Scarlett Howell

Journal Information: The Condor: Ornithological Applications publishes original research, syntheses, and assessments that address ornithological applications in two ways: the application of scientific theory and methods to the conservation, management, and ecology of birds; and the application of ornithological knowledge to conservation and management policy and other issues of importance to society. Appropriate topics include documentation, analysis, and interpretation of laboratory and field studies; theoretical or methodological advances in practice; and reviews of information or ideas. Contributions are welcomed from around the world but must be written in English. The Condor was published from 1899 to 2016 by the Cooper Ornithological Society, and as of 2016 is published by the American Ornithological Society (a merger of the American Ornithologists' Union and the Cooper Ornithological Society). The Condor became The Condor: Ornithological Applications in 2014. The articles in this journal reflect the research and opinions of the individual authors. As such, the articles do not necessarily reflect the opinions of the editors or any official policy of the American Ornithological Society

Submit manuscripts online at www.editorialmanager.com/condor. Author instructions are at americanornithologypubs.org/page/instructions.

Copying and permissions notice: Persons seeking to obtain rights and permission to reprint papers, figures, tables, etc., or parts thereof, previously published in The Condor and The Condor: Ornithological Applications should contact the Journals Office at pubs@AmericanOrnithology.org

Abstracting and Indexing: Articles appearing in The Condor: Ornithological Applications are abstracted and indexed in the databases listed online at www.aoucospubs.org/page/mission.



The Condor: Ornithological Applications (ISSN 0010-5422, e-ISSN 1938-5129) is published online weekly by the American Ornithological Society at AmericanOrnithologyPubs.org. Periodicals postage paid at Chicago, IL, and at additional mailing offices. POSTMASTER: Send address changes to The Condor: Ornithological Applications, American Ornithological Society, 1400 S Lake Shore Drive, Chicago, IL 60605; membership@americanornithology.org; business@osnabirds.org. Printed quarterly by Allen Press on Forest Stewardship Council® certified paper.



AMERICAN ORNITHOLOGICAL SOCIETY

THE COUNCIL FOR 2016–2017

OFFICERS AND EDITORS

President: Steven R. Beissinger, Division of Ecosystem Science, University of California-Berkeley, 130 Mulford Hall, #3114, Berkeley, CA 94720, beis@berkeley.edu

President-Elect: Kathy L. Martin, Department of Forest and Conservation Sciences, University of British Columbia, 2424 Main Mall, Vancouver, BC, V6T 1Z4 Canada, kathy.martin@ubc.ca

Secretary: Andrew W. Jones, Department of Ornithology, Cleveland Museum of Natural History, 1 Wade Oval Drive, University Circle, Cleveland, OH 44106, ajones@cmnh.org

Treasurer: Rebecca T. Kimball, Department of Biology, University of Florida, 528 Bartram Hall, Gainesville, FL 32611, rkimball@ufl.edu

Editor-in-Chief of The Auk: Ornithological Advances: Mark E. Hauber, Department of Psychology, CUNY Research, City University of New York, 205 E. 42nd Street, New York, NY 10017, markehauber@gmail.com

Editor-in-Chief of The Condor: Ornithological Applications: Philip C Stouffer, School of Renewable Natural Resources, Louisiana State University, Baton Rouge, LA 70803, pstouffer@lsu.edu

Editor-in-Chief of Studies in Avian Biology: Kathryn P. Huyvaert, Warner College of Natural Resources, Colorado State University, 400 University Avenue, Fort Collins, CO 80523, kate.huyvaert@colostate.edu

Executive Director: Melinda Pruett-Jones, 1400 S. Lake Shore Drive, Chicago, IL 60605, mpruettjones@americanornithology.org

2017: Colleen M. Handel, Patricia J. Heglund, James W. Rivers, Rebecca J. Safran
2018: Elizabeth P. Derryberry, Katie M. Dugger, Kevin E. Omland, Viviana Ruiz-Gutierrez
2019: Melissa S. Bowlin, Renee A. Duckworth, Scott V. Edwards, Nathaniel T. Wheelwright

American Ornithologists' Union: Scott Lanyon (2014–2016), Susan M. Haig (2012–2014), John Faaborg (2010–2012), Erica H. Dunn (2006–2008), James A. Kushlan (2004–2006), Fred Cooke (2002–2004), John W. Fitzpatrick (2000–2002), Frank B. Gill (1998–2000), Richard C. Banks (1994–1996), Frances C. James (1984–1986), Wesley E. Lanyon (1976–1978)

Cooper Ornithological Society: Martin Raphael (2015–2016), Frank R. Moore (2013–2015), Kimberly A. Sullivan (2011–2013), Mercedes S. Foster (2009–2011), Thomas E. Martin (2007–2009), John T. Rotenberry (2005–2007), Bonnie S. Bowen (2003–2005), Terry Rich (2001–2003), Glenn Walsberg (1999–2001), J. Michael Scott (1997–1999), Sheila Mahoney (1995–1997), Lloyd Kiff (1993–1995), Martin L. Morton (1991–1993), Jared Verner (1989–1991), Russell P. Balda (1987–1989), C. John Ralph (1985–1987), Dennis Power (1978–1981), Stephen M. Russell (1976–1978)

Any person interested in avian biology may become a member of the American Ornithological Society. Regular membership costs \$85 per year; student memberships are \$30. Membership is \$30 for persons in all countries except the United States, Canada, Israel, Japan, Australia, New Zealand, and the following Western European countries: Iceland, Norway, Sweden, Finland, Denmark, Germany, The Netherlands, Belgium, Luxembourg, France, the United Kingdom, Ireland, Switzerland, Austria, Italy, Spain, and Portugal. All members receive access to the online version of The Auk: Ornithological Advances and The Condor: Ornithological Applications and the bimonthly Ornithological Newsletter. Quarterly print versions of both journals can be ordered by members for \$40/year. A life membership is \$2880, paid in one sum or four annual installments of \$720. Individuals may join, renew memberships, and report changes of address through the Ornithological Societies of North America (OSNA): the OSNA Member Portal; osnamembers@gmail.com; 312/883-4670

AOS is grateful to receive contributions of any amount. Donations help support AOS's programs to advance ornithology as a profession and promote ornithologists at every career stage. Contributions may be sent to: AOS, 1400 S. Lake Shore Drive, Chicago, IL, 60605; or, can be made online through AOS's website, Americanornithology.org. Gifts to the AOS are tax-deductible to the full extent permitted by law.

The Ornithological Societies of North America (OSNA) handles institutional subscriptions: 312-665-7936, business@osnabirds.org. See www.osnabirds.org for single-issue and subscription orders, claims information, and mail dates. Domestic claims for nonreceipt of issues should be made within 90 days of the mail date; overseas claims within 180 days.

ELECTIVE COUNCILORS

LIVING PAST PRESIDENTS

MEMBERSHIP

SUPPORT THE AOS

INSTITUTIONAL SUBSCRIPTIONS